Volume 50, Number 2

JOURNAL OF NURSING SCHOLARSHIP

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Journal of Nursing Scholarship

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JOURNAL OF NURSING SCHOLARSHIP, (ISSN: 1527-6546 [print]; ISSN: 1547-5069 [online]), is published bimonthly on behalf of Sigma Theta Tau International, the Honor Society of Nursing by Wiley Subscription Services, Inc., a Wiley Company, 111 River St., Hoboken, NJ 07030-5774.

MAILING: Journal is mailed to Honor Society members via Nonprofit Standard Rate; Standard Rate to all others.
POSTMASTER: Send all non profit Honor Society address changes to Sigma Theta Tau Int'l, 550 West North St, Indianapolis, IN 46202. Send all other address changes to *JOURNAL OF NURSING SCHOLARSHIP*, Journal Customer Services, John Wiley & Sons, Inc., C/O The Sheridan Press, PO Box 465, Hanover, PA 17331.

Information for Subscribers: *Journal of Nursing Scholarship* is published in six issues per year. Institutional subscription prices for 2017 are:

Print & Online: US$432 (The Americas), US$613 (Rest of World), €402 (Europe), £314 (UK). Prices are exclusive of tax. Asia-Pacific GST, Canadian GST/HST and European VAT will be applied at the appropriate rates. For more information on current tax rates, please go to wileyonlinelibrary.com/tax-vat. The price includes online access to the current and all online back files to January 1st 2014, where available. For other pricing options, including access information and terms and conditions, please visit wileyonlinelibrary.com/access.

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Publisher
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Abstracting and Indexing Services: The Journal is indexed by the Science and Social Science Citation Indexes, the British Nursing Index, and SCOPUS. For a complete listing of all A&I services, please visit the journal homepage at www.wileyonlinelibrary.com/journal/jnu.

View this journal online at www.wileyonlinelibrary.com/journal/jnu.

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Journal of Nursing Scholarship accepts articles for Open Access publication. Please visit http://olabout.wiley.com/WileyCDA/Section/id-406241.html for further information about OnlineOpen.

Printed in the USA by The Sheridan Group.

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JOURNAL OF NURSING SCHOLARSHIP

EDITORIAL

How Can We Disseminate Nursing Science More Effectively?

I recently had the pleasure of conversing with researchers from a number of different disciplines about how we can most expeditiously disseminate science. It became immediately clear to me that although in nursing we do disseminate much needed research in a timely fashion, there are things each of us (researcher, reviewer, editor) can do to facilitate the effective dissemination of quality nursing science.

While researchers strive to close the gap between conducting research and disseminating research findings for use in practice, there are several things that we must remember. It is imperative that we build our work on what is already known. All researchers need to ensure that they find and use systematic reviews on topics pertaining to their research. We also need to continue to perform systematic reviews so that the foundation of our science is clearly articulated. Evidence-based guidelines, integrative reviews, and other sources of compiled knowledge must also be used to ensure that in our studies we are extending the body of knowledge rather than unintentionally replicating known information. We need to search the known knowledge from around the world and place our proposed studies in the context of what is known globally, not just in our own country. If we do all of these things, the impetus to disseminate and use nursing science globally will be accelerated.

We are fortunate in health care to have well-articulated guidelines of how information can best be presented to facilitate the use of quality research. If you are conducting a randomized trial, it is important that you use the CONSORT (Consolidated Standards of Reporting Trials) guidelines (please see article on the quality of randomized trials in this issue). Likewise, when you are conducting that systematic review, it is important that you follow the PRISMA (Preferred Reporting Items for Systematic Reviews) guidelines. If you are reporting on how to improve health care, the SQUIRE guidelines provide information to guide system level work that improves the quality, safety, and value of health care. In our next issue, I hope you will read the article on "the Use of Author Guidelines," which discusses other guidelines like the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines or the Equator (Enhancing the Quality of Transparency of Health Research) guidelines. Each of these guidelines, and indeed author guidelines for specific journals, help us as researchers disseminate high-quality research findings.

Conducting and then writing about your excellent research is only the first step. Researchers also need to help others find their science. Using techniques of search engine optimization (e.g., same words in title, abstract, and key words) helps others locate your work from databases. Ensuring that you publish in high-quality journals that are indexed in major databases also helps others to find and use your work. Finally, using social media is a new important tool to help those who will most benefit from your research find it.

There are other members of the publishing team that help ensure that excellent research is efficiently disseminated. Peer reviewers have the obligation of providing a thoughtful fair critique that will give an author substantive information that they can use to improve their science. Peer review takes time, and we, like many other journals, are finding that it is increasingly difficult to find three reviewers who are willing to provide peer review. Let us know what we can do to make your job easier and to help you feel rewarded and appreciated. We do appreciate the excellent job our peer reviewers do. Our science would be sadly diminished without excellent peer review (and if you aren't already a peer reviewer and wish to be, please email me at jns@stti.org or look for reviewer applications at https://www.sigmanursing.org/learn-grow/publications).

Peer reviewers in the future will face increasing challenges in ensuring they can provide the necessary time to conduct fair, systematic, and thorough reviews of research. Without peer review we cannot disseminate the best research, so I hope you will honestly evaluate how much time you do have for peer review and use that time to provide high-quality reviews. I hope those of you who are mentors to emerging researchers will emphasize the importance to the discipline of researchers giving back by providing quality peer review.

As an editor, knowing how much we owe to peer reviewers, I, like many of my editor colleagues, am now spending more time on desk reviews and rejecting manuscripts that are not a good fit with the journal, have major methodologic flaws, or are not on topics that I have found are of interest to our readers. Rather than sending these manuscripts out for peer review, I am rejecting them. I believe in peer review and so I hesitate to reject a

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manuscript out of hand rather than send it out for review. However, I know that I need to value the time of my peer reviewers and not ask them to review manuscripts that are not at our usual level of quality or interest.

I know that some of you are disquieted when your manuscript is rejected prior to peer review. However, the peer review process is core to the dissemination of quality research, and the time peer reviewers have to spend on the work of others is not infinite. Hence, all manuscripts cannot undergo peer review. Additionally, if we have a manuscript that is of adequate quality to go out for peer review but we have multiple (more than 10) reviewers who are not interested in reviewing it, I reread it to determine if it is fair to continue to proceed in the peer review process. Another reason that the peer review process may be shortened is when a manuscript that was originally a "revise and resubmit" is not positively re-evaluated by peer reviewers. Rather than asking for another round of peer review, if reviewers feel that a revision is unresponsive to their concerns or they find new issues that were not originally noted in the first review, a manuscript is rejected rather than going out again for peer review.

Our peer reviewers take their job very seriously, and we are fortunate to have very dedicated reviewers. As researchers, I know that you take their expertise seriously, and although you might not always agree with what each reviewer says, I ask that you carefully consider the peer reviewers' viewpoint. Ultimately, healthy debate does help to improve the quality of our science and facilitates dissemination and use of our science in practice.

I know in this fast-paced world where so much information abounds it is increasingly important that we continue to work together—researchers, reviewers, and editors—to ensure that we are disseminating the highest quality work that is the most important to improve health care. We have many systems in place to ensure that we are efficiently disseminating nursing research, and I look forward to working with you so that we continue to disseminate research that improves the health of the world's people.

Susan Gennaro
Editor

JOURNAL OF NURSING SCHOLARSHIP

A Sincere Thank You to Our Reviewers

Dissemination of quality research relies on peer review. Below please find a list of those generous scholars who volunteered time in 2017 as peer reviewers for the *Journal of Nursing Scholarship*. All of us at *JNS* are deeply grateful for the dedication and commitment of these generous and excellent scholars.

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CLINICAL SCHOLARSHIP

Integrative Review of the Intersection of Green Space and Neighborhood Violence

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Accepted September 15, 2017

doi: 10.1111/jnu.12365

Abstract

Purpose: To systematically analyze evidence about the impact of green space on the perception and actual safety of residents of urban neighborhoods.
Design and Organizing Construct: Systematic review of green space and violence based on Broome review criteria.
Methods: One landmark study prompted the initial hand search and identification of search terms. Twenty-three quantitative, five qualitative, and two mixed-methods studies were found in the urban planning, public health, medical, and psychological literature that met the following criteria: analyzed green space and violence as factors in the perception of safety as an outcome measure, including action taken by being outside for recreation, exercise, or self-report in the survey.
Findings: Findings were inconsistent regarding the direct relationship between perception of safety and green space when using recreation and exercise as a proxy for perception of safety. Findings regarding perception of safety in surveys were limited but indicated a positive correlation with green space. There is sufficient evidence to conclude that the perception of safety is supported by quality, accessibility, and aesthetic dimensions of neighborhood green space, and the perception of safety is often unrelated to actual crime rates.
Conclusions: The science for understanding mechanisms between green space and violence as part of environmental health has been insufficiently developed and requires further study. Environmental health, including green space, is central to health promotion, and understanding is key to preventing the epidemic of violence.
Clinical Relevance: This article provides a summary of research related to green space, violence in communities, perception of safety, and violent crime in those communities. It identifies gaps in our knowledge where future research is needed. Nurses have the opportunity to lead the development, implementation, and evaluation of evidence-based interventions and policies addressing the inequality of quality and quantity of green space in the built and natural environment and related co-benefits.

Violence is a leading cause of death worldwide; an estimated 440,000 lives were lost due to violence in 2013 (World Health Organization [WHO], 2016). In 2013, among those 15 to 34 years of age, homicide from assault was the third leading cause of death (11.5%) in the United States (Centers for Disease Control and Prevention [CDC], 2016). In Baltimore, Maryland, those who were 15 to 34 years of age and Black or African American accounted for all 148 homicides in 2013 (CDC, 2016). In the same group, homicide accounted for 51.5% of mortality for males and 28% for females (CDC, 2016). For those who survive the assault, life-long health impacts can include disabling injury, chronic pain, other chronic health conditions, depression, and post-traumatic stress disorder (Campbell, 2002; McLaughlin et al., 2016). The health impact of morbidity and mortality from violence in communities and around the world has led to prevention becoming a priority of the WHO, the CDC, and city governments (CDC, 2009; City of Baltimore, 2014; WHO, 2015). Abnormally high temperatures are now a global phenomenon and have been associated with increased violence (Mares, 2013). Abnormally high-temperature days have the greatest impact on those who are socially disadvantaged and who experience disadvantage by environmental health inequities, especially African American women (Mares, 2013). Intersecting challenges from changes in the climate, social disadvantage, environmental health inequity, and community violence demand that nurses and other healthcare providers understand the mechanisms to facilitate primary, secondary, and tertiary prevention strategies and responses. Interdisciplinary research is needed to promote societal resilience (Szanton & Gill, 2010) to the intersecting challenges of environmental health and violence through evidence-based environmental, public, and community health interventions.

In their landmark study, Kuo and Sullivan (2001) compared urban-dwelling residents with the highest percentile of green space to those with the lowest percentile of green space and found that the latter had lower crime rates, lower reported violence in the home, and higher community cohesion. Nevertheless, few studies have supported these findings, and there is little understanding of the mechanisms at work. Kuo and Sullivan posited that potential factors mitigating violence in the community were the existing plants, including trees, flowers, grasses, and bushes. The science thus far has not established if mitigation of violence and subsequent health improvements occurred due to increased presence of community members in common green space areas, more opportunities for social interaction and social support with neighbors looking out for each other, increased opportunities for exercise in the neighborhood, stress reduction effects of aesthetic improvement, or increased public display of care for homes. Is decreased aggression directly related to the presence of natural habitats in neighborhoods or is decreased violence due to some synergistic effect of all or some of these? To better understand the effects of green space within neighborhoods, including the response of vulnerable populations to the presence or absence of green space, this systematic integrative literature review (Broome, 2000) sought to answer the following question: "Within urban neighborhoods, what is the impact of green space and violence on residents' safety and well-being?"

Methods

The natural environment including green space, is an emerging area of research; therefore, the investigation began with an initial hand search of references citing the 2001 study by Kuo and Sullivan, and led to the following key words: environmental restoration and remediation and urban renewal as medical subject heading (MeSH) terms, and urban renewal, environmental psychology, tree, trees, green spaces, and park or parks in the title or abstract. The search strategy included nature as a main heading, and walking trail or walking trails along with crime as MeSH terms, including crime or violence in the title or abstract. The key words were used for an initial query in PubMed. Utilizing similar search terms in PsycINFO, Embase, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) added citations to those found in the hand search, initially capturing 1,607 articles (**Figure 1**).

After limiting the search to articles that were published in the past 10 years, were in English, involved human subjects, and were peer reviewed and full text, the resulting collection included 498 articles. Removal of 232 duplicates left 266 articles to be reviewed by title and abstract for the first round of exclusion based on answering the research question. Inclusion criteria were studies that analyzed green space and violence as factors in the perception of safety. Studies that operationalized the perception of safety by self-report in the survey as well as those that used the proxy of action taken by being outside for recreation or exercise were included. Thirty-one articles were read completely, of which six quantitative articles were excluded due to having no measure of green space included as a variable. This resulted in a total of 29 studies for review (see **Figure 1**). Many of the articles were interdisciplinary, for example, medicine and urban planning (Adams et al., 2011) and medicine and public health (Sugiyama et al., 2015). None of the included articles were published in nursing journals. The majority of researchers were from public health, urban planning, and exercise physiology backgrounds. Study sites included one clinic (Roos, Myezwa, & van Aswegen, 2015), one at the neighborhood level (Adams et al., 2011), and one at the provincial level (Côté-Lussier, Barnett, Kestens, Tu, & Séguin, 2015), with most in urban areas ($n = 25$). One study looked across suburban, semi-suburban, and urban areas (Loptson, Muhajarine, Ridalls, & Smart Cities, Healthy Kids Research Team, 2012), although the majority of sites in that study were in urban areas ($n = 17$). Two

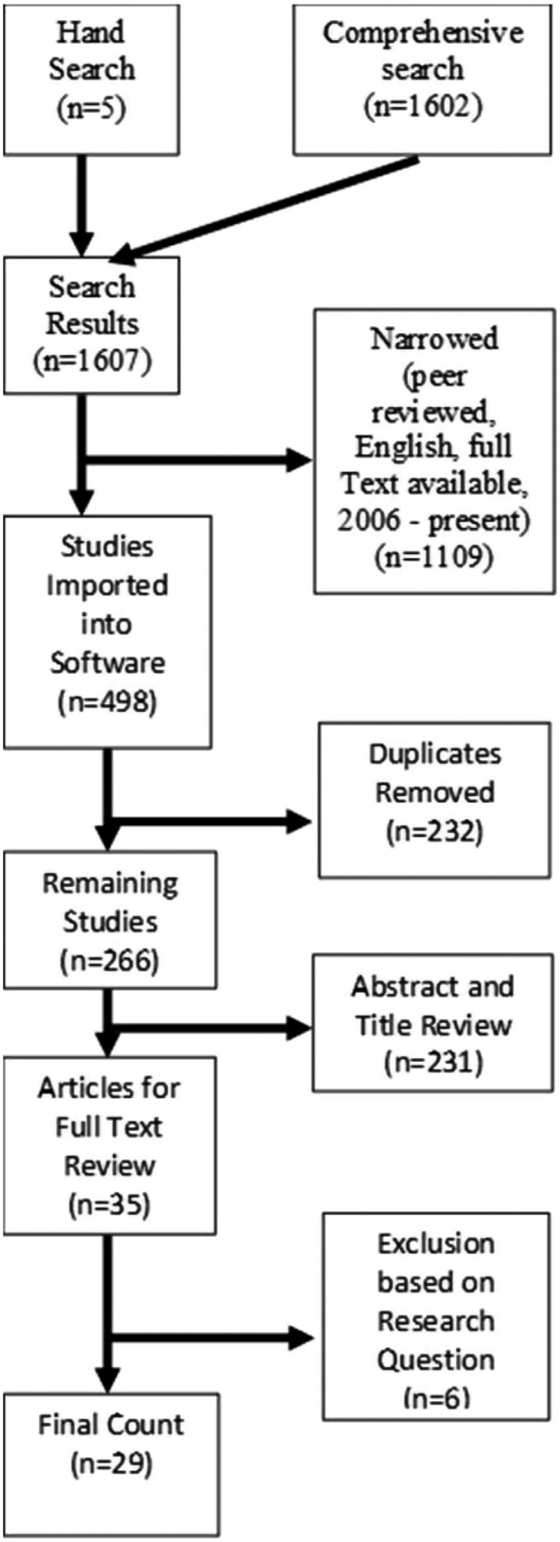

Figure 1. Details of literature review.

studies were national level studies (Jongeneel-Grimen, Droomers, van Oers, Stronks, & Kunst, 2014; Lachowycz & Jones, 2014). The studies as a whole represented eight countries, primarily Australia, Canada, the United Kingdom, and the United States, but also Japan and South Africa. Study populations ranged in age from 5 years (Lovasi et al., 2013) to 85 years (Sugiyama et al., 2015), with the majority composed of middle-aged adults; five studies included children.

Results

The process of data extraction for this review drew upon integrative and meta-synthesis methods to facilitate a deliberate and consistent approach to creating a whole picture from the breadth of qualitative and quantitative literature. First, a major concept was identified through a concept analysis of ecopsychological safety, the perception of safety, in mind and behavior, from harm or danger of humans in their environment (Mancus, n.d.). This concept analysis, as well as existing literature, led to the formation of the question. An iterative process, going back and forth from the literature to the question, continued with a review of Garvin, Cannuscio, and Branas' (2013) randomized, quasi-experimental study ($N = 21$ subjects). Their results suggested that the presence of green space decreased the net incidence of crime (-4.0 difference-in-difference), and significantly increased the perception of safety ($p < .01$). One observational study (Côté-Lussier et al., 2015; $N = 1{,}285$ subjects) with a convenience sample of children (mean age = 13.14 years, 5.9% female) revealed increased green space to be associated with decreased perception of neighborhood disorder ($\beta = -0.18$ [SE] $= 0.03$], $p \leq .001$). These findings, while potentially beneficial to those responsible for public health and safety policy, become less straightforward when others are considered. For example, one matched case control study with an experimental randomization of sites suggested nonsignificant decreases in homicides, assaults, and robberies with guns within a half mile of 52 green stormwater infrastructure sites (Kondo, Low, Henning, & Branas, 2015; $\beta = -0.04$ [$SE = 0.05$], $\beta = -0.03$ [$SE = 0.04$], $\beta = -0.03$ [$SE = 0.02$], respectively). Firm conclusions from these studies have eluded policymakers, suggesting the need for more accurate measurement of green space and its impact on violence.

The Geographic Information System (GIS; **Table 1**) has been used to quantify proximity to parks and green space (Cerin et al., 2016; Cutts, Darby, Boone, & Brewis, 2009; Kondo et al., 2015; Ou et al., 2016; Ribeiro, Pires, Carvalho, & Pina, 2015; Ries et al., 2009), percentage of green space (Roman & Chalfin, 2008), percentage of tree

Table 1. Studies measuring green-space with geographic information systems (GIS)

Author, year, N	Sampling/ Study Design	Setting/ Country	Sample Characteristics (Individual/Group)	GIS mapping/ greenspace
Cerin et al., 2016, n = 73,	Stratified/ Observational	Urban, United States	Parents; Age $\bar{x}$= 32.6, US born 41%, Children; age $\bar{x}$= 4.5, female 42%, Obese 31%	Activity in parks
Côté-Lussier et al., 2015 n = 1,285	Convenience/ Observational	Provincial Level/ Canada	Children; age $\bar{x}$= 13.14, Female 53.9%, Chronic poverty 13.26%	Greenery (NDVI)
Cutts et al., 2009, n = 1046	Convenience/ Observational	Urban/ United States	High school or lower education; 48%, Poverty 16%,	Proximity to parks
Deweese et al., 2013, n = 765	Randomised/ observational	Low income cities/ United States	Children; age 6–11 49%, female 50%, non-Hispanic black 52%, Hispanic 39%, Household income less than 200% FPL 82%,	Distance to school/ Pleasantness (trees)
Garvin et al., 2013, n = 29	Randomised/ pre-post-test (safety) & GIS (Crime)	Urban/ United States	Intervention group (Male = 50%, Age $\bar{x}$= 38.7, Race Black = 100%) Control (Male = 81.8%, age $\bar{x}$= 51.7, Race Black 100%)	Proximity to green-space
Kondo et al., 2015, n = 52 sites	Randomised/ matched case (site) control	Urban/ United States	52 Completed construction sites/ 186 control eligible sites	Proximity to greenspace
Kuo & Sullivan, 2001, n = 98	Randomised (Natural Experiment), Post-test only	Urban/ United States	Demographics of occupants of 98 Buildings; Female 65%, African American 97%, unemployed 93%	Public safety Record/ tree-canopy
Lachowycz et al., 2014, n = 165,424	Randomized/ Observational	Nation/ United Kingdom	Female 605, working age 77.3%, Ethnically homogenous 2% Asian, 2% Black African, .8% mixed, .4% Chinese other, 35.3 from lowest socioeconomic class	Percentage of green-space
Lovasi et al., 2011, n = 428	Convenience/ Observational	Urban/ United States	53% female, Age $\bar{x}$= 4, 11% non- Hispanic Black, 36% Mexican, 23% Dominican, 8% Puerto Rican, 16% Mixed or other Hispanic nationalities, 6% other	Mapping built environment
Nehme et al., 2013, n = 231	Convenience/ Observational	Planned urban community/ United States	new residents in a planned neighborhood; Female 4.8, ages 18–39 54.3%, non-white 11%, no college 6%	Tree canopy in network buffer (1.5km)
Ou et al., 2016, n = 354	Convenience/ Observational	Small City/ United States	Not Latino 39%, Latino 61%, age 43% 18–44,	Proximity to parks
Ribeiro et al., 2015, n = 523	Convenience/ Observational	Urban/ Portugal	Female 61% age $\bar{x}$= 73.7, Male $\bar{x}$= 72.7	Proximity to green-space
Ries et al., 2009, n = 329	Convenience/ Observational	Urban/ United States	Female 59%, African American 69%, Mother a college graduate or higher 40%	Proximity to parks
Roman et al., 2008, n = 803,	Stratified/ Observational	Urban/ United States	59% Female, 68% Black, age $\bar{x}$= 44.85	Percentage of green-space
Tachikawa et al., 2007, n = 63 n = 285	Convenience/ Interview & GIS (attractiveness) MM	Urban/ Japan	Female n = 60, age $\bar{x}$= 43, full time homemakers 26%, use of bicycle or walking as transport 33.8%, lived whole life in residential area n = 51	Areas of attractiveness

canopy (Kuo & Sullivan, 2001; Nehme, Oluyomi, Calise, & Kohl, 2016), generalized land use data (Lachowycz & Jones, 2014), areas of attractiveness (Tachikawa & Hashimoto, 2007), social and built environments (Deweese, Yedidia, Tulloch, & Ohri-Vachaspati, 2013; Garvin et al., 2013; Lovasi et al., 2013), and the Normalized Difference Vegetation Index (NDVI; Côté-Lussier et al., 2015). The Global Positioning System (GPS), a tool in GIS, has been used in combination with an accelerometer and found children's moderate to vigorous physical activity in parks to be more than four times higher ($p <$ .001) in parks than in their homes. However, parents' perceptions of neighborhood safety, including signs of physical disorder, influenced their decisions regarding letting their children play there (Cerin et al., 2016). The use of GPS and other satellite systems, including Landsat imaging, have increased the capacity to measure green space. However, there still exists a gap in a consistent unit of measure.

Green space has been positively associated with "walkability" of neighborhoods and with physical activity in large homogenous studies limited to female, White,

Table 2. Studies using survey or instruments to study green-space

Author, year, N	sampling/study Design	Setting/ Country	Sample characteristics (individual/group)	Instrument/ measure of green-space
Adams et al., 2011, n = 2199	Systematic/ Observational	32 neighborhoods stratified on built environment factors/ United States	Female 45.3, age $\bar{x} = 47.29$, At least College degree 63.2%, non-white 18%	Neighborhood Environment Walkability Scale (**NEWS**)/ Aesthetics (presence of trees)
Esteban-Cornejo et al., 2016, n = 928	Convenience/ Observational	Urban/ United States	Female 49.5%, age $\bar{x} = 14.10$, Racial minority 34%, Mother with College education or higher 64%	**NEWS-Y**/ Physical activity in parks
Kurka et al., 2015, n = 757	Convenience/ Observational	Urban/ United States	Female 81.4%, age $\bar{x} = 41.0$, non-white 7.3%,	**NEWS**/ Aesthetics (presence of trees)
Sugiyama et al., 2015, n = 2684	Cluster/ Observational	Urban, suburban and rural area of seven states and territories/ Australia	Female 56%, age $\bar{x} = 54.4$, tertiary education 44%, Unemployed 20%, Income <AUS $41,599 (37%)	**NEWS**/ Aesthetics (presence of trees)
Bungum et al., 2012, n = 263	Randomized/ Observational	Urban /United States	Asian and Asian-Pacific Islander Americans, age $\bar{x} = 49.11$, Female 65%, Chinese 20.5%, Japanese 20.5%, Filipino 14.8%, Korean 5.7%, Other AAPIA 39.5%	Environmental Physical Activity Supports/ Nearness to parks
Jongeneel-Grimen et al., 2014, n = 31,783	Convenience/ Observational Study	National Data/ Netherlands	Respondents in 2009, Female 55.61%, age 18–59 = 71.68%, unemployed 32.92%, low to med low income 51.54%, urban 92.14%	Social cohesion, absence of physical and social disorder/Satisfaction with green-space
Kalish et al., 2010, n = 254	Convenience/ Observational	Urban/ United States	Female 89%, Hispanic 76%, 21–35 76%, children 5–7	NA/Quality of parks
Leslie et al., 2010, n = 502	Cluster/ Observational	Urban/ United States	Female 74%, Age $\bar{x} = 47.7$, tertiary education 40%, employed 63%	Features of the Neighborhood Environment Scale/ Scenery & proximity to parks
Shinew et al., 2013, n = 386	Convenience/ Observational & Interviews MM	Urban/ United States	Female 53%, age (12-19, $\bar{x} = 14.53$), Born in USA 80%	NA/Fear of Crime, Victimization (Experienced, Witnesses) Perceived Community incivilities, acculturation.

[a]*Note*. MM = mixed methods; NA = not applicable.

middle-aged, higher income, and educated populations (Adams et al., 2011; Kurka et al.,2015, Sugiyama et al., 2015). In two studies, parents' perception of safety and allowing the physical activity of their children were significantly and inversely related to signs of physical and social disorder (Cerin et al., 2016; $N = 73$, $\beta = 2.17$, $SD = 0.86$) and reported violence (Kalish, Banco, Burke, & Lapidus, 2010; $N = 254$, $p < .0001$), but these findings were not replicated. Among Asian and Asian-Pacific Islander Americans, environmental physical activity supports, including greenspace, were the highest predictor of activity (Bungum, Landers, Azzarelli, & Moonie, 2012; odds ratio [OR] = 1.52, 95% confidence interval [CI] = 1.06–2.17, $N = 263$ subjects). Thus far, the use of instruments and measurement of green space have been inconsistent in these studies, and there has been only a peripheral focus on green space (**Table 2**; Bungum et al., 2012; Esteban-Cornejo et al., 2016; Jongeneel-Grimen et al., 2014; Kalish et al., 2010; Leslie, Cerin, & Kremer, 2010; Shinew, Stodolska, Roman, & Yahner, 2013).

A review of mixed-methods studies and examples of calculated green space, as well as surveys and interviews with Latino adolescents 12 to 19 years of age (53% female), uncovered themes of neighborhood disorder and safety (Shinew et al., 2013) and nature and attractiveness (Tachikawa & Hashimoto, 2007) in qualitative analyses. Similar findings were described in qualitative studies (**Table 3**) in Canada (Loptson et al., 2012), the United Kingdom (Seaman, Jones, & Ellaway, 2010), South Africa (Roos et al., 2015), and the United States (Rader et al., 2015; Stodolska, Shinew, Acevedo, & Izenstark, 2011). Also found were themes of green space promoting a sense of safety and pleasantness in neighborhoods (Loptson et al., 2012; Stodolska et al., 2011; Tachikawa & Hashimoto, 2007), perceptions of people as friends in green spaces (Loptson et al., 2012; Roos et al., 2015), perceptions of the quality, accessibility, and

Table 3. Summary of qualitative themes

First author, year, N, Population, Country, Setting	Perceptions of safety/ Facilitators			Perceptions of fear/ Barriers		
	People as "Friends"	Quality, Accessible and Aesthetic	Social capital and cohesion	People as "Others"	Crime	Mismanaged or Inaccessible
Loptson et al., 2012, n = 24, Parents of children 10–14 YO, Canada, Urban	X	X	X			
Rader et al., 2015, n = 44, parents of school aged children, United States, Mississippi Delta				X	X	X
Seaman et al., 2015, n = 24, adolescents and adults, United Kingdom, Urban	X	X	X	X	X	
Roos et al., 2015, n = 42, PLWHA, South Africa, Clinic	X	X	X		X	X
Shinew et al., 2013. n = 25, Latino Adolescents, United States, Urban				X	X	X
Stodolska et al., (2011), n = 26, Mexican American Adults, United States, Urban		X	X	X	X	X
Tachikawa & Hashimoto, 2007, n = 63, Adults, Japan, Urban	X	X			X	

[a]*Note*. YO = Year old; PLWHA = People living with HIV and AIDS.

positive aesthetics of green space, and perceptions of social capital and neighborhood cohesion related to green space (Loptson et al., 2012; Roos et al., 2015; Seaman et al., 2010). In contrast, when people perceived green space users to be "others" (Rader et al., 2015; Shinew et al., 2013; Stodolska et al., 2011), perception of crime was higher (Rader et al., 2015; Seaman et al., 2010; Tachikawa & Hashimoto, 2007) and perceived quality of green space was lower (Roos et al., 2015; Shinew et al., 2013; Stodolska et al., 2011). In these cases, there is a report of increased fear, and decreased outdoor activity, across age groups, ethnicities, and nationalities (Rader et al., 2015; Roos et al., 2015; Seaman et al., 2010; Shinew et al., 2013; Stodolska et al., 2011; Tachikawa & Hashimoto, 2007). Overall there is an increase in the perception of safety with regard to neighborhood green space, with other factors of the social and built environment contextualizing residents' experiences.

Perception of safety and actual safety based on crime statistics are well supported in several studies that evaluated the effect of green space on urban violence, although perception and actual violence are not always correlated (Cerin et al., 2016; Kurka et al., 2015). Kalish et al. (2010) in an observational study found that approximately 60% of parents ($n = 254$, 89% female, 76% being 21–35 years of age) were concerned about the safety of children (5- to 7-year-olds) playing in parks with poor conditions. Another observational study (Cerin et al., 2016) reported that low crime and, to a greater degree, perception of neighborhood safety from crime resulted in increased moderate to vigorous physical activity (MVPA; $N = 73$ subjects) among children (mean age 4.5 years). An additional observational study ($N = 757$) reported that children whose parents perceived the neighborhood to be unsafe experienced decreased MVPA by 13 min per week (Kurka et al., 2015). The perception of the built environment, including green space, frames the perception of neighborhood safety and impacts health-related behavior.

The quality of and proximity to green space are not equal in neighborhoods (Cutts et al., 2009; Ou et al., 2016; Ries et al., 2009), nor is there equity in the actual amount of green space available in neighborhoods (Lachowycz & Jones, 2014; Nehme et al., 2016; Roman & Chalfin, 2008). Quality, proximity, and amount of green space within the neighborhood are significantly associated with the mechanism of green space as a facilitator of safety (Kuo & Sullivan, 2001; Rader et al., 2015; Stodolska et al., 2011). The nearness of parks and the walkability of parks has been found to be associated with physical activity, a proxy for the perception of safety (Cutts et al., 2009; $\beta = 1.63$ [$SE = 0.16$], $p < .000$, $N = 1{,}046$). An observational study of adolescents in a mid-Atlantic city (Ries et al., 2009; $N = 329$, 69% African American, 59% female, 40% of mothers with college or higher education) found park quality (adjusted $OR = 2.29$, $SE = 0.63$) and availability (adjusted $OR = 2.97$, $SE = 1.23$) to be predictors of physical activity and park use.

Discussion

Quantitative findings of quality (Kalish et al., 2010) and pleasantness (Deweese et al., 2013), similar to the qualitative themes of quality, accessibility, and aesthetics (Loptson et al., 2012; Roos et al., 2015; Seaman et al., 2010), lend support to the hypothesis that greenness has a positive impact on safety. While data collection has been more superficial in the measure of green space as compared to other factors of perceived safety, such as neighborhood disorder (Côté-Lussier et al., 2015; Garvin et al., 2013; Shinew et al., 2013) and community cohesion (Côté-Lussier et al., 2015), there is a sufficient foundation of knowledge to support the need for more research. The science of green space and its relationship to violence needs further study in understanding how proximity, quality, amount, and accessibility to green space are moderators of violence. Amount of green space for these studies requires more accurate measures like the NDVI. The use of the NDVI is growing in global and public health. This validated ground level survey of vegetation uses satellite imagery and is calculated as near-infrared radiation minus visible radiation divided by near-infrared radiation plus visible radiation (Rhew, Stoep, Kearney, Smith, & Dunbar, 2011). Preliminary evidence suggesting that quality green space promotes safety requires further exploration. Research needs to investigate outstanding questions about the proximity, quality, and quantity of green space.

Limitations

The findings in this systematic literature review have several limitations. One author was responsible for screening the articles and abstracts. In addition, the same author was responsible for the representative reduction of the data. Due to the language limitations of the author, only English-language studies were included, potentially missing other significant contributions. The inconsistent measure of green space and perception of safety in this young science limits comparison. Furthermore, the gap of knowledge in nursing literature inhibits leadership and action.

Conclusions

The science of green space and violence is in its infancy. Future studies need to explore psychosocial factors such as mental fatigue, immune function, and stress response related to lack of green space, as well as how individuals, families, communities, and different populations experience the intersection of green space and violence. Evidence-based interventions guided by social and environmental justice that increase the quantity and quality of green space in neighborhoods has the potential to prevent violence. It has the co-benefits of mitigating urban heat island effect, air pollution, and noise pollution (Livesley, McPherson, & Calfapietra, 2016), as well as the associated health outcomes of decreased mortality from cancer, respiratory illness, and kidney disease (James, Hart, Banay, & Laden, 2016). Nurses need to be knowledgeable and engaged in advocacy of policies that promote healthy built and natural environments that mitigate violence and associated morbidity and mortality, as it is where the public works, plays, and sleeps that is the foundation of individual, family, and community health (International Council of Nurses, 2011). The collaboration of nurses and other healthcare providers through transdisciplinary action to promote health from the local to the planetary level is the opportunity of our lifetime.

Clinical Resources

- Alliance of Nurses for Health Environments. http://envirn.org/
- Centers for Disease Control and Prevention. Built Environment and Health Initiative. http://www.cdc.gov/healthyplaces/
- Food and Agriculture Organization of the United Nations. Urban forestry community. http://www.fao.org/forestry/urbanforestry/en/
- U.K. Forest Research. http://www.forestry.gov.uk/fr/INFD-9Q4FC8

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Comfort-Supporting Nursing Activities for End-of-Life Patients in an Institutionalized Environment

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Key words
Quality of care, terminal care, health of specific populations, symptom management, quantitative methodology, geriatrics

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Accepted June 27, 2017

doi: 10.1111/jnu.12341

Abstract

Purpose: Comfort promotion plays a significant role in end-of-life patient care. The objective of this study was to determine the utilization rate of comfort supporting nursing activities in end-of-life patients in an institutionalized environment in the Czech Republic in relation to the age of the registered nurses (RNs), length of work experience, education level, and type of workplace.
Design: A cross-sectional, descriptive study was designed. A questionnaire with Likert scales included 31 activities of dying care and spiritual support interventions. The sample comprised 907 RNs working in 49 institutions in nine regions of the Czech Republic. The Kruskal-Wallis test, Mann-Whitney *U* post-hoc test with Bonferroni correction of significance, Spearman's correlation analysis, and logical regression model were used for statistical evaluation.
Findings: The least frequently implemented activity by RNs was "Show the patient's willingness to discuss death" and the most frequent activity was "Threat to the patient's dignity and respect." The highest utilization rate of nursing activities was reported in the physical dimension, while the lowest utilization rate of nursing activities was in the social dimension set. Significant predictors for the high utilization rate of physical dimension set activities were hospice care departments, long-term care facilities (LTCFs), and the age of RNs. Hospice departments were also a predictor of high utilization rate of activities in the psychological, spiritual, and social dimension set activities.
Conclusions: With the exception of hospice departments, RNs used activities encouraging psychological, spiritual, and social comfort for end-of-life patients less frequently than the physical dimension.
Clinical Relevance: RNs in hospitals and LTCFs focus insufficiently on the spiritual and psychosocial comfort of end-of-life patients. This study is of particular significance to educators who prepare the next generation of nurses.

Institutionalization of death and end-of-life care is common in many non-European and European countries, including the Czech Republic (Pivodic et al., 2016). Three fourths of the Czech population die in hospitals and in long-term care facilities (LTCFs). Up to 17% of all deaths occur in intensive care units and 3% in inpatient hospices (Loucka, Payne, Brearley, Slama, & Spinkova, 2014; Institute of Health Information and Statistics of the Czech Republic [IHISCR], 2015).

Patients in institutionalized environments cope with a number of needs influencing their comfort at the end of their lives. Comfort-centered care is therefore a significant part of institutionalized end-of-life care. It can be defined as a summary of holistic nursing care that fulfils human needs in physical, psychological, spiritual, and social dimensions (Kolcaba, Tilton, & Drouin, 2006). Comfort needs are assessed in four contexts of patients' experience. Physical comfort needs pertain to bodily

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sensations and the physiologic problems associated with the medical diagnosis (Kolcaba, 1995). They are influenced by the severity of the symptoms of diseases causing physical distress (Falk et al., 2016; Singer et al., 2015), institutionalized environment (Krinsky, Murillo, & Johnson, 2014), and the level of self-sufficiency (Brown, Johnston, & Östlund, 2011). Psychological comfort needs pertain to internal awareness of self, including esteem and identity (Kolcaba, 1995). They are affected by high prevalence of emotional distress, including depression and anxiety (Lokker et al., 2016). Spiritual comfort needs pertain to meaning in one's life, and one's understood relationship with a higher being (Kolcaba et al., 2006). These are affected by religious and cultural bonds of the patient (Rohde, Kersten, Vistad, & Mesel, 2016), existential anxiety (Kisvetrova & Kralova, 2014), loss of dignity, hopelessness, and the inability to find the meaning of life (Chochinov et al., 2016; Hemati et al., 2016). Social comfort needs pertain to interpersonal, family, and societal relationships (Kolcaba et al., 2006). They are affected by lack of respect for privacy (Ho et al., 2013) and the level of social support and relationships with family and community (Slatyer, Pienaar, Williams, Proctor, & Hewitt, 2015).

The nurse must react to the needs of end-of-life patients in each dimension of comfort care with appropriate nursing activities. The "dying care" and "spiritual support" interventions from the International Nursing Intervention Classification (NIC) give nurses the tools to efficiently address all of the comfort care needs of end-of-life patients in institutionalized environments. Although these interventions were originally developed for the American cultural environment, they are useful in countries with different cultural traditions and various secularization rates (Bulechek, Butcher, & McCloskey Dochterman, 2008).

According to the European Association for Palliative Care, "End-of-life care may be used synonymously with palliative care or hospice care, with

> end-of-life understood as an extended period of 1 to 2 years during which the patient and family and health professionals become aware of the life-limiting nature of their illness. The term 'end-of-life care' is widely used in North America and it has been picked up by regulatory bodies in European countries, sometimes with the understanding that palliative care is associated predominantly with cancer, whereas end-of-life care would be applicable to all patients"

(Radbruch & Payne, 2009, p. 282). In accordance with this opinion, we have used the term end-of-life care in this article.

Similarly to many European and other countries, hospitals and LTCFs in the Czech Republic will be the most common place for deaths in the future (Kisvetrova, Joanovic, Vevoda, & Skoloudik, 2016). For this reason, it is necessary to evaluate whether nurses provide end-of-life patients with care involving all dimensions of comfort. Therefore, the objective of this study is to ascertain the utilization rate of comfort-supporting nursing activities in end-of-life patients in institutionalized environments within the Czech Republic. The sub-objectives were aimed at determining the relationships between the age of registered nurses (RNs), professional experience, education level, department type, and frequency of specific dimension activity set utilization.

Methods

Design and Sampling

A cross-sectional, descriptive study design was used to conduct the research. The study sample comprised RNs from nine regions of the Czech Republic. The RNs all had at least 1 year of work experience in departments that often take care of end-of-life patients in terminal phases of cancer or other chronic life-limiting disease.

Procedure

The sample size calculation was based on the methodology described by Ticháček (1997), in which the effective sample size is 1.5% of the defined population at a basic sample size of >50,000. According to preliminary calculations, a minimum of 1,500 distributed questionnaires was estimated, with an assumed 60% return rate of the distributed questionnaires. The head nurses of particular departments were contacted via telephone or meetings to confirm the study in all of the participating healthcare and social facilities. The details of the study, questionnaires, survey procedures, data collection methods, and prospective number of participants in each institution were discussed within one meeting of researchers with head nurses, who were at the same time given the questionnaires and a cover letter for the RNs. The importance of the study was explained with the purpose and the rights of research participants. The cover letters were subsequently distributed by head nurses in the corresponding wards. The completed questionnaires in sealed envelopes were returned to the appropriate head nurses, who in turn returned the sealed envelopes to the researchers. All participants were provided with an informed consent form before enrolment. The study was approved by the Ethics Committee of the Faculty of Health Sciences at Palacký University in Olomouc.

Measures

A structured questionnaire was designed by the authors and presented 31 nursing activities. These activities concerned two interventions (dying care and spiritual support) from the NIC system (Bulechek et al., 2008). The dying care intervention consists of 24 activities from both psychological and physical dimensions; we used all of the activities in our questionnaire. The spiritual support intervention includes 29 religious and nonreligious activities concerning the human spiritual dimension. Because previous research on spiritual support revealed that 22 of 29 activities occurred extremely rarely in Czech nursing practice (Kisvetrova, Klugar, & Kabelka, 2013), our questionnaire included only the seven most nonreligious activities.

The activities in the questionnaire were divided into four dimensions of comfort by an expert panel, including a physician, clinical psychologist, and clerical and research nurses. The number of activities was as follows: 11 in the physical dimension; 9 in the psychological dimension; 6 in the social dimension; and 5 in the spiritual dimension. Likert scales were used for assessment of activities, ranging from 1 (*always*) to 5 (*never*). A set of demographic data included four factors with a potential impact on providing end-of-life care, as follows: (a) RN age; (b) work experience (in years); (c) type of workplace; and (d) education level of RNs, reported as secondary school (secondary medical schools educated nurses until 2004; the majority of nurses have this type of education in the Czech Republic), high school (education between secondary medical schools and a university bachelor's degree), and university (bachelor's degree). Reliability was tested using internal consistency, which was measured using Cronbach's α coefficient. A value of >0.70 was considered acceptable (DeVon et al., 2007).

Statistics

The normality of data distribution was checked using the Shapiro-Wilk test. Data with a normal distribution (age) are reported as the mean ± standard deviation. Remaining variables are presented as the mean, standard deviation, and median. Spearman's correlation analysis was used for detection of a correlation between the frequency of activities supporting particular comfort dimensions of the patient and age and work experience of RNs. The Kruskal-Wallis test was used for testing dependency on department type, and the Mann-Whitney *U* post-hoc test with Bonferroni correction of significance was used for subsequent comparisons of particular department types in couples. The Kruskal-Wallis test was again used for correlation with education of RNs. The logistic regression model was used for determining the predictors of high utilization rate of particular comfort dimension activities. The statistical significance was defined as a $p < .05$. Statistical software (SPSS Statistics, version 22.0; SPSS, Inc., Chicago, IL, USA) was used for statistical data processing.

Results

A total of 1,500 questionnaires were distributed in 49 healthcare and social facilities in nine regions of the Czech Republic between 2013 and 2015. Nine hundred seven of 1,500 distributed questionnaires (60.46%) were completely filled out and statistically analyzed. The mean age of RNs was 37.8 ± 9.9 years, and they had 15.4 ± 10.2 years of work experience. The most common education was secondary medical school (71.5%). Complete demographic data of the RNs from particular department types are shown in **Table 1**. The internal consistency of the structured questionnaire was considered acceptable because Cronbach's α coefficient was 0.92 for the entire questionnaire, 0.89 for the physical dimension, 0.85 for the social dimension, 0.87 for the psychological dimension, and 0.76 for the spiritual dimension.

The least frequently reported activity was "Communicate willingness to discuss death" (mean value on the Likert scale = 3.29 ± 1.16), and the most frequently reported activity was "Treat patient with respect and dignity" (mean value on the Likert scale = 4.74 ± 0.71). Both of these activities are a part of the activity set supporting the spiritual comfort dimension of the end-of-life patient. The highest utilization rate occurred within the physical dimension activity set (mean value on the Likert scale = 4.23 ± 0.56), and the lowest utilization rate occurred within the social dimension activity set (mean value on the Likert scale = 3.86 ± 0.67; **Table 2**). A positive correlation between the physical dimension activity set score and the age of RNs was very poor ($r = 0.075$; $p = .025$; **Table 3**). There was a significantly higher set score in hospice facilities in all dimensions in comparison to other types of departments ($p < .0001$). A significant predictor for the high utilization rate of the physical dimension activity set were LTCFs (odds ratio [*OR*] = 1.54; 95% confidence interval [CI] = 1.04–2.27; $p = .030$), hospice care facilities (*OR* = 10.40; 95% CI = 3.17–34.10; $p = 0.0001$), and age of RNs (*OR* = 1.01; 95% CI = 1.00–1.03; $p = 0.045$). The Hospice Department was a predictor of the high utilization rate for other dimensions (**Table 4**).

Discussion

The results of our study show that the highest utilization rate was in the set of activities supporting physical

Table 1. Demographic Data

	Department type				
	Intensive care[a]	Acute care[b]	Long-term care[c]	Hospice care[d]	Total
n (%)	238 (26.2)	263 (29.0)	325 (35.8)	81 (8.9)	907 (100)
Age, average years ± *SD*	35.4 ± 8.6	37.4 ± 10.3	39.5 ± 10.2	38.9 ± 10.8	37.8 ± 9.9
Median (range)	35.0 (23–59)	36.0 (23–60)	38.0 (23–65)	38.0 (23–67)	36.0 (23–67)
Work experience, average years ± *SD*	14.0 ± 9.1	14.3 ± 10.4	18.0 ± 10.4	13.0 ± 10.2	15.4 ± 10.2
Median (range)	13.0 (1–40)	13.0 (1–40)	17.0 (1–46)	10.0 (1–49)	15.0 (1–49)
Education level, *n* (%)					
Secondary	117 (49.2)	184 (70.0)	280 (86.2)	65 (80.2)	648 (71.5)
High school	51 (21.0)	33 (12.2)	13 (4.0)	6 (7.4)	101 (11.1)
University	70 (29.4)	46 (17.5)	32 (9.8)	10 (12.3)	158 (17.4)

[a] Intensive care units.
[b] Internal and oncological departments.
[c] Long-term care facilities and nursing departments in retirement homes.
[d] Inpatient hospices.

comfort of end-of-life patients, with the most often reported activities pain monitoring, basic care, and rest promotion. Significant predictors for the high utilization rate of activities focusing on physical comfort were hospice care facilities, LTCFs, and age of RNs. Hong and Lee (2014) also refer to pain monitoring, bed rest, and environment comfort among the most frequently used interventions in hospices. The fact that RNs in Czech hospices used activities supporting physical comfort with a higher frequency than other RNs can be linked to the fact that up to 85% of oncology patients in Czech hospices are in a terminal phase of disease and mortality exceeds 80%. Patients usually have progressive pain that is difficult to manage and other serious physical distresses (IHISCR, 2014). The RNs do not meet with such a high concentration of this kind of end-of-life patients in other Czech healthcare facilities. The predictor for the high utilization rate of an activity supporting physical comfort was also an LTCF. This can also be influenced by the spectrum of patients RNs care for. Mortality in Czech LTCFs is approximately 20%, and a large group of patients consists of frail geriatric patients and older adults in an advanced stage of dementia (IHISCR, 2014). The frail and elderly patients comprise a highly vulnerable group of end-of-life patients, in which physical comfort needs pertain mostly to pain, high dependency, and increased demands for basic nursing care.

A further predictor for the high utilization rate of the activity set supporting the physical comfort of patients was the age of RNs. Activities of basic nursing care demand an active presence and physical contact of a nurse with a dying patient. This can be very difficult for young nurses, and it is often connected to their fear of death. Previous research confirmed that higher age has a positive influence on attitudes of nurses towards end-of-life patient care (Lange, Thom, & Kline, 2008; Park, & Yeom, 2014).

In the case of psychological comfort, the only predictor of high utilization rate for activities was hospice care department. In the context of Czech health care, Czech inpatient hospices represent a specific care system for the terminally ill similar to those of other countries (Kelley & Morrison, 2015). Bailey, Moran, and Graham (2009) also confirmed that hospice nurses assess activities supporting psychological comfort as one of the most important for patient support. The fact that these activities were reported by RNs in other Czech departments less frequently than in hospices can be related to the current situation in the Czech healthcare system in which performance and time efficiency are preferred. This leads to a situation in which time-demanding activities supporting psychological comfort are regarded as a luxury (Chan, Jones, Fung, & Wu, 2011). The least reported activity from the perspective of RNs was “Support patient and his family to share their feelings concerning death.” Atomization of today’s Czech society manifests in the increasing number of people living alone, and the breakdown of multigenerational families and secularization, which results in changes in the value hierarchy changes in individuals. This trend has an impact on social behavior and intergenerational ties (Sak, & Kolesarova, 2012), which limit the opportunities of the nurse to support the patient and family to share their feelings concerning death.

For spiritual comfort, the only predictor of a high utilization activity rate was again hospice care department. Currently, there are mostly low-skilled staff focusing predominantly on basic nursing care concerning biological needs in LTCFs and retirement homes in the Czech Republic. Because of the shortage of RNs, there is not enough time for promoting activities supporting spiritual

Table 2. Frequency of Dimension Activities Use

Activity	Average[a] ± *SD*	Median
Physical dimension	4.23 ± 0.56	4.00
Monitor pain	4.70 ± 0.73	5.00
Assist with basic care, as needed	4.69 ± 0.73	5.00
Provide frequent rest periods	4.56 ± 0.76	5.00
Monitor deterioration of physical and/or mental capabilities	4.56 ± 0.82	5.00
Offer fluids and soft foods frequently	4.39 ± 0.85	5.00
Minimize discomfort, when possible	4.39 ± 0.82	5.00
Medicate by alternate route when swallowing problems develop	4.32 ± 0.88	5.00
Identify the patient´s care priorities	4.17 ± 0.79	4.00
Postpone feeding when patient is fatigued	3.89 ± 0.96	4.00
Modify the environment, based on patient´s needs and desires	3.69 ± 0.96	4.00
Offer culturally appropriate foods	3.30 ± 1.23	3.00
Psychological dimension	3.94 ± 0.62	4.00
Be available to listen to individual´s feelings	4.23 ± 0.91	4.00
Assure individual that nurse will be available to support individual in times of suffering	4.16 ± 0.98	4.00
Monitor mood changes	4.15 ± 0.85	4.00
Monitor patient for anxiety	4.12 ± 0.89	4.00
Be open to individual's expressions of concern	4.10 ± 0.93	4.00
Express empathy with individual's feelings	4.04 ± 0.90	4.00
Reduce demand for cognitive functioning when patient is ill or fatigued	3.67 ± 1.03	4.00
Support patient and family through stages of grief	3.59 ± 1.21	4.00
Encourage patient and family to share feelings about death	3.35 ± 1.12	3.00
Social dimension	3.86 ± 0.67	4.00
Respect the need for privacy	4.33 ± 0.83	5.00
Support the family's efforts to remain at the bedside	4.16 ± 0.90	4.00
Stay physically close to frightened patient	3.92 ± 0.90	4.00
Respect the patient's and family's specific care request	3.73 ± 0.87	4.00
Facilitate discussion of funeral arrangements	3.54 ± 1.26	4.00
Include the family in care decisions and activities, as desired	3.47 ± 1.03	4.00
Spiritual/existential dimension	3.92 ± 0.70	4.00
Treat individual with dignity and respect	4.74 ± 0.71	5.00
Provide privacy and quiet times for spiritual activities	3.89 ± 1.05	4.00
Arrange visit by individual's spiritual advisors	3.86 ± 1.15	4.00
Facilitate obtaining spiritual support for patient and family	3.84 ± 1.00	4.00
Communicate willingness to discuss death	3.29 ± 1.16	3.00

[a] Average on the Likert scale (1 = *never*; 2 = *rarely*; 3 = *sometimes*; 4 = *often*; 5 = *always*).

comfort; however, hospices provide specialized palliative care via a multiprofession team, including spiritual assistants. The number of nurses here is higher than in LTCFs, and therefore there is time for spiritual comfort support. Active participation in religious activities by RNs is rare in Czech nursing practice (Kisvetrova et al., 2013). Activities included in our survey represent the aforementioned activities by RNs that fulfil patients' spiritual needs, but without active RN involvement in religious rituals, including communication about spiritual and existential issues with patient and family. This kind of support can be provided by RNs without religious persuasion, which is typical for highly secular society. During the last population census in 2011, only 20% of the Czech population declared to be religious and nearly 50% of citizens did not answer that question (Czech Statistical Office, 2016). This finding is evidence that religion in the Czech Republic is perceived as a very personal matter and people are not willing to share their beliefs with others. This finding also confirms the rising trend of departing from institutionalized religiosity, which is similar to other European and non-European countries (Central Intelligence Agency, 2015). Furthermore, Tornøe, Danbolt, Kvigne, and Sørlie (2015) state that nurses who do not consider themselves very religious see religion as a private and personal matter.

The activity set focusing on social comfort had the lowest utilization rate. The only predictor of a high utilization rate for these activities was hospice care workplace. Czech hospices offer maximum support of contact between family and patient and enable a continuous stay for family members in the room with the patient. This represents the optimum combination of an institutional care system and elements of social comfort in a home environment in which the patient experiences the end of his or her life together with his or her immediate family. In other Czech healthcare facilities, it is very difficult to arrange for the permanent presence of a family member with the patient.

Table 3. Select Factors Dependent on Activity Set Usage of Particular Dimensions

			Department, average (*SD*); median					Education level, average (*SD*); median			
Comfort dimension	Work experience r^a (p)*	Age r^a (p)*	Intensive	Acute	Long-term	Hospice	p^b	Secondary	High	University	p^b
Physical	0.038 (.257)	0.075 (.025)	4.14 (0.76); 4	4.23 (0.46); 4	4.23 (0.48); 4	4.50 (0.31); 4	**	4.24 (0.52); 4	4.17 (0.57); 4	4.22 (0.70); 4	.342
Social	−0.004 (.912)	0.039 (.238)	3.79 (0.77); 3	3.81 (0.61); 3	3.81 (0.62); 4	4.38 (0.40); 4	**	3.86 (0.56); 4	3.81 (0.57); 3	3.85 (0.78); 4	.328
Psychological	−0.063 (.060)	−0.028 (.397)	3.88 (0.76); 3	3.93 (0.55); 4	3.89 (0.55); 3	4.28 (0.42); 4	**	3.94 (0.58); 4	3.92 (0.60); 4	3.91 (0.77); 4	.883
Spiritual	−0.032 (.343)	0.005 (.886)	3.85 (0.80); 4	3.86 (0.67); 3	3.88 (0.62); 4	4.51 (0.39); 4	**	3.93 (0.67); 4	3.91 (0.67); 4	3.90 (0.81); 4	.921

[a] Spearman correlation coefficient.

[b] Kruskal-Wallis test.

*$p < .05$; **$p < .0001$.

The activity "Facilitate discussion of funeral arrangements" is one of the least reported activities. This finding can be linked to the increasing practice in the Czech Republic of the deceased being buried without a collective funeral ceremony. This practice emerged in recent decades and is unique in the European and worldwide context. The International Social Survey Programme reported that approximately one fourth of the Czech population wishes to have a secular funeral and one fifth would like to be buried without any ceremony. The rest of Czech society does not care which of these options will be selected for their funeral. Due to the high secularization of Czech society, the traditional social commitment concerning a religious funeral as a moral obligation of survivors in relation to the deceased is declining; however, a secular burial ritual is not seen as binding as a church funeral, and therefore it is a matter of choice rather than a duty (Nesporova, 2011). The very low frequency of the activity "Facilitate a discussion of funeral arrangements" is only an acknowledgement of this trend in Czech society.

No significant correlation between RN education and the utilization rate was found in any comfort dimension, and there was no predictor of a high utilization rate for these activities. The explanation for this finding may be that secondary medical school, high school, or university education provides the nurse with an equivalent amount of knowledge regarding palliative care, which is why the level of education in nurses in the Czech Republic itself has no significant impact on the utilization rate of activities supporting particular comfort dimensions for end-of-life patients. In addition, no significant correlation between the length of work experience amongst RNs and the utilization rate of activity while caring for end-of-life patients was found. This finding could correspond to the fact that not all RNs with longer work experience had worked in departments where they would encounter death. Higher RN turnover among particular types of workplaces within a single healthcare facility is the consequence of a decreasing number of urgent beds in departments and a lack of nurses in Czech hospitals.

The study's limitation should also be mentioned. We were unable to find a standardized survey that would address the study goals. The items were formulated based on the international classification (NIC).

Implications for Practice

The results of this study showed that RNs in hospitals and LTCFs focus insufficiently on the spiritual and psychosocial comfort of end-of-life patients. Although the results of this study might have been predictable, it is the

Table 4. Correlation Between Predictors and High Utilization Rate of Particular Dimension Activity Sets

	Physical dimension		Social dimension		Psychological dimension		Spiritual dimension	
	OR (95% CI)	*p*	*OR* (95% CI)	*p*	*OR* (95% CI)	*p*	*OR* (95% CI)	*p*
Department								
Intensive	Referential		Referential		Referential		Referential	
Acute	1.33 (0.89–1.98)	.170	0.96 (0.68–1.34)	.827	1.14 (0.80–1.62)	.827	0.85 (0.60–1.20)	.353
Long-term	1.54 (1.04–2.27)	.030	1.17 (0.84–1.63)	.356	0.92 (0.66–1.29)	.356	0.94 (0.67–1.31)	.720
Hospice	10.40 (3.17–34.08)	.0001	9.30 (4.45–19.48)	<.0001	3.10 (1.76–5.46)	<.0001	18.00 (6.38–50.76)	<.0001
Age	1.01 (1.00–1.03)	.045	1.02 (1.00–1.03)	.200	1.00 (0.99–1.01)	.960	1.00 (0.98–1.01)	.589
Work experience	1.00 (0.99–1.02)	.985	1.01 (1.00–1.02)	.201	0.99 (0.98–1.00)	.062	0.99 (0.98–1.01)	.325
Education level								
Secondary	Referential		Referential		Referential		Referential	
High school	0.70 (0.43–1.12)	.134	0.67 (0.44–1.02)	.060	1.08 (0.71–1.64)	.720	0.95 (0.62–1.44)	.794
University	0.94 (0.62–1.43)	.762	1.12 (0.79–1.58)	.538	1.04 (0.73–1.47)	.824	1.02 (0.72–1.45)	.899

Note: CI = confidence interval; *OR* = odds ratio.

first study that provides a baseline for this behavior of nurses caring for end-of-life patients. This study may be of particular significance to educators of the next generations of nurses not only in the Czech Republic, but also in other countries with a high rate of institutionalized dying care. So-called soft skills should be developed in nursing students by direct experience with psychosocial and spiritual comfort care needs of end-of-life patients.

Conclusions

With the exception of hospice departments, nurses used activities encouraging psychological, spiritual, and social comfort for end-of-life patients less frequently than activities in the physical dimension. Because it can be assumed that hospitals and LTCFs will remain the most common place for deaths in the future, it is necessary to implement comfort-supporting nursing activities in these facilities.

Acknowledgments

This study was supported by grants IGA_FZV_2014_007 and IGA_FZV_2015_002 of the Internal Grant Agency of Palacký University Olomouc, and grant 16–28628A by the Ministry of Health of the Czech Republic.

Clinical Resources

- End-of-Life Nursing Education Consortium. http://www.aacn.nche.edu/elnec
- European Association for Palliative Care. http://www.eapcnet.eu/
- National Hospice and Palliative Care Organization. http://www.nhpco.org/nhpco-0

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JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Perceived Infection Prevention Climate and Its Predictors Among Nurses in Saudi Arabia

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Key words
Infection prevention climate, nurses, patient safety, quality care, Saudi Arabia

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Accepted August 30, 2017

doi: 10.1111/jnu.12360

Abstract

Purpose: This study investigated the staff nurses' perception of the infection prevention climate and its predictors in two hospitals.
Design: This is a cross-sectional study employing a convenience sample of 224 staff nurses at two general hospitals in Riyadh province.
Methods: The study utilized a two-part questionnaire that captures respondents' characteristics and the validated tool on Leading a Culture of Quality for Infection Prevention (LCQ-IP). Both descriptive and inferential statistics were utilized accordingly.
Results: The prioritization of quality received the highest mean score among the four factors of the scale (mean = 3.89, *SD* = 0.65), followed by supportive work environment (mean = 3.88, *SD* = 0.68), psychological safety (mean = 3.85, *SD* = 0.65), and improvement orientation (mean = 3.84, *SD* = 0.64). Nationality, clinical experience, and attendance to seminars or training were identified as significant predictors.
Conclusions: The respondents perceived the infection prevention climate of the two general hospitals positively. This study strengthens the idea that organizational context influences negatively or positively the programs on infection prevention being implemented in the hospitals.
Clinical Relevance: The result may facilitate nursing and hospital management to reflect, examine, and review their organizational climate, the impact of infection prevention initiatives and patient safety strategies, and the reason to amend related policies or improve procedures, including the promotion of a healthy work environment.

For many years, the issue of healthcare-associated infections (HCAIs), including their prevention and control, has received considerable attention. The combined data from previous studies across the globe from 1995 to 2010 suggest that pooled HCAI prevalence in mixed patient populations in high-income countries was 7.6%, while the pooled hospital-wide prevalence in low- and middle-income countries was 10.1% (World Health Organization, 2011). A plethora of literature has suggested strategies to improve patient safety with regards to HCAIs and has established the effectiveness of such infection prevention and control (IPC) initiatives (Centers for Disease Control and Prevention, 2016; Gardam, Lemieux, Reason, & Goel, 2009; Thompson, Workman,

& Strutt, 2009). Despite the availability of guidelines and measures against HCAIs, the implementation of these interventions remains a huge challenge in healthcare facilities (Krein, Kowalski, Hofer, & Saint, 2012; Nelson, 2013; Stone et al., 2014).

Similar to the rest of the world, HCAIs and issues on IPC in hospitals are also serious concerns in Saudi Arabia. Outbreaks of several HCAIs and community infectious diseases (e.g., pandemic influenza A, H5N1 highly pathogenic avian influenza, Rift Valley fever, and Middle East respiratory syndrome) have been experienced in the country in recent years (Rabaan, Alhani, Bazzi, & Al-Ahmed, 2017). Hospitals are also faced with challenges in IPC, such as deficiency in trained infection control professionals, defects in several areas of infection prevention programs (e.g., training in IPC programs, ventilation facilities, use of antimicrobials, and staffing ratios; Assiri, Choudhry, Alsaleh, Alanazi, & Alsaleh, 2014), and relatively high levels of uncertainty among healthcare workers in infection prevention-related issues (e.g., institution-specific issues, surveillance and reporting standards, and readiness and competence to implement policies and respond to outbreaks; Rabaan et al., 2017). These challenges may negatively impact the infection prevention climate in hospitals, which may likewise affect the quality of patient care.

Background

Previous research demonstrates the essential role of organizational capacity to implement improvement strategies successfully, and it is likely to depend on the organizational climate (Castro-Sánchez & Holmes, 2015). Climate for quality in an organization is defined as the shared perceptions of the members of the organization that is expected, supported, and rewarded by the organization to provide quality care (Kaissi, Kralewski, Curoe, Dowd, & Silversmith, 2004; Williams, Manwell, Konrad, & Linzer, 2007). Also, it mirrors the organization's culture, which makes it easier to measure (Gershon, Stone, Bakken, & Larson, 2004). Stone and colleagues (2005) identified several indicators of organizational climate, such as leadership, work design, group behavior, and emphasis on quality.

Currently, interest in measuring the climate for infection prevention is growing (Pogorzelska-Maziarz, Nembhard, Schnall, Nelson, & Stone, 2015) along with several IPC initiatives, to help understand and eliminate HCAIs (Pronovost et al., 2006; Speroff et al., 2010). For instance, in the United States, Hessels, Genovese-Schek, Agarwal, Wurmser, and Larson (2016) conducted a study examining the relationship between patient safety climate and adherence to standard precautions among healthcare workers in 11 units in five hospitals. The researchers found that organizational characteristics such as staffing and teamwork within units were correlated with overall standard precaution adherence. In addition, Rozenbojm, Nichol, Spielmann, and Holness (2015) performed a secondary data analysis investigating hospital unit safety climate and its relationship to nurses' adherence to using facial protective equipment. The analysis found that safety climate varies significantly between units and that nurses' individual tenure and unit-level communication were significant predictors of the adherence to use of facial protective equipment. Similarly, Nelson et al. (2011) conducted a study in 149 hospitals investigating the perceptions of infection preventionists and quality directors on senior management engagement and leadership on patient safety climates with regards to infection prevention. The results indicated that infection preventionists perceived senior management engagement more positively than did quality directors. The study concluded that differences in perceptions among leaders in acute healthcare settings might have a critical outcome on HCAIs.

In Saudi Arabia, studies have been conducted on the culture of safety in several hospitals (Aboshaiqah & Baker, 2013; Alahmadi, 2010). However, no empirical studies have been found related to nurses· perceptions of the infection prevention climates of hospitals. While the literature indicates the relationship of organizational climate to such infection prevention strategies, prior research has failed to utilize a reliable tool that can measure the indicators of organizational climate for quality addressing infection prevention. Likewise, several investigators have argued that there is little reliable evidence that organizational factors influence infection prevention and control (Griffiths, Renz, Hughes, & Rafferty, 2009; Pratt et al., 2007). Much is still unknown about the influence of individual staff characteristics on perceptions of climate related to infection prevention (Braun et al., 2013). It is therefore essential to assess the infection prevention climate of hospitals to have a basis in planning interventions aimed at improving quality patient care. This study was designed to critically investigate the staff nurses' perceptions of the infection prevention climate in two general hospitals and predict the factors influencing their perceptions.

Methods

Design and Setting

This study utilized a descriptive, cross-sectional design. The study was conducted in two government-owned general hospitals in Riyadh province, Saudi Arabia. Hospital A has a 200-bed capacity and has a total of 217 nurses. Hospital B has a 150-bed capacity with a total of 158 nurses. Both hospitals operate under the supervision of the Ministry of Health and have the following specialty areas: outpatient department, emergency departments, adult intensive care unit, neonatal intensive care unit, obstetric ward, labor and delivery room, operating theaters, postanesthesia care unit, male and female surgical wards, male and female medical ward, and renal dialysis units.

Participants

A convenience sample of 224 staff nurses currently employed by the selected hospitals was included in this research. Nurses were recruited during their nonpatient contact hours in the morning and afternoon shifts. Male and female staff nurses who were able to read and understand English and expressed willingness to participate were involved in the study. From the total number of nurses in the two hospitals, 300 nurses met the inclusion criteria; hence, they were invited to participate in the study. From the 300 questionnaires distributed, 224 were completed and returned, giving a response rate of 74.7%.

Survey Instrument

The data were obtained using a two-part questionnaire. The first part captured respondents' characteristics, such as nationality, marital status, gender, highest educational attainment, area of practice, and previous seminars or training attended. The second part utilized the tool for Leading a Culture of Quality in Infection Prevention (LCQ-IP). The tool measures four dimensions of an infection prevention climate, which is central to an infection prevention framework. The questionnaire consisted of 19 items organized into four factors: psychological safety (7 items), prioritization of quality (5 items), supportive work environment (4 items), and improvement orientation (3 items). Responses to all items were set on a 5-point Likert scale, where 1 was interpreted as "*strongly disagree*" and 5 as "*strongly agree*." For item 16, the scoring was reversed. Scoring was done by getting the mean for each item and dimension, as well as the overall mean. Higher means signified more positive perception of the climate for quality in infection prevention. The LCQ-IP exhibited appropriate construct validity as evidenced by the four-factor solution of the principal component analysis with total explained variance of 58.8%. It also has adequate internal consistency with computed Cronbach's α ranging from 0.72 to 0.88 for the four factors, and an overall Cronbach's α of 0.93 (Pogorzelska-Maziarz et al., 2015). For this study, Cronbach's α was 0.87, indicating adequate internal consistency.

Ethical Consideration and Data Collection

Review and approval of the study protocol were obtained from Shaqra University, College of Applied Medical Sciences, Al Dawadmi and the participating hospitals' directors and research committees before beginning the study. Likewise, respondents' rights were ascertained before handing them the questionnaire by giving them full disclosure of their rights as participants, the nature and risk of the study, and the benefits. Then, written informed consent was solicited to signify their understanding of the survey and their voluntary participation. Confidentiality and anonymity of each respondent were strictly observed throughout the study process. Data were collected over a period of 3 months.

Data Analysis

Completed questionnaires were entered, cleaned, and analyzed using Statistical Package for Social Sciences (SPSS) version 22 (IBM Corp., Armonk, NY, USA). Incomplete questionnaires were not included in the data analysis. Descriptive statistics were used to define the respondents' characteristics and responses to each item of the questionnaire. Pearson product moment correlation, independent t-test, and one-way analysis of variance (ANOVA) were utilized to determine the association of the demographic characteristics to the mean scores. If the ANOVA revealed statistical results, a Tukey honest significant difference (HSD) test was performed. Multiple linear regression analysis was conducted to identify the predictors of the LCQ-IP. Statistical analysis was set at a .05 level of significance.

Results

The mean age of the respondents was 32.89 ± 8.83 years. Most of the participants were employed in Hospital A (59.4%), female (69.6%), and married (53.6%), and had attended seminars or training on infection control and prevention in the past 6 months (70.1%). More than one third of the respondents were Saudi nationals (35.7%) and Filipinos (33.9%). The mean clinical experience among the respondents was 6.23 ($SD = 4.78$) years. The respondents were fairly distributed among different clinical areas (**Table 1**).

Perceived Infection Prevention Climate

The perceived infection prevention climate is reflected in **Table 2**. The overall mean score was 3.86 ($SD = 0.51$).

Table 1. Demographic Characteristics of the Respondents ($N = 224$)

Characteristics		*n*	%
Hospital	Hospital A	133	59.4
	Hospital B	91	40.6
Gender	Male	68	30.4
	Female	156	69.6
Marital status	Single	104	46.4
	Married	120	53.6
Nationality	Saudi	80	35.7
	Filipino	76	33.9
	Others (Indians, Jordanians, and Egyptians)	68	30.4
Area of practice	Emergency room	28	12.5
	Medical ward	40	17.9
	Surgical ward	44	19.6
	Pediatrics	32	14.3
	Adult intensive care unit	28	12.5
	Operating room	24	10.7
	Dialysis/artificial kidney unit	28	12.5
Attendance to infection control and prevention seminars or training	Yes	157	70.1
	No	67	29.9
		Mean	*SD*
Age (years)		32.89	8.83
Clinical experience (years)		6.23	4.78

Prioritization of quality received the highest mean score among the four factors of the scale (mean = 3.89, *SD* = 0.65), followed by supportive work environment (mean = 3.88, *SD* = 0.68), psychological safety (mean = 3.85, *SD* = 0.65), and improvement orientation (mean = 3.84, *SD* = 0.64). Among the individual items, item 16 ("most people in their organization are so busy that they have very little time to devote to infection prevention efforts") received the highest mean score (mean = 4.22, *SD* = 0.99), followed by item 15 ("the quality of work suffers because of the amount of work staff are expected to do"), with a mean score of 4.20 (*SD* = 0.95), and item 19 ("I have a clear understanding of the organization's mission, vision, and values"), with a mean score of 4.09 (*SD* = 0.85). Item 14 ("people are held accountable for the results of their work") received the lowest mean score of 3.53 (*SD* = 0.82), followed by both items 6 ("the people in this organization value others' unique skills and talents"; mean = 3.55, *SD* = 1.20) and 13 ("senior leadership here has created an environment that enables changes to be made"; mean = 3.55, *SD* = 1.12).

Table 3 shows the association between the respondents' characteristics and their perceived infection prevention climate. Age ($r = 0.25$, $p < .001$) and clinical experience ($r = 0.22$, $p = .001$) had a weak positive correlation with the overall mean score of the LCQ-IP. Female nurses and those who had attended seminar or training on infection control and prevention in the past 6 months reported more positive perceptions regarding the infection prevention climate than male nurses ($t = -2.80$, $p = .006$) and those who did not have similar experience ($t = 5.67$, $p < .001$), respectively. Significant differences were noted on the infection control climate perception per nationality ($F = 12.95$, $p < .001$). The Tukey HSD tests revealed that Saudi nurses perceived the infection prevention climate more negatively than nurses from other countries ($p < .001$). There was no significant difference in the perception of the infection prevention climate between nurses from the two hospitals ($p = .065$).

Predictors of Infection Prevention Climate

A multiple linear regression analysis was done using the respondents' characteristics to estimate the significant predictors of the perception of the infection prevention climate. The model was statistically significant, $F(14, 209) = 4.08$, $p < .001$, and accounted for 16.2% of the variance of the perceived infection prevention climate ($R^2 = 0.215$, adjusted $R^2 = 0.162$). As shown in **Table 4**, nationality, clinical experience, and attendance to seminars or training on infection control and prevention were identified as significant predictors of the infection prevention climate. Filipino nurses and nurses from other countries (Indians, Jordanians, and Egyptians) had a significantly greater positive perception by 0.40 ($p = .001$, 95% confidence interval [CI] = 0.18, 0.63) and 0.40 ($p = .001$, 95% CI = 0.16, 0.63) units, respectively, than Saudi nurses. Those nurses who had not attended

Table 2. Perceived Infection Prevention Climate Among the Respondents ($N = 224$)

	Mean	*SD*
Overall	3.86	0.51
Factor 1: Psychological Safety	3.85	0.65
1. The climate in the organization promotes the free exchange of ideas.	4.00	0.92
2. Staff will freely speak up if they see something that may improve patient care or affect patient safety.	3.80	0.83
3. I feel free to express my opinion without worrying about the outcome.	3.96	0.99
4. In general, people in our organization treat each other with respect.	3.94	1.04
5. People in this organization are comfortable checking with each other if they have questions about the right way to do something.	3.87	0.93
6. The people in this organization value others' unique skills and talents.	3.55	1.20
7. Members of this organization are able to bring up problems and tough issues.	3.80	0.91
Factor 2: Prioritization of Quality	3.89	0.65
8. The health care–associated infection prevention goals and strategic plan of our organization are clear and well communicated.	3.83	0.92
9. Results of our infection prevention efforts are measured and communicated regularly to staff.	4.03	0.85
10. There is a good information flow among departments to provide high-quality patient safety and care.	3.88	1.09
11. People here feel a sense of urgency about preventing health care–associated infections.	3.69	0.88
12. Employees are encouraged to become involved in infection prevention.	4.01	0.86
Factor 3: Supportive Work Environment	3.88	0.68
13. Senior leadership here has created an environment that enables changes to be made.	3.55	1.12
14. Where I work, people are held accountable for the results of their work.	3.53	0.82
15. The quality of work suffers because of the amount of work staff are expected to do.	4.20	0.95
16. Most people in this organization are so busy that they have very little time to devote to infection prevention efforts.	4.22	0.99
Factor 4: Improvement Orientation	3.84	0.64
17. I can think of examples when problems with patient infections have led to changes in our procedures or equipment.	3.73	0.92
18. I know of one or more health care–associated infection prevention initiatives going on within our organization this year.	3.71	0.71
19. I have a clear understanding of the organization's mission, vision, and values.	4.09	0.85

infection control and prevention seminars or training in the preceding 6 months exhibited lower scores by 0.29 ($p = .001$, 95% CI $= -0.45, -0.13$) compared with those who had attended. Lastly, an increase of 1 year in the clinical experience corresponded to a 0.03 ($p = .030$, 95% CI $= 0.00, 0.06$) unit increase in the perception of the infection prevention climate among nurses.

Discussion

This study is one of the first investigations to assess staff nurses' perceptions of the infection prevention climate in two general hospitals in Saudi Arabia. Also investigated were the factors that may predict staff nurse perceptions. Three significant findings are discussed in this section.

First, the overall perceived infection prevention climate among our respondents is comparable with that of the earlier study conducted in the United States, which suggests a positive organizational climate for infection prevention (Pogorzelska-Maziarz et al., 2015). Nelson (2013) reported that participants working in rural or suburban area hospitals in the United States perceived the organizational climate negatively using an earlier version of the tool.

Second, our respondents scored highly in the prioritization of quality factor, but low in the improvement orientation factor, which is in contrast with findings in the prior study conducted by Pogorzelska-Maziarz et al. (2015). This can mean that although our respondents prioritize infection prevention, they may still be deficient regarding proper orientation or application of infection preventive initiatives. This opposing result can be reflected from the high score obtained on item 19, which may suggest that although our respondents are aware of

Table 3. Association Between Demographic Characteristics and Perceived Infection Prevention Climate Among the Respondents ($N = 224$)

Characteristics	Mean ± *SD*	Statistical test	*p*
Hospital			
Hospital A	3.81 ± 0.49	$t = -1.85$	.065
Hospital B	3.94 ± 0.54		
Age		$r = 0.25$	<.001**
Gender			
Male	3.69 ± 0.71	$t = -2.80$	.006*
Female	3.94 ± 0.73		
Marital status			
Single	3.83 ± 0.51	$t = -0.87$	.383
Married	3.89 ± 0.52		
Nationality[a]			
Saudi	3.64 ± 0.63	$F = 12.95$	<.001**
Filipino	3.99 ± 0.52		
Others (Indians, Jordanians, and Egyptians)	3.98 ± 0.48		
Area of practice			
Emergency room	3.87 ± 0.44	$F = 2.10$	.055
Medical ward	3.74 ± 0.57		
Surgical ward	3.78 ± 0.64		
Pediatrics	3.75 ± 0.50		
Adult intensive care unit	3.95 ± 0.41		
Operating room	4.10 ± 0.40		
Dialysis/artificial kidney unit	3.99 ± 0.43		
Clinical experience		$r = 0.22$	.001*
Attendance to seminars/training			
Yes	4.00 ± 0.74	$t = 5.67$	<.001**
No	3.54 ± 0.63		

[a] Saudi versus Filipino ($p < .001$), Saudi versus Others ($p < .001$).
*Significant at .01 level; **significant at .001 level.

their hospital's vision, mission, and values or even when a new strategy or guideline was successfully adapted, healthcare provider commitment tends to deteriorate because of specific reasons such as information overload, the complexity of guidelines and its evidence, and competing work demands (Gerber et al., 2014). Moreover, the respondents garnered the highest score on item 16, where they have little time to devote to infection prevention, jeopardizing the quality of work rendered regarding infection prevention, and as seen on item 15 as the second highest item mean. Congruent to this finding is the literature review conducted by Zing et al. (2015), where they found that high work load, low staffing, and long working hours are all related to occurrences of HCAIs.

Furthermore, the inconsistency in the results may be due to our respondents' perceptions of lack of support from their management and lack of staff nurses' accountability in their actions to infection prevention strategies, as seen in low scores obtained on items 13 and 14. Shah, Castro-Sanchez, Charani, Drumright, and Holmes (2015) argued that if the working environment is supportive, infection prevention control and compliance are attainable, which could further engage nurses to perform well. This further relates to the low score obtained on item 6, as staff nurses are perceived to have a lack of autonomy in utilizing their skills with regards to infection prevention. Higher levels of autonomy among nurses have been linked with higher quality of patient care, better performance, enhanced patient outcomes, improved patient safety, and lower mortality rates (Weston, 2010). Hence, having lower levels of autonomy among nurses may negatively impact their compliance with infection prevention actions.

The third significant finding in this study was the identification of the respondents' nationality, clinical experience, and attendance at seminars or training on IPC as significant predictors to their perception of the infection prevention climate. This finding is rather difficult to interpret because this result has not previously been described using the same tool in other studies. Related study findings in Saudi Arabia using a different tool suggest that non-Arabic-speaking nurses and those with more extensive clinical experience have a positive perception of patient safety culture (Aboshaiqah & Baker, 2013). As to nationality, it could be attributed to the experience and education of the nurses. Differences in the experience and education of the nurses could be attributed to the country of origin (Aboshaiqah & Baker, 2013; Colet et al., 2015, 2017). Furthermore, clinical experience was identified as a predictor. This may mean that seasoned nurses tend to possess broader perspectives and a better understanding of patient care quality than less experienced staff nurses, which corroborates the findings of a previous study by Aboshaiqah and Baker (2013). This finding can also be supported by the study conducted in Saudi Arabia by Cruz et al. (2016), which reported that nurses who are more experienced had better compliance with standard precautions than nursing students, who are still under training. The findings also indicated that attendance to training and seminars was a significant predictor—those nurses who attended training and seminars manifested better perceptions of the infection prevention climate than those who did not attend. This is congruent with the study conducted by Pellowe (2007), which indicated that nurses who participated in the workshop are most likely to be highly motivated to improve infection prevention practices. Another study done in Saudi Arabia suggested that extensive education sessions conducted for nurses and staff contribute to success in reducing infections (Khalid et al., 2013). Female nurses had a more positive perception of the infection prevention climate than male nurses. Gender, however, was not identified as a

Table 4. Predictors of Infection Prevention Climate ($N = 244$)

						95% CI	
Predictor variables	B	SE-*b*	Beta	*t*	*p*	Lower bound	Upper bound
Hospital (Reference group: Hospital A)							
Hospital B	0.17	0.07	0.11	1.78	.077	−0.01	0.24
Age	0.00	0.01	−0.00	−0.03	.978	−0.02	0.02
Gender (Reference group: Male)							
Female	−0.02	0.10	−0.02	−0.22	.826	−0.23	0.18
Marital status (Reference group: Single)							
Married	−0.15	0.08	−0.14	−1.83	.069	−0.30	0.01
Nationality (Reference group: Saudi)							
Filipino	0.40	0.12	0.37	3.51	.001**	0.18	0.63
Others (Indians, Jordanians, & Egyptians)	0.40	0.12	0.36	3.31	.001**	0.16	0.63
Area of practice (Reference group: Operating room)							
Emergency room	0.06	0.12	0.04	0.46	.644	−0.19	0.30
Medical ward	−0.04	0.11	−0.03	−0.35	.727	−0.26	0.18
Surgical ward	−0.17	0.11	−0.12	−1.56	.121	−0.38	0.04
Pediatrics	−0.21	0.12	−0.13	−1.80	.073	−0.43	0.02
Adult intensive care unit	0.06	0.13	0.04	0.46	.644	−0.19	0.30
Dialysis/artificial kidney unit	0.16	0.12	0.10	1.29	.199	−0.09	0.41
Clinical experience	0.03	0.01	0.29	2.19	.030*	0.00	0.06
Attendance to seminars/training (Reference group: Yes)							
No	−0.29	0.08	−.262	−3.51	.001**	−0.45	−0.13

Note. The nurses' perceptions of the infection prevention climate were the dependent variable. $R^2 = 0.215$; adjusted $R^2 = 0.162$. B = unstandardized coefficients; Beta = standardized coefficients, CI = confidence interval; SE-b = standard error.
$^*p < .05$; $^{**}p < .01$.

significant predictor in this study. Aboshaiqah and Baker (2013) related being female to caring behavior, where they also found that females perceived patient safety culture more positively than male nurses.

The findings should be interpreted with caution as this study has several strengths and limitations. This is the first study to attempt to investigate the infection prevention climate in Saudi Arabia using a validated tool. Also, the result of this report was obtained in a group of nurses with varied nationalities, including varying levels of education and experience. It is unfortunate that the study did not include other healthcare providers, which limits the assessment of climate as a shared perception; hence, generalizability of these findings is limited. Likewise, causality was unable to be determined as it employs a cross-sectional, descriptive design. It is recommended that future studies include other professions, obtain a bigger sample, and use hospitals with varied characteristics. Additional strengths of the study include the use of a tool that has established psychometric properties, as well as a high response rate.

Conclusions

Returning to the objectives posed at the beginning of this study, it is now possible to state that staff nurses in the two general hospitals perceived the infection prevention climate positively. The participants' demographics likely influenced their perceptions of the infection prevention climate in the hospitals. Overall, this study strengthens the idea that organizational context influences negatively or positively the programs on infection prevention in the hospitals.

Relevance to Clinical Practice

Utilizing the LCQ-IP tool may be helpful in generating baseline information to assess the hospitals· infection prevention climate. The result may, in turn, facilitate nursing and hospital management to reflect, examine, and review their organizational climate, the impact of infection prevention initiatives, and patient safety strategy. This may also provide a general picture of staff problems that may act as obstacles in forwarding infection prevention initiatives, providing management with the basis to amend related policies or improve procedures, including the promotion and support of a safe environment for patients and hospital staff. Since infection prevention and control have been proven effective in reducing HCAIs and in improving overall patient safety, initiatives directed toward enhancing the compliance of nurses in infection control policies and guidelines, coupled with organizational prioritization of quality and workplace and management support, should be implemented. Having an organization that prioritizes the climate for infection control and supportive management in addition to healthcare workers' stringent compliance with infection control policies will create a synergistic effect in improving patient care, and eventually patient outcomes.

Finally, the findings of the study also have implications for nursing education and training in Saudi Arabia. The poorer perception of the infection prevention climate among Saudi nurses denotes the need for improvement. Nursing education in the kingdom should integrate the concepts of infection control and prevention as well as patient safety, both in the classroom and with clinical learning. Frequent monitoring of student knowledge and skill competency related to infection prevention should be conducted to insure continuous student learning. Enhancement training programs for Saudi nurses on this aspect of health care should also be implemented to improve their perception and implementation.

Clinical Resources

- Agency for Healthcare Research and Quality: https://www.ahrq.gov/professionals/quality-patient-safety/hais/index.html
- Centers for Disease Control and Prevention: https://www.cdc.gov/infectioncontrol/tools/index.html
- Government of South Australia. SA Health: http://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/clinical+resources/safety+and+quality/preventing+and+controlling+healthcare+associated+infections

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JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Agreement Between Actigraphy and Diary-Recorded Measures of Sleep in Children With Epilepsy

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Key words
Actigraphy, children, diary, epilepsy, sleep

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Accepted September 30, 2017

doi: 10.1111/jnu.12364

Abstract

Purpose: To describe sleep patterns in young children with epilepsy and to examine levels of agreement between measurements derived from actigraphy and diary recordings.
Design: Cross-sectional study.
Methods: Eighty-nine toddlers and preschool-aged children with epilepsy wore an actigraph on their wrists for 7 consecutive days. Parents and caregivers maintained a concurrent sleep diary while the child was wearing the monitor. Levels of agreement between actigraphy and diary recordings were examined using the Bland and Altman method separately for all recording days, weekdays, and weekends.
Findings: Discrepancies between actigraphy-derived and diary-documented sleep onset, sleep offset, actual sleep at night, wake after sleep onset, and daytime sleep were ±35, ±15, ±82, ±70, and ±29 min, respectively. Differences between actigraphy and diary-derived sleep variables were consistently greater for weekends than for weekdays. Discrepancies between actigraphy and diary-derived actual sleep at night were significantly greater for children who slept alone than for those who co-slept with a parent.
Conclusions: Our study demonstrates an acceptable agreement between actigraphy and diary recordings for sleep onset, sleep offset, and daytime sleep, but insufficient agreement for actual sleep at night and wake after sleep onset, with parents of children sleeping alone more likely to misestimate child sleep behaviors. Deviation of weekend sleep from weekdays further decreased the accuracy of parental sleep estimates and increased the discrepancies between actigraphy and diary.
Clinical Relevance: Sleep in children with epilepsy assessed using diary recordings alone could be misleading, and actigraphy should be preferred over diaries when resources are available.

Sleep problems are among the most frequent concerns for parents of young children. Large-scale cross-cultural studies have documented both high global and regional prevalence rates estimating that 10.10% to 75.93% of children experience sleep problems during the first 6 years of life (Mindell, Sadeh, Kwon, & Goh, 2013; Mindell, Sadeh, Wiegand, How, & Goh, 2010), with Asian countries having higher recorded prevalence rates than Western countries. Problematic sleep in early childhood can persist into school age and has been associated with lower nonverbal intelligence and depression as well as anxiety symptom severity (Kocevska et al., 2017; Whalen, Gilbert, Barch, Luby, & Belden, 2017). Sleep problems, including difficulty falling asleep, night awakenings, reduced sleep duration, and daytime sleepiness, are even more serious in children with epilepsy, whose sleep can be disrupted by seizures occurring during the night or during the day (Chan et al., 2011; Larson et al., 2012; Stores, 2013). However, few studies have used objective sleep measures such as actigraphy to assess sleep in toddlers and preschool-age children with epilepsy.

Accurately assessing sleep in children with epilepsy is the most fundamental component for early identification of potential sleep problems and preventing their associated adverse outcomes. Different sleep assessment strategies are often chosen based on feasibility, practicability, and source of information. Actigraphy is an activity-based sleep monitoring system that detects and records gross body movements through an omnidirectional accelerometer. Parental reports are the most common and cost-effective source of child sleep information either in research or in clinical settings. However, previous research on subjective and objective assessment of sleep has reported inaccurate information provided by parents, potentially due to recall, social desirability, and limited understanding and biased perception about their child's sleep (Acebo et al., 2005; Dayyat, Spruyt, Molfese, & Gozal, 2011). The accuracy of parental reports is also influenced by the child's tendency to signal and parental awareness of the child's awakenings (Asaka & Takada, 2011; Sadeh, 1996). For example, one study reported that the correlation between actigraphic and parental reported sleep measures were higher in infants who slept with their parents when compared with those slept in their own rooms (Asaka & Takada, 2011). Sleep in children with epilepsy is altered by seizures and epileptic discharges that their parents may not be aware of, potentially contributing to differences between actigraphy and diary-derived sleep parameters.

The majority of the research examining sleep in young children using different assessment modalities has primarily focused on typically developing infants and toddlers (Asaka & Takada, 2011; Molfese et al., 2015) or healthy preschoolers (Iwasaki et al., 2010; Lam, Mahone, Mason, & Scharf, 2011; Tikotzky & Sadeh, 2001; Werner, Molinari, Guyer, & Jenni, 2008). Although some attention has been paid to children with clinical conditions (Kushnir & Sadeh, 2013; Sadaka et al., 2014), we are not aware of any researchers applying the Bland-Altman method to evaluate how well nighttime and daytime sleep parameters derived from actigraphy and daily diary agree in children with epilepsy (Bland & Altman, 1986, 1999). The Bland-Altman method plots the differences between two measurements against their averages to evaluate measurement equivalence. The mean difference between the two measurements is the bias. Such a statistical approach has been recommended for the field of pediatric sleep research because using correlation coefficients to conclude the interchangeable use of objective and subjective sleep assessments can be misleading and does not necessarily reflect the agreement or disagreement between different methods of measurement (Bland & Altman, 1986, 1999; Werner et al., 2008). Sleep parameters derived from actigraphy and diaries have been found moderately to strongly correlated, but the actual values were significantly different (Asaka & Takada, 2011; Iwasaki et al., 2010; Sadeh, 2004).

The purpose of this study was to examine the agreement between actigraphy and diary-derived sleep parameters in children with epilepsy. The specific aims were to (a) describe nighttime and daytime sleep behaviors in children with epilepsy by measures derived from actigraphy and daily sleep diaries, (b) examine levels of agreement between the two methods using the Bland and Altman statistical approach (Bland & Altman, 1986, 1999), and (c) investigate child characteristics associated with levels of agreement between the methods. Given that sleep in preschool-aged children has been shown to have weekday and weekend differences (Iwata, Iwata, & Matsuishi, 2013; Price et al., 2014; Spruyt, Alaribe, & Nwabara, 2016), sleep and levels of agreement were analyzed separately for all days, weekdays, and weekends. According to previous studies (Kushnir & Sadeh, 2013; Sadeh, 1996; Werner et al., 2008), we hypothesized a sufficient agreement for sleep schedule variables including sleep onset and sleep offset between the two methods, but expected that actual sleep at night and wake after sleep onset would agree less well. Because daytime sleep parameters are less explored in pediatric actigraphy (Galland et al., 2016; Galland, Meredith-Jones, Terrill, & Taylor, 2014; Meltzer, Montgomery-Downs, Insana, & Walsh, 2012), we hypothesized, based on our own research experience and clinical observation, that actigraphy and diary daytime sleep parameters would agree well. Based on prior pediatric sleep literature (Werner et al., 2008), sufficient levels of agreement between actigraphy and diary was defined as differences between the two methods being less than ±30 min.

Methods

Participants

Participants were recruited from an outpatient pediatric neurology clinic in a university-affiliated hospital in Taipei, Taiwan, between September 2015 and November

2016 to participate in a larger ongoing study of sleep interventions in children with epilepsy. Children were eligible for the study if they were between 1.5 and 6 years of age with a confirmed diagnosis of epilepsy based on clinical and electro-encephalogram examinations. Exclusion criteria were children born before 37 weeks' gestation, children with evidence of overt structural brain damage, and children with cerebral palsy or those who were bedridden. A total of 100 eligible children were approached, and 93 children participated in the study. Four children were subsequently excluded from analysis because three of them had less than 4 days of usable actigraphy data and another did not provide any weekend sleep data, resulting in a final sample size of 89. This report included the baseline sleep data of the participating children before the intervention was provided.

Procedures

Participating families provided child and parental background, health, and childcare information covering birth order, sleeping arrangements, parental sociodemographic characteristics, and seizure history. A convenient week was scheduled with the families to conduct the sleep monitoring during which children wore the actigraph for 7 days, with parents or caregivers recording a concurrent diary. Supportive phone calls were provided at least twice during the week of data collection to answer questions and enhance compliance. Research staff met with the families after the 7 days of study to collect the study materials and review diary completeness. Children were provided an opportunity to wear the actigraph for more than 7 days if equipment malfunction occurred or compliance was an issue. The study and its protocols were approved by the hospital ethics committee. All participating families provided informed written consent.

Measures

Actigraphy. Child sleep was objectively assessed with an actigraph (Actiwatch2, Phillips-Respironics Co., Inc., Murrysville, PA, USA) for 7 consecutive days and nights (Acebo et al., 1999). The device was worn on the child's wrist continuously and removed only when bathing or swimming. Data were stored in 30-s epochs and converted to sleep parameters using the Actiware 5.52 software (Phillips-Respironics Co., Inc.) with the medium wake threshold setting. If the activity count was greater than 40, the epoch was scored as wake; otherwise it was scored as sleep. The actigraph was downloaded to the computer as soon as the device was received from the families, with data scored using the methods described by Acebo et al. (1999), who included 30 min before parental reported bedtime and 30 min after parental reported risetime into the scoring interval. We applied the same scoring rule, a window of 30 min before the reported nap start time and after the nap end time, to generate daytime sleep parameters. To facilitate data scoring, follow-up phone calls were made to resolve any large, unexplained discrepancies between the actigraphy record and parental diary.

Actigraphy has been increasingly used in pediatric research over the past 20 years, and has been suggested to be an ecologically valid approach for assessing child sleep patterns (Galland et al., 2014; Meltzer et al., 2012). Sleep parameters derived from actigraphy for the agreement analysis in the current study were (a) sleep onset, defined as the clock time of first 10 consecutive minutes of immobility within the scoring interval; (b) sleep offset, defined as the clock time of the last 10 consecutive minutes of immobility prior to the end of the scoring interval; (c) actual sleep at night, defined as the amount of time scored as sleep between sleep onset and sleep offset; (d) wake after sleep onset (WASO), defined as the amount of time scored as wake between sleep onset and sleep offset; and (e) daytime sleep, defined as the total amount of time scored as sleep within each nap interval. In our study, actigraphy data were considered usable when recordings were obtained for the entire night and device removal time was <2 hr during the day. No imputation was made for the missing segments of actigraphy data.

Diary. Parents and caregivers kept a paper-and-pencil diary over the period the child wore the actigraph to document child bedtime, sleep latency, risetimes, actual sleep at night, and daytime naps, as well as periods when the actigraph was removed. Sleep parameters derived from the daily diary for the agreement analysis were (a) sleep onset, defined as sleep latency added to bedtime with lights off; (b) sleep offset, defined as the risetime; (c) actual sleep at night, defined as the amount of time reported sleeping between sleep onset and sleep offset; (d) WASO, defined as the amount of time between sleep onset and sleep offset minus actual sleep at night; and (e) daytime sleep, defined as the total amount of time reported sleeping during each nap between risetime and bedtime.

Statistical Analysis

Actigraphy and diary sleep parameters were matched for each child for individual day and night. Sleep parameters were averaged separately for the entire study period, weekdays, and weekends. Descriptive statistics for sample and sleep characteristics are presented as means ± standard deviations (SDs) or frequencies and percentages. Sleep patterns between weekdays and weekends were compared using paired *t*-tests. Differences between the methods were calculated as actigraphy minus diary-derived sleep parameters, including sleep onset, sleep offset, actual sleep at night, WASO, and daytime sleep. Levels of agreement between actigraphy and diary were examined separately for the entire study period, weekdays, and weekends according to the Bland and Altman method using the 95% limits of agreement, an interval computed as the mean difference ± 1.96 *SD* of differences. Unpaired *t*-tests were used to assess child characteristics associated with the absolute value of the difference in sleep parameters between actigraphy and diary. All statistical analyses were performed using SPSS 16.0 for Windows (IBM Corp., Armonk, NY, USA) with two-sided tests, and a *p* value of less than .05 was considered significant.

Results

Sample Characteristics

Children had a mean age of 3.81 years at the time of sleep assessment (**Table S1**). The majority of the children were from two-parent families, with 31 children (34.8%) being the only child at home, 49 (55.1%) receiving child care outside the home during the day, and 32 (36.0%) usually sleeping alone at night. Fifty children (56.2%) had been free of seizure for at least 3 months at the time of study, with 14 (15.7%) having daily seizures and 4 (4.5%) having weekly seizures. Fifteen children (16.9%) had seizures during the study week while they were wearing the actigraphic monitor. The majority of the children (92.1%) were currently taking one or more antiepileptic drugs.

Sleep Patterns and Levels of Agreement Between Actigraphy and Diaries

Children provided a mean of 6.88 ± 0.67 days of usable actigraphy data, with complete 7-day nighttime and daytime data available for 90.9% of the children. Actigraphy recordings showed that children significantly delayed their sleep offset time (8:03 vs. 8:20) and had more WASO (83.43 vs. 90.72 min) at weekends than on weekdays (**Table S2**). Children also had significantly shorter daytime sleep during weekends than weekdays as measured by both actigraphy (90.54 vs. 104.09 min) and diary recordings (95.31 vs. 104.71 min). Differences between actigraphy and diaries were ±35 min for sleep onset, ±15 min for sleep offset, and ±29 min for daytime sleep, indicating satisfactory agreement between methods (**Table S3**). For actual sleep at night and WASO, agreement was not satisfactory, with differences between the methods being ±82 and ±70 min, respectively. Differences between actigraphy and diary-derived sleep variables were consistently greater for weekends than weekdays. Only one child did not nap over the entire week.

Bland-Altman plots demonstrating the differences between actigraphy and diary recording against the mean between the methods are shown for sleep parameters averaged over all the available recording days (**Figure S1**). Although the interval of agreement between actigraphy and diaries varied among different sleep parameters, parents consistently overestimated actual sleep at night and underestimated WASO of their children, with a sizable number of children with a greater than 2-hr difference in WASO between the methods.

Child Characteristics Associated With Discrepancies Between Actigraphy and Diaries

Discrepancies between all the days of actigraphy and diary-derived actual sleep at night were significantly greater for children who slept alone when compared to those who co-slept with a parent (111.13 vs. 90.99 min; **Table S4**). Discrepancies between actigraphy and diaries were not significantly related to other child characteristics such as whether the child was the only child at home, whether the child had reported a seizure during the study week, or whether the child was male or was the firstborn child in the family (data not shown).

Discussion

We are the first to report agreement for both nighttime and daytime sleep parameters between actigraphy measurements and multiday diary in a substantial amount of toddlers and preschool-aged children with epilepsy using the analytical method proposed by Bland and Altman (1986, 1999). The mean difference between actigraphy and diary-derived sleep onset, sleep offset, and daytime sleep in our study was acceptable, and the 95% limits of agreement for these sleep parameters were within 30 min. These findings are in line with prior reports on correlations between actigraphy and diary showing that parents are quite accurate in reporting sleep schedule variables such as sleep onset but often underestimate sleep quality variables such as number and duration of night wakings (Iwasaki et al., 2010; Sadeh, 1996; Tikotzky & Sadeh, 2001). We hypothesized that the agreement for daytime sleep between methods would be satisfactory because child daytime sleep might be more observable for parents and caregivers. Previous research on healthy preschool children also concluded that parental diaries can be used to assess daytime sleep because no differences between actigraphy and diary-derived daytime napping were found (Lam et al., 2011). Our findings, along with these prior reports, suggest that actigraphy and parental daily diaries are interchangeable approaches to measure sleep onset, sleep offset, and daytime sleep in toddlers and preschool-aged children with epilepsy.

Our results also indicate that the agreement between actigraphy and daily sleep diaries is not satisfactory for actual sleep at night and WASO. Based on pediatric sleep literature (Werner et al., 2008), an acceptable agreement between actigraphy and diaries in our study was predetermined as differences between the two methods of less than ±30 min. For actual sleep at night and WASO the discrepancies found in our study were even greater, up to ±1 hr. These findings are consistent with prior studies showing that WASO is among the most difficult sleep parameters to record because parents' memories might be vague or the child might not be a signaler (Asaka & Takada, 2011; Iwasaki et al., 2010; Sadeh, 1996). Discrepancies between actigraphy and diary-derived sleep parameters were largely unrelated to the children's sociodemographic and clinical characteristics in our study. However, we found that parents and caregivers were significantly more likely to misestimate their child's actual sleep at night when not sleeping with the child. Findings from our study suggest that nighttime physical proximity facilitates parental observation of child sleep behaviors and improves parental estimates of sleep quality variables such as actual sleep at night in children with epilepsy.

The 95% limits of agreement between actigraphy and diary for the majority of the sleep parameters in our study were wider for weekends relative to weekdays as well as to the entire study period. These results reflect greater variations in the differences between the methods during weekends and suggest reduced agreement of weekend diary reports with actigraph data. The narrower weekday 95% limits of agreement may be explained by child weekday sleep schedules being regulated by childcare and parental work schedules, given that the majority of the parents were employed and more than half of the children in our study were receiving daytime childcare outside the home. The link between weekday work schedules and sleep schedules likely provides parents greater predictability for weekday than weekend sleep, resulting in more accurate diary reports on weekdays. Greater discrepancies between the methods for weekends may also reflect reduced reliabilities of actigraphy and diary measures for only 2 nights and days of data (Acebo et al., 1999). Our findings suggest that a minimum of a week of actigraphy recording is necessary and suggest that neither weekday nor weekend sleep estimates alone are unbiased and can represent the overall sleep patterns of children with epilepsy.

Total sleep duration observed in our study was shorter than the recommended amount of 11 to 14 hr of sleep per 24 hr for toddlers and 10 to 13 hr of sleep for preschool-aged children (Paruthi et al., 2016). The sleep onset observed in our study was late (22:50) and the nighttime sleep was also low (7 2/3 hr) compared to the findings on typically developing children from studies in the United States (Acebo et al., 2005; Lam et al., 2011; Werner et al., 2008). While sleep assessment methodologies across studies may differ, cross-cultural studies on the sleep of infants, toddlers, and preschool-aged children have consistently reported that children from predominately Asian countries had significantly later bedtimes and shorter nighttime sleep compared with those from predominately Caucasian countries (Mindell et al., 2010, 2013). It is possible that the sleep onset and length of nocturnal sleep as well as daily sleep duration observed in our sample may reflect cultural variability. Notably, the two children with extreme values for sleep onset and offset and the one with roughly 2.25 hr WASO were all children with epilepsy presenting with developmental delay.

We found that children with epilepsy already had a delayed sleep offset during weekends as young as 1.5 years of age. The 17-min weekday-weekend differences in sleep offset as measured by actigraphy in our study were slightly shorter than the 18 and 36 min reported in prior actigraphic studies in preschool-aged children without chronic illness (Iwata et al., 2013; Werner et al., 2008). Weekday-weekend differences in sleep offset have been reported to increase progressively from age 3 to age 9 years (Price et al., 2014). The differences between our findings and those of previous reports are likely to be because our sample also included toddlers. Parental daily rhythms are shown to be the most important factor influencing child sleep-wake schedules, with a reciprocal relationship between the late weekend schedule of the parents and that of their preschool children (Iwata et al., 2013). Child sleep offset time might be shaped by adults given that the majority of the parents in our study were employed and may have the opportunity to extend their sleep offset during weekends. However, we did not observe longer sleep on weekends; rather, we found significantly longer WASO and shorter daytime sleep on weekends over weekdays. These findings suggest that children with epilepsy do not necessarily have improved sleep quality and lengthened daily sleep duration even with a delayed sleep offset on weekends.

We found that actigraphy is more sensitive in detecting sleep pattern differences in comparison with diary recordings. In our study, the weekday-weekend differences in daytime sleep were demonstrated by both actigraphy and diaries. However, weekday-weekend differences in sleep offset and WASO can only be detected by actigraphy but not diaries. Such a finding suggests that actigraphy is more capable of tracking the variability of child sleep and may be more accurate in documenting subtle but clinically meaningful treatment responses. Polysomnography, the gold standard to determine sleep-wake states using neurophysiological parameters, is not an alternative to actigraphy in this respect because it is typically restricted to one or two nights and cannot be applied for multiple nights in the usual home environment. A recent study of sleep in African-American preschool-aged children found that weekday-weekend differences in WASO and wake-up times were associated with internalizing and externalizing behavior problems (Spruyt et al., 2016). Whether disturbances in the regular daily rhythm are linked to adverse health or behavior consequences in children with epilepsy merits further study. Our findings have important clinical implications calling for the development of interventions targeting enhancement of parental awareness and improvement of sleep hygiene in children with epilepsy.

Our study has some limitations worth noting. First, our sample only consisted of epileptic children whose motor and physical activity was not severely impaired. This may limit the generalizability of our study because epilepsy is a heterogeneous disease condition. Examinations of diverse samples of children with epilepsy may expand current understanding on the agreement in sleep behaviors between actigraphy and diaries. Second, although we found that the discrepancies between actigraphy and diary were not influenced by the child characteristics, a few children and their families declined to participate when being informed about the study. We do not know whether the children who did not participate in the study have sociodemographic and clinical characteristics that differ from the children in our sample. Third, we analyzed the daytime sleep data in our study because toddlers still take naps and daytime sleep constitutes a substantial proportion of their 24-hr sleep (Galland et al., 2016; Mindell et al., 2010; Price et al., 2014). However, daytime actigraphy sleep parameters are not reported as commonly as nighttime actigraphy sleep parameters, and their scoring procedures are not standardized (Galland et al., 2014, 2016; Meltzer et al., 2012).

In conclusion, our study of children with epilepsy demonstrates an acceptable agreement between actigraphy and diary for sleep onset, sleep offset, and daytime sleep, but insufficient agreement for actual sleep at night and WASO, with parents of children sleeping alone more likely to misestimate child sleep behaviors. Deviation of weekend sleep from weekday sleep further decreases the accuracy of parental sleep estimates and increases the discrepancies between actigraphy and diaries. Parental diaries have long been used to obtain not only child sleep information, but also other aspects of child behaviors. The actigraphic system requires a monitoring device, an interface reader, software, and considerable expertise in scoring and interpreting the data. Findings from our study suggest that sleep in young children with epilepsy assessed by diaries alone could be misleading and actigraphy should be preferred over diaries when resources are available. Future research applying the Bland-Altman method in a more diverse clinical sample of children with epilepsy or other chronic health conditions is needed.

Acknowledgments

This work was supported by the Ministry of Science and Technology, Taiwan, MOST 104-2314-B-002-115-MY3. There was no industry support for the study. The authors have no financial conflicts of interest. The authors would like to thank Hsin-Yu Li and Ying-Ying Lin for their assistance in data collection and processing. Special thanks to the children and families who participated in the study.

Clinical Resources

- American Academy of Sleep Medicine. Practice guidelines: http://www.aasmnet.org/
- Pediatric Sleep Council. Pediatric sleep news & research: https://www.babysleep.com/

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Figure S1. Plots for actigraphy versus diary comparing (A) sleep onset, (B) sleep offset, (C) actual sleep at night, (D) wake after sleep onset, and (E) daytime sleep. The solid lines indicate the mean of the differences. The dash lines represent the 95% limits of agreement (mean difference ± 1.96 standard deviation).

Table S1. Characteristics of the Children in the Study (N = 89)

Table S2. Sleep Parameters Derived From Actigraphy and Diary (*N* = 89)

Table S3. Mean ± *SD* and Limits of Agreement (Actigraphy Minus Diary; *N* = 89)

Table S4. Child Characteristics Associated With Discrepancies Between All Days of Actigraphy and Diary Derived Sleep Parameters (*N* = 89)

JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Technology Experience of Solid Organ Transplant Patients and Their Overall Willingness to Use Interactive Health Technology

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Key words
Human-centered, interactive health technology, self-management, solid organ transplantation, willingness to use

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Accepted September 1, 2017

doi: 10.1111/jnu.12362

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Abstract

Background: The use of interactive health technology (IHT) is a promising pathway to tackle self-management problems experienced by many chronically ill patients, including solid organ transplant (Tx) patients. Yet, to ensure that the IHT is accepted and used, a human-centered design process is needed, actively involving end users in all steps of the development process. A first critical, predevelopment step involves understanding end users' characteristics. This study therefore aims to (a) select an IHT platform to deliver a self-management support intervention most closely related to Tx patients' current use of information and communication technologies (ICTs), (b) understand Tx patients' overall willingness to use IHT for self-management support, and investigate associations with relevant technology acceptance variables, and (c) explore Tx patients' views on potential IHT features.

Design and Methods: We performed a cross-sectional, descriptive study between October and December 2013, enrolling a convenience sample of adult heart, lung, liver, and kidney Tx patients from the University Hospitals Leuven, Belgium. Broad inclusion criteria were applied to ensure a representative patient sample. We used a 35-item newly designed interview questionnaire to measure Tx patients' use of ICTs, their overall willingness to use IHT, and their views on potential IHT features, as well as relevant technology acceptance variables derived from the Unified Theory of Acceptance and Use of Technology and a literature review. Descriptive statistics were used as appropriate, and an ordinal logistic regression model was built to determine the association between Tx patients' overall willingness to use IHT, the selected technology acceptance variables, and patient characteristics.

Findings: Out of 139 patients, 122 agreed to participate (32 heart, 30 lung, 30 liver, and 30 kidney Tx patients; participation rate: 88%). Most patients were male (57.4%), married or living together (68%), and had a mean age of 55.9 ± 13.4 years. Only 27.9% of Tx patients possessed a smartphone, yet 72.1% owned at least one desktop or laptop PC with wireless Internet at home.

On a 10-point numeric scale, asking patients whether they think IHT development is important to support them personally in their self-management, patients gave a median score of 7 (25th percentile 5 points; 75th percentile 10 points). Patients who were single or married or living together were more likely to give a higher rating than divorced or widowed patients; patients who completed only secondary education gave a higher rating than higher educated patients; and patients with prior ICT use gave a higher rating than patients without prior ICT use. Tx patients also had clear preferences regarding IHT features, such as automatic data transfer, as much as possible, visual aids (e.g., graphs) over text messages, and personally deciding when to access the IHT.

Conclusions: By investigating Tx patients' possession and use of ICTs, we learned that computers and the Internet, and not smartphones, are the most suitable IHT platforms to deliver self-management interventions for our Tx patients. Moreover, Tx patients generally are open to using IHT, yet patient acceptance variables and their preferences for certain IHT features should be taken into account in the next steps of IHT development. Designers intending to develop or use existing IHTs should never overlook this critical first step in a human-centered design.

Clinical Relevance: Before considering using eHealth technology in clinical practice, professionals should always check whether patients are familiar with using information and communication technology, and whether they are willing to use technology for health-related purposes.

Given that many chronically ill patients struggle to adhere to their medication regimens and to lead a healthy lifestyle, interventions are needed to support patients' self-management (Newman, Steed, & Mulligan, 2004). In recent years, interactive health technology (IHT) has been increasingly put forward as an effective way to deliver such interventions (Murray, Burns, See, Lai, & Nazareth, 2005). IHT refers to technologies that allow patients to access or transmit health information and receive guidance or support on a particular health issue, and has shown to significantly improve patients' knowledge, self-efficacy, and clinical and behavioral outcomes in a variety of diseases (Flodgren, Rachas, Farmer, Inzitari, & Shepperd, 2015; Murray et al., 2005). However, whether IHT will be effective in improving medication adherence or other health behaviors will largely depend on patients' willingness to use such technologies.

Indeed, use of technology should not be taken for granted. Unfortunately, software companies or engineers usually develop technologies using a "top-down" approach, assuming their IHT solutions will be welcomed and used by patients. Yet, without formally checking technology acceptance, or patients' openness or willingness to use these technologies in advance, it is not surprising that patients often refuse to use or abandon such technologies prematurely, with rates of patient dropout in technology-related studies of up to 67.7% (Jeffs et al., 2016). This occurs for a variety of reasons: patients do not feel a need for the technology, perceive it as too intrusive, demanding, or difficult, have technical problems or problems with the graphical user interfaces, or have insufficient skills to use the technology (Cruz-Correia et al., 2007; Or & Karsh, 2009; Stoop, van't Riet, & Berg, 2004; Williams, Nicholas, & Huntington, 2003). In other words, the chasm between the developers' and the patients' views often leads to technology implementation failure.

In order to bridge this gap, and maximize technology acceptance and subsequent use, it is crucial to apply a human-centered design process. A human-centered design uses a "bottom-up" approach, and early and iteratively involves patients and relevant stakeholders in the design process, with the goal of fully understanding and involving them as end-users (De Vito Dabbs et al., 2009). Research suggests that by applying these principles and evaluating variables that are known to influence technology acceptance throughout the process, the usability, quality, and implementation of the technology in general improves, since it allows the multidisciplinary development team to accurately assess and address user requirements (Karsh, 2004).

In the PICASSO-Tx project ("Is there a preference for IHT as self-management support for solid organ transplantation?"), we aim to develop and test the efficacy of a core face-to-face self-management intervention with IHT options to support adult solid organ transplant (Tx) patients' medication adherence, physical activity, and weight control, following a state-of-the-art human-centered design. More specifically, we started from a pressing need within the field of transplantation to improve medication adherence and a healthy lifestyle. Indeed, nonadherence to the immunosuppressive regimen, insufficient physical activity, and unhealthy diet are among the most prevalent Tx self-management problems, occurring in about 23, 19, and 25 cases per 100 patients per year, respectively, and are associated with a high risk for morbidity and mortality (Dew et al., 2007). Several risk factors have been investigated (Constantiner & Cukor, 2011). Theoretical models, like the Integrative Model of Behavior Prediction, can help to identify the most important drivers of nonadherence and lifestyle problems (Fishbein & Yzer, 2003). This model holds that a lack of intention or motivation, poor knowledge and skills, and the presence of barriers need to be addressed by self-management interventions, as these factors explain most of the variance in health behavior. Unfortunately, few of these interventions have been tested in adult transplantation, with variable efficacy, mainly due to methodological shortcomings such as the lack of a theoretical model underpinning the intervention and a poor description of the intervention, making it difficult to understand and replicate effective components (De Bleser, Matteson, Dobbels, Russell, & De Geest, 2009; Low, Williams, Manias, & Crawford, 2015). Techniques that most consistently seem to work in improving health behaviors are self-monitoring, behavioral feedback, goal setting, action planning, and problem solving (Michie et al., 2013). Although these are typically presented during face-to-face encounters with a health professional and take place during a scheduled clinic visit, studies in other chronically ill populations have demonstrated that they can also be used on a more continuous basis, in patients' daily lives, by means of IHT (Murray et al., 2005). Unfortunately, IHT for self-management support in the field of transplantation is still in its infancy and deserves further testing (De Vito Dabbs et al., 2016; Dew et al., 2004). However, before designing and testing IHT in transplantation, we first need to understand which information and communication technologies (ICTs) patients already use, allowing the selection of a platform to deliver such an intervention that is most familiar to patients (De Vito Dabbs et al., 2009). Many designers ignore this step and create fancy apps, not realizing that perhaps not all patients possess a smartphone, let alone have sufficient familiarity to use one if offered for free in the context of a research project, leading to an increased risk for premature IHT abandonment (Zhou et al., 2014). Second, it is crucial to evaluate Tx patients' openness to such technology, and which relevant technology acceptance variables are associated. If there would be no or low openness, all future development steps would be pointless and a waste of money. Furthermore, if subgroups of patients would be less open to IHT for self-management support (guided by characteristics known to influence technology acceptance), researchers should ensure that these patients are well represented in the next steps of the design process, to increase their eventual acceptance (Karsh, 2004). Finally, patients' opinions on suggested IHT features should be solicited early, before developing an actual technology. Their preferences can then be applied in the next steps of our human-centered design, in which (a) more details on Tx patients' self-management needs are collected, (b) prototypes are iteratively created with a heterogeneous group of patients, (c) a prototype is programmed in the IHT platform and piloted in patients' daily lives, and (d) the prototype is further tested on its efficacy in improving self-management.

To summarize, this study represents the first step of a human-centered design process, and aims to (a) select an IHT platform to deliver a self-management intervention that is most closely related to Tx patients' current use of ICTs, (b) understand Tx patients' overall willingness to use IHT for self-management support, and investigate associations with relevant technology acceptance variables, and (c) explore Tx patients' views on potential IHT features.

Methods

Design, Sample, and Setting

This cross-sectional, descriptive study was conducted in the four adult solid organ Tx programs of the University Hospitals Leuven, Belgium. Leuven hosts one of the largest Tx centers within Europe. Belgium has a compulsory health insurance system with full immunosuppressive medication cost coverage. Patients remain in lifelong follow-up with outpatient clinic visits every 3 to 6 months, depending on their medical status, organ type, and time posttransplantation. This study used a convenience sample and applied broad inclusion criteria to ensure a representative sample of approximately 30 patients per Tx population. A patient sample of 120 was deemed sufficient, relative to the number of variables assessed (at least 10 patients per variable; see section on Variables and Measurements). Patients were eligible to participate if they were (a) a heart, lung, liver, or kidney transplant recipient ≥6 months postsurgery (as most patients are past the critical posttransplantation period and presumably have taken up their "normal" lives again; Patel & Paya, 1997), (b) scheduled for a follow-up visit at the outpatient clinic of the University Hospitals Leuven during the study period (October to December 2013), (c) ≥18 years of age, (d) sufficiently able to express themselves orally in Dutch, and (e) willing to sign an informed consent form. Patients were excluded if they were physically or cognitively unable to participate, as judged by the treating physician (e.g., mental retardation or severe cognitive problems following stroke). Illiteracy was not an exclusion criterion, as all variables were collected via interview (see section on Variables and Measurements).

Variables and Measurements

Different types of concepts and variables related to possession and use of modern ICTs, overall willingness to use IHT as self-management support, technology acceptance that might be associated with overall willingness to use, and preferences for specific IHT features were selected based on theoretical and empirical evidence, or developed specifically for this study.

Possession and use of modern ICTs. Together with information technology– and human-centered design experts, the researchers constructed a list of commonly used ICTs that were considered eligible as IHT platforms to deliver interventions. Patients were asked about their possession of a cell phone, smartphone, desktop, laptop, or tablet personal computer (PC; yes or no), duration of use (<1 month, 1 month to 1 year, 1–3 years, >3 years), purpose (e.g., calling or sending text messages), frequency (never, less than once a week, multiple times a week, every day, multiple times a day), and, if applicable, reasons for nonuse. Furthermore, additional questions were asked about access to and type of Internet (wired-wireless-mobile), where it was used, the purpose (e.g., e-mailing), as well as frequency of use.

Overall willingness to use IHT for own self-management support. To assess Tx patients' overall willingness to use IHT, we asked how important it was for them personally that IHT would be developed to support them in their medication taking, physical activity, and weight control (10-point numeric scale, 0 = *not at all important*, 10 = *very important*). We also explored associations between patients' scores and relevant technology acceptance variables. These were derived from the Unified Theory of Acceptance and Use of Technology (UTAUT), a widely used model that predicts the acceptance and subsequent use of a new technology. It should be noted that only variables that were deemed relevant for the purpose of this predevelopment study were applied (i.e., age and gender; other variables are only important when a technology [prototype] is already designed; Venkatesh, Morris, Davis, & Davis, 2003). Additionally, we performed a literature review, and found that the technology acceptance variables education, children, marital status, employment, and prior experience with technology were worthwhile to consider in relation to patients' overall willingness to use IHT for self-management support. **Figure 1** provides an overview of all identified technology acceptance variables and the selection that was made for this first step of our human-centered design.

Tables 1 and **2** and **Figure 2** show the answer categories and operationalization of the variables. Based on empirical evidence, we hypothesized that younger age, male gender, higher education, having children, being married or living together, being employed, and having prior technology experience would be associated with a higher overall willingness to use IHT (Duplaga, 2012; Morris, Venkatesh, & Ackerman, 2005; Or & Karsh, 2009; Venkatesh & Morris, 2000; Venkatesh et al., 2003).

Patients' views on potential IHT features. Tx patients' views on possible IHT features were operationalized by asking to what extent they would see themselves using a range of common IHT options (certainly not, neutral, certainly). Options to support medication adherence, physical activity, and weight control were selected during multidisciplinary brainstorm sessions (see also **Table 3** for IHT features).

The combination of these variables resulted in a 35-item, iteratively developed questionnaire that was presented to usability experts and was subsequently pilot-tested in one patient. It was administered in a structured, "skip-logic" interview (i.e., skip questions based on patients' answers) to limit patient burden, ensure maximal participation, and provide additional information or clarify items if needed. Total time for the interview was about 20–30 min.

Procedure

The Ethics Committee of University Hospitals Leuven approved the study, which was conducted according the Declaration of Helsinki and the guideline "Good Clinical Practice."

The researchers obtained lists of all adult solid organ Tx patients who had a scheduled outpatient clinic visit during the study period (October to December 2013). These lists were acquired from and screened for eligibility by the treating physicians of the adult heart, lung, liver, and kidney Tx programs. During this visit, the researcher (author J.M.M.V., a master's prepared nurse not belonging to the therapeutic team) approached eligible patients in the

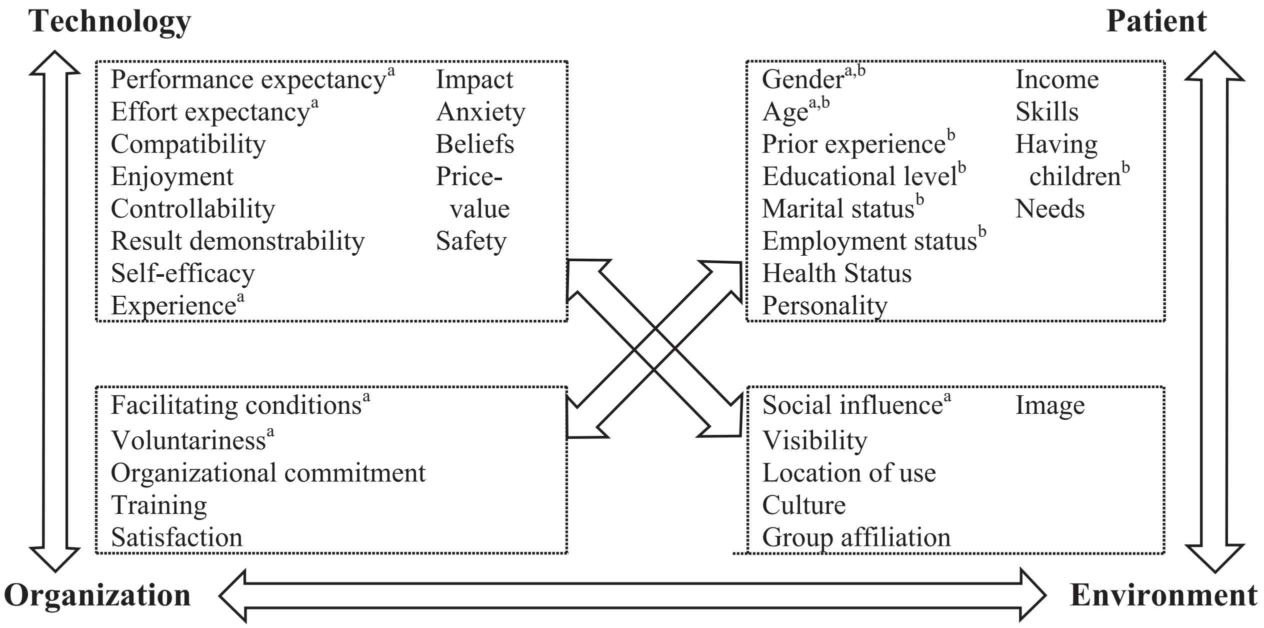

Figure 1. Overview of technology acceptance variables that can be used throughout a human-centered design process. Technology acceptance has to do with an interaction between patient-related variables (i.e., patient characteristics) and their perception of the new technology, the environment, and the organization. [a]Variable is part of the Unified Theory of Acceptance and Use of Technology, i.e., combination of patient-, technology-, organizational-, and environmental-related variables that predict the acceptance and use of a new technology (Venkatesh et al., 2003). [b]Variable included in questionnaire of the current study. Figure adapted from Smith and Sainfort (1989).

waiting room right before or after their consultation, and informed them about the study in a standardized way. If willing to participate, patients signed the informed consent form and the interview started at a convenient time for the patient. Approximately 30 patients per Tx population were pursued. All questionnaires were de-identified to allow coded analyses.

Analyses

Descriptive statistics were used as appropriate, based on the level of measurement and distribution of variables assessed (i.e., frequencies, percentages, means ± *SD*, medians [25th percentile; 75th percentile]). An ordinal logistic regression model was fitted to determine the association between patients' score on overall willingness to use IHT to support their own self-management and the selected technology acceptance variables. Additionally, the variable Tx population was included to explore potential differences in association across the four populations. Presence of multicollinearity between variables was assessed through linear regression. The possibility of interactions was determined between age and the other independent variables. A p value of $<.05$ was considered statistically significant, and analyses were done with SPSS version 22 (IBM Corp., Armonk, NY, U.S.A.).

Results

Sample Characteristics

A convenience sample of 139 heart, lung, liver, and kidney Tx patients who met the inclusion criteria was invited to participate, of which 122 consented to participate (i.e., 32 heart, 30 lung, 30 liver, and 30 kidney Tx patients; participation rate 88%). The mean age was 55.9 ± 13.4 years, and most patients were male (57.4%) and married or living together (68%; see **Table 1**).

Possession and Use of Modern ICTs

Patients most frequently owned a cell phone (70.5%); only 27.9% of patients possessed a smartphone. Desktop, laptop, and tablet PCs were owned by 54.1%, 64.8%, and 26.2% of patients, respectively (see **Figure 2**). A total of 113 Tx patients (92.6%) had at least Internet access at home and possible other places (e.g., at work). The percentage of patients possessing at least one desktop or laptop PC was 89.3%, with all having access to the Internet at home and the majority having wireless Internet (72.1%). Yet, not all patients who possessed ICTs also used them. For example, 13 patients did not use the Internet because they found it too complicated ($n =$ 5), because they themselves did not need it (as opposed

Table 1. Demographics and Clinical Characteristics

Characteristics	Total sample (*N* = 122)
Men, *n* (%)	70 (57.4)
Age in years, mean ± *SD*, range	55.9 ± 13.4, 21–83
Native tongue, *n* (%)	
Dutch	115 (94.3)
French	5 (4.1)
Italian	2 (1.6)
Having children, *n* (%)	93 (76.2)
Marital status, *n* (%)	
Married or living together	83 (68)
Single	24 (19.7)
Divorced	9 (7.4)
Widow/widower	6 (4.9)
Educational level, *n* (%)	
Primary school	35 (28.7)
Secondary school	47 (38.5)
University college	25 (20.5)
University	15 (12.3)
Employment, *n* (%)	
Employed	31 (25.4)
Full time	19 (61.3)
Other[a]	12 (38.7)
Disabled	45 (36.9)
Retired	41 (33.6)
Unemployed	2 (1.6)
Student	2 (1.6)
Housewife	1 (0.8)
Type of transplantation, *n* (%)	
Lung	30 (24.6)
Heart	32 (26.2)
Kidney	30 (24.6)
Liver	30 (24.6)
Time posttransplantation in years, median (25th percentile–75th percentile) range	6 (2–12), 0.5–27

[a] Time employed between 50% and 80%.

Table 2. Top Three Most Frequent Actions Performed by Transplant Patients Who Actually Use Information and Communication Technology (*N* = 122)

Action	*n* (%) Yes
I use my cell phone at least once a week to . . .	
receive text messages	59 (72)
make phone calls	54 (65.9)
send text messages	52 (63.4)
I use my smartphone[a] at least once a week to . . .	
receive text messages	33 (97.1)
send text messages	33 (97.1)
make phone calls	31 (91.2)
I use my desktop PC at least once a week to . . .	
work with a text processor	20 (36.4)
play games	12 (21.8)
work with a spread sheet program	11 (20)
I use my laptop PC at least once a week to . . .	
work with a text processor	22 (32.4)
play games	17 (25)
work with a spread sheet program	13 (19.1)
I use my tablet PC at least once a week to . . .	
play games	12 (41.4)
use Bluetooth[b]	4 (13.8)
take and/or watch photos	2 (6.9)
I use the Internet at least once a week to . . .	
send and/or receive e-mails	91 (91)
read literature[c]	59 (59)
participate in social media[d]	45 (45)

Note. PC = personal computer.

[a] Differences between cell phone and smartphone: the latter has a touch screen and/or full keyboard, is a combination of a cell phone and a personal digital assistant, uses an operating system that allows third party applications to run on, and has more advanced capabilities (Joan, 2011).

[b] To connect with other devices to, for example, stream music, videos, and photos.

[c] For example, online newspaper, news site, etc.

[d] For example, Facebook®, Twitter®, etc.

to their partner or children; $n = 4$), or a combination of both ($n = 4$). Hence, of the patients who owned the ICT, 95.5% used their cell phone, all patients used their smartphone, and 83.4%, 86.1%, and 90.9% used their desktop, laptop, or tablet PC, respectively. The majority of cell phone, desktop, and laptop PC and Internet users had been using it for ≥3 years, while this was only the case in 18% and 10% of the smartphone and tablet PC users, respectively. **Table 2** shows the top three most frequently performed actions per technology.

Overall Willingness to Use IHT for Own Self-Management Support

The median score for patients' overall willingness to use IHT for personal self-management support on the 10-point numeric scale was 7 (25th percentile, 5 points; 75th percentile, 8 points; range, 0–10; see **Table 3**). Multivariable ordinal logistic regression analysis showed that patients who were single (odds ratio [OR] 16.9; 95% confidence interval [CI] 3.57–80.05) or married or living together (OR 4.11; 95% CI 1.44–11.70) were more likely to score higher on overall willingness to use IHT compared to patients who were divorced or widowed. Likewise, patients who completed secondary education only (OR 3.02; 95% CI 1.30–7.02) were more likely score higher than patients with a higher education (university college or university), and patients with prior technology use scored higher (OR 11.36; 95% CI 1.70–75.88) than patients without prior technology use (**Table 4**).

Patients' Views on Potential IHT Features

The majority of Tx patients (84%) would see themselves using a weight scale to monitor their weight. About

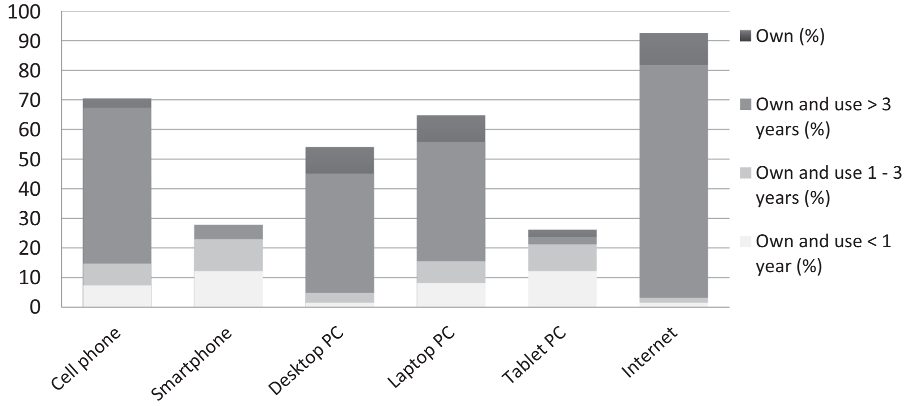

Figure 2. Possession and actual use of information and communication technologies by transplant patients ($N = 122$). Use < 1 year = % of patients who own and have used the respective technology for less than 1 year; use 1–3 years = % of patients who own and have used the respective technology for 1 to 3 years; use > 3 years = % of patients who own and have used the respective technology for more than 3 years; Own = % of patients who own the respective technology, but do not use it (themselves).

half the patients (51%) would be willing to use a pedometer to monitor their physical activity, yet only 37% would see themselves using an electronic medication pillbox. Automatic data transfer to a computer (84%) or smartphone (79%) was preferred over the patient sending the data on his or her own (60% and 56%, respectively). Results on receiving feedback via smartphone or computer were similar (66% and 62%), yet patients preferred receiving the feedback via visual aids (e.g., graphs) over text messages (62% versus 52%; see **Table 3**).

Discussion

To our knowledge, this is the first study in solid organ transplantation that focuses on selecting an IHT platform based on ICT familiarity, overall willingness to use IHT, and views on potential IHT features. We found that most Tx patients are familiar with modern ICTs, especially computers and the Internet, yet not with smartphones and tablets. Overall, our Tx patients are willing to use IHT to support them in taking their medication and monitoring weight control and physical activity. Yet divorced or widowed patients, patients who attained higher education, and patients with no prior technology use had a lower overall willingness to use IHT. These important findings are further discussed in view of future development and testing of an IHT.

Smartphone apps are increasingly used to deliver self-management support interventions, wrongfully assuming that all patients possess and are familiar with using smartphones (Chow, Ariyarathna, Islam, Thiagalingam, & Redfern, 2016). Therefore, the importance of investigating end users' familiarity with modern ICTs, to make optimal use of their skills, should not be overlooked in this first human-centered design step. Indeed, we found a surprisingly low number of patients who owned and used smartphones (27.9%). This prevalence rate is even slightly lower than the range of 35% to 63% reported in kidney Tx studies, or compared to the general Belgian population in 2013 (46.2%; Browning, McGillicuddy, Treiber, & Taber, 2016; Federale Overheidsdienst [FOD] Economie, 2014; Lockwood et al., 2013; McGillicuddy et al., 2013; Sieverdes, Nemeth, et al., 2015; Sieverdes, Raynor, et al., 2015). Yet these studies did not always make a clear distinction between cell phones and smartphones, nor between possession and actual use. In comparison, 93% of our patients possessed at least one cell phone or smartphone. One may wonder why our findings contrast with, for instance, the general Belgian population. This can be partially explained by the fact that Tx patients in general are older, retired, or disabled and have a lower health status, factors that are known to be negatively associated with the adoption of new technologies (Or & Karsh, 2009). Furthermore, Browning et al. (2016) revealed that although smartphone use among kidney Tx patients had increased over the past years, patients ≥55 years of age were still significantly less likely to possess one (46% vs.75%, $p < .001$). Even if the number of smartphone users among Tx patients increased since our data collection, this number would still not exceed 50%. Hence, selecting smartphones as a primary platform and developing an app to deliver our self-management intervention would have been a suboptimal choice, as patients who do not possess a smartphone would not be eligible to participate in future trials testing the efficacy of our IHT intervention, inevitably leading to selection bias. One could consider equipping patients with a smartphone, yet this would be costly, and might

Table 3. Overall Willingness of Transplant Patients to Use Interactive Health Technology (IHT) for Personal Self-Management Support and Their Views on Potential IHT Features ($N = 122$)

To what extent do you see yourself using . . .	Certainly: *n* (%)
a weight scale to monitor your weight	103 (84)
a pedometer to monitor your physical activity	62 (51)
a pillbox that registers your medication intake	45 (37)
technology of which data are sent to a computer automatically	101 (83)
technology of which data are sent to a smartphone automatically	96 (79)
technology where you have to send data to a computer on your own	73 (60)
technology where you have to send data to a smartphone on your own	68 (56)
a smartphone to receive feedback	80 (66)
a computer to receive feedback	75 (62)
visual aids to receive feedback[a]	76 (62)
text messages to receive feedback	63 (52)
How important it is for you that technology is being developed to support you in your physical activity, weight control and medication adherence on a scale from 0 to 10?[b] Median (25th percentile–75th percentile), range	7 (5–8)

[a] For example, graphs and tables.

[b] 0 = not important at all; $n = 121$.

lead to a high drop-out rate because of usability issues inherent to initial smartphone usage (Zhou et al., 2014). Our interviews revealed that delivering our planned self-management intervention via a computer and website was a good alternative, since 89.3% of patients owned at least one computer with Internet access (of which 72.1% was wireless), and the vast majority had been using it for >3 years. Furthermore, comparable numbers were found in the general Belgian population (81.9%) and in a recent study in kidney transplantation (79.1%; Browning et al., 2016; FOD Economie, 2014).

Apart from selecting a suitable IHT platform, this study also provided interesting insights on patients' overall willingness to use IHT. In general, Tx patients were open to IHT development, reflected by a median score of 7 out of 10 on the "overall willingness to use IHT" question, with 75% of patients giving a score of ≥5. This positive finding is consistent with the limited evidence available in solid organ Tx literature (Browning et al., 2016; McGillicuddy et al., 2013; Sieverdes, Nemeth, et al., 2015). Some technology acceptance variables might be associated with overall willingness to use, bearing in mind that the numbers are small as shown in the wide confidence intervals, and the results should therefore be interpreted with care. More specifically, we found that patients who were divorced or widowed, who had attained higher education, or who had no prior technology use gave lower ratings. The latter is in line with other research showing an association between no or little prior technology use and lower acceptance of new technologies, given the lower ICT familiarity and skills (Or & Karsh, 2009). It is plausible that divorced or widowed patients suffer from depressive symptoms, and might therefore experience insufficient energy to adequately manage their therapeutic regimens, with or without technology (Kessler & Bromet, 2013). Yet the underlying mechanisms for these lower scores warrant further investigation. Similarly, one can only speculate about the lower scores in higher educated patients. Perhaps these patients are more sceptical regarding IHT development and want to experience the new technology first. Yet it seems that higher educated patients in particular might benefit from additional support, since previous research has shown that higher education, not lower education, was associated with medication nonadherence (Dobbels et al., 2009). In the philosophy of a human-centered design process, these patient subgroups in particular need to be actively involved in all future steps so that they also become open to using IHT. It is nevertheless reassuring that we did not find different scores in overall willingness to use IHT for the other selected variables, like gender, employment, having children, or Tx population. Surprisingly, and in contrast to other studies, age did not correlate significantly with overall willingness to use IHT (Or & Karsh, 2009). Since the age of Tx patients is increasing, this is encouraging and suggests that a majority would be willing to embrace IHT for self-management support, irrespective of their age (Abecassis et al., 2012).

Interestingly, participants provided useful information on desired IHT features for self-management support. First, patients are not eager to receive messages or reminders and want to independently decide when to

Table 4. Ordinal Logistic Regression Determining the Association Between Selected Technology Acceptance Variables and Transplant (Tx) Population and Tx Patients' Overall Willingness to Use Interactive Health Technology[a] ($n = 121$)

				95% CI for Exp(B)	
Parameter		Exp(B) OR	Significance	Lower bound	Upper bound
Age		0.99	.6384	0.96	1.02
Gender	Male	0.63	.1948	0.31	1.27
	Female (Ref)				
Marital status	Single	16.90**	.0004	3.57	80.05
	Married or living together	4.11*	.0082	1.44	11.70
	Divorced/Widowed (Ref)				
Educational level	Primary education	2.52	.0644	0.95	6.71
	Secondary education	3.02*	.01	1.30	7.02
	Tertiary education (Ref)				
Employment	Unemployed	1.31	.5138	0.58	2.98
	Employed (Ref)				
Having children	Yes	0.33	.0742	0.10	1.11
Transplant type	Lung	2.63	.058	0.97	7.16
	Heart	1.23	.6838	0.45	3.34
	Kidney	1.21	.6965	0.47	3.14
	Liver (Ref)				
Prior technology use[b]	Yes	11.36*	.0121	1.70	75.88

Note. Results: Patients who were single or married or living together were more likely to give a higher score than divorced or widowed patients; patients who completed secondary education were more likely to give a higher score than patients with higher education; patients with prior technology use were more likely to give a higher score than patients without. CI = confidence interval; Exp(B) = exponentiation of the B coefficient, which represents the OR; OR = odds ratio; Ref = group used as reference.

[a] Tx patients' overall willingness to use interactive health technology as personal support in their medication adherence, physical activity, and weight control; scale from 0 to 10.

[b] Patients who already own and use any of the questioned information and communication technologies.

*Statistically significant, $p < .05$.

**Statistically significant, $p < .001$.

access the website, despite meta-analytic evidence showing significant improvements in medication adherence by reminder systems (Fenerty, West, Davis, Kaplan, & Feldman, 2012). Second, they prefer visual aids, like graphs, over text messages to receive feedback. And finally, they prefer automated data transfer between the monitoring devices and the website, rather than having to type in information themselves. These preferences will be used in IHT development, further in our human-centered design, in order to maximize technology uptake.

Some limitations of our work should be addressed. First, although this was a monocentric study, raising caution for generalization, the inclusion of four solid organ Tx populations from one of the largest European Tx centers can be considered a strength. Furthermore, notwithstanding the fact that convenience sampling was used and that only 30 Tx patients per group were included, the demographic characteristics of the included Tx patients closely resemble those of registry reports, ensuring a heterogeneous and representative sample (Eurotransplant International Foundation, 2017a, 2017b; Lund et al., 2013; Yusen et al., 2013). Yet, we excluded patients who were <18 years of age, physically or cognitively unable to participate, and insufficiently able to communicate in Dutch, which are groups that are often prone to health inequalities. The use of interviews further contributed to the representativeness of our sample, since it allowed inclusion of illiterate patients as well, and items that were not well understood could be easily clarified. The use of UTAUT as a theoretical model underpinning our choice of variables can be considered a strength, yet some of its variables might be less relevant when exploring IHT openness before an actual technology is designed. For example, patients can only judge how easy a technology is to use once they can experience it. Therefore, assessing their openness, irrespective of technology-related characteristics, might be more relevant in a pre-design stage. The Technology Readiness Index is such a questionnaire that captures patients' beliefs about new technologies, independent of their actual competence to use them, and might therefore be a valuable addition to our interview questionnaire (Parasuraman, 2000). Finally, mobile phone usage in Belgium has increased since the time of our data collection from 46.2% to 65%. However, the rate of computer possession remains much higher (82.1%), still confirming our selection of computers as a primary IHT platform (FOD Economie, 2016).

In conclusion, investigating Tx patients' possession and use of ICTs showed that computers and the Internet are suitable IHT platforms to deliver self-management interventions in the sample and setting under study. Furthermore, Tx patients in general are positive towards the development and use of IHT. Future studies intending to develop or use existing IHT should never overlook this critical first step within a human-centered design process.

Acknowledgments

The authors would like to thank all patients for their contribution and the hospital staff for their support in conducting the study. This project was supported by a research grant from the Research Council of KU Leuven (OT13-101).

Clinical Resources

- More information on the PICASSO-Tx project: https://soc.kuleuven.be/mintlab/blog/projects/
- More information on the human-centred design process: http://www.designkit.org/human-centered-design; http://www.designkit.org/resources

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JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Depression, Perceived Health, and Right-of-Return Hopefulness of Palestinian Refugees

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Key words
Depression, perceived health, hope, right of return, Palestinian refugee, Jordan

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Accepted September 30, 2017

doi: 10.1111/jnu.12363

Abstract

Purpose: Displacement is traumatic and often an unwanted social change that can lead to a loss of identity and socioeconomic, physical, and psychological livelihood. The purpose of the study was to describe the association of perceived health and right-of-return hopefulness to depressive symptom severity in Palestinian refugees, taking into consideration gender and poverty.

Design: The descriptive, correlational study was framed within a socioecological lens. Data collection occurred between October 2015 and November 2015 in Amman, Jordan, which hosts the most Palestinian refugees in the world. The participants in the sample ($N = 177$) had a mean age of 36.9 years.

Methods: Participants responded to the Patient Health Questionnaire for depressive symptom severity, the RAND-36 perceived health item, and a statement about hopefulness to return to Palestine. Descriptive, correlation, and logistic and linear regression analyses were computed.

Findings: Results showed that 43% of participants had moderate to severe depressive symptoms, 42% lived in poverty, and 20% had fair or poor health; yet, 60% were hopeful about returning to Palestine. Participants who had better perceived health and right-of-return hopefulness were less likely to have symptoms of major depression. Perceived health was the only factor—not gender, poverty, or right-of-return hopefulness—that explained the variance in depressive symptoms.

Conclusions: Palestinian adult refugees in Jordan exhibited symptoms of major depression that were associated with poorer perceived health and less hopefulness about repatriation to Palestine.

Clinical Relevance: Nurses with community or mental health specialization can play a major role by systematically screening refugees for depression using worldwide, evidence-based tools and by advocating for policies that can improve the health and living conditions of refugees.

Over 65 million people are either a refugee, internally displaced, or seeking asylum; half of whom are women and children (United Nations High Commissioner for Refugees (UNHCR), 2015). Refugees represent 21.3 million or 32.8% of the world's displaced population, people who were forced to leave their homes, usually due to armed conflict. Of the 21.3 million refugees worldwide, 5.2 million Palestinian refugees are registered by the United Nations Relief and Works Agency (UNRWA), which exists for the singular purpose of providing humanitarian relief, protection, and basic health, social, education, and human development assistance to Palestinian refugees in need (UNRWA, n.d.a). A Palestinian refugee is a person "whose normal place of residence was Palestine during the period 1 June 1946 to 15 May 1948, and who lost both home and means of livelihood as a result of the 1948 conflict" (UNRWA, n.d.a, "Who are Palestine refugees," para. 1). Since 1948, the Arab-Israeli conflicts have forced Palestinians to leave their homes and seek refuge in the Occupied Palestinian Territories of the West Bank and Gaza Strip and neighboring countries (Tessler, 2017). The Hashemite Kingdom of Jordan hosts more Palestinian refugees, 2.1 million, than any country in the world, and three generations of Palestinian refugees and descendants have been born and reared in Jordan (UNRWA, n.d.c).

Forced displacement is traumatic and often an unwanted social change that can lead to a loss of identity and physical, psychological, and socioeconomic livelihood (Lori & Boyle, 2015; Marie, Hannigan, & Jones, 2016; UNHCR, 2017). For many refugee women, intimate partner and gender-based violence and associated mental health conditions have been identified as additional issues (Al-Modallal, 2012, 2016). The poor physical health, living, and socioeconomic conditions of Palestinian refugees in Jordan have been documented (Tiltnes & Zhang, 2013), although current literature about their psychological health could not be found. In neighboring countries to Jordan, 19% of Palestinian adult refugees in Lebanon were found to have mental health disorders, with 8% having depression (Llosa et al., 2014). The prevalence of depression was 11% among Palestinian adult refugees in the Occupied Palestinian Territory of the West Bank (Madianos, Sarhan, & Koukia, 2012). Depression has significant health, social, and financial impacts on individuals and society, particularly in conflict-affected populations (Ayer et al., 2015). Depression is the leading cause of disability worldwide, and the burden of depression is 50% higher for women than for men (World Health Organization [WHO], 2017). Depression is a focus that deserves attention in order to reduce its burden in a culturally appropriate manner.

Displacement is often a protracted reality for most refugees. More than half of all refugees have been displaced for 10 years or longer, and once refugees have been displaced for 6 months, they are unlikely to return to their home country (UNHCR, 2017). The United Nations General Assembly Resolution 194 Right of Return guarantees refugees the right to return to their home at the earliest feasible date (UNRWA, n.d.b). Seventy percent of Jordanians have Palestinian ancestry; thus, returning to Palestine is a desire of Palestinian refugees living in Jordan, given that a solution to the Israeli-Palestinian conflict is not imminent and most Palestinian refugees have spent their entire lives in Jordan and have never been to Palestine (Tessler, 2017; Young, 2011). Little is known about right-of-return hopefulness and how a presumed positive motivational state could affect the psychological well-being of the Palestinian refugee population.

Purpose of the Study and Conceptual Framework

The purposes of the study were to describe depressive symptom severity, perceived health, and right-of-return hopefulness; explore the association of perceived health and right-of-return hopefulness to depressive symptom severity; and examine the influence of perceived health, right-of-return hopefulness, gender, and poverty on depressive symptom severity among Palestinian refugees in Jordan. The socioecological lens that framed this research inquiry was the WHO Commission on the Social Determinants of Health, which emphasizes that health should be a fundamental right of every human being; health encompasses physical, mental, and social well-being; and health is impacted by social determinants, such as culture, economics, gender, education, housing, social justice, and freedom of movement, among others (Marmot et al., 2008).

The WHO Social Determinants of Health framework is consistent with the nursing profession's code of ethics, which also emphasizes the causes of health as well as the requirements for health (American Nurses Association, 2015; International Council of Nurses, 2012). For example, in the context of this study, nurses can ensure the universality of health by screening and monitoring health indicators (depression and perceived health) that may provide early warnings of potential problems and the immediate and long-term effects of displacement, by being cognizant of the sociocultural environment in which a population is displaced (gender, poverty, and host country), and by advocating for policies and programs that promote not only the health but also the human rights of refugees (right-of-return).

Methods

Design

The design of this nonexperimental study was descriptive and correlational, with data collected at one cross-section of time in Amman, Jordan, between October 2015 and November 2015. The Institutional Review Board of the University of California, San Francisco, approved the study. In addition, the study had the support and approval of the UNRWA's administration in Amman, Jordan, and the University of Jordan.

Sample and Setting

A noninstitutionalized, community sample of Palestinian adult refugees who were 18 years of age and older, were registered with the UNRWA, had Jordanian citizenship, and were able to read, speak, and comprehend Arabic were recruited for the study. Persons who had or were being treated for depression or other mental health conditions were excluded from the study. Participants were recruited from healthcare centers, markets, and mosques located in neighborhoods in northern Amman, an urban area and the most populous city of 4 million people in Jordan. Amman is the capital of Jordan, which is considered a small country in the Middle East of about 7.6 to 8.1 million people, depending on the data source, of whom 97% of the population are Muslim in religion and 98% are ethnically and linguistically Arab (Central Intelligence Agency, 2017; World Bank, 2016). Jordan has an "upper middle income" economy designation (World Bank, 2016); its economy is among the smallest in the Middle East and its debt has been burgeoned by the influx of refugees (Hakim, Hasna, Halabi, & Abu-Ghaida, 2016).

A total of 210 Palestinian refugees were approached by the first author (H.A.) and a trained research assistant, both of whom are Jordanian and speak Arabic and English fluently. Of the 210 Palestinian refugees approached, 23 refused to participate in the study and 10 did not meet the study's eligibility criteria, yielding a nonprobability convenience sample of 177 Palestinian refugees. A priori sample size calculation with power set at .80, medium effect noted in parentheses, and $p \leq .05$ (two-tailed test) was 128 ($d = .15$) for independent Student's *t*-test analysis, 194 ($r = .20$) for correlation analysis, and 84 ($R^2 = .15$) for multiple linear regression analysis with four predictors (Cohen, 1988; Cohen, Cohen, West, & Aiken, 2003).

Procedure

Study procedures occurred in a quiet, private location in the community and were conducted in Arabic. Following the previously described recruitment and eligibility screening processes, the study was explained to participants, who also received a copy of the study's information sheet. After participants' questions were answered, they completed the self-administered questionnaire in the presence of the first author (H.A.) or research assistant. The average completion time was about 20 min. Participants were thanked for their time and reassured that their information would be handled confidentially. Questionnaires were numbered sequentially prior to recruitment, contained no personal identifying information, and were secured in a locked cabinet.

Variables and Measures

Participants were assessed on depressive symptom severity, perceived health, right-of-return hopefulness, and demographic characteristics.

Depressive symptom severity. The multipurpose, nine-item Patient Health Questionnaire (PHQ-9) was used to assess depressive symptom severity during the preceding 2 weeks. Items correspond to the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (DSM-V) depression diagnostic criteria, and its brevity is pragmatic for field work (Kroenke, Spitzer, & Williams, 2001). Response options were 0 (*not at all*), 1 (*several days*), 2 (*more than half the days*), or 3 (*nearly every day*) for items such as "little interest or pleasure in doing things" and "feeling down, depressed or hopeless." Scores were summed and could range from 0 to 27; a higher score indicates more depressive symptoms. As described by Kroenke and colleagues, level of depressive symptom severity was categorized as minimal (0 to 4), *mild* (5 to 9), *moderate* (10 to 14), *moderately severe* (15 to 19), or *severe* (20 to 27).

The diagnostic validity of the PHQ-9 was established in primary care and obstetrics-gynecology clinic samples in the United States, for which it had a sensitivity of 88% and a specificity of 88% for major depression at a cutoff score of 10 or greater (Kroenke et al., 2001). Cronbach's alpha internal consistency reliability coefficients were .86 and .89, respectively, for the two samples. In this study, Cronbach's alpha was .80. The Arabic-translated version of the PHQ-9 has been shown to be reliable ($\alpha = .88$) and valid with relatively good sensitivity (77%), but low specificity (46%) for major depression at a cutoff score of 10 or greater in a Lebanese adult psychiatric outpatient sample (Sawaya, Atoui, Hamadeh, Zeinoun, & Nahas, 2016).

Perceived health. Perceived health was assessed on a scale of 1 (*excellent*), 2 (*very good*), 3 (*good*), 4 (*fair*), or 5 (*poor*). The item "in general, would you say your health is" was selected from the well-established and widely used RAND-36 tool (Hays & Morales, 2001).

Right-of-return hopefulness. The investigator-developed question about right-of-return hopefulness was "On a scale of 1 to 5, how hopeful are you about the possibility of returning to Palestine in the future?" The response options were 1 (*not hopeful at all*), 2 (*somewhat not hopeful*), 3 (*neutral/unsure*), 4 (*somewhat hopeful*), or 5 (*very hopeful*). A higher score indicates more hopefulness about returning to Palestine.

Demographics. Demographic data collected were gender (male or female), age in years, education (less than Tawjihi/high school, Tawjihi/high school, or college degree), marital status (married or unmarried), employment status (employed or unemployed), health insurance (yes or no), and poverty (above or below Jordan's poverty line). Poverty was based on per capita annual income. Jordan's current annual absolute (food and nonfood) poverty line to meet basic needs was 814 Jordanian dinars (JD) or US$1,149 per person, which was based on Jordan's Household Expenditure and Income Survey of 2010 (Jolliffe & Serajuddin, 2015).

Data Analysis

All data were self-reported. There were no missing data. Data were entered, verified, and analyzed using the Statistical Package for Social Sciences for Windows version 24 (IBM Corporation, 2016). Descriptive statistics were calculated to identify outliers and describe frequencies, percentages, medians, means, and standard deviations of the study variables. Mean scores of the continuous variables were normally distributed. Student's t-test analysis was computed to determine gender and poverty differences in depressive symptom severity, perceived health, and right-of-return hopefulness. Pearson's r correlation analysis was computed to examine the relationship among depressive symptom severity, perceived health, and right-of-return hopefulness. Univariate logistic regression analysis was computed to examine the likelihood of having major depression ($M \geq 10$ or $M < 10$) relative to perceived health and right-of-return hopefulness. Multiple linear regression analysis was computed to determine the variance in depressive symptom severity related to perceived health, right-of-return hopefulness, gender, and poverty. The assumptions of normality, linearity, and homoscedasticity were met for the multiple linear regression analysis. An alpha level of $p \leq .05$ (two-tailed test) determined statistical significance.

Results

The sample was composed of 54.8% ($n = 97$) men and 45.2% ($n = 80$) women with a mean age of 36.9 ($SD = 13.8$), ranging from 18 to 75 years. Half of the sample was 34 years of age or younger ($n = 88$, 49.7%), and a majority of the sample was married ($n = 117$, 66.1%). Among the sample, 28.2% ($n = 50$) of participants did not complete Tawjihi/high school, 28.8% ($n = 51$) participants completed Tawjihi/high school, and 42.9% ($n = 76$) completed college. Over half of the sample was employed ($n = 102$, 57.6%), of which 27.5% ($n = 28$) owned small businesses, 26.5% ($n = 27$) were laborers, 17.6% ($n = 18$) worked in government, 12.7% ($n = 13$) worked in education, 9.8% ($n = 10$) worked in healthcare, and 5.9% ($n = 6$) were engineers. Unemployment was high at 42%, and more women ($n = 55$, 73.3%) were unemployed compared to men ($n = 20$, 26.7%) ($\chi^2[1, N = 177] = 41.6, p < .0005$). Besides employment, there were no statistically significant gender differences in demographic characteristics. The mean per capita annual income was JD 1,303 or US$1,840 ($SD$ = JD 1,075, Md = JD 960). Forty-two percent ($n = 74$) of the sample lived below Jordan's poverty line. All of the participants had UNRWA basic health insurance, and 33.7% ($n = 29$) of the participants had additional health insurance.

Eighty percent ($n = 142$) of the sample reported good to excellent health, and 19.8% ($n = 35$) reported fair or poor health (**Table 1** and **Figure 1**). The mean score for depressive symptom severity was 9.43 ($SD = 5.11$), and 42.6% ($n = 75$) of participants were categorized as having major depression, defined as a score of 10 or greater (Kroenke et al., 2001). A majority of the sample was very hopeful about returning to Palestine (60.5%, $n = 107$). There were no statistically significant gender or poverty differences in depressive symptom severity, perceived health, and right-of-return hopefulness.

There was a significant association between depressive symptom severity and perceived health ($r = -.36$, $p < .0005$, $n = 176$). A one-unit increase in perceived health decreased the odds of having major depression by 2.1 times (95% confidence interval [CI] [1.54, 2.97], $p < .0005$), suggesting that participants who rated their health better were less likely to be depressed than those who rated their health poorer. A one-unit increase in participants' hopefulness about returning to Palestine decreased the odds of having depression by 1.4 times (95% CI [1.04, 1.78], $p = .03$), suggesting that participants who were more hopeful about returning to Palestine were less likely to be depressed than those who were less hopeful about returning to Palestine. See **Table 2** for the multiple linear regression analysis results, which indicated the model for depressive symptom severity was statistically significant ($R^2 = .14$, $F[4, 170] = 6.71$, $p < .0005$) with 14% of the variance explained by a combination of perceived health, right-of-return hopefulness, poverty, and gender; however, only perceived health contributed significantly to the variance in depressive symptom severity ($\beta = -.35$, $p < .0005$).

Table 1. Summary Descriptive Statistics for Depressive Symptom Severity, Right-of-Return Hopefulness, and Perceived Health ($N = 177$)

Subscale	*n*	%	Range of scale	Range of scores	*M*	*SD*
Depressive symptom severity	33	18.8	0–27	0–25	9.43	5.11
Minimal (0–4)	68	38.6				
Mild (5–9)	45	25.6				
Moderate (10–14)	24	13.6				
Moderately severe (15–19)	6	3.4				
Severe (20–27)						
Right-of-return hopefulness			1–5	1–5	4.24	1.13
Very hopeful	107	60.5				
Somewhat hopeful	28	15.8				
Neutral/unsure	28	15.8				
Somewhat not hopeful	5	2.8				
Not hopeful at all	9	5.1				
Perceived health						
Excellent	32	18.1				
Very good	62	35.0				
Good	48	27.1				
Fair	31	17.5				
Poor	4	2.3				

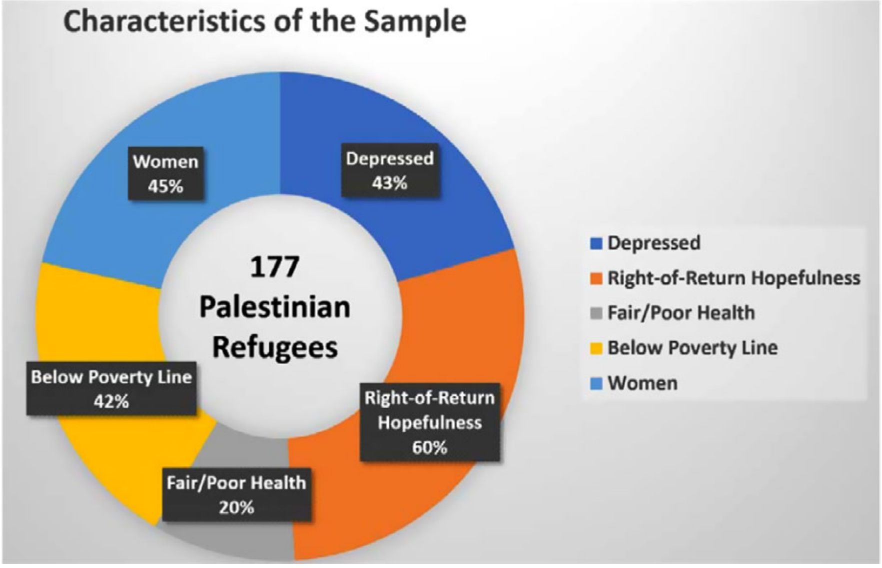

Figure 1. Characteristics of the sample.

Discussion and Recommendations

For almost 70 years, Palestinian refugees have been displaced from their homeland and forced to live in host countries because of armed and sociopolitical conflicts, which likely have had short- and long-term physical, psychological, and sociocultural consequences on their daily lives and humanity. Findings indicated that a significant proportion (43%) of the sample of Palestinian adult refugees living in Jordan had symptoms of major depression. In the literature, 4% of the Jordanian general adult population in 2015 had depression (WHO, 2017), and 8% and 11% of Palestinian adult refugees living in Lebanon (Llosa et al., 2014) and the Occupied Palestinian Territory of West Bank (Madianos et al., 2012), respectively, had depression. In contrast to neighboring host countries and the occupied Palestinian territories, Jordan is a relatively peaceful and politically stable country (CIA, 2017). Furthermore, a majority of Palestinian refugees in Jordan have citizenship, unlike their counterparts in other host countries (UNRWA, n.d.c). Similar to other host countries, however, the socioeconomic,

Table 2. Regression Analysis of Depressive Symptom Severity Assessed in Perceived Health, Right-of-Return Hopefulness, Poverty, and Gender ($N = 177$)

	Depressive symptom severity		
Variable	Standardized β	t	p
Perceived health	−.35	−4.84	.0005
Right-of-return hopefulness	−.07	−1.03	.30
Poverty	−.01	−0.144	.89
Gender	.01	0.18	.86

Note. $R^2 = .14$, $F(4, 170) = 6.71$, $p < .0005$.

environmental, and living conditions of Palestinian refugees in Jordan have been found to be poor (Tiltnes & Zhang, 2013; UNRWA, 2016). Thus, why the prevalence of depression was significantly higher in this study compared to Palestinian adult refugees in the aforementioned studies is unclear. In the study by Llosa and colleagues (2014), a single psychiatrist performed the mental health appraisal, and in the study by Madianos and colleagues (2012), the time period in which depressive symptoms were assessed was 1 month. In the current study, the recall duration, 2 weeks, was relatively recent, and depressive symptoms were not validated by a mental health professional, which may have resulted in the overreporting of depressive symptomatology.

In one study, the Arabic-language version of the PHQ-9 depressive symptom severity tool was shown to have good sensitivity, but low specificity for majordepression in a Lebanese adult psychiatric outpatient sample (Sawaya et al., 2016). The English-language version of the PHQ-9 depressive symptom severity tool was shown to have good sensitivity and high specificity for major depression in ambulatory care samples of American adults (Kroenke et al., 2001). In this study, presuming low specificity for Arab populations, the PHQ-9 may have assessed symptoms of depression along with other mental health conditions, such as anxiety, panic, or posttraumatic stress disorder, which have been shown to be prevalent in Palestinian refugees (Ayer et al., 2015). Moreover, it has been suggested that some Arab populations have a general negative affect factor that may lead to the reporting of more depressive symptomatology (Al-Turkait, Ohaeri, El-Abbasi, & Naguy, 2011). Without supportive data, however, whether this was the case in this study is unknowable. Nevertheless, the findings provide some baseline evidence about depressive symptom severity in a sample of Palestinian refugees living in Jordan that can be used by future researchers as comparative data in similar populations.

Although a prodigious number of participants had moderate to severe depressive symptoms over the preceding 2 weeks that were comparable to the DSM-V diagnosis of major depression, it is critical to assess whether refugees not only have depressive symptoms, but also whether they have health and daily functioning challenges due to depressive symptoms. One fifth of the relatively young and healthy sample rated their health as fair or poor. This finding is important to take heed of because not only was there a significant association between perceived health and depressive symptoms, but perceived health also was the only assessed indicator—not gender, poverty, or right-of-return hopefulness—that predicted depressive symptomatology. Participants who perceived their health as good to excellent were twofold less likely to have symptoms of major depression compared to those who perceived their health as fair or poor. While this would be an expected finding, the results provide evidence that there may be a subset of the Palestinian refugee adult population, those who perceive their health as fair or poor, that should be specifically targeted and identified for depression screening, monitoring, and early intervention, along with taking a health history and assessing daily functioning.

Targeted depression screening, monitoring, and management must be done in a manner that is respectful of and sensitive to the local culture and customs and that does not potentially stigmatize, prejudice, or create uneasiness about seeking behavioral health assistance in an already vulnerable population of people that have lost their home and cultural identity due to displacement external to their control. Interventions should actively engage the refugee community and should focus on self-care (meditation or prayer, exercise, nutrition, etc.), resiliency, and coping strategies. Although there was no gender difference in depressive symptom severity in this study, there was evidence in the literature of gender-specific vulnerabilities in refugee populations, particularly among women in regard to psychological health, discrimination, safety, exploitation, violence, and harassment (Al-Modallal, 2012, 2016). Socioecological factors, such as income, employment, and education, also have been shown to be robust predictors of physical and psychological health (Marmot et al., 2008). Gender concordance should be considered when designing and providing behavioral health care for Arab populations. Poverty and other assessed social determinants were not associated with depressive symptom severity in this study; perhaps the sample size was inadequate or the sample was too homogeneous.

All of the participants had basic health insurance and healthcare access through the UNRWA; this access could provide a practical solution and opportunity to integrate psychological health strategies into the UNRWA's primary healthcare system. In one study of Palestinian refugees in Lebanon, the mental health gap treatment was 96% (Llosa et al., 2014). The treatment gap, which could lead to suicide and other consequences of undiagnosed and untreated mental health conditions, was due to lack of availability of mental health specialists. Economic analysis has indicated that treating refugees' depression in primary care is feasible, affordable, and cost effective (UNRWA, 2016). In Jordan, there are 25 primary care centers for Palestinian refugees, and collectively the centers receive 1.7 million visits per year (UNRWA, 2016). As of 2014, Jordan had no mental health promotion and prevention programs (WHO, 2016a), and mental health nurses in Jordan were found to have a negative attitude toward mental illness and people with mental illness (Hamdan-Mansour & Wardam, 2009). Development and implementation of policies, such as the WHO's evidence-based mental health gap program, at the local level should be explored for depression prevention, screening, and management and training of nursing and other healthcare professionals (WHO, 2016b). Currently, the UNRWA is working toward integrating mental health and psychosocial support, to be delivered by nurses and midwives, into its primary care family health team model (UNRWA, 2016).

Right-of-return hopefulness appeared to have served as a buffer to depressive symptom severity. Participants who were more hopeful about returning to Palestine were less likely to have symptoms of major depression compared to those who were less hopeful about returning to Palestine. Perhaps, there is a way to harness right-of-return hopefulness to improve Palestinian refugees' perceptions of their health and depressive symptomatology. According to the United Nations General Assembly Resolution 194 Right of Return, every refugee has a right to return to the country of origin with dignity (UNRWA, n.d.b). In contrast to the study's findings, Young (2011) found that 60% of Palestinian refugees in Jordan would choose to stay in Jordan, even if repatriation to Palestine was realized, primarily because of community and family ties in Jordan and the uncertainty of future sociopolitical conflicts and financial prospects in Palestine. For many Palestinian refugees, the right-of-return is about their autonomy, self-determination, visibility, legitimacy, justice, and dignity (O'Malley, 2015).

The current literature related to the psychological health of Palestinian refugees is almost nonexistent, which is likely related to the difficulty in conducting research with conflict-affected populations and areas with limited resources and inadequate research and health infrastructures (Khatib, Giacaman, Khammash, & Yusuf, 2017; Marie, Hannigan, & Jones, 2017). There is a need to explore the individual and societal causes (biological, genetic, environmental, social, and behavioral) of depression and other mental health disorders resulting from individual and collective trauma due to chronic displacement. Multiple armed and sociopolitical conflicts that subsequently lead to multiple displacements can take a physical and emotional toll, with polytraumatic effects on displaced populations. Prospective, longitudinal studies are needed to assess and monitor changes in psychological and physical health and well-being, taking into consideration social determinants, including generational differences among refugees and their descendants. Whether depression severity is associated with exposure to one, two, or more incidences of conflicts and displacements needs to be examined, along with the general negative affect factor that has been noted in Arab populations (Al-Turkait et al., 2011). Qualitative studies are needed for an in-depth understanding of the psychosocial needs of refugees from the lived experiences of men and women since depression tends to vary by gender (WHO, 2017). Refugees' sharing their stories may give voice to their experiences, feelings, and right-of-return desire that close-ended questionnaires may not adequately capture.

Limitations

In interpreting the study's findings, a cause-and-effect and temporal relationship between variables cannot be assumed because data were collected at one point in time. Although the nonprobability sampling yielded a convenience sample and data collection occurred in an urban setting, the sample's demographic characteristics were similar to the Palestinian refugee population described by the UNRWA (2016). Nevertheless, potential sampling bias limits the external validity and generalization of the findings to other refugee populations. In addition, self-reported data might have been influenced by recall bias and social desirability related to the sociopolitical landscape of the Palestinian-Israeli conflict. The sample size may have been insufficient and the sample too homogeneous to detect gender and poverty differences in the assessed variables. The Arabic version of the PHQ-9 depression severity tool has been shown to have good sensitivity, but low specificity (Sawaya et al., 2016); thus, it may have assessed depression as well as other psychological conditions, resulting in a higher prevalence of symptoms of major depression compared to studies with a similar demographic profile. Despite limitations, to our knowledge, this is the first study to document depressive symptom severity, perceived health, and right-of-return hopefulness in Palestinian adult refugees living in Jordan.

Conclusions

Palestinian adult refugees living in Jordan exhibited symptoms of moderate to severe depression that was associated with poorer perceived health and less hopefulness about repatriation to Palestine. Symptoms of depression severity, however, did not appear to be compounded by gender and poverty. Findings suggest that the mental health needs of refugees should be systematically screened, diagnosed, and treated by healthcare professionals and should include objective assessments, along with self-reporting questionnaires, of psychological well-being at multiple points in refugees' lives in order to understand the impact of chronic displacement on their psychological health. Sociocultural considerations of mental health issues also should be considered to prevent stigmatization and gender bias.

Since a majority of the UNRWA's primary healthcare services for Palestinian refugees are provided in community settings, nurses with community or public and mental health specialization can play a major role by systematically screening refugees for depression, designing culturally appropriate programs and providing follow-up care using the WHO's evidence-based tools. Advanced education and clinical training in community or public and mental health specialization, however, need to occur first in order to prepare a nursing workforce that can work under challenging conditions. The experiences of nurses who are also Palestinian refugees would be invaluable for refugee health program planning. These nurses would likely have an awareness, understanding, and appreciation of refugees' experiences and the impacts that displacement have had on refugees' lives. Moreover, the nurses can serve in an advocacy role by informing and supporting public health policies that improve refugees' physical and psychological well-being and human rights issues that improve refugees' socioeconomic and living conditions.

Clinical Resources

- Pan American Health Organization. World Health Organization's mhGAP intervention guide for mental, neurological and substance use disorders. http://www.paho.org/mhgap/en/
- United Nations High Commissioner for Refugees. Mental health and psychosocial support. http://www.unhcr.org/en-us/protection/health/525f94479/operational-guidance-mental-health-psychosocial-support-programming-refugee.html
- United Nations Relief and Works Agency[JC10]. Integrating Mental Health within the UNRWA Family Health Team Model. https://www.unrwa.org/resources/reports/integrating-mental-health-within-unrwa-family-health-team-model

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JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Sources and Types of Social Support for Physical Activity Perceived by Fifth to Eighth Grade Girls

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Key words
Adolescent, exercise, female, friend, parent, peer, puberty

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Accepted October 27, 2017

doi: 10.1111/jnu.12369

Abstract

Background: Information is lacking on forms and sources of social support for physical activity (PA) received by adolescent girls during various pubertal stages. Two study purposes were to (a) identify the sources and forms of social support for PA perceived by adolescent girls, and (b) examine associations of pubertal stage and social support with PA.
Methods: A secondary analysis of data from a randomized trial was conducted. Fifth through eighth grade girls ($N = 1{,}519$) completed surveys on social support for PA and pubertal stage and wore an accelerometer.
Results: Girls in early-middle and late-post puberty most frequently received social support from their mothers. A higher proportion of girls in late-post puberty, compared to early-middle puberty, received social support from nonfamily adults (4.2% vs. 3.0%, $p = .019$). Girls identifying three sources participated in more moderate-to-vigorous PA than those having fewer sources ($t_{1,512} = -3.57$, $p < .001$). Various forms of social support, except for encouragement, were positively related to moderate-to-vigorous PA. Girls in early-middle puberty reported greater social support than those in late-post puberty ($t_{1,512} = 3.99$, $p < .001$). Social support was positively associated with moderate-to-vigorous PA, while girls in late-post puberty had lower moderate-to-vigorous PA than those in early-middle puberty.
Conclusions: Mothers are important sources of social support for PA. Having more than two sources may result in greater PA. Encouraging girls to increase their PA may not be sufficient.
Clinical Relevance: Efforts are needed from health professionals to prevent any decline in social support for PA as girls advance across adolescence.

Despite World Health Organization (WHO, 2011) recommendations calling for children and adolescents 5 to 17 years of age to attain at least 60 min of moderate-to-vigorous physical activity (PA) per day, disparities in girls' PA are evident. Worldwide, greater than 80% of adolescents 13 to 15 years of age do not meet the WHO PA recommendation, and girls are usually less active than boys (Hallal et al., 2012). In the United Kingdom, Black girls 11 to 13 years of age are significantly more likely than their male counterparts to report no PA during the past week (Curry, Dagkas, & Wilson, 2017). In the United States, more White (19.5%) than Black (16.6%) high school girls meet the recommendations (Kann et al., 2016). Among 12- to 17-year-olds, the proportion is 13.7% for those below the U.S. Department of Health and Human Services poverty threshold (Song, Carroll, &

Fulton, 2013). To reduce the disparities, research with girls of minority or low socioeconomic status (SES) is warranted.

Girls' PA declines sharply from ages 9 to 12 years, but whether pubertal development has an effect on girls' PA is less clear (Dumith, Gigante, Domingues, & Kohl, 2011). Some studies noted no influence of pubertal development on PA (Finne, Bucksch, Lampert, & Kolip, 2011; Knowles, Niven, Fawkner, & Henretty, 2009), whereas others indicated early-maturing girls are either less active (Smart et al., 2012) or more active than those who mature later (Fawkner, Henretty, Knowles, Nevill, & Niven, 2014). No definitive explanation exists for the inconsistencies, indicating a need for continued research.

To understand reasons for the decline in PA among girls as age increases (Dumith et al., 2011), researchers have also examined psychosocial factors, such as social support (Laird, Fawkner, Kelly, McNamee, & Niven, 2016). Jackson and colleagues (2013) noted a negative correlation between pubertal development and parental social support for PA among British adolescent girls. Whether relationships among pubertal development and social support for PA are similar for other adolescent girls warrants investigation because of the potential negative impact on their PA. Studies that examine social support and PA in large, urban, multiracial or ethnic adolescent populations are particularly needed (Gill et al., 2017).

Although adolescent girls may receive social support for PA from a variety of sources, research has mainly focused on social support received by adolescents from parents (Laird et al., 2016), peers or friends (Garcia et al., 2016), and family members (Edwardson, Gorely, Musson, Duncombe, & Sandford, 2014). These studies do not capture social support received from nonfamily members, such as teachers and coaches or instructors (e.g., dance; Laird et al., 2016; Ling, Robbins, Resnicow, & Bakhoya, 2014). Little is known about whether the number of sources of support is related to adolescent girls' PA (Laird et al., 2016). Given society's varied social networks, acquiring information on sources of social support perceived by girls as helping to increase their PA, particularly during various stages of pubertal development, is important for guiding intervention development (Robbins, Stommel, & Hamel, 2008).

Besides its various sources, social support is described as being in two categories: instrumental and emotional. The former category comprises forms that directly facilitate adolescents' PA, such as transporting, paying fees, planning for PA, purchasing equipment, and performing PA with them; whereas the latter category includes indirect forms, such as encouragement and praise for PA (Siceloff, Wilson, & Van Horn, 2014). Whether specific forms of social support are related to adolescent girls' PA and their pubertal stage is unclear.

Understanding the relationship among pubertal stage, social support, and PA can assist nurses in tailoring interventions to meet girls' social support needs as they progress across adolescence. To contribute toward filling current gaps in knowledge, this study's twofold purpose is to (a) identify the sources and forms of social support for PA perceived by adolescent girls and (b) examine associations of pubertal stage and social support with PA.

Methods

Research Design and Setting

This study involved a secondary analysis of data obtained during baseline data collection in the fall of three intervention years (2012, 2013, and 2014) of a 5-year school-based group randomized controlled trial (RCT; 2011–2016). The main purpose of the trial, including 24 schools in racially diverse urban areas of low SES in the Midwestern United States, was to evaluate the effect of a 17-week intervention on girls' moderate-to-vigorous PA (Robbins et al., 2013). The group RCT was based on the Health Promotion Model, which purports that various personal factors and certain modifiable variables, such as social support, influence PA (Pender, Murdaugh, & Parsons, 2015).

Participants

A total of 1,519 fifth through eighth grade girls provided data for the RCT and this study. Girls were included if they met the following criteria: (a) in the fifth through eighth grade; (b) willing and available to participate in an after-school PA club 3 days per week for 17 weeks; (c) available for 9-month postintervention follow-up; (d) agreement with random assignment of the school; and (e) able to read, understand, and speak English. Exclusion criteria included: (a) involvement in organized sports or programs including moderate-to-vigorous PA 3 or more days per week after school and (b) having a health condition preventing PA participation. The sample size was based on power calculations for the group RCT that have been reported previously (Robbins et al., 2013).

Measures

Demographics. A parental or guardian response of "yes" to a consent form item asking whether their daughter was in the free or reduced-price school lunch program indicated low SES. Parents or guardians also reported their daughter's age, academic grade, race, and ethnicity.

Pubertal stage. The Pubertal Development Scale was used to determine pubertal stage (Petersen, Crockett, Richards, & Boxer, 1988). Girls reported their growth spurt, body hair, skin changes, and breast growth by selecting from four response choices: *no* (1); *yes, barely* (2); *yes, definitely* (3); or *development complete* (4). They indicated whether menarche had started by responding to another item with *yes* (1) or *no* (4). Response choices for the five items were averaged for each girl to form a continuous variable. Pubertal stage was also determined categorically by summing the following scores for body hair (underarm) growth and breast development and noting whether or not menarche had occurred: prepuberty = 2 and no menarche; early puberty = 3 and no menarche; middle puberty = >3 and no menarche; late puberty = ≤7 and menarche; and postpuberty = 8 and menarche. The scale has acceptable reliability (Cronbach's alphas ranging from .67 to .70) and validity (high correlation of .84 to .87 with pediatrician-rated physical development) in girls as young as those in the fifth grade (Carskadon & Acebo, 1993).

Social support for PA. An 8-item Social Support Scale was used to measure forms of instrumental assistance and emotional encouragement for PA that girls received from others. The scale has good reliability and validity (Ling et al., 2014). Cronbach's alpha and test-retest reliability were .83 and .78, respectively; results from exploratory factor analysis suggested a single-factor structure; and social support was significantly correlated with accelerometer-measured PA. Response choices were *never* (0), *rarely* (1), *sometimes* (2), and *often* (3). A higher score indicated more support. In addition, girls selected up to three people who helped them to "exercise, be active, or do sports" from 12 sources: father, stepfather, mother, stepmother, brother, stepbrother, sister, stepsister, teacher or coach, and friends, other family members, and other nonfamily members.

Physical activity. The ActiGraph GT3X-plus accelerometer (www.theActiGraph.com) was used to estimate minutes of moderate-to-vigorous PA per day. PA measured by the GT3X accelerometers is highly correlated with oxygen consumption ($r = .88$), supporting its validity (Hänggi, Phillips, & Rowlands, 2013). A research team member discussed monitor-wearing instructions with each girl at her school. Girls were asked to wear the monitor attached to an elastic belt on the right hip all day for 1 week, except when bathing, swimming, or sleeping at night. During the 7-day wear period, each girl received a daily automated phone call to remind her to wear the monitor. Researchers initialized the monitors and set them to begin data collection at 5:00 a.m. on the day after girls received them. For analysis, moderate-to-vigorous PA was identified as ≥574 counts/15 s (Evenson, Catellier, Gill, Ondrak, & McMurray, 2008).

Procedure

Approval to conduct the study was obtained from the Michigan State University Institutional Review Board and school administrators. At the beginning of each academic year, two researchers presented an overview of the study at each school, invited girls to participate, distributed information packets to interested girls, and answered questions. Each packet included consent and assent forms and a screening tool including items reflecting inclusion and exclusion criteria. Girls were asked to share information with their parents or guardians and return completed forms the next day. Data collectors girls access an iPad-delivered, Internet-based survey with voice-overs so girls could complete the Social Support Scale (Ling et al., 2014). Sitting behind a privacy screen, a researcher assisted each girl with completing the Pubertal Development Scale (Petersen et al., 1988).

Data Analysis

Among the 1,519 girls participating, 1,514 (99.7%) had some accelerometer data. Missing data were identified as missing at random and imputed via multivariate imputation (Rubin, 1987) by chained equations (van Buuren, 2007). Ten imputations, which were performed at the individual level, were determined to be sufficient (Azur, Stuart, Frangakis, & Leaf, 2011). The average of the imputations was reported as the summary statistics. The imputation model included baseline demographics, social support, and moderate-to-vigorous PA variables.

All analyses were conducted in IBM SPSS Statistics for Windows version 22.0 (IBM Corporation, 2013) and R statistical software version 3.2.4 (R Core Team, 2016). Means, standard deviations, frequencies, and percentages were calculated. A chi-square test was used to examine sources of social support and pubertal stage. Associations among social support, pubertal stage (mean score of five Pubertal Development Scale items), and moderate-to-vigorous PA were evaluated using Pearson product-moment correlation analyses. Independent *t* tests were employed to examine pubertal stage differences in forms of social support and moderate-to-vigorous PA. Linear mixed-effects models were used to examine the association of social support and pubertal stage with moderate-to-vigorous PA. The cluster random effect of school was incorporated via a random intercept for school, while controlling for demographics: age, race (Black or non-Black), SES (enrolled in free or reduced-price school lunch program—yes or no), and ethnicity (Hispanic—yes or no).

Results

Demographic Characteristics

The mean age of the 1,519 girls was 12.05 years (*SD* = 1.01, range 10–15). Most were Black (n = 756, 49.8%), in sixth (n = 584, 38.4%) or seventh (*n* = 573, 37.7%) grade, and enrolled in the free or reduced-price school lunch program (*n* = 1,182; 83.5%; 103 girls had missing information). Due to only a small number in the pre-, early, and post pubertal categories, the first two were combined with middle puberty, and the third category was merged with late puberty to form two groups: early-middle puberty and late-post puberty. Among the 1,519 girls, 803 (53.1%) were in early-middle puberty, and 710 (46.9%) were in late-post puberty. Black girls were older than White girls and those selecting more than one race (12.17 years vs. 11.86 and 12.01, respectively). A higher percentage of Black girls was in late-post puberty, as compared to White girls and those selecting more than one race (57.6% vs. 20.3%, $p < .001$; 57.6% vs. 22.1%, $p = .004$); a higher percentage of White girls was in early-middle puberty than those selecting more than one race (32.9% vs. 24.0%, $p = .008$). On average, girls participated in 24.42 min of moderate-to-vigorous PA per day. Girls in early-middle puberty had higher minutes of moderate-to-vigorous PA (29.40 vs. 25.17 min, $p < .001$) than those in late-post puberty. **Table 1** presents sample characteristics by pubertal stage.

Sources of Social Support

Table 2 shows sources of social support according to pubertal stage. Girls in early-middle puberty reported most frequently receiving support from their mother (*n* = 522, 34.5%), followed by teacher or coach (*n* = 305, 20.1%), father (*n* = 296, 19.6%), sister (*n* = 254, 16.8%), friend (*n* = 214, 14.1%), and other family member (*n* = 206, 13.6%). Girls in late-post puberty most frequently selected their mother (*n* = 420, 27.8%) and teacher or coach (*n* = 243, 16.1%), followed by sister (*n* = 223, 14.7%), friends (*n* = 215, 14.2%), other family member (*n* = 195, 12.9%), and brother (*n* = 194, 12.8%). Compared to those in early-middle puberty, a lower proportion of girls in late-post puberty identified their mother (34.5% vs. 27.8%, $p = .019$) or father (19.6% vs. 12.0%, $p < .001$). A higher proportion of girls in

Table 1. Characteristics of Girls in Early-Mid and Late-Post Puberty ($N = 1{,}519^a$)

Variable	Total *n* (%)	Early-middle puberty *n* (%)	Late-post puberty *n* (%)
No. of girls	1,519 (100.0)	803 (53.1)	710 (46.9)
Age (years)*			
10	230 (15.1)	196 (24.4)	32 (4.5)
11	543 (35.7)	371 (46.2)	171 (24.1)
12–14	746 (49.1)	236 (29.4)	507 (71.4)
Academic grade*			
5th	228 (15.0)	193 (24.0)	33 (4.6)
6th	584 (38.4)	399 (49.7)	184 (25.9)
7th	573 (37.7)	198 (24.7)	372 (52.4)
8th	134 (8.8)	13 (1.6)	121 (17.0)
Hispanic ethnicity	201 (14.0)	110 (14.6)	90 (13.4)
Race*			
Black	756 (49.8)	346 (43.1)	409 (57.6)
White	412 (27.1)	264 (32.9)	144 (20.3)
More than one/other	351 (23.1)	193 (24.0)	157 (22.1)
Enrollment in free or reduced-price school lunch program*	1,182 (83.5)	597 (79.5)	581 (87.9)
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
Moderate-to vigorous PA*	27.42 (13.54)	29.40 (14.11)	25.17 (12.55)

PA, physical activity.

[a] Table includes data prior to imputation.

*$p < .01$.

Table 2. Sources of Social Support by Pubertal Stage ($N = 1{,}514^a$)

Source of social support	Total *n* (%)	Early/middle puberty *n* (%)	Late/postpuberty *n* (%)
Father[b]	478 (31.6)	296 (19.6)	182 (12.0)
Stepfather	97 (6.4)	49 (3.2)	47 (3.1)
Mother[c]	572 (37.8)	522 (34.5)	420 (27.8)
Stepmother	54 (3.6)	29 (1.9)	25 (1.7)
Brother	388 (25.6)	194 (12.8)	194 (12.8)
Stepbrother	27 (1.8)	15 (1.0)	12 (0.8)
Sister	476 (31.4)	254 (16.8)	223 (14.7)
Stepsister	37 (2.4)	21 (1.4)	17 (1.1)
Teacher/coach	547 (36.1)	305 (20.1)	243 (16.1)
Friend	429 (28.3)	214 (14.1)	215 (14.2)
Other family member	401 (26.5)	206 (13.6)	195 (12.9)
Other nonfamily adult[c]	108 (7.1)	45 (3.0)	63 (4.2)

[a] Four girls were excluded from analysis due to no accelerometer data at all.

[b] $p < .001$.

[c] $p < .05$.

late-post puberty received support from other nonfamily adults than those in early-middle puberty (4.2% vs. 3.0%, $p = .019$).

Compared to girls selecting one or two sources, girls identifying three engaged in more minutes of moderate-to-vigorous PA per day (40.78 vs. 37.00 min, $t_{1,512} = -3.57$, $p < .001$). Girls who received support from a sister participated in more moderate-to-vigorous PA (42.62 vs. 38.53 min, $t_{1,512} = -4.01$, $p < .001$) than girls who did not receive this support. Social support from a source other than sister resulted in no moderate-to-vigorous PA differences between those receiving and not receiving support from the identified source.

Forms of Social Support

Of the eight scale items reflecting forms of social support, four were negatively correlated with pubertal stage mean score: (a) Someone takes me to play sports or exercise ($r = -.09$, $p < .001$); (b) Someone exercises or plays active games or sports with me ($r = -.11$, $p < .001$); (c) Someone watches me exercise, play active games, or do sports ($r = -.08$, $p < .001$); and (d) Someone congratulates or tells me I am doing well with my exercise, PA, or sports ($r = -.07$, $p < .001$). All but one item (Someone encourages me to exercise) were positively correlated with moderate-to-vigorous PA: (a) Someone takes me to play sports or exercise ($r = .12$, $p < .001$); (b) Someone exercises or plays active games or sports with me ($r = .13$, $p < .001$); (c) Someone watches me exercise, play active games, or do sports ($r = .10$, $p < .001$); (d) Someone congratulates or tells me I am doing well with my exercise, physical activity, or sports ($r = .11$, $p < .001$); (e) Someone plans things to help me be physically active ($r = .10$, $p < .001$); (f) Someone pays money for physical activities or sports for me ($r = .10$, $p < .001$); and (g) Someone buys clothes or equipment for me so I can be physically active ($r = .08$, $p <.001$).

For the total sample, social support was negatively correlated with age ($r = -.14$, $p < .001$) and pubertal stage mean score ($r = -.08$, $p = .003$), and positively correlated with moderate-to-vigorous PA ($r = .14$, $p < .001$). The association between social support and moderate-to-vigorous PA did not differ by pubertal stage. Girls in early-middle puberty reported higher mean levels of social support than girls in late-post puberty (1.91 vs. 1.76, $t_{1,512} = 3.99$, $p < .001$). Pubertal stage mean score was positively correlated with age ($r = .44$, $p < .001$) and negatively correlated with moderate-to-vigorous PA ($r = -.13$, $p < .001$).

Table 3 shows results from the linear mixed-effects model. After controlling for age, ethnicity, race, and SES, as well as the random cluster effect of school, social support was still positively associated with moderate-to-vigorous PA (B = 0.17, $p = .002$). Girls in the early-middle puberty participated in 5.79 min per day more of moderate-to-vigorous PA than those in the late-post puberty ($p < .001$).

Discussion

This study examined fifth through eighth grade girls' sources and forms of social support, along with associations among pubertal stage, social support for PA, and accelerometer-measured moderate-to-vigorous PA. White girls were slightly younger than Black girls (11.86 vs. 12.17 years, respectively), but 57.6% of the Black girls were already in late-post puberty, as compared to only 43.1% of the White girls. U.S. data have shown that, on average, Black girls experience menarche earlier than White girls (Chumlea et al., 2003). Of concern is that early menarche increases future disease risk (Britton et al., 2004), which may be amplified among girls who do not attain adequate PA.

The finding that the most common source of social support for PA cited by girls in all pubertal stages was their mother indicates the importance of involving mothers when designing PA interventions for girls. Research supports that Black mothers play an important role in increasing their daughters' PA. Thus, tailoring PA intervention content to address cultural preferences of Black mothers and daughters may promote PA (Alhassan, Greever, Nwaokelemeh, Mendoza, & Barr-Anderson, 2014).

In this study, a greater proportion of girls in early and middle puberty identified immediate family members (mother, father) as sources of social support, compared to girls in later pubertal stages. Consistent with findings of Jackson et al. (2013), social support was positively correlated with PA, and pubertal stage was negatively associated with social support and PA. Perhaps, reduced parental support is contributing to the PA decline across adolescence.

This study's finding that more sources of social support are related to higher moderate-to-vigorous PA was also noted by Davison, Cutting, and Birch (2003), who found only 32% of 9-year-old girls reported a high level of PA when no parent provided support. This proportion increased to 56% when one parent provided support and 70% when both parents provided support (Davison et al., 2003). Other researchers suggest that exposing adolescent girls to multiple sources of support is important to increase their PA (Laird et al., 2016). Oosterhoff, Kaplow, Wray-Lake, and Gallagher (2017) identified continued involvement in organized sports or PAs as one way for adolescent girls to cultivate supportive relationships with

Table 3. Linear Mixed-Effects Model of Moderate-to-Vigorous Physical Activity ($N = 1{,}514^a$)

Variable	Estimate	*SE*	95% CI	*p* value	FMI
Intercept	**2.44**	0.15	[2.15, 2.73]	<.001	0.04
Age	−0.01	0.00	[−0.01, 0.00]	.123	0.02
Hispanic ethnicity (reference: no)	0.00	0.10	[−0.19, 0.19]	.994	0.06
Race: Black (reference: no)	**0.38**	0.07	[0.24, 0.53]	<.001	0.02
Enrollment in free or reduced-price school lunch program (reference: no)	**0.22**	0.09	[0.04, 0.40]	.017	0.08
Pubertal stage (reference: early/middle)	**−0.45**	0.07	[−0.60, −0.31]	<.001	0.02
Social support	**0.17**	0.05	[0.08, 0.26]	.002	0.02

Note. Boldfacing indicates statistical significance ($p < .05$). Multiple imputations = 10; random cluster effect of school intraclass correlation = 0.02. CI = confidence interval; FMI = fraction of missing information; SE = standard error of the parameter estimate.
[a] Five girls without any accelerometer data were excluded.

several adults and peers who can help the girls increase their PA.

Adolescents younger than 15 years need transportation to places to be physically active (Beets, Vogel, Forlaw, Pitetti, & Cardinal, 2006). Unfortunately, girls' perceived support with regard to transportation decreases as they mature, as indicated by the negative relationship between this form of support and pubertal stage. Even as adolescents become more independent from families as maturity increases, they still rely on parents to gain access to PA opportunities. Unfortunately, income disparities may preclude some parents from providing instrumental support for their adolescents, especially their daughters (Beets, Cardinal, & Alderman, 2010). Assisting parents with transportation issues and helping them find low-cost activity costs or scholarships may be essential for increasing low-income, urban adolescent girls' PA.

The finding that participating in PA with girls was associated with their moderate-to-vigorous PA is consistent with other study results showing that involving friends (Zook, Saksvig, Wu, & Young, 2014), family members (Springer, Kelder, & Hoelscher, 2006), and parents (Crawford et al., 2010) in PA with adolescent girls can increase girls' PA. Unfortunately, parents spend more time on PA with their sons than daughters (Fredricks, Simpkins, Eccles, & Simpkins-Chaput, 2005), indicating a need to involve parents with their daughters in PA interventions. Consistent with this study's results, Duncan, Duncan, and Strycker (2005) found that having family members or peers watch adolescents engage in PA was positively associated with adolescents' PA. Encouraging others to watch girls participate in PA may promote girls' continued engagement in the behavior.

Similar to results reported by Springer et al. (2006), praise was associated with PA, while encouragement was not. The nonsignificant association between encouragement and PA is inconsistent with other studies identifying encouragement as an emotional form of support related to PA (Yao & Rhodes, 2015). As explained by Beets et al. (2010), encouragement may be a precursor to PA participation, while praise may reinforce behavior already being enacted. Regardless, the findings emphasize the importance of praise in promoting PA among girls.

To address disparities in PA noted among adolescent girls of low SES, effective strategies may include transporting; participating in PA with them; watching them engage in PA; providing positive reinforcement; planning PA-related events; and paying for PA fees, clothes, or equipment. Future research is needed to test these strategies to help this vulnerable population overcome their barriers to PA as a means to promote long-term sustainability of the behavior.

This study had strengths and limitations. Use of accelerometers and the large sample of racially diverse girls in low-SES urban areas represent important strengths. However, the study findings cannot be generalized to girls in other environments (e.g., private schools) who may have a different social support network; these girls may have numerous options for involvement on sports teams that provide social support, opportunities to compete at state and national levels, and rewards (e.g., trophies for winning). One study limitation was that girls were allowed to select only a maximum of three sources of social support, as opposed to all of their sources. Although ranking sources of support from most to least helpful would have provided additional information, one of the authors noted, in prior unpublished pilot work, that this age group had difficulty completing the task due to perceptions that some sources provided equivalent support. Family composition was not assessed, so it is not known whether or not a participant selected her mother, for example, as a source of social support because her father was absent. Although PA data were collected immediately after pubertal stage and social support data, a longitudinal investigation may be beneficial for identifying changes in the variable relationships over time.

Conclusions

Nursing interventions may need to involve family members to assist them in helping busy mothers support their adolescent daughters' PA. As girls advance across pubertal stages, participation in PA programs that foster additional support from teachers and coaches should be encouraged. For adolescent girls of low SES, interventions that offer instrumental support and positive reinforcement may be key for assisting them to attain adequate PA. According to Brown (2009), to increase girls' PA, nurses need to design multifaceted PA interventions that integrate PA-specific cognitive and affective, as well as physical (e.g., increased opportunities for PA), domains. Roy's Adaption Model (Roy & Andrews, 2009) also supports that engaging the mind and spirit, as well as the body, in a PA intervention helps individuals to feel better about themselves (e.g., improves self-esteem or body image) and, as a result, promotes successful adaptation to an active lifestyle (Rogers & Keller, 2009). Cognitive and affective variables, such as those noted in various nursing theories and models (e.g., Health Promotion Model; Pender et al., 2015), that are identified as having a significant effect on PA can be integrated with those of other theories and models to underpin novel interventions to assist girls in increasing their PA. A theory-based approach also allows for the recommended rigorous analysis of proposed mediators in order to determine the most effective combination of factors to target to meet the unique needs of girls to increase their PA (Perry, Garside, Morones, & Hayman, 2012). Nurses interested in conducting programs to increase girls' PA should consider the aforementioned information.

Acknowledgments

This publication's contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health (NIH). The research was made possible by grant number R01HL109101 from the National Heart, Lung, and Blood Institute (NHLBI) at the NIH; PI: L. B. Robbins, Michigan State University College of Nursing.

Clinical Resources

- Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services. Physical activity guidelines for Americans. https://health.gov/paguidelines/guidelines/
- Office on Women's Health, U.S. Department of Health and Human Services. Fitness. https://www.girlshealth.gov/fitness/index.html
- World Health Organization. Physical activity. http://www.who.int/topics/physical_activity/en/

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JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Prevalence, Defining Characteristics, and Related Factors of the Nursing Diagnosis of Anxiety in Hospitalized Medical-Surgical Patients

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Key words
Advanced nursing process, anxiety, defining characteristics, nursing diagnosis, prevalence, related factors, standardized nursing languages

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Accepted November 6, 2017

doi: 10.1111/jnu.12370

Abstract

Purpose: To document the prevalence of the nursing diagnosis of anxiety in hospital patients, based on its level of severity, defining characteristics (DCs), and other related factors, and to identify the key DCs that serve as predictors of clinically significant anxiety (CSA).
Design: Cross-sectional study. We enrolled 116 consecutive adult patients hospitalized from October 10 to 16, 2016, in medical-surgical wards within the first 48 hr of admission.
Methods: The potential DCs and related factors of anxiety were collected based on the NANDA International terminology. Anxiety was considered clinically significant when presenting at moderate, severe, or panic level. The differences in DC prevalence among patients having or not having CSA were analyzed by unpaired student's *t*-test. Multivariate analysis was used to examine the independent association between the DCs and CSA.
Findings: The prevalence of CSA was 36.2% and was significantly higher in patients who were older, female, and taking anxiolytic drugs, and among those who had cancer. The most frequent related factor for CSA was major change in health status. In the logistic regression, the presence of the DCs helplessness, altered attention or concentration, and anguish independently increased the odds of having CSA, whereas subjects presenting with Diminished ability to problem-solve had about a 96% reduction in the likelihood to suffer from such a condition.
Conclusions: A high prevalence of CSA among medical-surgical patients was shown. Furthermore, a critical cluster of DCs useful to identify CSA was found.
Clinical Relevance: The ability to accurately diagnose CSA should help prescribe and deliver the appropriate nursing interventions.

Anxiety concerns the subjective experiences and feelings of an individual. Anxiety should be diagnosed by nurses, considering that it can have various kinds of impact on the patient—low levels of anxiety can positively influence the patient's coping responses, while higher levels can prove detrimental (Herdman, 2014). Anxiety becomes clinically relevant when it causes psychological distress, which can directly increase the risk for major complications in vulnerable populations (McKinley et al., 2012; Moser & Dracup, 1996).

Spielberger (2010) distinguished between state anxiety (i.e., a response to particular situations or circumstances) and trait anxiety (i.e., an intrinsic characteristic of a person). Although the responsibility to diagnose trait anxiety often falls outside the professional responsibilities of nurses (Shuldham, Cunningham, Hiscock, &

Luscombe, 1995), the recognition of state anxiety is highly relevant for nursing and has therefore been included in the NANDA International (NANDA-I) nursing diagnosis (ND) taxonomy (Young, Polzin, Todd, & Simuncak, 2002). Hospital nurses must be able to assess anxiety early and accurately, since they are the healthcare professionals working most closely and continuously with patients through the day (Moser et al., 2003).

Unfortunately, anxiety is under-reported by nurses in clinical practice (Oliveira, Chianca, & Rassool, 2008). The poor diagnostic accuracy in the context of anxiety is a result of the complexity of its clinical nature and the difficulty in recognizing its defining characteristics (DCs) as listed in the NANDA-I taxonomy (da Cruz & de Mattos Pimenta, 2005). Studies analyzing anxiety among medical-surgical patients have showed that the nurses' assessment revealed significantly fewer DCs than those identified through patient self-assessment and that nurse-observed anxiety levels do not always reflect the patient's experienced anxiety (Suriano, Michel, Zeitoun, Herdman, & de Barros, 2011; Young et al., 2002). Thus, there is a need for better strategies to support and improve the accuracy of nurses' diagnostic reasoning (Sousa et al., 2016).

Background

According to NANDA-I, anxiety is defined as a

> Vague, uneasy feeling of discomfort or dread accompanied by an autonomic response (the source is often nonspecific or unknown to the individual); a feeling of apprehension caused by anticipation of danger. It is an alerting sign that warns of impending danger and enables the individual to take measures to deal with that threat

(Herdman, 2014, p. 323). As in the case of all NDs, to identify anxiety, nurses collect data through clinical assessment and apply clinical reasoning, distinguishing between normal and abnormal conditions through inferences based on the analysis of the available information (Alfaro Le Fevre, 2009). Anxiety should be documented in terms of its signs or symptoms (DCs) as well as its etiology or related factors (RFs) according to the PES format (problem statement, pertinent etiology, corresponding signs or symptoms; Gordon, 1994). However, diagnostic accuracy can be validated only if nurses rigorously apply the diagnostic process according to the NANDA-I taxonomy. The diagnosis can seldom be made on the basis of a single DC—usually, a cluster of symptoms is required to improve diagnostic accuracy.

Regrettably, there is no defined number of DCs whose presence indicates the existence and severity of an ND (Herdman, 2014). Moreover, the majority of DCs are not specifically related to a single ND but may be present in many different clinical situations. Consequently, a long list of signs or symptoms may be of little clinical utility in making an ND of anxiety. Therefore, it is necessary to validate critical DCs that must be present to make a diagnosis in order to identify the most important diagnostic indicators (Herdman, 2014).

For these and other reasons, related, for example, to the limited use of standardized nursing terminologies and information systems (Thoroddsen, Ehrenberg, Sermeus, & Saranto, 2012), only a few studies have reported on the prevalence of anxiety among hospitalized patients (Castellan, Sluga, Spina, & Sanson, 2016; D'Agostino et al., 2017; da Costa, da Costa Linch, & Nogueira de Souza, 2016; Jomar & de Souza Bispo, 2014), and, to our knowledge, none so far have considered the relationship between the severity of anxiety and the prevalence of DCs and RFs and sociodemographic or clinical variables. Moreover, no study so far has identified the strength of the association between the DCs and ND of anxiety in order to establish which DCs better predict the presence of anxiety.

The Study

Aims

The aims of this study were (a) to document the prevalence of the diagnosis of anxiety according to NANDA-I, by level of severity, among medical-surgical patients in the early phases of their hospitalization; (b) to identify the prevalence of DCs and RFs based on sociodemographic and clinical variables; and (c) to identify the best DCs that can serve as predictors of clinically significant anxiety (CSA).

Study Design, Setting, and Population

This was a cross-sectional study carried out in the 866-bed Academic Hospital of Trieste, Italy. All adult patients (age ≥18 years) consecutively hospitalized during a 7-day period (October 10–16, 2016) in the Internal Medicine and General Surgery wards, who were fluent in Italian and without cognitive dysfunctions based on the Six-Item Screener (Carpenter, DesPain, Keeling, Shah, & Rothenberger, 2011) were considered eligible for the study. Since anxiety may vary during hospitalization either in terms of getting resolved or in terms of appearing in the subsequent days, we only studied patients within the first 48 hr of their admission.

Data Collection

Data were collected by a research group consisting of two expert nurses with more than 30 years of clinical nursing practice in collaboration with a third-year undergraduate nurse. The research team was skilled in diagnostic reasoning and also attended a 12-hr special training session on critical thinking, diagnostic reasoning, and NANDA-I terminology in the context of case study practice, in line with similar courses described in the literature (Collins, 2013).

The potential DCs and RFs of anxiety were collected for each individual patient at her or his bedside using a nursing assessment form on the basis of the diagnostic methodology described below. The researcher informed the patient that the purpose of the assessment was to investigate her or his emotional state, without explicitly referring to anxiety. Other patient variables were collected from the clinical documentation—age, gender, trait anxiety and cancer in past medical history, and prescribed medications (anxiolytics).

Diagnostic Methodology

The theoretical framework used to assess the DCs and RFs for the NDs of anxiety was based on the terminology of the most recently updated NANDA-I, which lists 72 DCs (divided into six groups—behavioral, affective, physiological, sympathetic, parasympathetic, cognitive) and 15 RFs (Herdman, 2014).

The method to identify each potential DC and RF was preliminarily designed by the authors. For each DC, the modality of assessment was defined. For example, to assess the DC abdominal pain, the patient was asked, "Do you feel a sense of abdominal tension, or tightness, or weight or pain?" and to assess hypervigilance, the question was, "Do you always feel alert, as if something is about to happen?" DCs like poor eye contact, restlessness, or voice quivering were assessed through a focused observation of the patients' behaviors and communicative attitude. DCs such as alteration in attention or concentration, confusion, and tendency to blame others were assessed by talking to the patients, questioning, and active listening. Increase or decrease in blood pressure, heart rate, or respiratory rate, if any, were confirmed after comparing the actual measured data to values reported in the clinical documentation in order to distinguish known alterations from abnormalities potentially related to anxiety. All such information was recorded in the nursing assessment form, in which the researchers also transcribed anything significant or relevant the patient may have said to describe her or his symptoms, feelings, or thoughts.

Based on all the acquired data, the researchers discussed each case and applied clinical reasoning to identify anxiety by consensus. When present, anxiety was divided into four categories based on the patient's individual response to the condition (**Table 1**; Gulanick & Myers, 2013; Varcarolis & Halter, 2010; Videbeck, 2013; Wilkinson, 2013).

Ethical Considerations

The study was conducted according to the ethical principles of the Declaration of Helsinki. Formal approval was obtained from the hospital authorities. After explaining the study's aims and methodology and ensuring the absolute anonymity and confidentiality of the data gathered, each patient was asked to sign a consent form.

Data Analysis

Since a state of mild anxiety is not considered clinically relevant (Wilkinson, 2013), the patients were divided into two groups: (a) CSA, that is, patients with moderate, severe, and panic anxiety; and (b) nonsignificant anxiety (NSA), that is, patients with mild anxiety or no anxiety.

Statistical analysis was performed using the software IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). Nominal variables (e.g., gender, DC, and RF frequency) were displayed as numbers and percentages and were analyzed via Fisher's exact test using 2 × 2 contingency tables. Continuous variables (e.g., patients' ages, number of DCs) were displayed as means, standard deviations (*SD*s), medians, and ranges. The differences between the means in the two groups (e.g., mean age of patients with or without CSA or a certain DC) were analyzed by unpaired Student's *t*-test after considering whether the subgroups had equal variance using Levene's test. A one-way analysis of variance was applied for all comparisons between more than two groups (e.g., mean number of DCs according to level of anxiety). For all tests, an alpha level of $p = .05$ was set for statistical significance.

Multivariate analysis was used to examine the independent association between the DCs and CSA. Given the high number of predictors, only DCs related to CSA in bivariate analysis with a statistical significance threshold of $p < .001$ were considered for inclusion in a forward conditional logistic regression model. The analysis of the adequacy of the adjustment of the final model was based on a likelihood-ratio χ^2 test, whereas the coefficient of the determination of the model was calculated based on the Nagelkerke R^2. A p value

Table 1. Criteria Adopted to Anxiety Levels Determination According to the Characteristics of the Patient's State and Her or His Individual Response to the Condition

Anxiety level	Characteristics of the state	Possible individual responses to anxiety
Mild	Positive state of heightened awareness that may be associated with the tension of everyday life events and may lead to increased motivation and sharpened senses, and the ability to widen the perceptual field, increase sensory stimulation, and focus attention on learning, doing, solving problems, feeling, and protecting her/himself.	Patient appears essentially calm, but may report symptoms such as restlessness, fidgeting, difficulty sleeping, alertness, irritability, hypersensitivity to noise, or "butterflies in the stomach."
Moderate	State of narrowed perceptual field. The patient is only focused on the immediate task, while other forms of communication and other details tend to be neglected. She/he can learn new behaviors or solve problems, but only with assistance. Another person can redirect the person to the task.	Patient appears energized and may show muscle tension, high voice pitch and tone, increased rate of speech, and animated facial mimicry. The patient may report feeling tense, nervous, or agitated. She/he is selectively attentive to the immediate task, can't connect thoughts or events independently, and use of automatisms is increased. Vital signs may be normal or slightly elevated. Diaphoresis, pounding pulse, dry mouth, and gastrointestinal or urinary upsets may be present.
Severe	State involving feelings of fear; the patient believes that something undefined constitutes a threat, and in any behavior is embedded a call for help. She/he can't effectively solve problems or learn. Her/his perceptual field is narrowed, tending to focus only on one detail or scattered particulars, while perception of different specific details is severely limited. She/he can neither complete tasks nor be redirected to a task.	The patient may be agitated and irritable and reports feeling afraid, overloaded, or overwhelmed by new stimuli. She/he may show repetitive purposeless behaviors. More severe signs and symptoms of increased autonomic nervous system activity (e.g., nausea/vomiting/diarrhea, trembling, paleness, palpitations, tachycardia, tachypnea) may be present.
Panic	Condition of rational thought loss; perceptual field is reduced and focused on self. The patient feels terrified and loses control; she/he may experience distorted perceptions and may show extreme behaviors, ranging from combativeness to extreme passivity.	The patient reports feeling completely out of control and may show complete physical immobility and muteness as well as frenetic and aimless behavior. Effective verbal communication may be compromised. She/he can't process any environmental stimuli and doesn't recognize potential danger; delusions or hallucinations may be evident. Sympathetic autonomic nervous system activity increases, so that the related signs and symptoms may become more severe.

of $<.05$ was considered statistically significant for DCs having a strong association with CSA in the final model.

Results

The ND of Anxiety

During the study period, 171 patients were admitted to the study wards. Fifty-five patients (32.2%) were not eligible because (a) they had been admitted for more than 48 hr at the time of the assessment ($n = 28$); (b) they did not speak Italian with sufficient fluency ($n = 4$); or (c) they had a cognitive impairment ($n = 23$). All of the eligible patients agreed to participate in the study. A sample of 116 patients constituted the final study population, of whom 62 were female (53.4%) and 54 male (46.6%); their average age was 72.0 (*SD* 14.3; range 25–91) years. Sixty-one patients were admitted to the surgery wards (52.6%) and 55 (47.4%) to internal medicine. Overall, 36 patients (31%) had cancer. Sixty patients had been prescribed anxiolytic drugs; 37 of them had been taking this medication chronically before hospitalization, while the remaining had been prescribed the medication after their hospitalization.

Overall, an ND of anxiety was made for 72 patients (62.1%). In 30 cases (25.9%) the level was mild, in 39 (33.6%) it was moderate, and in 3 (2.6%) it was severe—anxiety at a panic level was not diagnosed in any of the patients. The prevalence of CSA was 36.2%. Compared to the NSA population, CSA was significantly more frequent among older patients (CSA: 76.2 [*SD* 12.4] years; NSA: 69.5 [*SD* 14.9] years; $t = -2.479$, $p = .015$). Moreover, CSA was significantly more frequent among patients taking anxiolytic drugs (anxiolytic: $n = 32$ [60.4%]; no anxiolytic: $n = 10$ [15.9%]; $\chi^2 = 24.683$, $p < .001$), in the female gender (female: $n = 30$ [48.4%]; male: $n = 12$ [22.2%]; $\chi^2 = 8.555$, $p = .003$), and in patients

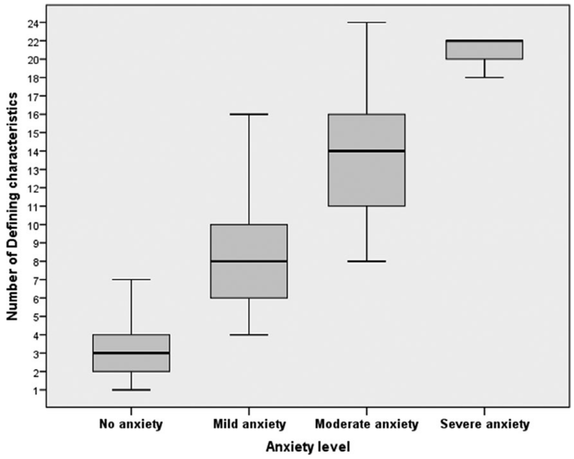

Figure 1. Number of the defining characteristics assessed in the study population according to the assigned anxiety level. The black horizontal line inside the boxes represents the median, and box height is the interquartile range; whiskers represent 1.5 × interquartile range.

suffering from cancer (cancer: 18 [50%]; no cancer: 24 [30%]; $\chi^2 = 4.300$, $p = .038$). No difference was found in the prevalence of CSA between the medical or surgical units (medicine: 18 [32.7%]; surgery: 24 [39.3%]; $\chi^2 = 0.548$, $p = .459$). Among the patients admitted to the surgery units, 53 (86.8%) had already undergone surgery at the time of the study, whereas 8 (13.2%) had an upcoming surgery. No difference in the prevalence of CSA was seen between these subgroups (before surgery: 3 [37.5%]; after surgery: 21 [39.6%]; $\chi^2 = .013$, $p = .909$).

Defining Characteristics

Overall, a mean of 8.4 (*SD* 5.5; range 1–24) DCs were found via the assessment. The number of DCs was significantly higher in patients with CSA (CSA: 14.1 [*SD* 4.0]; NSA: 5.2 [*SD* 3.1]; $t = -13.298$, $p < .001$) and was significantly related to the level of anxiety ($F = 2.315$, $p < .001$). Most patients who were not diagnosed with anxiety showed no more than four DCs, while none of the patients with an ND of anxiety of any level showed less than four DCs (**Figure 1**).

In the CSA population, only the DC of helplessness showed a significantly different distribution among genders (female: 86.7%; male: 58.3%; $\chi^2 = 4.087$, $p = .043$), whilst only the DC increase in heart rate was significantly more frequent among medical patients (medical: 38.5%; surgical: 4.3%; $\chi^2 = 4.683$, $p = .030$). No significant difference was found in the frequency of a single DC between patients who did and did not have cancer. Three DCs were found to be significantly related to older age: anorexia (present: 82.1 [*SD* 7.1] years; absent: 73.3 [*SD* 13.5] years; $t = -2.794$, $p = .008$); alteration in sleep pattern or insomnia (present: 78.1 [*SD* 10.4] years; absent: 58.3 [*SD* 17.0] years; $t = -3.438$, $p = .001$); and alteration in attention or concentration (present: 81.5 [*SD* 6.2] years; absent: 69.2 [*SD* 15.0] years; $t = -3.663$, $p = .003$). Conversely, two DCs were significantly related to younger age: anguish (present: 75.1 [*SD* 12.8] years; absent: 84.4 [*SD* 2.3] years; $t = 3.962$, $p < .001$) and rumination (present: 75.6 [*SD* 13.0] years; absent: 81.2 [*SD* 2.8] years; $t = 2.277$, $p = .030$).

Eleven DCs were found in over 50% of the CSA population, with four of the DCs noted in over 90% of all such patients (**Table 2**). The DCs of abdominal pain, alteration in sleep pattern or insomnia, anguish, apprehensiveness, helplessness, increase in respiratory rate, preoccupation, rattled, restlessness, rumination, and worried about change in life event were present in all patients with severe anxiety. The frequency of all but five DCs was significantly different between CSA and NSA patients—all these DCs were more frequent in the CSA subgroup, with the exception of diminished ability to problem-solve, which was significantly more frequent among NSA patients.

The 21 DCs showing a significantly different prevalence ($p < .001$) between CSA and NSA patients (see **Table 2**) were considered for the logistic regression analysis (**Table 3**). The model explained 86% of the variance in identifying CSA. Four DCs were found to be significant independent predictors of CSA. In the presence of the DCs of helplessness, altered attention or concentration, and anguish, the patients were, respectively, 8, 44, and 51 times more likely to have CSA, whereas subjects presenting with Diminished ability to problem-solve were around 96% less likely to have CSA.

Related Factors

The most frequent RFs for CSA were major change in health status ($n = 30$; 71.4%), family history of anxiety ($n = 25$; 59.5%), Threat of death ($n = 23$; 54.8%), unmet needs ($n = 11$; 26.2%), and knowledge deficit ($n = 11$; 26.2%). No significant difference was found in the frequency of the different RFs between medical and surgical patients. Family history of anxiety was significantly most frequent among female patients (female: 70.6%; male: 0%; $\chi^2 = 24.706$, $p < .001$). Major change in health status was significantly more frequent among patients with a diagnosis of cancer (cancer: 88.9%; no cancer: 58.3%; $\chi^2 = 4.706$, $p = .030$) and showed a nonsignificant trend towards the male gender (female: 63.3%; male: 91.7%; $\chi^2 = 3.372$, $p = .066$). Threat of death (RF present: 79.8

Table 2. Frequency Distribution of the Identified Defining Characteristic (DC) in Patients Having No or Nonsignificant Anxiety (NSA; $n = 74$) or Clinically Significant Anxiety (CSA; $n = 42$)

Category	Defining characteristic	NSA, *n* (%)	CSA, *n* (%)	*p* value
Affective	Anguish	9 (12.2)	37 (88.1)	<.001
	Apprehensiveness	49 (66.2)	42 (100.0)	<.001
	Helplessness	4 (5.4)	33 (78.6)	<.001
	Increase in wariness	3 (4.1)	12 (28.6)	<.001
	Irritability	7 (9.5)	6 (14.3)	.308
	Overexcitement	2 (2.7)	14 (33.3)	<.001
	Rattled	14 (18.9)	20 (47.6)	.001
Behavioral	Alteration in sleep pattern/Insomnia	38 (51.4)	38 (90.5)	<.001
	Hypervigilance	2 (2.7)	14 (33.3)	<.001
	Poor eye contact	5 (6.8)	17 (40.5)	<.001
	Restlessness	49 (66.2)	42 (100.0)	<.001
	Worried about change in life event	30 (40.5)	39 (92.9)	<.001
Cognitive	Alteration in attention/concentration	5 (6.8)	24 (57.1)	<.001
	Diminished ability to problem-solve	70 (94.6)	11 (26.2)	<.001
	Preoccupation	21 (28.4)	37 (88.1)	<.001
	Rumination	17 (23.0)	37 (88.1)	<.001
Physiological[a]	Abdominal pain	9 (12.2)	23 (54.8)	<.001
	Alteration in respiratory pattern	2 (2.7)	5 (11.9)	.058
	Anorexia	6 (8.1)	14 (33.3)	.001
	Diarrhea	1 (1.4)	5 (11.9)	.023
	Dry mouth	5 (6.8)	11 (26.2)	.005
	Facial flushing	2 (2.7)	8 (19.0)	.004
	Facial tension	6 (8.1)	20 (47.6)	<.001
	Faintness	1 (1.4)	4 (9.5)	.057
	Hand tremors	0 (0.0)	6 (14.3)	.002
	Heart palpitations	2 (2.7)	7 (16.7)	.011
	Increase in blood pressure	0 (0.0)	3 (7.1)	.045
	Increase in heart rate	1 (1.4)	6 (14.3)	.009
	Increase in perspiration	0 (0.0)	6 (14.3)	.002
	Increase in respiratory rate	1 (1.4)	5 (11.9)	.023
	Increase in tension	22 (29.7)	30 (71.4)	<.001
	Nausea	1 (1.4)	11 (26.2)	<.001
	Trembling	0 (0.0)	2 (4.8)	.129
	Voice quivering	2 (2.7)	4 (9.5)	.125

Note. The DCs pupil dilation and superficial vasoconstriction were observed in no patients.
[a] Comprising sympathetic and parasympathetic.

Table 3. Logistic Regression of Clinically Significant Anxiety on Defining Characteristics ($R^2 = 0.861$; $p < .001$)

Defining characteristic	*β*	*SE*	OR (95% CI)	*p* value
Altered attention/concentration	3.784	1.398	43.973 (2.842–680.642)	.007
Anguish	3.937	1.339	51.242 (3.714–707.042)	.003
Diminished ability to problem-solve	−3.198	1.237	0.041 (0.004–0.461)	.010
Helplessness	2.102	1.038	8.181 (1.070–62.555)	.043
Constant	−1.868	1.216	0.000	

Note. CI = confidence interval; OR = odds ratio; SE = standard error.

[*SD* 10.1] years; RF absent: 71.9 [*SD* 13.7] years; $t = -2.159$, $p = .037$) and unmet needs (RF present: 69.0 [*SD* 13.9] years; RF absent: 78.8 [*SD* 10.9] years; $t = 2.385$, $p = .022$) were significantly related to older and younger patients, respectively.

Discussion

The ND of Anxiety and Its Diagnostic Criteria

The main finding of this study was to document a high prevalence of CSA with its DCs and RFs in a population of medical-surgical patients. Also, a critical cluster of DCs useful for nurses to identify CSA was found.

More than one third of patients were affected by CSA. The prevalence of anxiety was found to be significantly higher among patients who were older, female, and taking anxiolytic drugs, and among patients with cancer. These results are consistent with those of previous studies (Bryant, Jackson, & Ames, 2008; Jomar & de Souza Bispo, 2014; Pigott, 1999).

The number of DCs was significantly higher among patients with a higher level of anxiety. It should be noted that DCs potentially associated with anxiety were identified among almost all the enrolled patients, including subjects who were diagnosed with mild or no anxiety. In fact, the signs or symptoms of anxiety do not necessarily have a negative impact on the individual, since they may be the expression of positive physiological responses. Only when the patient's response exceeds this physiological threshold does anxiety become clinically relevant, resulting in an increasing deterioration of both mental and physical performances.

Anxiety manifested mainly in the form of affective or behavioral alterations, whereas physiological signs or symptoms were much less frequent (see **Table 2**). This highlights the importance of the relational aspects of nursing assessment, since anxiety cannot be identified as an ND without an accurate observation of the patient's feelings and behavior accompanied by verbal interaction including active listening. Interestingly, the CSA population was for the most part characterized by the presence of a similar pattern of DCs, seen in over 90% of the cases—restlessness, apprehensiveness, worried about change in life event, and alteration in sleep pattern or insomnia. This result is in line with previous studies with clinical and expert consensus on the ND of anxiety, which, however, did not consider the level of severity (Assis, Lopes Jde, Nogueira-Martins, & de Barros, 2014; Oliveira et al., 2008; Suriano et al., 2011; Vanečková, Sollár, & Vörösová, 2012).

Although many of the studies mention similar DCs, no study so far has analyzed the association between DCs and the ND of anxiety. This is particularly important to reduce the long list of DCs useful to identify anxiety (Beckstead, 2009). Based on our findings, at least four DCs are required to make a diagnosis. According to the results of the multivariate analysis, the likelihood of CSA was higher among patients presenting independently with helplessness, altered attention or concentration, and anguish and not among those showing diminished ability to problem-solve. This supports the hypothesis that most NDs require a cluster of symptoms ("probably three or four," as stated by Herdman [2014, p. 117]) to be accurate. We think that observing the DC of anguish during nursing assessment is particularly relevant, since its presence independently indicates an increase in the likelihood of CSA by 51 times, and it also showed a very high frequency in the study population. On the other hand, the DC of diminished ability to problem-solve was observed much more frequently in NSA patients. Further, the multivariate analysis showed that it represents a kind of protection against the occurrence of CSA, suggesting it should be excluded from the list of DCs of anxiety.

The most frequent etiologies (RFs) for CSA found in this study could be attributed to the actual health condition (major change in health status and threat of death). This is in line with the findings of Ogasawara et al. (2005) among hospitalized patients with end-stage cancer.

It has been theorized that poor nurse–patient communication can result in several problems in nursing (Peplau, 1991). Nurses may face difficulties in diagnosing anxiety as a result of experiencing a distant attitude from the patient, which may lead to the inference that all patients present similar behaviors, regardless of their characteristics or sociocultural backgrounds (Suriano et al., 2011). Conversely, the relational aspects of the assessment are even more important considering that anxiety may be strongly influenced by patients' sociocultural circumstances (Shimomai et al., 2016). The following section presents an analysis of some aspects of the narrative data derived through the assessment of our cohort of patients.

Translating Patient Conversations Into Data: Critical Aspects of Nursing Assessment

Translating the NANDA-I's DCs potentially related to the ND of anxiety into practice was neither simple nor obvious, emphasizing the importance of considering all of the acquired data together and making accurate inferences through diagnostic reasoning. The first problem was determining if the observed symptoms and signs matched the DCs provided by NANDA-I in the form of a simple list without precise definitions. For example, to assess the DC of abdominal pain, the nurses had to consider patients' descriptions like, "I feel a cramp in my stomach," "I have a pit in my stomach," or "My stomach feels small"—nobody actually described this symptom as pain. Another problem was that, oftentimes, what the patient subjectively reported was in sharp contrast to what the nurse directly observed. For instance, many patients who described themselves as "completely quiet and peaceful" were in reality visibly restless, agitated, and nervous, sometimes manifesting physical symptoms such as facial flushing, excitation, facial tension, increased sweating, and increased heart and respiratory rate. For example, two men in the sample described themselves as "completely quiet" but they could not stop walking around the room during the assessment. Among patients who denied having problems with concentration or attention, the nurses nevertheless documented the DC of alteration in attention or concentration when they had to repeat or reformulate their questions several times, despite using simple and clear language.

This study also emphasized the importance of identifying information arising in the patients' narratives to establish the presence and severity of anxiety. Some people, for instance, spontaneously described their anxious natures using phrases like, "I was born anxious," "I am always anxious," "I have been living with anxiety for years," "As time goes on, I become more and more anxious," "Anxiety and I are one thing," "I usually take medication for anxiety," and "After my hospital admission, I had to ask the doctor to prescribe me something to reduce this anxiety." Such utterances also helped determine if the patients already showed trait anxiety or if it had appeared following their hospitalization. Among other patients, the following were considered: the use of recurring words like anxiety, restlessness, concern, agitation, hopelessness, and anguish; the tendency to repeat phrases like "I am afraid" or "I look forward;" the concern or real belief that their clinical condition has been underestimated and is in fact more serious than described by the physician; the belief in a conspiracy theory among the healthcare professionals or the relatives to hide relevant information about the patient's health or family troubles; and a difficulty in having positive or optimistic thoughts in spite of a favorable prognosis.

Many behavioral and affective DCs were intercepted by carefully observing the patients' interactions with the nurse. For example, some people did not want the nurse to leave and wanted to continue their conversation, while in others it appeared their floodgates had opened and they seemed relieved to be able to talk about their emotional condition. In some cases, the patient was in search of physical or visual contact or needed to be reassured, to be given certainties and clear answers, posing the same question several times. Ensuring a high level of accuracy in identifying anxiety thus has important implications for nursing practice because doing so supports nurses in undertaking the appropriate interventions (Suriano et al., 2011; Wilkinson, 2013).

A Brief Reflection on Interventions to Reduce Anxiety

Although this study did not aim to explore the interventions delivered to treat anxiety, we did note that many CSA patients were prescribed drug treatments. Surprisingly, our data showed that at the time of the assessment, CSA was significantly more frequent among patients taking anxiolytic drugs, raising doubts about the effectiveness of such treatments in controlling anxiety.

Another consideration is that nurses are often expected to manage the administration of medications prescribed on an as-needed basis for patients with anxiety, based on their independent clinical decision making (Usher, Baker, Holmes, & Stocks, 2009). Unfortunately, nurses have very few guidelines they can follow to administer needs-based drugs, and they therefore run the risk for incorrectly identifying the presence or absence of anxiety and may therefore inappropriately administer the drugs (Hilton & Whiteford, 2008). The ability to identify patients with CSA based on NANDA-I criteria could be one solution.

Most importantly, recent studies have demonstrated that many nonpharmacological interventions prescribed by nurses are effective in anxiety reduction and control in very different settings (Al-Azawy, Oterhals, Fridlund, Assmus, & Schuster, 2015; Franzoi, Goulart, Lara, & Martins, 2016; Hosseini, Heydari, Vakili, Moghadam, & Tazyky, 2016; Saatsaz, Rezaei, Alipour, & Beheshti, 2016) and that their efficacy is similar to pharmacological treatments (Salmore & Nelson, 2000). Moreover, Peplau's therapeutic communication has proved effective in reducing anxiety among patients (Zarea, Maghsoudi, Dashtebozorgi, Hghighizadeh, & Javadi, 2014). Some commonly known effective nursing interventions to bring relief to sufferers of anxiety are being present; allowing physical contact; encouraging the verbalization of needs, concerns, doubts, and questions; and clearly showing the patients that they are not alone. Accordingly, we can assume that if nurses were able to systematically and carefully diagnose anxiety, they would already undertake the first steps towards treatment.

Limitations

The results of the multivariate analysis are limited by a small sample size and therefore should be interpreted with caution. Moreover, the study was conducted in a single hospital, which limits the generalizability of the results.

Conclusions

This study demonstrated a high prevalence of the ND of anxiety in a medical-surgical population, with one out of three patients having CSA. Subgroups of patients (the elderly, females, and patients with cancer) were identified as having a significantly higher risk for CSA.

The appropriate identification of patients with CSA may have a positive impact on daily clinical practice, helping nurses prescribe and deliver the appropriate nonpharmacological interventions or to correctly administer as-needed psychoactive medications to patients.

Accurately diagnosing anxiety is also important for nursing research. The systematic collection of data on the epidemiology of the ND of anxiety can provide information about this aspect of nursing care, which would also enable a comparison between different cohorts of patients, with the aim to ensure that nurses have the best knowledge and expertise to care for patients with such a diagnosis. Further studies with larger samples should analyze the prevalence of anxiety in different care settings and should aim to identify a critical cluster of DCs, thereby allowing for a more reliable and agile diagnostic pathway to identifying patients with CSA.

Clinical Resource

- NANDA International. http://www.nanda.org/

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JOURNAL OF NURSING SCHOLARSHIP

PROFESSION AND SOCIETY

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Current Literature Review of Registered Nurses' Competency in the Global Community

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Key words
competency, global, nurse, international nursing

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Accepted September 15, 2017

doi: 10.1111/jnu.12361

Abstract

Purpose: In order to enhance international standards of nursing service, this article aims to analyze the English full-text peer-reviewed published articles from the past 10 years that describe contemporary registered nurses' (RNs') competency in the global community.

Design: An integrative review of literature was conducted between June 2016 and January 2017.

Methods: A systematic search was completed using four databases (Science Direct, Scopus, Web of Science, and the Cumulative Index to Nursing and Allied Health Literature) that covered the years between 2007 and 2017, and used the key words nurs* OR (staff nurs*) OR (register nurs*) AND competenc* AND international OR global. Ultimately, 32 studies meeting inclusion and exclusion criteria were selected for analysis.

Findings: Nursing competency trended towards definitions using a holistic lens and behavior statements reflecting the skills, knowledge, attitudes, and judgment required for effective performance in the nursing profession. By using inductive content analysis, 11 components emerged. Additionally, six instruments were found to measure generalist RNs' competencies across countries. The variables related to generalist nursing competency included sociodemographic variables, professional-related variables, and work environment variables.

Conclusions: This review provides the research evidence for updating definitions, components, measurements, and variables related to RNs' competency in the global community. Further research should consider cross-cultural validation of instruments and influencing factors related to nursing competency.

Clinical Relevance: The components and measurements identified in this review can be used by nursing administrators to select or evaluate qualified nurses. The multivariables related to nursing competency can assistant hospital administrators to recognize and find effective ways to improve nursing competency.

Globalization makes people interconnected and interdependent (Morin, 2012). Medical tourism has provided a channel for international patients to move from more developed countries to less developed countries, where treatment can often be more rapidly and more cheaply accessed (Mainland & Wilson, 2010). In healthcare settings, nurses have a common vision to protect and promote patients' health, no matter what the patient's nationality. Thus, it is required that nurses have adequate abilities to provide high-quality services that meet international standards.

In addition, nursing staff shortages in many developed countries remain a challenge to the provision of effective health care, resulting in some countries such as the United States and the United Kingdom actively recruiting qualified nurses from overseas. With nurses' migration to work in other countries, the demographic profile of today's nursing workforce represents various religions, nationalities, cultures, and generational cohorts (Meretoja, Numminen, Isoaho, & Leino-Kilpi, 2015). Nurses' migration has resulted in requirements for comparable competencies (World Health Organization, 2009). This has been particularly in evidence in the past decade, when regulation has been enacted to ensure the competence of a globally migrating health and nursing workforce (Cashin et al., 2017). For example, in order to facilitate the mobility of the international nursing workforce, the International Council of Nurses (ICN; Alexander & Runciman, 2003) identified 17 indicators within three domains of the generalist registered nurses' (RNs') competencies framework to advocate for global nursing competency. In addition, several national organizations also focused on nursing service standards in order to ensure safety and quality nursing practice. For example, the American Association of the Colleges of Nursing and their accrediting body the Commission on Collegiate Nursing Education in the United States and the Nursing and Midwifery Council in the United Kingdom are the main agencies that monitor and develop the standards of nursing practice (Safadi, Jaradeh, Bandak, & Froelicher, 2010). These standards are generic competencies that every RN should have in order to provide nursing services (Cashin, Chiarella, Waters, & Potter, 2008). Thus, the measurement of nursing competence is an essential indicator to assess quality nursing care (Cowin, Johnson, Craven, & Marsh, 2008). This is because nursing competencies have been considered crucial contributions to assure high-quality and safe nursing care (Cowin, Johnson, et al., 2008; Smith, 2012).

Although "competence" in nursing has been widely discussed in the literature, definitions of nursing competencies are ambiguous. Garside and Nhemachena (2013) stated that competence is generally considered as an impalpable entity when thinking about its actual meaning. Safadi et al. (2010) stated that competence is the concept used to determine whether or not a nurse is fulfilling the required standards for safe practice. Cowan, Norman, and Coopamah (2007) and Safadi et al. (2010) have suggested that a holistic definition of nursing competency should be operationalized. Additionally, nurses practice in complex work settings, which makes nursing competency difficult to measure (Cowan, Wilson-Barnett, & Norman, 2007). Yet how to define and measure nursing competency differs among researchers; therefore, it is essential to clarify what is meant by nursing competency and to make suggestions for how to measure it.

Moreover, competence is context related and time specific (Garside & Nhemachena, 2013). This requires that RNs update their education and skills on an ongoing basis. For example, with the rapid changes in advanced medicine, nurses should augment their abilities to adapt to society's changing requirements (Akamine, Uza, Shinjo, & Nakamori, 2013). Thus, it is crucial to identify current contemporary nursing competencies. This review aims to capture the research evidence of contemporary RNs' competencies in the context of the global community for the purpose of enhancing the international standards of nursing care. Ultimately, the present review proposes to answer the following questions: (a) How are RNs' competencies defined? (b) What are the components of RNs' competencies? (c) How are RNs' competencies measured? and (d) What are the variables related to RNs' competency?

Methods

Whittemore and Knafl's (2005) integrative review method was adapted for conducting this extensive review in order to gather diverse methodological evidence-based resources related to contemporary RNs' competency in the global community. This review was conducted between June 2016 and January 2017 by using the databases of Science Direct, Scopus, Web of Science, and the Cumulative Index to Nursing and Allied Health Literature. In addition, the search engines of Google and Yahoo were used for searching further. The specific search terms of nurs* OR (staff nurs*) OR (register nurs*) AND competenc* AND international OR global were used in the aforementioned databases. This review covered literature between 2007 and 2017. The Endnote program was used for reference management. The inclusion criteria were: (a) the retrieval articles focused on generalist nursing competency and English full text of peer-reviewed articles; (b) the sample was general nurses who were RNs or staff nurses working in hospital settings; and (c) the methodology of articles included reviews, concept analyses, correlational studies, experimental studies, or qualitative studies. The exclusion criteria were: (a) the reviewed articles described specific competencies, such as disaster competencies or cultural competencies; (b) the review articles related to nurse managers; (c) the samples were nongeneral RNs (e.g., Licensed Practical Nurses or nursing assistants) or nurse practitioners; and (d) the settings were nonhospital settings, such as home care.

The studies' selection process used the flowchart of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), as shown in **Figure S1**. The initial screening progress was conducted by one researcher (Y.L.). Then the other researcher (Y.A.) checked the results. Disagreements with included articles were discussed until they reached consensus. The reference list of 32 articles are presented in **Table S1**, which includes author, year, country, aim of studies, components of generalist nurses' competency, design, measurements/sample size/response rate, data analysis, and key findings.

Results

Articles' Characteristics

Thirty-two articles published between 2007 and 2017 were included in this review. One fourth of the articles involved research or scholarly literature that took place in the geographic area of the European Union, including Finland ($n = 5$); the United Kingdom, Belgium, Greece, Germany, and Spain ($n = 2$); and Italy ($n = 1$). The remaining articles came from Australia ($n = 5$), Japan ($n = 5$), the People's Republic of China ($n = 3$), the United Kingdom ($n = 2$), Canada ($n = 2$), Norway ($n = 2$), Indonesia ($n = 1$), Iran ($n = 1$), Jordan ($n = 1$), Switzerland ($n = 1$), and the United States ($n = 1$). The most common study type was self-reported survey article ($n = 25$). The remaining 7 articles were reviews.

Defining Competency, Trending Toward the Holistic Approach

Two literature review studies stated that the definitions related to competency have changed over time. Three distinct stages are commonly discussed, which include the behavioral perspective, psychological construct, and holistic approach (Cowan, Norman et al., 2007; Garside & Nhemachena, 2013). The behavioral perspective and psychological construct were generally used before 2007, while in this updated review, the holistic approach for defining nursing competency was used. The behavioral perspective described competency as task oriented, which refers to the ability and skills to complete a job (Wells, 2003). The psychological construct focused on the integration of cognitive, affective, and psychomotor skills (Girot, 1993). The holistic approach identifies competency as "broad clusters of general attributes which are considered essential for effective performance" (Garside & Nhemachena, 2013, p. 543).

This review found that the holistic definition of nursing competency was popularly used to develop nursing competency instruments in the past decade. Five studies were found describing nursing competency as holistic, which are presented in **Table 1**.

Components of Nursing Competency

A summary of nursing competency's components from each of the articles is presented in **Table S1**. This list was used to group the components using inductive content analysis. This process contributed to identifying 11 components of nursing competency in the global community, which were composed of personal traits, professional clinical practice, legal and ethical practice, ensuring safety and quality, communication, management of nursing care, leadership, teaching-coaching, cooperation and therapeutics practice, critical thinking and innovation, and professional development. The dimensions' descriptions with reference sources are shown in **Table S2**.

Measurements of Nursing Competency

This review explored five developed instruments used to assess generalist nurses' competency. These were the European Questionnaire Tool (EQT1 and EQT2; Cowan, Wilson-Barnett, Norman, & Murrells, 2008), Competence Inventory for Registered Nurses (Liu, Kunaviktikul, Senaratana, Tonmukayakul, & Eriksen, 2007; Liu, Yin, Ma, Lo, & Zeng, 2009), Australian National Competency Standards for Registered Nurses (Andrew et al., 2008; Cowin, Hengstberger-Sims, et al., 2008), Competence Scale for Senior Clinical Nurses (Akamine et al., 2013), and Holistic Nursing Competency Scale (Takase & Teraoka, 2011). The EQT1, EQT2, Competence Inventory for Registered Nurses, and Australian National Competency Standards for Registered Nurses were originally developed in the European Union and the countries of China and Australia, respectively. The Competence Scale for Senior Clinical Nurses and Holistic Nursing Competency Scale were developed in Japan.

The psychometric properties testing and descriptions of the five developed instruments are presented in **Table S1**. All five of the instruments tested internal consistency reliability. Only one study conducted test-retest reliability (Liu, Kunaviktikul, Senaratana, et al., 2007). Four of the instruments conducted construct validity testing by using the exploratory factor analysis method (Akamine et al., 2013; Cowan et al., 2008; Liu, Kunaviktikul, Senaratana, et al., 2007; Takase & Teraoka, 2011). In addition, construct validity testing by using confirmatory factor analysis was found in four studies (Akamine et al., 2013; Andrew et al., 2008; Liu et al., 2009; Takase & Teraoka, 2011), contrasted-group validity testing was found in two studies (Akamine et al., 2013; Liu, Kunaviktikul, Senaratana, et al., 2007), convergent validity testing was found in one study (Andrew et al., 2008), and criterion-related validity testing was found in

Table 1. The Description of Nursing Competency

Country	Author and year	Definition of nursing competency
Japan	Takase & Teraoka (2011)	"The ability of nurses to effectively illustrate a set of attributes, such as personal characteristics, professional attitudes, values, knowledge and skills to fulfill their professional responsibility through practice" (p. 398).
Indonesia	Lock (2011)	"A comprehensive profile of knowledge, skills and professional behaviors" (p. 350).
Australia	Nursing and Midwifery Board of Australia (2006)	"The combination of knowledge, skills, values, attitudes, and abilities that underpin effective and/or superior performance in a professional or occupational area" (p. 10).
Italy	Dellai, Mortari, & Meretoja (2009)	"The combination of abilities, knowledge, values and personal aptitudes to perform a task in a specific work environment" (p. 784).
Canada	Black et al. (2008)	"The ability of registered nurses to apply and integrate the knowledge, judgments, skills, and personal attributes required to practice ethically and safely in a designated role and setting" (p. 173).

two studies (Liu et al., 2007; Takase & Teraoka, 2011). All five developed instruments were evaluated by self-report questionnaires. Four instruments were rated using Likert scales, with the scores ranging from 4 to 7. Only one instrument used self-report of the visual analog scale (VAS), with the scores ranging from 1 (*very low*) to 100 (*very high*; Cowin, Hengstberger-Sims, et al., 2008).

In addition, the Nurse Competence Scale (NCS), which was initially developed in Finland by Meretoja, Isoaho, and Leino-Kilpi (2004), has been tested for cross-cultural validity in Norway (Wangensteen, Johansson, & Nordström, 2015), Switzerland (Müller, 2013), and Italy (Dellai, Mortari, & Meretoja, 2009). These cross-culturally tested instruments' psychometric properties are presented in **Table S1**. However, through confirmatory factor analysis, neither the Norwegian version ($\chi^2 = 8466.277$, $df = 2548$, $\chi^2/df = 3.32$, Comparative Fit Index = 0.703, and Normed Fit Index = 0.626) nor the Swiss version ($\chi^2 = 7473$, $df = 2555$, $\chi^2/df = 2.94$, $p < .0001$, Comparative Fit Index = 0.53, Tucker-Lewis Index = 0.51, and root mean square error of approximation = 0.09) of the NCS demonstrated goodness-of-fit indicators. This means that the NCS did not have good construct validity in the context of Norway and Switzerland. Hence, exploratory factor analysis was used in these two studies, which extracted nursing competency with five factors' constructs (Müller, 2013; Wangensteen et al., 2015). Moreover, internal consistency reliability was tested for both the Norwegian and Swiss versions of the NCS. In the Italian context, only content validity was tested without other psychometric properties being tested (Dellai et al., 2009). The NCS can be evaluated using a 4-point Likert scale to assess nurses' frequency of performing the competency (0 = *not applicable in my work*, 1 = *used very seldom*, 2 = *used occasionally*, 3 = *used very often in my work*) or the VAS to determine the level of competency.

Variables Related to Nursing Competency

Ten survey studies illustrated the variables related to nursing competency in this review (see **Table S1**). Nine survey studies found significant low to high correlations between selected variables and nursing competency. The related variables are presented as follows.

Sociodemographic variables had low to moderate absolute correlation values (0.08–0.35, $p < .05$) with nursing competency, such as work experience in four studies (Meretoja et al., 2015; Numminen, Meretoja, Isoaho, & Leino-Kilpi, 2013; Takase, 2013; Wangensteen, Johansson, Björkström, & Nordström, 2012), employment status in one study (Meretoja et al., 2015), and age in three studies (Numminen, Leino-Kilpi, Isoaho, & Meretoja, 2015b; Numminen et al., 2013; Wangensteen et al., 2012). However, one study did not find significant correlations among age, overall work experience, work experience in the current ward, and competency (Bahreini, Shahamat, Hayatdavoudi, & Mirzaei, 2011).

In addition, professional-related variables were found to have low to moderate positive effects on nursing competency (0.14–0.39, $p < .001$), such as self-esteem in one study (Takase, Yamamoto, Sato, Niitani, & Uemura, 2015) and critical thinking and research utilization in one study (Wangensteen et al., 2012).

Furthermore, work environment variables had low to high correlation coefficient scores, which ranged from 0.13 to 0.57 ($p < .01$), influence on nursing competency, such as organizational climate in one study (Liu, Kunaviktikul, & Tonmukayakul, 2007), ethical climate in one study (Numminen, Leino-Kilpi, Isoaho, & Meretoja, 2015a), satisfaction with current job in one study (Numminen et al., 2015b), practice environment in one study (Numminen et al., 2016), and learning in one study (Takase et al., 2015).

Discussion

When considering how to define contemporary nursing competency in the global community, the researchers Bradshaw (1998) and Cowan, Norman, et al. (2007) argued that both the behavioral perspective and psychological construct of competency are ambiguous or redundant, and most researchers suggest it is better to describe competence from a holistic perspective. This review illustrates how most contemporary definitions of nursing competency are focused through a holistic lens. This was consistent with the ICN's (1997, p. 44) definition of nursing competence as "a level of performance demonstrating the effective application of knowledge, skills and judgments." In addition, Del Bueno, Barker, and Christmyer (1981) stated that "The competency statements should clearly define the criteria for successful achievement" (p. 25). Therefore, based on a holistic perspective, nursing competency can be generally written as behavior statements that reflect the skills, knowledge, attitudes, and judgment required for effective performance in the nursing profession.

Regarding the components of international nursing competency, different researchers described them in various ways. This may be the result of education system differences, since nurses' competency development varies among countries (Bradshaw, 1998). In addition, a given researcher may base dimensions of competency on different classification systems to describe the components of nurses' competency at different periods of time. With the rapidly changing healthcare system and treatment methods, nurses' competencies should be updated as well. As mentioned in the Results section, 11 components emerged through the researchers analyzing 17 countries' nursing competency components in the past decade. All of these components update nursing professional capabilities to provide international services in global communities. The discussion of these 11 components is presented in **Table 2**.

This review presents clear synthesized descriptions of each component to assist subsequent researchers. Additionally, cultural awareness was suggested by Chiarella, Thoms, Lau, and McInnes (2008) as a component to be added as a crucial competency. This is because nurses have the responsibility to respect patients' differences, values, preferences, and needs in the global community. Moreover, information technology has been widely used in clinical settings to facilitate nursing practice to direct patient care, decrease error, minimize time spent on documentation, and reduce duplicate work (Chang, Poynton, Gassert, & Staggers, 2011). Cronenwett et al. (2007) described informatics as one component of nursing competency in the Quality and Safety Education for Nurses initiative. Thus, it is recommended that nurses' informatics be added as another component.

This review analyzed five developed instruments used to assess generic RNs' competency in the European Union and three countries. All of the instruments have good psychometric properties. However, all five developed instruments were designed as self-reported scales to evaluate nursing competency. Although self-reported scales have been used as an essential method to evaluate competency, this may contribute to the bias of nurses rating their competencies as higher or lower (Baxter & Norman, 2011). Thus, more objective approaches are recommended to assess nurses' competency, such as evaluating nursing competency through patients, peers, administrators, or observations, which may be more useful (Wilkinson, 2013). In addition, although the Finnish version of the NCS has been translated into Norwegian, Italian, and German and tested for cross-cultural validity, the construct validity cannot be established in Norway and Italy through confirmatory factor analysis. This may result from the fact that the 73-item NCS has low item-to-item correlation (Flinkman et al., 2017). Additionally, exploratory factor analysis has been used to extract five constructs in these two countries, while it may not detect theory-based constructs. Therefore, the components synthesized from this review may help other researchers to further study the specific constructs in their own cultural contexts.

This review also found that factors related to nursing competency were composed of sociodemographic variables (e.g., work experience, employment status, and age), professional-related variables (e.g., self-esteem, critical thinking, and research utilization), and work environment variables (e.g., organizational climate, ethical climate, practice environment, satisfaction with current job, and learning). Among these three group variables, only work environment variables, such as learning ($r = 0.57$, $p < .01$) had the high correlation coefficient related to nursing competency (Takase et al., 2015). Therefore, nursing managers should pay close attention to work environment variables in order to improve nursing competency. Additionally, well-qualified nurses may move to another country for better pay and working conditions. Thus, nursing managers should consider ways to provide a supportive work environment to maintain nurses as well. Furthermore, since little is known about the factors influencing nursing competency (Takase et al., 2015), further studies should investigate factors related to nursing competency.

Table 2. The Discussion of 11 Components of Nursing Competency

No.	Discussion of each component
1	"Personal traits" identified nurses' consistent and long-lasting tendency in behaviors and thoughts, such as self-confidence, self-control, accountability, and self-management of stress as critical for providing international nursing services.
2	"Professional clinical practice" pointed out that nurses should pay attention to holistic nursing care, that is, support and promote the various patients' needs in the global community.
3	"Legal and ethical practice" must be considered by international nurses, especially when they work in diverse cultural practice environment. This component was consistent with the ICN generalist nurses' competency subdimension (Alexander & Runciman, 2003).
4	"Ensuring quality and safety" involves personal integrity and evaluation for quality improvement of nursing care as a goal and is a worldwide consideration when nurses provide healthcare services (World Health Organization, 2009).
5	"Communication" includes the ability to understand and be understood in the international context. It is a priority, and foundational ability should be considered. There can be no safe care without effective communication (Baird, Funderburk, Whitt, & Wilbanks, 2012).
6	"Management of nursing care" elaborated on how nurses provide nursing care based on the nursing procedures. These nursing procedures were consistent with the nursing process mentioned by Yura and Walsh (1983).
7	"Leadership" meant that nurses should be able to lead, motivate, influence, and support in the provision of nursing services regardless of their specific job title.
8	"Teaching-coaching" competencies relate to nurses being aware of teaching/learning principles and being able to use these in health promotion and patient-centered care, as well as with junior nurses in clinical practice.
9	"Cooperation and therapeutics practice" pointed out that international nurses should cooperate with the multidisciplinary team to provide good nursing services.
10	"Critical thinking and innovation" indicates international nurses' judgment should be based on evidence-based practice.
11	With the rapidly developing healthcare system, the "professional development" competency makes sure nurses can continue to update their skills and knowledge to adapt to changes in technology and social development.

Note. ICN = International Council of Nurses.

Limitations

Although this extensive review provides evidence for nursing competency in the global community, there are a few limitations. Firstly, only English-language literature was selected, since both authors could read English. Secondly, only four databases and two search engines were selected for literature searching, since they were popularly used in the nursing field. Thirdly, the content of most of the articles are psychometric analyses regarding the instruments' development. Psychometric analyses processes were the method to develop instruments.

Conclusions

This review included 32 articles for analysis. The definition of nursing competency has trended towards using a holistic approach. Through inductive content analysis, 11 dimensions were generated for nurses working in the global community. Additionally, this review confirmed that the existing five developed instruments can effectively measure generalist nurses' competency in their initial instruments' testing populations, since the original instruments have good psychometric properties. However, cross-cultural validation should be sought using appropriate methods for the existing Finnish version of the NCS. Furthermore, variables related to nurses' competency can be grouped into sociodemographic, professional-related, and work environment variables, but there are few empirical studies. Thus, factors influencing nursing competency should be considered for later studies.

Implications for Nursing and Clinical Practice

Other nursing researchers can apply the definitions and components identified from this review to further develop measurements of contemporary RNs' competency in the global community within their own countries. Additionally, the components and measurements identified can be used by nurse administrators to select or evaluate qualified nurses. Moreover, several work environment, professional-related, and sociodemographic variables have been found to relate to nursing competency. Therefore, hospital managers should recognize that nursing competency is influenced by multifactorial variables when they plan to design programs for enhancing nurses' competency.

Acknowledgments

This research was supported by the Rachadapisek Sompote Fund for Postdoctoral Fellowship, Chulalongkorn University. A special thanks to Dr. Dawn Doutrich from Washington State University College of

Nursing-Vancouver for suggestions, and for clarifying and editing this article.

Clinical Resource

- Nursing and Midwifery Board of Australia. Revised registration standards and standards for practice published today: http://www.nursingmidwiferyboard.gov.au/News/2016-02-01-revised-standards.aspx

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Table S1. Studies selected for full text review and a short overview of their results (n = 32)

Table S2. Descriptions of nurses' competency components

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PROFESSION AND SOCIETY

Revisiting the Quality of Reporting Randomized Controlled Trials in Nursing Literature

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Key words
CONSORT, quality, randomized controlled trials, clinical trials

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Accepted October 16, 2017

doi: 10.1111/jnu.12368

Abstract

Purpose: To examine and update the literature on the quality of randomized controlled trials (RCTs) as reported in top nursing journals, based on manuscripts' adherence to the CONsolidated Standards of Reporting Trials (CONSORT) guidelines.
Design: Descriptive review of adherence of RCT manuscript to CONSORT guidelines.
Methods: Top 40 International Scientific Indexing (ISI) ranked nursing journals that published 20 or more RCTs between 2010 and 2014, were included in the study. Selected articles were randomly assigned to four reviewers who assessed the quality of the articles using the CONSORT checklist. Data were analyzed using descriptive and inferential statistics.
Findings: A total of 119 articles were included in the review. The mean CONSORT score significantly differed by journal but did not differ based on year of publication. The least consistently reported items included random allocation, who randomly assigned participants and whether those administering the interventions were blinded to group assignment.
Conclusions: Although progress has been made, there is still room for improvement in the quality of RCT reporting in nursing journals. Special attention must be paid to how adequately studies adhere to the CONSORT prior to publication in nursing journals.
Clinical Relevance: Evidence from (RCTs) are thought to provide the best evidence for evaluating the impact of treatments and interventions by the U.S. Preventive Services Task Force. Since the evidence may be used for the development of clinical practice guidelines, it is critical that RCTs be designed, conducted, and reported appropriately and precisely.

The healthcare environment in the US has changed dramatically with the challenges of ever rising health care costs and the introduction of the Affordable Care Act in 2010. With the new US administration and the majority in Congress, it remains uncertain to what extent the Affordable Care Act will be "repealed and replaced," but more health policy changes are likely. Despite this turbulent environment, health care professionals, including nurses, need to stay focused on determining best practices. Identifying best practices are certain to improve the quality of care, prevent complications, reduce chronic diseases, and increase cost effectiveness

Journal of Nursing Scholarship, 2018; 50:2, 200–209.

(Institute of Medicine of the National Academies, 2011).

Translational research is one important tool to reduce the time between the completion of benchmark research and the implementation in healthcare settings of best practices identified by the research (Rubio et al, 2010). However, adopting these healthcare best practices requires impeccable quality in reporting research that provides the level of evidence to support the identification of best practices.

Randomized controlled trials (RCTs), that are designed, conducted, and meticulously reported are generally viewed as providing the best evidence for evaluating the effectiveness of treatments or interventions because of their ability to minimize or avoid bias (Moher, Montori, Elbourne, & Eggar, 2010). The U.S. Preventive Services Task Force (2012) rated the systematic review of multiple relevant RCTs as the highest or best level of evidence (Level I), and the evidence from at least one well-designed RCT as the second-best level of evidence (Level II), when evaluating which best practices should be translated into clinical practice. To improve the reporting of RCTs, and aid in their critical appraisal, the Consolidated Standards of Reporting Trials (CONSORT) was first developed in 1996, with several updates since then (Altman, Moher, & Schulz, 2012; Begg et al., 1996).

The CONSORT checklist, adopted by hundreds of health care related journals, including nursing journals, should be used when reporting RCTs. This checklist includes a diagram for reporting the flow of participants through the trial (Altman et al., 2012; Begg et al., 1996; Moher et al., 2012). In 2001, a more structured, revised CONSORT checklist and flow diagram was published, along with an Explanation and Elaboration (E&E) document (Altman et al., 2012). The CONSORT E&E document provides the rationale and scientific background for each item in the CONSORT guidelines, and gives examples (Moher et al, 2012). A third version of the statement and updated E&E document, were published in 2010, which included several new items, such as reporting of trial design and allocation ratio, and reporting of any changes to methods after trial commencement (Altman et al., 2012). The new 2010 statement consists of 25 concepts with a 37-item checklist (Schulz, Altman, Moher, 2010). The updated 2010 flow chart, which is used to track participants in an RCT from enrollment to data analysis, is presented in **Figure 1**.

Although the CONSORT guidelines are relevant to all RCTs, their primary focus is on two-group, parallel trials (Schulz et al., 2010). Extensions of the CONSORT to other trial designs, such as cluster randomized trials, non-inferiority and equivalence randomized trials, or pragmatic trials, have been developed and published by others (Campbell, Piaggio, Elbourne, & Altman, 2012; Piaggio, Elbourne, Pocock, Evans, & Altman, 2012; Zwarenstein et al., 2008). Since its initial publication in 1996, adoption of the CONSORT has grown steadily. By 2011, more than 600 journals around the globe endorsed the CONSORT (Altman et al., 2012; Begg et al., 1996). The International Committee of Medical Journal Editors, also supported and endorsed the CONSORT (Schulz et al, 2010). However, despite the endorsement of the CONSORT by a number of journals, adherence to checklist items when reporting RCTs remain poor (Altman et al., 2012).

A few systematic reviews have highlighted that medical journal endorsement of CONSORT is associated with improved reporting of RCTs (Plint et al., 2006; Turner, Shamseer, Altman, Schulz, & Moher, 2012). However, several studies that have analyzed the completeness of RCT reporting according to CONSORT guidelines in medical journals concluded that improvements are still needed (Ahmadzadeh, Rezaeian, & Mobaraki, 2013; Folkes, Urquhart, & Grunfeld, 2008; Ghimire, Kyung, Kang, & Kim, 2012; Kane, Wang, & Garrard, 2007). A study on adherence to CONSORT items in reporting RCTs in top medical journals found that the total proportion of items addressed by all studies was 74% (Ahmadzadeh et al., 2013). Adherence to aspects of the CONSORT checklist such as attrition reporting, pre-randomization, and abstract reporting, have also been investigated (Folkes et al., 2008; Ghimire et al., 2012; Kane et al., 2007). Unlike medical literature, only a few studies have analyzed the effect of CONSORT on RCT reporting in nursing journals. A study conducted by Smith et al. (2008) described the quality of RCT reporting in four nursing journals, published between 2002 and 2005, using the CONSORT checklist. Their study found modest adherence to the CONSORT. There were no statistically significant differences in the quality of published reports of RCTs among the nursing journals investigated, but the quality of reporting improved significantly in the one journal that had adopted the CONSORT (Smith et al., 2008). Another study examined associations between CONSORT endorsement by top nursing journals and the quality of reporting on design elements in RCTs based on Cochrane's collaboration risk of bias tool (Jull & Aye, 2015). This study found that CONSORT promoting nursing journals published RCTs that were at low risk of bias for blinding and completeness of follow up due to providing sufficient information for assessment of risk of bias (Jull & Aye, 2015).

The purpose of this study was to examine and update the literature on the quality of RCTs as reported in top nursing journals, based on manuscripts' adherence to the CONSORT guidelines. Specifically, this study focused on top nursing journals publishing at least 20 RCTs

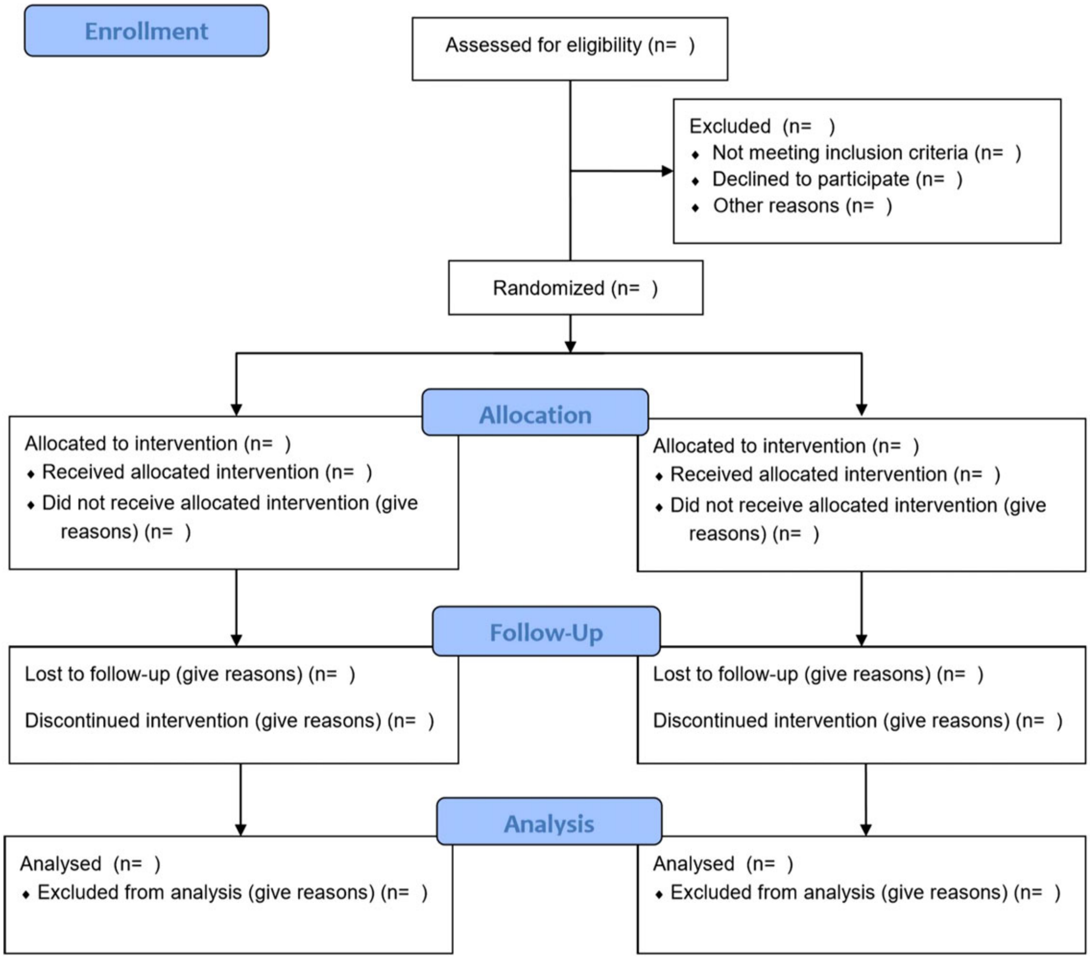

Figure 1. CONSORT flowchart.

between 2010 and 2014 and examined how adequately the published reports of RCTs adhered to CONSORT items. Articles were selected from the top 40 ISI ranked nursing journals, which happened to have an impact factor greater than 1.2. This study is different from the study by Jull and Aye (2015), which examined the association between CONSORT endorsement and adherence to reporting of design elements based on the Cochrane Collaboration Risk of Bias Tool. Our study examines the quality of RCTs based on adherence to the CONSORT guidelines in journals that endorsed the CONSORT.

Methods

Journal Selection

The following five nonspecialized nursing journals that had published 20 or more RCTs between 2010 and 2014 (PubMed database) were selected from the top 40 ISI-ranked journals: *International Journal of Nursing Studies* (impact factor, 2.901), *Journal of Advanced Nursing* (impact factor, 1.741), *Journal of Clinical Nursing* (impact factor, 1.255), *Nursing Research* (impact factor, 1.356), and *Research in Nursing and Health* (impact factor, 1.267). The journals all happened to have an impact factor of greater than 1.2. All of the journals in this study endorsed the use of the CONSORT guidelines for reporting RCTs.

Article Selection

A research librarian assisted in the search of the PubMed database in January 2016, employing the limiter [Journ]. Once each journal was located, the publication type was limited to “randomized controlled trial” or “clinical trial,” with a time period limitation of 2010–2014. A total of 387 abstracts were retrieved from the five journals: *International Journal of Nursing Studies* ($n = 110$), the *Journal of Advanced Nursing* (n = 84), the *Journal of Clinical Nursing* (n = 129), *Nursing Research* (n = 41), *Research in Nursing and Health* (n = 23). Abstracts were reviewed if they reported on a RCT defined as an experimental study in which participants were randomly allocated to two or more groups for the purpose of testing the efficacy and effectiveness of an intervention (Smith et al., 2008). Abstracts were included with randomization at the individual subject and participant level and excluded if randomization occurred at the group or cluster level such as schools, classrooms, hospitals or floors within hospitals. Out of the 387 abstracts retrieved from the search, 146 studies did not meet the definition of a RCT due to no randomization, it was a secondary data analysis, or the randomization occurred at the group level.

There were 241 remaining abstracts: *International Journal of Nursing Studies* (n = 66), the *Journal of Advanced Nursing* (n = 46), the *Journal of Clinical Nursing* (n = 92), *Nursing Research* (n = 27), and *Research in Nursing and Health* (n = 11). For the two journals above that yielded fewer than 40 abstracts, we included all abstracts in the review. For journals with more than 40 abstracts, we randomly selected 50% of the abstracts to avoid biasing study outcomes towards the journals publishing considerably more RCTs. Therefore, the following 140 abstracts were reviewed: *International Journal of Nursing Studies* (n = 33), the *Journal of Advanced Nursing* (n = 23), the *Journal of Clinical Nursing* (n = 46), *Nursing Research (n = 27), Research in Nursing and Health* (n = 11). During the subsequent review of articles, 21 additional articles were excluded, because they were a secondary analysis of a RCT, or a protocol for a RCT. This resulted in a total of 119 studies included in the final analysis: *International Journal of Nursing Studies* (n = 27), the *Journal of Clinical Nursing* (n = 40); the *Journal of Advanced Nursing* (n = 20), *Nursing Research* (n = 22), and *Research in Nursing and Health* (n = 10). **Figure 2** is a flow diagram of the article selection process.

Measurement

The 2010 CONSORT checklist contains 25 items; however, several of the items would require more than one response. Although the content of the item was not changed, we divided each item that had more than one possible response into separate items such that there could be only one possible response. For example, item 10 contains three separate components: "Is it described who generated the random allocation sequence; is it described who enrolled participants; and is it described who assigned participants to interventions?" This item was rewritten as three separate items: (a) Is it described who generated the random allocation sequence? (b) Is it described who enrolled participants? and (c) Is it described who assigned participants to interventions? This recalibration resulted in 54 items. Question 17b in the original CONSORT guideline, "for binary outcomes, presentation of both absolute and relative effect sizes is recommended" was removed, since it was listed as a recommendation. Questions were scored as *yes* (1) or *no* (0). A total CONSORT score was calculated by summing the dichotomized scores of the 54-item checklist, resulting in scores from 0 to 54.

Inter-Rater Reliability

All abstracts during article selection, and adherence of selected articles to CONSORT guidelines during analysis, were reviewed by four PhD-prepared nurse faculty or PhD students and supervised by a senior author with experience conducting multiple National Institutes of Health, foundation, and industry funded RCTs. Reviewers received several hours of training that included practice reviews prior to reviewing for the study. When questions arose about scoring, reviewers discussed the issue with at least one other reviewer prior to final scoring. All disagreements were resolved by consensus between the four reviewers. During analysis of articles, each of the four reviewers was assigned 35 randomly selected articles to review their adherence to CONSORT guidelines. In addition, each reviewer was also assigned 10 articles that had been evaluated by another reviewer. In order to gauge the agreement among these pairs in rating each article on the 54 items, we computed Cohen's kappa for each pair of articles reviewed during the full-text article analysis phase. Kappa values showed 37.5% substantial to almost perfect agreement (kappa = 0.61-1.00), 40% moderate agreement (kappa = 0.41-0.60), 18% fair agreement (kappa = 0.21-0.40), and 5% slight agreement (kappa < 0.20) among reviewers. Interpretation of kappa values was based on Stata version 14 (StataCorp LLC, College Station, TX, USA) base reference manual.

Statistical Analysis

Data were entered into spreadsheets and transferred into Stata version 14.1. Descriptive and inferential statistics were used for data analysis. Mean differences in CONSORT scores between different journals and by year of publication were analyzed using analysis of variance (ANOVA). Pairwise comparisons were used to test differences in mean CONSORT scores between journals. A p value of less than .05 was set a priori.

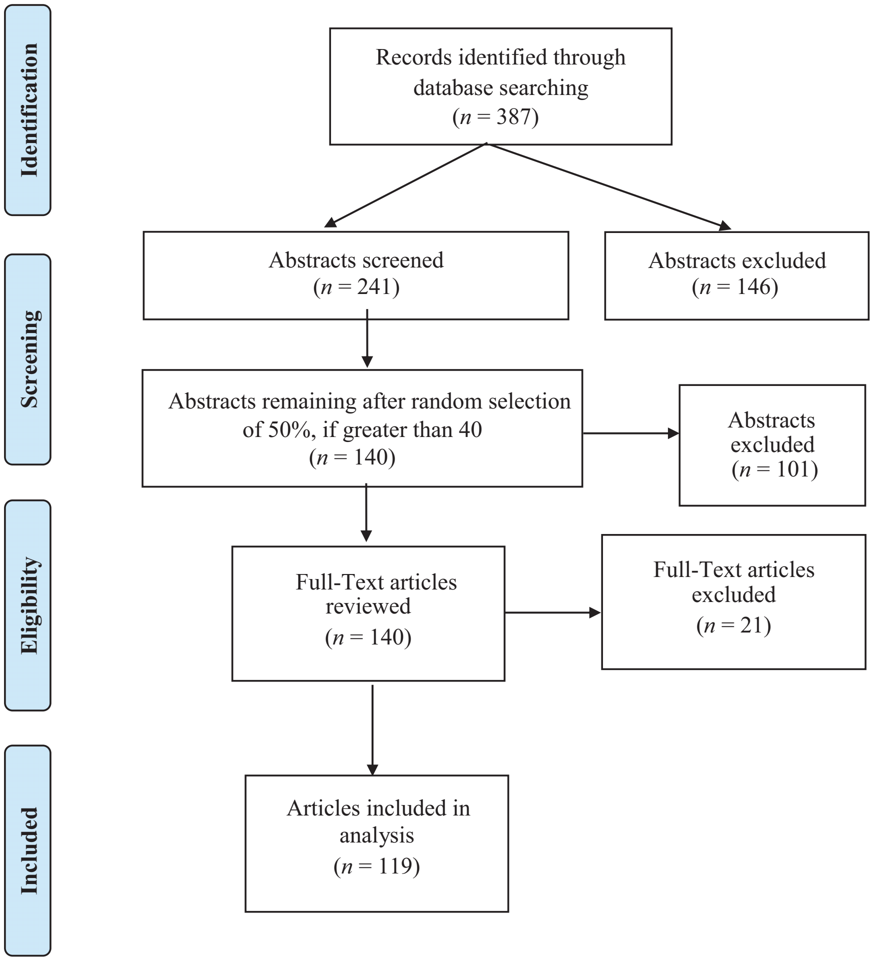

Figure 2. Flow diagram of the article selection process. Adapted from: Moher, Liberati, Tetzlaff, Altman, and The PRISMA Group (2009).

Table 1. Quality of Reporting RCTs Between Journals

Journal title	*n*	Mean CONSORT score [95% CI]	*F*	*p*
JCN	40	32.03 [30.09, 33.96]	4.09	.0039
IJNS	27	37.70 [35.35, 40.05]		
JAN	20	36.45 [33.72, 39.18]		
NR	22	33.73 [31.12, 36.33]		
RIHN	10	35.70 [31.94, 39.56]		

Table 2. Quality of Reporting RCTs Over Time

Year	*n*	Mean CONSORT score [95% CI]	*F*	*p*
2010	27	33.78 [31.28, 36.27]	0.32	.8618
2011	20	35.20 [32.30, 38.10]		
2012	25	34.28 [31.68, 36.88]		
2013	25	34.72 [32.12, 37.32]		
2014	22	35.73 [32.96, 38.50]		

Findings

The total score on our CONSORT checklist for all 119 articles ranged from 18–50 (Mean = 34.68, *SD* = 6.48). The mean sub-score of the methods items (items 3a to 12b) was 15.45 (*SD* = 0.36) while the mean sub-score of the results items (items 13a to 19) was 11.97 (*SD* = 0.27). The mean total CONSORT scores (**Table 1**) differed significantly among the five journals ($F = 4.09$, $p = .0039$). The *International Journal of Nursing Studies* had the highest mean CONSORT score (37.7) followed by the *Journal of Advanced Nursing* (36.45), *Research in Nursing and Health* (35.7), *Nursing Research* (33.73), and the *Journal of Clinical Nursing* (32.03). The mean CONSORT score for the International the *Journal of Nursing Studies* differed significantly from that of the *Journal of Clinical Nursing* ($p = .003$). All other pairwise comparisons between journals were not statistically significant. The CONSORT scores (**Table 2**)

Table 3. Journal Scores (Mean) for Each CONSORT Category

	Assessment of individual journals: mean [95% CI]						
Paper selection and topic	*JCN* ($n = 40$)	*IJNS* ($n = 27$)	*JAN* ($n = 20$)	*NR* ($n = 22$)	*RIHN* ($n = 10$)	*F*	*p*
Title and abstract (max score = 2)	1.45 [1.3, 1.6]	1.96 [1.78, 2.14]	1.75 [1.53, 1.97]	1.5 [1.29, 1.71]	1.1 [0.8, 1.4]	8.05	.000
Introduction (max score = 2)	1.98 [1.93, 2.02]	2 [1.94, 2.05]	2 [1.93, 2.06]	1.9 [1.84, 1.97]	2 [1.9, 2.1]	1.34	.26
Methods (max score = 26)	14.23 [13.02, 15.43]	16.6 [15.12, 18.06]	16.4 [14.69, 18.11]	14.9 [13.28, 16.54]	16.6 [14.19, 19.01]	2.24	.0691
Results (max score = 16)	11.23 [10.34, 12.11]	13.22 [12.14, 14.30]	12.5 [11.24, 13.76]	11.18 [9.98, 12.37]	12.3 [10.52, 14.08]	2.64	.0373
Discussion (max score = 3)	2.1 [1.84, 2.36]	2.33 [2.02, 2.65]	2.25 [1.88, 2.62]	2.37 [2.01, 2.71]	2.4 [1.88, 2.92]	0.58	.6799
Other information (max score = 4)	0.825 [0.51, 1.14]	1.26 [0.88, 1.64]	1.25 [0.81, 1.69]	1.46 [1.03, 1.88]	0.8 [0.17, 1.43]	1.96	.1057

did not differ based on the year of publication ($F = 0.32$, $p = 0.86$). Year-by-journal interactions were not statistically significant, meaning there were no patterns of improvement or deterioration of scores by specific journals over time ($F = 0.75$, $p = 0.73$). **Table 3** also shows the mean journal scores for each sub-category of CONSORT items. Journal mean scores differed significantly in the sub-categories “title and abstract” ($p = .000$) and “results” ($p = .037$).

Table 4 shows the proportion of questions that were addressed using both the modified and original CONSORT table. Articles most consistently reported the scientific background, objectives or hypothesis, and primary outcomes. The least consistently reported items included random allocation, who randomly assigned participants and whether those administering the interventions were blinded to group assignment. A core component of RCTs is randomization and blinding, but these were not adequately reported in many studies. Only 55% of studies reviewed reported the type and details of randomization, and the mechanism used to implement random allocation sequence. Further, even fewer studies reported whether sequence was concealed until interventions were assigned (39%) and who generated the random allocation sequence (32%). Whether or not participants were blinded was reported in only 34% of studies. Thirty percent reported whether or not those administering the interventions were blinded while 25% reported whether or not those assessing outcomes were blinded. Other poorly reported details in the methods section included who enrolled study participants (32%), who assigned participants to interventions (22%), and inclusion of a description of trial design (60%).

Discussion

This study provides an update of the literature examining the quality of published reports of RCTs in the five nursing journals evaluated in this study. These top nursing journals published a number of RCTs between 2010 and 2014, and had endorsed the CONSORT. Results indicated that some progress has been made since the study by Smith et al. (2008), but there is still room for improvement in the quality of reporting of RCTs in the nursing literature. Many studies reporting RCTs are still not adhering to all CONSORT checklist items despite journal endorsement of the CONSORT. None of the published RCTs reviewed in this study adhered to all CONSORT checklist items; however, only 14.3% adhered to less than half of the checklist items compared to 36.5% in the initial study by Smith et al. (2008). Although published studies generally adhered to abstract and introduction reporting guidelines, 37% of articles did not identify the study as an RCT in the title and abstract, an increase from the 24% reported by Smith et al. (2008). This is still very low adherence compared to medical journals (Ahmadzadeh et al., 2013). When articles do not report the study as an RCT in the title or abstract, it becomes problematic for readers to quickly identify RCTs in the literature.

Our results revealed some areas of robust adherence (95% or greater) to CONSORT checklist items in the methods section. Ninety-seven percent of published RCTs in this study reported inclusion criteria, described the details of interventions, and clearly defined primary and secondary outcomes measures. In addition, 98% of studies described statistical methods used to compare groups, and 95% described the details of when the intervention

Table 4. Proportion of Parameters Met Using Both the Modified and Original CONSORT Items

Paper selection and topic	Item	Description	Proportion met modified (54 items)	Proportion met original
Title and abstract	1a	Was the article identified as a randomized trial in the title?	0.63	0.63
	1b	Is the abstract presented in a structured way?	0.97	0.97
Introduction	2a	Do the authors explain the scientific background and the rationale for the trial?	1	1
	2b	Do the authors explain the specific objectives or hypotheses?	0.97	0.97
Methods	3a	Was there a description of the trial design (such as parallel, factorial) including allocation ratio?	0.60	0.60
	3b	Were important changes to methods after trial commencement (such as eligibility criteria) included with reasons?	0.13	0.13
	4a	Are inclusion criteria described?	0.99	0.91
	4a	Are exclusion criteria described?	0.82	
	4b	Do authors report settings and locations where the data were collected?	0.88	0.88
	5	Are the details of control group described?	0.89	0.91
	5	Are the details of interventions described?	0.97	
	5	Are the details of when the intervention group was administered described?	0.95	
	5	Are the details of when the control group was administered described?	0.81	
	6a	Are primary and secondary outcome measures defined clearly including how they were assessed?	0.97	0.97
	6b	Were there any changes to trial outcomes after the trial commenced, with reasons?	0.03	0.03
	7a	Was the determination of sample size explained?	0.76	0.76
	7b	Are explanations of any interim analyses or stopping rules descripted?	0.04	0.04
	8a	Is the method used to implement the random allocation sequence described?	0.76	0.76
	8b	Is the type and details of randomization (such as blocking and block size) described?	0.55	0.55
	9	Was the mechanism used to implement the random allocation sequence (such as sequentially numbered containers) described?	0.55	0.47
	9	Is it clarified whether the sequence was concealed until interventions were assigned?	0.39	
	10	Is it described who generated the random allocation sequence?	0.32	0.29
	10	Is it described who enrolled participants?	0.32	
	10	Is it described who assigned participants to interventions?	0.22	
	11a	Is it described whether or not participants were blinded to group assignment?	0.34	0.29
	11a	Is it described whether or not those administering the interventions were blinded to group assignment?	0.25	
	11a	Is it described whether or not those assessing the outcomes were blinded to group assignment?	0.30	
	11a	Is it described how blinding was done?	0.25	
	12a	Were the statistical methods used to compare groups for primary and secondary outcomes described?	0.98	0.98
	12b	Were the methods for additional analysis, such as subgroup analysis and adjusted analysis described?	0.71	0.71
Results		Is there a diagram?	0.88	
	13a	Are the numbers of participants who were randomly assigned reported?	0.94	0.88

(*Continued*)

Table 4. Continued

Paper selection and topic	Item	Description	Proportion met modified (54 items)	Proportion met original
	13a	Are the numbers of participants receiving intended treatment reported?	0.76	
	13a	Are the numbers of participants analyzed for the primary outcome reported?	0.95	
	13b	Are the losses and exclusions after randomization explained?	0.88	0.88
	14a	Is the period of recruitment defined?	0.68	0.74
	14a	Is the period of follow-up defined?	0.80	
	14b	Was it explained why the trial ended or was stopped?	0.24	0.24
	15	Is there a table showing baseline demographic and clinical characteristics for each group?	0.89	0.89
	16	For each group, are the numbers of participants (denominator) in each group included in the analysis?	0.91	0.90
	16	For each group, is it described whether or not the analysis was by original assigned groups?	0.88	
	17a	Is a summary of results for each group described for each primary and secondary outcome?	0.94	0.78
	17a	Is the estimated effect size described for each primary and secondary outcome?	0.68	
	17a	Is the effect size's precision (e.g. 95% confidence interval) described for each primary and secondary outcome?	0.71	
	18	Does the article report other analyses performed including subgroup analysis and adjusted analyses, indicating those pre-specified and those exploratory?	0.46	0.46
	19	Are all important harms or unintended effects in each group described?	0.22	0.22
Discussion	20	Are the trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analysis discussed?	0.89	0.89
	21	Is the generalizability (external validity, applicability) of the trial findings discussed?	0.53	0.53
	22	Is the interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence discussed?	0.83	0.83
Other information	23	Is the registration number and name of trial registry included?	0.15	0.15
	24	Is where the full trial protocol can be accessed, if available included?	0.08	0.08
	25	Are sources of funding and other support (such as supply of drugs) described?	0.62	0.44
	25	Is the role of funders described?	0.25	

group was administered. These are typically areas of adequate reporting, not only in nursing journals, but also in medicine (Ahmadzadeh et al., 2013) and psychiatry (Han et al., 2009). However, the nursing literature had better adherence to defining primary and secondary outcome measures (97%) than did medicine and psychiatry, which had adherence rates of 86% and 74% respectively (Ahmadzadeh et al., 2013; Han et al., 2008).

The quality of reporting of randomization and blinding in RCTs according to CONSORT guidelines in the nursing literature despite improvements is still less than optimal since the study by Smith et al. (2008). The reporting rates of sequence generation, allocation concealment, and blinding were 49%, 14%, and 13%, respectively, in the study by Smith et al. compared to 55%, 39%, and 34% in this study. However, these numbers are still relatively low compared to the rates from medical journals and psychiatry journals (Ahmadzadeh et al., 2013; Han et al., 2009). Jull and Aye (2015) identified through the Cochrane Collaboration Risk of Bias Tool that 75.9% of articles reported sequence generation, 38.6% reported allocation concealment, and 42.1% reported blinding.

When authors fail to provide sufficient information on methods used for sequence generation and allocation concealment, readers are not able to assess the likelihood of bias in group assignments and selection bias (Moher et al., 2012).

Other areas of potential concern were reporting of recruitment periods, effect size, and generalizability of results. About 68% of the nursing studies that were reviewed defined the recruitment period and described the estimated effect size for outcomes. Although relatively low, this can be considered good progress given that previous analysis have revealed reporting rates as low as 36% for recruitment period and 15% for estimated effect sizes (Smith et al., 2008). Generalizability or external validity tells readers the extent to which study findings can be generalized to other populations with characteristics different from those in the RCT (Moher et al., 2012). Our study results indicated that only 53% of RCTs discussed the generalizability of findings compared to 100% of RCTs in medical journals (Ahmadzadeh et al., 2013).

From our study results, it appears that simply endorsing the CONSORT is not enough for adequate reporting of RCTs in nursing journals. Involvement of a variety of stake holders including journal editors, authors and peer reviewers working together could substantially improve the adequacy of RCT reporting. Journal editors could ask reviewers to assess adherence to CONSORT guidelines as part of the review process, and provide training and guidelines on the important elements of peer review when bringing on new reviewers. Peer reviewers can be encouraged to employ the CONSORT guidelines while reviewing and specifically identify missed elements in their reviews. Alternatively, authors could be required to complete the CONSORT checklist as part of the submission process. Finally, the CONSORT and reporting guidelines for other types of research often used by nurse scientists such as the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), the Standards for Reporting Qualitative Research (SRQR), and other guidelines (equator-network.org) should be part of research and dissemination training for PhD and DNP students, as well as training for principal investigators of RCTs.

Limitations

Our search for RCTs was limited to nonspecialized, top ranked nursing journals that published more than 20 RCTs. Therefore, findings may not be generalizable to specialized nursing journals, and journals with lower ISI ranking. Our search was also limited to articles published between 2010 and 2014. Future research studies should consider including all nursing journals that publish RCTs, irrespective of impact factors (ISI ranking), and no publication date limitation. A systematic review of quality of reporting RCTs in nursing journals is recommended. The authors acknowledge a possibility of bias from the fact that 40 out of 140 included studies were analyzed by two independent reviewers, and the rest were each analyzed by one of the four reviewers. The variation in inter-rater reliability among reviewers of the RCTs in this study, although moderate, point to differences in understanding and interpretation of the CONSORT guidelines.

Conclusions

The number of RCTs reported in the nursing literature is growing, because these studies provide the highest level of evidence on the efficacy and effectiveness of interventions. To improve the quality of reporting of RCTs in the nursing literature, some nursing journals now require articles to adhere to the CONSORT guidelines. This study examined how adequately the published reports of RCTs in nursing journals that published more than 20 RCTs between 2010 and 2014, and endorsed the CONSORT, adhered to all checklist items. The results showed that the quality of reporting of RCTs and adherence to the CONSORT has improved but remains less than optimal, particularly in the methods section. Reporting on details of randomization, random allocation sequence, and blinding needs to be improved. Journal editors, manuscript reviewers, and authors must pay special attention to how adequately studies adhere to the CONSORT prior to publication, especially when the journal requires authors to follow the CONSORT checklist.

Clinical Resources

- The CONSORT website: http://www.consort-statement.org/
- Equator Network: http://www.equator-network.org/

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JOURNAL OF NURSING SCHOLARSHIP

HEALTH POLICY AND SYSTEMS

Associations of Nurse Staffing and Education With the Length of Stay of Surgical Patients

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Key words
Korea, length of stay, nurse education, nurse staffing, patient outcomes

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Accepted September 30, 2017

doi: 10.1111/jnu.12366

Abstract

Purpose: To examine the association of nurse staffing and education with the length of stay of surgical patients in acute care hospitals in South Korea.
Design: A cross-sectional survey design was used for a nurse survey in acute hospitals collected between 2008 and 2009. The survey data ($N = 1{,}665$) were linked with patient discharge data ($N = 113{,}438$) and hospital facility data from 58 hospitals with 100 or more beds in South Korea.
Methods: The dependent variable was the length of stay, that is, the number of days a patient remained in the hospital. The independent variables were nurse staffing (number of patients per nurse) and nurses' education level (percentage of nurses with a bachelor of science in nursing [BSN] degree). A multilevel analysis was used to analyze the associations of nurse staffing and education level with the length of stay by controlling for both hospital and patient characteristics.
Findings: The average proportion of nurses with a BSN in all the hospitals was 30.86%, while the average number of patients per nurse was 14.31. The median length of hospital stay for patients was about 7 days. The multilevel analysis showed that nurse staffing and nurse education level were significantly associated with the length of stay of surgical patients in acute care hospitals. A 10% increase in the average number of patients per nurse increased the length of stay by 0.284 days ($p = .037$). When the number of nurses with a BSN was increased by 1%, the length of stay decreased by 0.42 days ($p = .025$).
Conclusions: Nurse staffing and nurses' education levels were significantly associated with the length of stay of surgical patients in South Korean hospitals. The findings from this study suggest that the South Korea healthcare system should develop appropriate strategies to improve the nurse staffing and education levels to ensure high-quality patient care in hospitals.
Clinical Relevance: Healthcare policymakers and nurse managers need to modify adequate nurse staffing and education levels in order to reduce the length of stay of patients.

In South Korea, healthcare services at acute hospitals have expanded remarkably, while the shortage of nurses has worsened. The deficiency in the supply of nurses is estimated to be about 17 to 19 million against the demand by 2030 in South Korea (Oh, 2014). A recent study revealed that the mean patient:nurse ratio is 11.1:1 in South Korean hospitals (Cho et al., 2017), while Western countries have a lower mean patient:nurse ratio (e.g., 5.2:1 in Norway, 6.9:1 in Ireland, and 7.6:1 in Sweden; Aiken, Sloane, et al., 2014). Furthermore, only 43.7% of the nurses in Korean acute hospitals have a bachelor of science in nursing (BSN) degreex (Aiken, Sloane, et al., 2011). The percentage of nurses reporting high burnout and poor quality of care in their units is also higher in Korea than in other countries (Aiken, Sloane, et al., 2011).

The importance of the nursing workforce in ensuring a high quality of care is being emphasized because complicated healthcare procedures are increasingly required in hospitals (Aiken, Clarke, & Sloane, 2002a; Blegen, Goode, Spetz, Vaughn, & Park, 2011; Kane, Shamliyan, Mueller, Duval, & Wilt, 2007; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Recent studies have consistently found that nurse staffing and nurse education levels are significant predictors of patient outcomes. Better nurse staffing levels are also associated with reductions in nurse-sensitive adverse events (Kane et al., 2007) and patient mortality (Kane et al., 2007; Needleman et al., 2011; Wiltse Nicely, Sloane, & Aiken, 2013). Research evidence has shown that the care provided by nurses with a BSN is associated with better patient outcomes in terms of reduced readmissions (Kutney-Lee & Aiken, 2008) and lower rates of hospital mortality (Aiken, Clarke, Cheung, Sloane, & Silber, 2003; Aiken, Sloane, et al., 2014; Kutney-Lee, Sloane, & Aiken, 2013). Such research evidence has had an impact on the development of hospital policies and practices, particularly in the United States. For example, hospital nurse staffing legislation has already been implemented or is being considered in almost half of the United States (American Nurses Association, 2015). In addition, by 2020, increasing the number of nurses with a BSN has been recommended to reach 80% of all nurses in the United States (Institute of Medicine [IOM], 2011), and hospitals have substantially increased the recruitment of nurses with a BSN (American Association of Colleges of Nursing, 2015).

Patients' length of stay (LOS) is frequently used as an outcome measure to evaluate whether nurses have enough time to monitor patients and quickly intervene when complications arise (Spetz, Harless, Herrera, & Mark, 2013). An improved surveillance for complications can lead to earlier interventions, which can result in earlier discharges and shorter LOSs (Dresser, 2012). Research on the association of the nursing workforce with LOS may provide better knowledge about the significance of nurse staffing for patient outcomes (Spetz et al., 2013). In addition, LOS is considered to be a proxy measure of cost, since shorter LOSs may lead to monetary savings (Newhouse, Johantgen, Pronovist, & Johnson, 2010). Researchers have reported that better levels of nurse staffing are significantly associated with shorter LOSs (Martsolf et al., 2014; Needleman et al., 2002). Studies have also shown that the care provided by nurses with a BSN is associated with reductions in LOS (Blegen, Goode, Park, Vaughn, & Spetz, 2013). The most current evidence on the association between the nursing workforce and LOS is limited to the Western countries, such as in the United States and Europe. However, research findings from Western countries may not be directly applied to other Asian countries due to substantial differences in the healthcare and educational systems for nurses, as well as the differences in the available nursing resources.

In South Korea, there is inadequate evidence to support that nurse staffing and education are associated with patient outcomes. Few studies have explored the associations of nurse staffing and education levels with the LOS in South Korea. Recent studies in South Korea indicate that nurse staffing levels and the percentage of nurses with a BSN are significantly associated with patient mortality (Cho et al., 2015) and adverse events (including administration of the wrong medication or dosage, development of pressure ulcers, and injuries from falls; Cho, Chin, Kim, & Hong, 2016). Therefore, more evidence will be needed to increase the required levels of nurse staffing and education in South Korea. This study aimed to examine the associations of nurse staffing and education levels with the LOS of surgical patients in acute care hospitals in South Korea in order to replicate and extend the findings of other countries that have reported a significant association between nursing workforce and patient outcomes.

Methods

Data and Sample

This study employed a cross-sectional survey design using the same protocol and questionnaire validated by many international studies (Aiken, Sloane, et al., 2014; Aiken, Sloane, et al., 2011). This study was conducted with the approval of the Institutional Review Board of the authors' affiliated university. The data for this study were obtained from three different sources: (a) a nurse survey, (b) hospital facility data, and (c) patient discharge data from randomly selected South Korean acute care hospitals. The hospital facility and patient discharge data were extracted from the national database of the Health Insurance Review Agency (HIRA). South Korea has a national health insurance system, and almost every Korean citizen is enrolled in it. Hospital facility and patient discharge data from all the hospitals are submitted to the HIRA, which has the authority to review all claims data and monitor the quality of care as an official institute of the Ministry of Health in South Korea.

We also administered surveys to nurses at selected hospitals to assess the number of patients per nurse, the nurses' education levels, and the working units. The data collected from the surveys were combined with facility data, including hospital location and the number of beds, as well as patient discharge data, which consisted of the patient's age, gender, diagnosis, comorbidity, and LOS.

Of all the South Korean acute care hospitals with more than 100 beds ($N = 295$), 65 were randomly selected by region and the number of beds. Of these, 60 hospitals participated in this study; general wards and special units at these participating hospitals were randomly selected, and all the nurses working at the selected general wards and special units were invited to participate in the survey. For wards and units with three shifts, nurses who worked during day, evening, and night shifts on the date of the survey were included. The surveys were administered at each hospital to 5,103 nurses, and 4,910 (96.2%) completed them between October 2008 and July 2009. Nurses completed the anonymous survey in private, and put the sealed questionnaires into collection boxes. The collection boxes were sent to the research team; anonymity and confidentiality were ensured for all the data. More detailed information about the survey is available in previous publications (Aiken, Sloane, et al., 2011; Cho et al., 2013).

Patient discharge data were unavailable at 2 of the 60 hospitals that participated in the study; therefore, these two facilities were excluded from our analysis. A total of 4,864 nurses from these 58 hospitals participated in our surveys, and only bedside nurses providing direct patient care ($n = 3{,}058$) were included in the analysis. Furthermore, since the purpose of this study was to examine the associations of nurse staffing and education levels with the LOS of surgical patients, data obtained from the nurses working in medical and surgical wards, intensive care units, and perioperational units were included. Other units ($n = 1{,}393$) were excluded from the analysis. Therefore, the final analysis included a total of 1,665 nurses.

Between January 1 and December 31, 2008, 128,222 patients underwent general, orthopedic, or vascular surgeries at the 58 hospitals that participated in this study. Those who died within 30 days of admission ($n = 749$) were excluded; all other patients 19 to 89 years of age ($n = 113{,}438$) were included in the final analysis. Surgical patients were selected because risk adjustment methods for surgical patients are well validated, the patient group is relatively homogeneous, and the risk factors can be measured and controlled for statistically.

Measures

Nurse staffing, education levels, and the type of unit. The key explanatory variables of interest were nurse staffing and education levels at each hospital. Information regarding the number of patients per nurse during the most recent work shift was obtained by surveying bedside nurses only. The data from this survey are more valid and reliable to measure nursing staff than administrative data that includes nurses who do not provide direct care to the patients (Aiken, Cimiotti, et al., 2011). The number of patients per nurse during the most recent work shift was aggregated into mean values for each hospital. The nurses' education level was assessed by the nurse surveys. The nurses' education level was analyzed as a binary variable wherein 1 signified diploma and 2 signified BSN education level. The percentage of those with BSN in each hospital was calculated. The types of units where the nurses worked according to the nurse survey were categorized as medical and surgical, perioperative, and intensive care units.

Length of stay. LOS was our outcome measure. This value indicates the number of days a patient remained in the hospital and was calculated from the date of admission to the date of discharge.

Patient characteristics. For risk adjustment, patient characteristics were extracted from patient discharge data as follows: age, gender, whether the patient was admitted emergently or transferred from another hospital, type of surgery based on the major diagnostic category, and comorbidities. The comorbidities were measured by Elixhauser et al.'s list of 30 comorbidities (Elixhauser, Steiner, Harris, & Coffey, 1998). HIV/AIDS, obesity, blood loss anemia, and drug abuse among these 30 comorbidities affected less than 10 patients and were therefore not used in this study. Two diabetes groups and three cancer groups based on Elixhauser's list of comorbidities were combined into one diabetes and one cancer group for the patient discharge data.

Hospital characteristics. Hospital characteristics were extracted from the facility data, and variables that indicated the structural characteristics of the hospitals included information about the location (metropolitan city or province), number of beds (100–399, 400–699, 700–999, 1,000 or above), whether the hospital was a teaching hospital, and whether it was a high-technology hospital. A high-technology hospital was defined as a hospital with equipment and facilities capable of performing open-heart surgeries and major organ transplants.

Table 1. Characteristics of the Hospitals and Registered Nurses in the Study

Characteristics	Category	Hospitals ($N = 58$) n (%) or $M \pm SD$	Nurses ($N = 1,665$) n (%) or $M \pm SD$
Location	Metropolitan	31 (53.45)	1,135 (68.17)
	Province	27 (46.55)	530 (31.83)
Bed size	1,000 or above	7 (12.07)	479 (28.77)
	700–999	7 (12.07)	325 (19.52)
	400–699	15 (25.86)	482 (28.95)
	100–399	29 (50.00)	379 (22.76)
Teaching hospital	Yes	42 (72.41)	1,514 (90.93)
	No	16 (27.59)	151 (9.07)
High-technology hospital	Yes	44 (75.86)	1,545 (92.79)
	No	14 (24.14)	120 (7.21)
Type of unit	Medical and surgical		866 (52.01)
	Perioperative		544 (32.67)
	Intensive care unit		255 (15.32)
Nurse education (% BSN)	0–19	25 (43.10)	348 (20.90)
	20–39	12 (20.69)	398 (23.90)
	40–59	11 (18.97)	290 (17.42)
	60–79	5 (8.62)	329 (19.76)
	≥80	5 (8.62)	300 (18.02)
Number of patients per nurse		14.31 ± 6.16	

Note. BSN, bachelor of science in nursing.

Analysis

Data obtained for this study included individual patient-level data, such as patients' age, diagnosis, and comorbidities, as well as hospital-level data, such as hospital characteristics, nurse staffing, and the percentage of nurses with a BSN. A multilevel analysis was used to analyze the associations of nurse staffing and nurse education level with the LOS by controlling for both hospital and patient characteristics. The adjusted characteristics of the hospitals included location, and the adjusted characteristics of the patients were age, gender, type of admission, transfer status, major diagnostic category, and Elixhauser comorbidities. A multilevel linear regression was used since the LOS, which was the dependent variable, was a continuous variable; the SAS MIXED procedure was also employed.

When multicollinearity was investigated, the Variance Inflation Factor exceeded by 2.5 (Allison, 1999) for the number of beds at the hospital and the type of unit, and these variables were therefore removed to construct an analysis model. Moreover, the correlations between the predictor variables—the number of patients per nurse and nurse education—and other independent variables were investigated using an independent two-sample *t* test, analysis of variance (ANOVA), and the correlation of the predictor variables with whether the hospitals were teaching hospitals and whether they were high-technology hospitals was statistically significant ($p < .05$). Therefore, these variables were also removed to construct the analysis model. After performing a K-S normality test, the number of patients per nurse, which was a non-normal variable, was transformed using a natural logarithm transformation for the analysis.

Results

The characteristics of the participating hospitals and nurses in this study are shown in **Table 1**. Thirty-one out of the 58 participating hospitals (53.45%) were located in metropolitan areas; 1,135 nurses (68.17%) were surveyed at these hospitals. Seven hospitals had over 1,000 beds, and 479 nurses (28.77%) were surveyed at these hospitals. Forty-two hospitals (72.41%) were teaching hospitals, and 44 (75.86) hospitals were high-technology hospitals. Of the 1,665 surveyed nurses, 866 nurses (52%) worked in medical and surgical wards, and 544 nurses (32.67%) were assigned to perioperative units. The average proportion of nurses with a BSN at all the hospitals was 30.86%. At five (8.62%) of the hospitals, over 80% of the nurses had a BSN; 300 nurses (18.02%) were surveyed at these hospitals. The average number of patients per nurse at the hospitals that took part in this study was 14.31.

The characteristics of the patients investigated in this study are shown in **Table 2**. The median LOS for a patient was about 7 days. The average age of the patients was 53.58 years, 50.21% were male, and 24.46% of the patients were emergently admitted, while 5% were transferred from other hospitals. Orthopedic

Table 2. Characteristics of Patients in the Study Hospitals ($N = 113{,}438$)

Variable	*n* (%)
Length of stay: median (1st–3rd quartile)	7 (4–13)
Age (years), mean (*SD*)	53.58 ± 16.24
Male	56,952 (50.21)
Emergency admission	25,847 (24.46)
Transfer	5,841 (5.53)
Major diagnostic categories (MDCs): general surgery	
Diseases and disorders of the digestive system (MDC 6)	18,618 (16.41)
Diseases and disorders of the hepatobiliary system (MDC 7)	16,349 (14.41)
Diseases and disorders of the skin, subcutaneous tissue or breast (MDC 9)	13,466 (11.87)
Endocrine, nutritional or metabolic diseases and disorders (MDC 10)	8,469 (7.47)
Orthopedic surgery	
Diseases and disorders of the musculoskeletal system (MDC 8)	37,585 (33.13)
Vascular surgery	
Diseases and disorders of the circulatory system (MDC 5)	18,951 (16.71)
Comorbidities	
Congestive heart failure	1,660 (1.46)
Arrhythmia	6,193 (5.46)
Aortic stenosis	1,080 (0.95)
Pulmonary circulation disorders	319 (0.28)
Peripheral vascular disorders	1,322 (1.17)
Hypertension	24,560 (21.65)
Paralysis	380 (0.33)
Neurodegenerative disorders	632 (0.56)
Chronic obstructive pulmonary disease	6,040 (5.32)
Diabetes mellitus	17,363 (15.31)
Hypothyroidism	2,427 (2.14)
Renal failure	971 (0.86)
Liver disease	10,573 (9.32)
Peptic ulcer disease, no bleeding	7,865 (6.93)
Cancer	6,823 (6.01)
Rheumatoid arthritis/collagen vascular diseases	766 (0.68)
Coagulopathy	2,284 (2.01)
Weight loss	3,604 (3.18)
Fluid and electrolyte disorders	2,519 (2.22)
Deficiency anemia	2,954 (2.60)
Alcohol abuse	407 (0.36)
Psychoses	256 (0.23)
Depression	1,122 (0.99)

surgery (33.13%) was the most common surgical procedure, followed by vascular surgery (16.71%). The most prevalent comorbid conditions were hypertension and diabetes.

Table 3 shows the analysis results of the associations of nurse staffing and education levels with patients' LOS. Since the number of patients per nurse was log-transformed for the analysis, every 1% increase in the independent variable increased the dependent variable by (coefficient/100) units. In our results, with a 1% increase in the average number of patients per nurse, the LOS increased by $2.84/100 = .0284$ days ($p = .037$). In other words, for each 10% increase in the average number of patients, the LOS increased by $(2.84/100) \times 10 = .284$ days. The results also showed that as the number of nurses with a BSN increased by 1%, the LOS decreased by 0.42 days ($p = .025$), whereas if the number of nurses with a BSN increased by 10%, the LOS decreased by 4.2 days.

Discussion

This study examined the associations of nurse staffing and education with the LOS of surgical patients in South Korean hospitals. Our findings will have significant implications on nursing workforce development to ensure a high quality of patient care in South Korea.

We concluded that a better nurse staffing level was associated with a shorter LOS. This finding is consistent with the findings in previous studies conducted in Western countries (Blegen et al., 2011; Frith et al., 2010; Kane et al., 2007; Needleman et al., 2002; Tschannen & Kalisch, 2009). The association of a better nurse staffing level with a reduction in the LOS may be explained by the greater amount of time these nurses have to engage in vigilant surveillance of patients, including early detection of patient conditions and needs as well as interventions to reduce the occurrence of adverse events (Aiken, Clarke, & Sloane, 2002b; Griffiths, Jones, & Bottle, 2013; Kutney-Lee, Lake, & Aiken, 2009; Pappas, 2008; Tschannen & Kalisch, 2009). Previous studies have suggested that nurses implicitly ration the priority of care to be provided when they have a high patient workload (Ball, Murrells, Rafferty, Morrow, & Griffiths, 2014; Jones, Hamilton, & Murry, 2015; Kalisch, Landstrom, & Hinshaw, 2009; Schubert et al., 2008; Schubert, Glass, Clarke, Schaffert-Witvliet, & De Geest, 2007). When there is a lack of time or other resources, nurses tend to prioritize critical needs and treatment administration but often do not educate patients and their families, provide comfort and spend time talking with patients, and conduct adequate patient surveillance (Aiken, Rafferty, & Sermeus, 2014; Ball et al., 2014; Cho, Lee, et al., 2016). Patient surveillance is considered a key mechanism of the effects of nurse staffing on the patient's health outcomes, including the LOS (Aiken et al., 2002a; Clarke & Aiken, 2003; Kutney-Lee et al., 2009; Lankshear, Sheldon, & Maynard, 2005; Lucero, Lake, & Aiken, 2009; Naughton, Prowroznyk, & Feneck, 1999). In addition, previous studies have reported that the amount of care left undone is higher when the number of patients per nurse is increased

Table 3. Effects of Nurse Staffing and Education Level on Patient Length of Stay

	Unadjusted models		Adjusted models	
	B (*SE*)	*p* value	B (*SE*)	*p* value
Nurse staffing (patients per nurse)[a]	2.89 (1.08)	.007	2.84 (1.36)	.037
Nurse education (percent with BSN)	−0.30 (0.15)	.041	−0.42 (0.19)	.025

Note. Unadjusted models are bivariate models that separately estimate the effects of each nurse staffing and nurse education level without any controls. The adjusted model estimates nurse staffing and nurse education levels in one model while controlling for the full set of patient characteristics used in risk adjustment, as well as the hospital characteristics. The adjusted characteristics of hospitals included location, while the adjusted characteristics of patients were age, gender, type of admission, transfer status, major diagnostic category, and Elixhauser comorbidities (see **Table 2**). BSN, bachelor of science in nursing.

[a] Transformed using natural logarithm.

(Ball et al., 2014). Thus, safe nurse staffing is necessary for a shorter LOS.

We also found that more nurses with BSN were associated with a reduction in the LOS. Yakusheva, Lindrooth, and Weiss (2014) reported a significant association of nurse education level with the LOS when patients received 80% or more of their care from nurses with a BSN. Previous studies have also found that the presence of a higher proportion of nurses with a BSN was significantly associated with a lower mortality rate (Aiken et al., 2003; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005). The function of surveillance by nurses is a key mechanism that links nursing workforce and patient outcomes; educational level as well as staffing adequacy of nurses are significant for adequate surveillance (Aiken et al., 2003; Kutney-Lee et al., 2009). Nurses need the professional knowledge, clinical judgment, and skills gained in their BSN education to provide safe and high-quality care (Kutney-Lee et al., 2009; Tourangeau et al., 2007). The IOM in the United States has called for increasing the proportion of nurses with a BSN to 80% by 2020 (IOM, 2011). A previous study conducted in South Korea reported that only 43.75% of the nurses working in acute hospitals have a BSN (Aiken, Sloane, et al., 2011). To provide high-quality patient care, an adequate proportion of nurses must have a BSN to understand patients' needs and intervene on their behalf. In South Korea, nursing education is offered as a 4-year bachelor's program at a university or a 3-year diploma program at a community college. Recently the Korean government converted all 3-year programs into 4-year programs (Lee, Kang, Ko, Cho, & Kim, 2014). The results of this study offer important evidence to support the change of this policy. Korean hospitals need to increase their recruitment of nurses with a BSN and provide educational opportunities for nurses without a BSN.

Our findings suggest that hospitals can reduce the LOS of surgical patients in Korean hospitals by ensuring a safe nurse staffing level and a higher percentage of nurses with BSNs. Hospital administrators and policymakers must consider the quantity and quality of nurses to reduce the LOS of patients in acute care hospitals.

Limitations

Our study has some limitations. First, there is a slight disjunction in the dates of the nurse survey and patient discharge data due to the time lag in the availability of patient discharge data. Another large study showed similar effects of nursing on mortality despite the date disjunction of nurse survey data and patient discharge data (Aiken, Sloane, et al., 2014). Second, this study could not demonstrate a causal relationship of nurse staffing and education with LOS in acute care hospitals due to its cross-sectional design. Third, although we controlled for various patient and hospital characteristics, the covariates may have been omitted. Fourth, according to the results of multilevel linear regression, the association between nurse staffing and LOS was small but still statistically significant. Fifth, this study used 2008 data, and replication of the study using recent data would be informative.

Despite these limitations, this study found that better nurse staffing and education level are significantly associated with shorter LOS in South Korean hospitals. Based on these findings, Korean hospitals and the Korean government need to develop strategies for appropriate nurse staffing and education level to provide high-quality patient care at the hospitals. Nurse staffing legislation must be considered in South Korea, and hospitals need to hire nurses with a BSN and support nurses with a diploma to have a chance to obtain a BSN. Additional research will be needed to ensure the clinical significance of the associations of nurse staffing with the LOS of surgical patients in Korean hospitals. Future studies on readmissions and nursing-sensitive outcomes are also suggested to explore more comprehensive effects of nurse staffing and education on patients.

Conclusions

We found significant associations of nurse staffing and education levels with the LOS of surgical patients in South Korean hospitals. To the best of our knowledge, this is the only study that has used a large set of nationally representative data from acute care hospitals in South Korea. The findings of this study suggest that the South Korean healthcare system should develop appropriate strategies to improve nurse staffing and education to provide safe and high-quality care at the hospitals.

Clinical Resources

- Agency for Healthcare Research and Quality. Patient safety & medical errors: http://www.ahrq.gov/professionals/quality-patient-safety/index.html
- Quality and Safety Education for Nurses: http://qsen.org
- U.S. Department of Health and Human Services. Hospital compare: https://www.medicare.gov/hospitalcompare/search.html?

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HEALTH POLICY AND SYSTEMS

Nurses' Perceptions on the Overuse of Health Services: A Qualitative Study

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Key words
Nurses, overuse, perceptions, qualitative

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Accepted November 9, 2017

doi: 10.1111/jnu.12371

Abstract

Purpose: To examine whether nurses in Israel think there is overuse of health services, the reasons behind the issue, and ways to reduce the overuse.
Design: This was a qualitative study using semistructured interviews. A convenience sample of community care nurses from health clinics across Israel was interviewed. Interviews focused on common areas of overuse, outcomes of overuse, causes of overuse, and potential ways to address the issue. Interviews were recorded, transcribed, and analyzed thematically.
Findings: Overuse of antibiotics, imaging, blood tests, and prenatal surveillance were cited as main areas of health service overuse. Participants stated that negative outcomes of overuse could be seen at patient, health system, and population levels. Factors influencing overuse included patient satisfaction, physician fears, and insecurities. Potential interventions included improving physicians' diagnostic confidence, increasing appointment times, providing patients with more treatment information, and implementing a unified computerized system across medical institutions.
Conclusions: Nurses mentioned physicians and patients as main actors in influencing overuse; hence, those populations should be researched further. The health system was identified as the responsible party to address the issue. Health system leaders must consider potential barriers, and investigate interventions that match current culture and context within the health system.
Clinical Relevance: Nurses can play an essential role in limiting overuse and mitigating subsequent harms to patients.

In this age of technological advances and progress, and an insatiable need for information, there is growing evidence of overuse of low-value health services (Ellen, Wilson, Grimshaw, & Lavis, 2015). Overuse of health services are services provided that carry more risk of harm than potential benefit and may be unnecessary due to their lack of definitive medical basis (Chassin et al., 1998; Institute of Medicine, 2001; Morgan et al., 2015). Overuse is used synonymously with overutilization, overmedicalization, unnecessary use, and low-value care, and includes overtreatment and overdiagnosis (Niven et al., 2015).

Overuse is associated with physical, psychological, and economic harms (Morgan et al., 2015). Physically, patients are exposed to more radiation, more medication, and more antibiotics than necessary. Psychologically, increased screening, treatments, and medications lead to unnecessary stress and psychological harm. Economically, research has identified that at least 20% of healthcare spending in the United States is wasteful (Berwick & Hackbarth, 2012). Harms of overuse are interconnected and perpetuate one another, a cycle that needs to be addressed.

Healthcare providers, patients, health systems, and service providers all contribute to the issue of overuse. Healthcare providers want to provide patients with the best and newest health services, sometimes regardless of their effectiveness. Physicians may send patients for further tests and procedures "just in case," due to lack of knowledge, lack of diagnostic confidence, patient demands, or fear of malpractice (Emanuel & Fuchs, 2008; Han et al., 2013; Rooshenas et al., 2015). Another motivation for overuse could be financial incentives related to a physician's referral to a service or procedure (Hendee et al., 2010). From patients' perspectives, they may come to healthcare providers with requests or demands for specific tests, believing that since they pay for health insurance, they are entitled to requested services (Emanuel & Fuchs, 2008; Schleifer & Rothman, 2012). Patients may have misguided information, misunderstanding certain tests, procedures and associated adverse effects, leading to confusion and distress (Ahmad, Hudak, Bercovitz, Hollenberg, & Levinson, 2006). The health system may also contribute to the issue of overuse, encouraging physicians to see more patients in less time, even providing financial incentives for tests and treatments (Rooshenas et al., 2015). This leaves little time for patients and an inability for physicians to perform thorough examinations or provide thorough explanations (Rooshenas et al., 2015). Additionally, industry may play a role. Pharmaceutical and medical technology companies are invested in both physicians and patients, marketing their products to specific audiences and holding power for change in the health sector (Bryan, Mitton, & Donaldson, 2014; Emanuel & Fuchs, 2008; Schleifer & Rothman, 2012).

Overuse is a problem in developed countries around the world; however, each country has unique contexts and circumstances, hence the obligation to study each country independently. Israel is a developed country with good Organisation for Economic Co-operation and Development indicators and low health expenditures; however, there are wide socio-economic inequalities in health (Horev & Avni, 2016). For example, overuse of benzodiazepines in the elderly remains problematic, with usage rates among individuals of low socio-economic status or among those 85 years of age and over being significantly higher than usage rates among the general population (Kaufman-Shriqui, Podell, & Ben-Yehuda, 2016). In Israel, all residents are entitled to health care under the National Health Insurance Law, with monthly premiums paid to the National Insurance Institute. Citizens select from four health maintenance organizations (HMOs), each providing an identical basket of services (Rosen, 2016). There is also a significant parallel private system. While the approval process of including health services in the basket of government-funded services is rigorous, there is no formal removal process (Israel Ministry of Health, 2016). Examining and managing overuse in Israel has the potential to improve the quality of care and free up resources.

Currently, most research and interventions targeting overuse focus on physicians, yet the majority of healthcare professionals are nurses (World Health Organization, 2017); therefore, understanding their perceptions is essential. Nurses are highly trusted by the public (Gallup, 2016) and spend more time with patients than do physicians (Horrocks, Anderson, & Salisbury, 2002). Patients are often less intimidated to ask questions of and request clarifications from nurses than from physicians. An understanding of nurses' perceptions regarding overuse will lead to a deeper understanding of the issue and potential interventions. Therefore, the purpose of this study was to examine nurses' perceptions regarding overuse of health services in Israel.

Methods

In-depth, semistructured interviews were conducted with a convenience sample of community care nurses (hereafter referred to as nurses). Semistructured interviews were preferred because this is an effective research method where few data are available, allowing participants to focus on areas they perceive as most influential, and permitting interviewers to probe issues that may be of interest but are not specifically addressed by the interview guide (Bryman, 2007; Morse & Field, 1995).

Study Sample and Recruitment

We chose to study nurses because many studies in the literature focus on physicians' perceptions on overuse of health services but we could not find any focusing on nurses. Considering community care nurses are frequently the primary point of contact for patients, it is worthwhile to understand their perspectives and insights (Horrocks et al., 2002). Furthermore, we focused on community care nurses since many instances of overuse of health services occur at the community level (Choosing Wisely, 2013). Undergraduate nursing students conducted the interviews in their final year of study as part of their research seminar requirements. A convenience sample was used (i.e., the interviewers approached nurses they knew who worked in the community).

Data Collection and Analysis

The interview guide (**Table S1**) was based on a thorough review of literature that identified main outcomes, barriers and causes, and ways to address overuse of health services. It included demographic questions, open-ended questions focusing on perceptions regarding overuse in Israel, specific areas of overuse, consequences and causes, and potential solutions. A senior researcher with expertise in qualitative research provided in-depth training in qualitative research, conducting research interviews, and analyzing qualitative data. Training included both theoretical aspects of qualitative research and simulations of interviews. Furthermore, the senior researcher monitored the interviews, read each transcript, and led the analysis.

All interviews were recorded, transcribed, anonymized, and analyzed thematically. Transcripts were read for an initial feeling and understanding, then reread and divided into key themes and subthemes. At least two researchers reviewed each interview, independently, and then the full project team examined, coded, and revised overall themes until agreement was reached.

Research ethics exemption was obtained from the nursing students research group's institution's research ethics board.

Results

Twenty-two nurses from different HMOs were approached; two declined to participate, and one strongly felt that there was no problem of overuse and would not participate. Nineteen nurses agreed to participate (response rate of 86%). The average age was 50.2 years (range 31–69 years), average seniority was 27.2 years (range 7.5–47 years), and average amount of time in community care was 15.6 years (range 1–37.5 years). Twelve nurses (63%) had bachelor's degrees in nursing, six (32%) had registered nurse certifications without a degree, and one (5%) had a practical nursing certification. Some nurses had additional training, including in public health, trauma, clinical training, and administration. Nurses worked in different HMOs: 13 nurses (68.5%) worked at the largest HMO and two nurses (10.5%, respectively) worked at each of the remaining HMOs. Eight nurses (42%) worked in Jerusalem, six (31.5%) in the central region, three (16%) in the south, and two (10.5%) in the north.

Overuse in the Israeli Healthcare System and Specific Problem Areas

Participants were asked whether they thought there was a problem of overuse of health services in Israel. The majority of nurses said that overuse is a big problem and is important to address, and one nurse felt there was no need to address it. The majority of the participants stated that overuse is evident in many areas across the health system (**Table 1**). The leading theme mentioned by most nurses was overuse of antibiotics, occurring for two main reasons. The first reason stems from patients (e.g., "patients who take antibiotics on their own accord. There are doctor's instructions to take antibiotics only when there is a positive test result, but they take before there is an answer."). The second reason stems from physicians (e.g., "a lot of doctors, in order to solve a problem, use antibiotics unnecessarily in my opinion"). Imaging tests was another recurrent example (e.g., "there are unnecessary MRIs, when people demand to undergo an MRI when there is no need or when the need is marginal"). Other nurses spoke about excessive blood tests. Some nurses, especially those involved in women's health, noted prenatal care as an area with overtreatment, and explained that women's health has a greater tendency for medical negligence claims; therefore, physicians are extra cautious.

Medications were also mentioned, specifically within the elderly (e.g., "the most unfortunate are the elderly.... This hurts you, take this, that hurts you, so take this too, you have high blood pressure, so let's take this."). Furthermore, "people who walk around with packages of medications ... the same drug under a different name ... and they go home and have two drugs and they receive both as if they are separate."

Negative Consequences of Overuse

Numerous negative consequences of overuse were raised, such as economic, side effects, resistance, and psychological issues (**Table 2**). The central theme that arose was economical. Participants noted that overuse costs the system a lot of money (e.g., "it is wasteful and it's a lot of money that can go towards other purposes"). Another theme mentioned was the burden on the health system (e.g., "undue burden, unjustified burden on the medical system, on the health system"). Many participants mentioned the issue of side effects and potential damage (e.g., "every test has side effects to be wary of"). Antibiotic resistance was another important theme, with the negative effects on individual patients and the entire population. A few nurses mentioned the psychological aspect of overtreatment (e.g., "unnecessary stress").

Causes of Overuse of Health Services

Most participants mentioned more than one cause of overuse (**Table 3**). The central cause mentioned was patient demands (e.g., "today people come with a grocery list"). Participants identified different types of demands. The first was those that stemmed from

Table 1. Representative Quotations of Common Areas of Overuse

Common area of overuse	Selected quotations
Antibiotics	"Giving antibiotics when there is no certainty they are needed, just to 'cover.'"
Imaging tests	"I see it in unnecessary referrals for imaging, for me less CT and MRI but I know that there are many doctors who are quick to refer to CT."
Blood tests	"Patients that do the tests too often. A general blood test more than once a year for the entire population and two or three times for those who have a problem, but there are many who just give the blood tests."
Medications	"Today there is no time or desire, or they do not teach them to wait and see what is causing the headache, immediately shove paracetamol, Nurofen. The same with antibiotics."
Pregnancy care/monitoring	"Prenatal testing routines get larger and larger each year. Another scan, another test. . . . It's really mostly pregnant women because it is also a very suitable place for malpractice suits, people really rush to sue."
Immunizations	"While I also think about immunizations that many people demand and not always with good reason."
Physician visits	"Too many doctor visits and they give more tests to get rid of the patient."
ER referrals	"Referrals to the emergency room. This creates a burden on the system and a waste of resources. A lot of waiting for those for whom it who really matters, and an incorrect distribution of resources. A family doctor knows perfectly well how to take care of what can be done in the community and can follow the patient."
Screening	"Screening when the result comes back invalid and then needing to send the patient again for a lot of tests and they end up being more invasive tests."

Note. Themes are arranged in order of most to least common.

Table 2. Representative Quotations of Negative Consequences of Overuse

Themes	Selected quotations
Monetary	"Economic implications, a waste of HMO resources."
Side effects of radiation	"Medical—radiation, antibiotics destroy the stomach and intestines. Not all overtreatment is good, it can cause a lot of problems, an unnecessary biopsy and accidentally making a perforation. . . . CT, for example, a terrible blow of radiation, contrast materials that harm kidney function."
Resistance	"Antibiotic treatment, for example, the matter of resistance to antibiotics and beyond resistance, it's just a harm with overtreatment of people."
Psychological	"Anxiety that you put the woman in. . . . Just today a woman told me, 'you do not let women enjoy their pregnancy, every day I have to do more and more tests.'"
Burden on the system	"The other side of this whole thing of this is burden on the system. That there's a woman who [who's fetus] really has suspected VSD or something like that, she goes to make an appointment for an echocardiogram but there is no room because all women who [who's fetus] have an echogenic intracardiac focus need to do echocardiography. The capacity of fetal cardiology is full of things that are frivolous, and when serious things come and there is no room, an appointment is booked for her for another 6 weeks—after giving birth, it overloads the system."

Note. Themes are arranged in order of most to least common.

patients wanting to leave a visit having felt the physician "did something" (e.g., "Patient desire to receive medical treatment, something in their hand. A prescription for example. Not to leave the doctor's office without a treatment, even when one isn't needed."). Other types of demands stemmed from educated patients who go to physicians after self-diagnosis to fulfill the need for a health service (e.g., "people are very 'educated' when they are on the Internet, read things, and then go to a doctor and require the tests").

Physicians' fear of lawsuits was another common influencing factor (e.g., "doctors are afraid to take responsibility for themselves and determine a purely clinical diagnosis . . . they do not want to take responsibility for themselves and risk an incorrect diagnosis, and then get sued, and they often send their patients for unnecessary testing and imaging"). Some participants felt overuse stems from physicians' insecurities (e.g., "there are doctors who give too much, because of the lack of confidence").

A few participants mentioned lack of system coordination (e.g., "you go to a surgeon they give you this, you go to an internist they give you an antihypertensive, you go to the endocrinologist and they give you anti-diabetic medication and nobody connects them and sees what is good and what is not good"). Furthermore, clinicians "don't really look to see if she [the patient] has already done the test, so they send her again." Overall, participants felt that "we give medication too quickly, we do not give the person time to see if anything passes. . . . " Other factors raised were related to external factors, such as pharmaceutical companies, the media, HMO

Table 3. Representative Quotations of Causes of Overuse

Theme	Selected quotations
Patients' desires	*Patient demand and desire for "something" in their hand:* "The patient, the patient has a feeling that if he goes to his doctor without getting a paper in hand that is, a prescription, referral for imaging, referral to a specialist or things like that, then it [is] as if there was not treatment from as far as the patient is concerned, and that is a flawed perspective. It's a combination of both [patient and doctor] but what really makes the doctor eventually send the patient away with antibiotics even though they did not think the patient needed antibiotics in the first place is the pressure from the patient." *Lack of knowledge*: "Even low awareness among doctors and especially patients about consequences and dangers of unnecessary tests and treatments."
Physicians' fear of lawsuits	"Doctors are afraid today they will get sued and therefore they make sure to cover themselves by all possible tests."
Physician insecurity and lack of knowledge	"Lack of knowledge and confidence of the doctor—unprofessional doctors send for extra tests just in case because of a lack of knowledge and confidence." "Young doctors that are not sure of themselves. I see a doctor filling in, or a young specializing doctor and I notice that sometimes they give more ancillary tests because they have difficulty in diagnosis." "Patients request and doctors give them what they want to find favor with patients."
Improper management	"Overuse is also created in a situation by sending to the ER when it is not always needed, i.e., at times that there isn't a doctor in the clinic or times when there isn't proper equipment."
Impatience of the patient and/or physician	"Impatience of patients, during a few days of treatment it is possible to reach a reasonable balance and not panic and go to the emergency room."
Media hype	"The last flu vaccine was given a lot and it was used up. But there was a lot of media buzz around the fact that the vaccines ran out and then they brought a lot of vaccines that were left, and that was a lot of money for [name of HMO]. And the media is responsible for that because they publicized and made noise about the issue."
Pressure from pharmaceutical companies	"Economic factors that the pharmaceutical manufacturers market to doctors and convince them of the efficacy and to give the drug. . . . And for example, I encountered a lot in homecare with types of dressings when there are very advanced and expensive dressings these days and every company want us to use theirs and often cheaper dressings can be used."

Note. Themes are arranged in order of most to least common.

incentives, and patients' families. For example, "the pharmaceutical companies also have a great impact," "the media is responsible for publicizing and making noise about the issue," "doctors receive [reimbursement] for every action," and "when parents are stressed they ask the doctor to send for tests."

Proposed Solutions to Reducing Overuse of Health Services

Participants proposed several key ideas for solving the problem (**Table 4**). Most nurses suggested patient education (e.g., "if a parent comes in with a specific complaint it can be explained to them using professional knowledge and experience to explain that I see what the problem is and why it is not necessary to back up the findings with a test"). A proposed solution is to explain the dangers of overuse (e.g., "to explain to the patient that there is danger to over-testing").

At the system level, participants felt that funding and delivery of services need adjustments. The knowledge and skills of physicians could be expanded, but more importantly, physicians need more time to consult patients. During in-depth consultations, physicians can explain risks and consequences, thus preventing overuse.

Additionally, participants proposed establishing better professional security for physicians to mitigate their litigation fear (e.g., "We must support doctors. If the courts only accept sporadic lawsuits of patients, doctors will already be less defensive and rely more on clinics rather than additional ancillary tests."). A few participants suggested improved coordination between physicians. Participants stated the need to synchronize the chain of medical care from physicians, to nurses, pharmacists, and more, improving order in the transfer of medical records and treatment.

A few participants proposed the growing need for a review of the distribution of referrals for tests, particularly those that include risk (e.g., patients "ask to check for pneumonia without the need and sometimes the doctor is not strong enough against them. If the doctor would have to report everything they did . . . why they did it, it very well may help."). There are current examples of this in the Israeli health system (e.g., "Today there is a restriction of HMOs. . . . [name of HMO] allows a vitamin D blood test only once a year."). This structure can be built upon for other overused services.

Table 4. Representative Quotations of Proposed Solutions to Reducing the Overuse of Unnecessary Health Services

Theme	Quotations
Solutions at the level of the treatment team	*Coordination between the institutions or the physicians:* “There should be an option between all hospitals’ computers to see one another other, then a doctor goes in and sees maybe yesterday you were in Jerusalem, and did all the tests.”
	Synchronization between staff: “All staff should be aware of it, from the doctor and pharmacist, to the nurse and caregiver at home, to see that the person, I’m talking about the elderly here, that the person really knows to take the pills and on time and what pills and not too much and not too little.”
	Review of treatment delivery: “We too, the nurses also, we have criticism that we need to inspect the doctors’ [work], check the blood tests and see how many there are, if for example a patient is doing okay with blood sugars, then tracking and seeing if they do not need what they are getting, maybe you can reduce medications for sugar, it may sometimes even be stopped.”
	Professional confidence, education, enriching the knowledge of physicians: “Doctors need to know to stand their ground and be confident.”
	Establishing a think tank: “We need to establish a think tank specifically on this topic—all the medical and nursing staff together—doctors and nurses and all treatment professionals.”
Solutions at the patient level	*Information and educational workshops for patients:* “Explain to the patient that there is danger in over-testing, one should be very careful.” “Be attentive to the patient and explain to them in their language advantages and disadvantages and what he needs and doesn’t need.”
Solutions at the health system level	*Appointments and communication available to the patient:* “For every patient to have the window of opportunity to be in touch to find out whether to continue [treatment], not to continue, maybe to stop, maybe it could work.”
	Legal protection for physicians: “Protect doctors so doctors will be less afraid of lawsuits and legal problems.”
	Resources: “We need to add positions and personnel [to address the issue].”

Note. Themes are arranged in order of most to least common.

Barriers to Implementation

Participants raised numerous potential implementation barriers. One major limitation is lack of resources (e.g., “there are serious financial constraints”). System changes incur expenses that the system cannot afford. Secondly, there is a shortage of human resources; in the interest of giving each patient the right treatment, physicians have to invest time characterizing the exact problem, and personalizing treatment. Yet, physicians must manage to see large quantities of patients within limited time frames (e.g., “time with one patient comes at the expense of time with another”).

A few participants raised the issue that closed-minded physicians could limit the effectiveness of interventions. Many veteran physicians can be fixed in their ways and not open to rapid developments in medical research (e.g., “older doctors are fixed in their thoughts and are not willing to listen to new things“). One participant stated that physicians would not agree to fewer tests and treatments so as not to take on risk, so that no one can complain about lack of care. The same nurse also discussed the role of nurses (e.g.,”Even we nurses cannot help. We won’t succeed in convincing a patient not to do a test that the doctor gave them, that is unnecessary, and was given only to protect themselves [the doctor]. In reality, we don’t want to convince the patient so that afterwards something won’t happen and they will sue us, so we also want to protect ourselves.”).

Responsibility for Solving the Problem

Participants suggested a variety of stakeholders that should take responsibility, yet ultimately only cooperation and harnessing all factors can change the situation (e.g., “everyone is responsible, each has a significant part of the issue”). All participants stated that the Ministry of Health has a large role to play, either by providing more resources and clinicians or setting “clear guidelines.” The majority of participants stated that physicians also need to play a large role in rectifying the situation. Awareness among physicians about overtreatment guides them in determining treatment, and the problem can be solved from the bottom up (e.g., "everyone will take responsibility for their actions and each doctor would think if what they are doing is necessary"). Some participants stated that patients need to play an active role; when patients understand the risks and the complexities of the issue, they will not demand unnecessary services.

Discussion

The majority of nurses interviewed think overuse is a serious and widespread problem that needs to be addressed. Problematic areas identified by nurses in Israel were similar to findings from other countries. A key issue related to overuse in previous studies was overtreatment with antibiotics; in this study, antibiotic treatments emerged as one of the leading problem areas, likely due to participants' positions as community care nurses, where excess antibiotic treatment is observed often. The main negative consequence discussed in this study was the financial cost of overuse, which is in line with previous findings (Colla, 2014; Ellen et al., 2015; Emanuel & Fuchs, 2008; Schleifer & Rothman, 2012).

Most participants think the main factor leading to overuse is related to patient demands. This is in contrast to existing literature, where the main factor leading to overuse stemmed from physicians, their fear of litigation, and their desire to please patients (Emanuel & Fuchs, 2008; Han et al., 2013; Rooshenas et al., 2015). Our study identified physician-related factors; however, they were not perceived to be the main factor. Patient satisfaction as the leading factor can be attributed to the more direct and assertive nature of Israelis, who are likely to demand specific health services from healthcare providers (Diederich, 2016). Findings of this study supported previous findings that physicians contribute to overuse due to lack of knowledge or confidence in diagnoses and lack of time with patients (Han et al., 2013; Rooshenas et al., 2015). While pharmaceutical and medical technology companies were mentioned as a significant factor in the literature (Bryan et al., 2014; Emanuel & Fuchs, 2008; Schleifer & Rothman, 2012), this study did not find them to be significant. The nurses may be unaware of the impact these companies have, or this may be because drug plans are government funded, making the economic aspects of overuse differ in Israel (Peled, Porath, & Wilf-Miron, 2016).

Interestingly, nurses in this study identified the health system as the responsible party to address the issue of overuse, whereas in the literature, physicians were held responsible. This may be due to the perceived efficiency and supervision of the health system, and the expectation that the system will address related issues (Rosen, 2016; Weil, Nun, & McKee, 2013). In addition, in Israel physicians are less independent, usually working under an HMO and needing to explain, clarify, and justify decisions to conduct tests and procedures (Horev & Avni, 2016; Weil et al., 2013). The nurses did not identify themselves as part of the solution, perhaps because of their perceived lack of authority. However, nurses are likely to be primary resources for patient education. Patients develop a relationship with and trust nurses, allowing nurses to validate concerns or explain risks and benefits (Irurita, 1999). Furthermore, because nurses spend more time with patients than any other healthcare professional, they can best support an intervention geared to patients (Kieft, de Brouwer, Francke, & Delnoij, 2014). Better educated patients with more understanding of risks and benefits of tests and treatment options are less likely to demand unnecessary services.

The main strength of this research is that it is the first of its kind among nurses in Israel, and among nurses internationally. This study population is important because nurses have a broader perspective on patient care, can identify treatment failures and opportunities for quality optimization, and can use their power to advocate for change (Ellen, Hughes, Shach, & Shamian, 2017; Fackler, Chambers, & Bourbonniere, 2015). An additional strength is the broad representation of nurses representing all the HMOs, various geographic regions, and educational and experiential backgrounds. Participants also treat a broad patient demographic and are exposed to a wide range of health services.

Our study is not without limitations. Firstly, social desirability response bias could have played a role in responses. Secondly, participants were all Jewish nurses who primarily treat Orthodox or observant patient populations, which may have skewed results. More comprehensive research including a broader demographic of nurses may shed more light on the issue.

Implications for policy and practice as a result of this study include the need for workshops for healthcare providers to increase their diagnostic confidence, to improve their ability to counsel patients against wasteful treatment options, and to remind nurses of their legal rights to decrease fear of litigation. Our research found that a potential solution to overuse would be increasing appointment times so providers may spend more time with patients. Implementing such a solution would require increased incentives and resources for physicians.

Nurses can use their rapport with patients, and patients' high level of trust in nurses, to mitigate overuse of health services. Nurses' broader perspective on patient care allows for the identification of failures in treatment and opportunities for quality optimization. Community care nurses have an opportunity to lead potential initiatives to reduce overuse in their clinical practices by educating patients about proper use of medication and by discussing indications and duration of treatment with both patients and physicians. Nurses can also contribute to research with evidence from their clinical settings, promoting awareness of overuse and advocating for, prioritizing, and implementing policy changes (Ellen et al., 2017).

Additional suggested solutions include limiting access to health services (i.e., reducing the number of tests allowed by the HMO) or implementing a unified computerized system to improve continuity of care and facilitate better communication. A plethora of initiatives have been implemented internationally to address the issue of overuse (Ellen et al., 2015). Aggregated changes are likely to save time and resources, and minimize overuse. However, implementation of such reductions in services could be met with resistance, both from patients, who do not want to feel care is rationed, and from physicians, who do not want to relinquish autonomy (Ellen et al., 2015). Health system leaders need to consider potential barriers and investigate interventions that match current culture and context within the health system.

Conclusions

Future research should consider researching physicians' perceptions of overuse in Israel, as well as patients' perceptions, to further understand why they seek additional tests and procedures. Physical, psychological, and economic harms that may arise due to overuse must be mitigated to provide the best health services to the most people in the most efficient manner. The accessibility of nursing staff, their relationships with patients, their training, and their influence are an asset to any health system and should be used to limit overuse and create an efficient and effective system, as well as a knowledgeable, healthy population.

Clinical Resources

- Australian College of Nursing. Choosing Wisely Australia: https://www.acn.edu.au/choosing-wisely
- Choosing Wisely. American Academy of Nursing: http://www.choosingwisely.org/societies/american-academy-of-nursing/
- Choosing Wisely Canada. Canadian Nurses Association: https://choosingwiselycanada.org/nursing/
- Organisation for Economic Co-operation and Development. Tackling wasteful spending on health: https://www.oecd.org/els/health-systems/Tackling-Wasteful-Spending-on-Health-Highlights-revised.pdf
- Registered Nurses' Association of Ontario. Best practice guidelines: http://rnao.ca/bpg/guidelines

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Table S1. Overuse in Health Services-Interview Guide

JOURNAL OF NURSING SCHOLARSHIP

HEALTH POLICY AND SYSTEMS

Resilience as a Moderator of Psychological Health in Situations of Chronic Stress (Burnout) in a Sample of Hospital Nurses

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Key words
Burnout, professional, mental health, nursing staff, resilience, psychological, stress, psychological

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Accepted October 17, 2017

doi: 10.1111/jnu.12367

Abstract

Objectives: To analyze the role played by resilience in the dimensions that constitute burnout syndrome and, through that, the psychological health of a sample of nurses working at hospital centers.

Methods: Cross-sectional design, with a questionnaire as the tool. The sample consisted of 537 nurses from three public hospitals in Murcia, Spain. The questionnaire contained measures of the following variables: resilience, the three dimensions of burnout (emotional exhaustion, cynicism, and professional efficacy), and general psychological health, as well as sociodemographic and employment information.

Results: The emotional exhaustion and cynicism dimensions of burnout were significantly linked to psychological health in the manner expected, but this was not the case for professional efficacy. A stepwise multiple regression analysis revealed the moderating role of resilience on the emotional exhaustion and cynicism dimensions, as well as on psychological health.

Conclusions and Clinical Relevance: This study highlights the moderating role of resilience on burnout and psychological health. The practical implications of the results are discussed for the implementation of measures to increase resilience as a personal resource in order to improve the health and work performance of these professionals.

Currently, nursing professionals are exposed to stressful events that are fundamentally linked to organizational aspects and the specific nature of the tasks they do (Chang, Hancock, Jonhson, Daly, & Jackson, 2005).

Among the diverse stressful work conditions, work overload, and interpersonal conflicts (e.g., with doctors and colleagues), the following stand out: lack of personal resources to face daily work challenges, lack of social support, long working hours and exposure to patient suffering, violence from patients and their relatives, and sexual harassment. Numerous studies corroborate the connection of these stressors with burnout (García-Izquierdo & Ríos-Rísquez, 2012; Khamisa, Peltzer, & Oldenburg, 2013; Li et al., 2013).

Burnout syndrome has been a topic of research since the 1980s, and it is described as a response to work stress determined by three dimensions: emotional exhaustion, cynicism, and professional inefficacy (Maslach, Schaufeli, & Leiter, 2001). In this definition, the three-dimensional character of burnout among hospital nurses is clear, since it affects the person (causing emotional exhaustion or perception of being at the edge of their emotional limit), the psychosocial field (cynicism or distant attitude to work, to the people they care for as part of their work, and to their colleagues), and the professional field (professional inefficacy or perception of doing work tasks inadequately, and of being incompetent).

The consequences of burnout might be negative both for the employing organization (e.g., increases in rota changes and absenteeism, with decreases in work satisfaction, productivity, and quality of work; Heinen et al., 2013; Khamisa et al., 2013; Roch, Dubois, & Clarke, 2014) and for the professionals' health (Adriaenssens, De Gutch, & Maes, 2015; Sorour & El-Maksoud, 2012).

Resilience has been described as the human capacity for facing adversity and overcoming or bouncing back from difficulties, with positive outcomes (Grotberg, 2003; Rutter, 2012; Zautra, Hall, & Murray, 2010). In the past few years, resilience has awoken great interest on the premise that it could be favorable for workers' health, since it is understood to be a personal resource that encourages adequate adaptation against significant stressors of all kinds, including work stressors (American Psychological Association, 2011; Jackson, Firtko, & Edenborough, 2007). In this way, resilience enables positive adjustment of the person and his or her environment, that is, maintenance of good health despite stressing circumstances, such as those faced in the day-to-day work environment (Windle, 2011). In this study, resilience is understood as a personal resource that can improve a professional's capacity to recognise, understand, and react to stressing situations in the workplace.

The Job Demands-Resources model (JD-R model; Bakker & Demerouti, 2007; Van Wingerden, Bakker, & Derks, 2016) has been used to explain occupational stress and it can be useful to clarify the relationship between burnout syndrome and resilience. According to this model, work characteristics can be classified into job demands and job resources. Job demands refer to physical, social, or organizational aspects of the job that require physical or cognitive effort and are therefore associated with certain physiological and psychological costs, for example, burnout syndrome. This model suggests that a high level of job demands combined with a lack of resources is most likely to lead to adverse consequences (such as health problems). Thus, having a high level of personal resources such as resilience makes it more possible to cope appropriately with the stressful demands of a job, allowing fewer negative effects on health (Bakker & Demerouti, 2014). Therefore, the starting point of this study is to consider resilience as a personal resource that can moderate the burnout effects of the psychological health of professionals that have been analyzed.

There is evidence of negative connections between resilience and burnout (Rushton, Batcheller, Schroeder, & Donohue, 2015; Treglown, Palaiuou, Zarola, & Furnham, 2016; Zou, Shen, Tian, Liu, Li, & Li, 2016), and positive connections between resilience and psychological health (Arrogante, 2014; Mealer et al., 2012; Zou et al., 2016). A possible way that resilience might function is by acting as a moderator; that is, professionals who have higher resilience scores respond in a more adaptive way to adverse situations at work and experience better health than those who have lower resilience scores. This would explain, for example, why some professionals quit healthcare-related work or intend to change their positions, while others keep their posts and reach high levels of personal and professional development (Lee, Dai, Park, & McCreary, 2013). Therefore, resilience is a psychological characteristic, essential for the development and maintenance of health in these professionals (Jackson et al., 2007).

However, studies examining the connection between resilience of nursing personnel and burnout syndrome and psychological health are scarce (Arrogante, 2014; Zou et al., 2016). Both from the individual and organizational points of view, the importance and necessity of studies considering the variables above are important. This is especially true for nursing because nurses form a professional group whose health may have a significant impact on the quality of the services provided by the healthcare system (Aiken et al., 2012; Van Bogaert, Kowalski, Weeks, & Clarke, 2013).

Accordingly, this study has a double objective: on the one hand, analyzing the connections between resilience, the three dimensions of burnout, and psychological health; and, on the other hand, examining the moderating role of resilience on the dimensions of burnout and psychological health in a sample of nursing personnel working at public hospital centers. In particular, on the basis of the findings of the empirical studies described above, the following hypotheses were postulated:

> Hypothesis 1: Perception of burnout will be significantly associated with psychological health—the relationship with the dimensions of emotional exhaustion and cynicism will be negative, and the relationship with professional efficacy will be positive.
>
> Hypothesis 2: Resilience will be significantly associated with the three dimensions of burnout—the connection with emotional exhaustion and cynicism will be negative, and the connection with professional efficacy will be positive.
>
> Hypothesis 3: Resilience will be significantly and positively associated with psychological health.
>
> Hypothesis 4: Resilience will moderate the associations between the dimensions of burnout and psychological health. Thus, nursing professionals participating in the study with high scores for resilience will perceive their

psychological health as better even if they reveal high scores for emotional exhaustion and cynicism, and low scores for professional efficacy.

Methods

The study design was cross-sectional and the information was collected by means of anonymous questionnaires. The necessary permission from the management of the health centers was requested and obtained, and the objectives of the research were explained to the potential nursing participants before application of the questionnaires. Participation was voluntary and under verbal informed consent; the participants were assured of the confidentiality and anonymity of the obtained data.

Ethical Considerations

Ethical rules for research and essential legal requirements for the development of this study were followed. The project was revised, approved, and managed by the University of Murcia.

Participants

The final sample was made up of 537 nurses (the response rate was 67.3%) working at the public hospitals in Murcia, Spain. Women comprised 84% of the participants ($n = 451$). The average age was 41.3 years ($SD =$ 9.72 years; range = 20–64 years) and 69.1% were married or had a partner. In terms of the type of contract, 61.7% had a permanent contract and the rest were working under a temporary contract; the majority worked in rotating shifts (46%), 35.7% in morning shifts, and the rest (18%) in night shifts. The average length of career in the profession was 14.75 years ($SD = 9$ years; range = 1–41 years), and the average length of career in their current post was 7.17 years ($SD = 7.83$ years; range = 1–38 years).

Measures

The questionnaire contained diverse questions about sociodemographic and work variables (age, sex, contract type, shift pattern, length of career in the profession, and length of career in the post), as well as the validated scales described below.

Resilience was assessed with the 10-item Connor-Davidson Resilience Scale (CD-RISC), developed by Connor and Davidson (2003), utilizing the Spanish adaptation by Notario-Pacheco et al. (2011). This scale measures the capacity or the ability of a person to resist change or ill health in the face of adversity and stressful situations. Participants were asked to indicate to what extent they agreed with each of the given sentences, answering on a 5-point Likert scale (from 0 to 4 points). An average was calculated, with higher marks showing a higher level of resilience. In the present study, the reliability coefficient (Cronbach´s alpha) was .83.

Burnout was measured by means of the Maslach Burnout Inventory General Survey scale (MBI-GS) by Schaufeli, Salanova, and González-Roma (2002). It is formed by 16 items assessing the degree of burnout. It covers the following dimensions: emotional exhaustion (5 items), cynicism (5 items), and professional efficacy (6 items). The answer scale for each item is Likert-type, fluctuating from 0 (*never*) to 6 (*always*). The marks were averaged for each of the three dimensions. The profile of a worker with burnout is known to show high marks in exhaustion and cynicism, and low marks in his or her concept of professional efficacy (Maslach et al., 2001). The reliability coefficients (Cronbach´s alpha) were .86, .81, and .73 for emotional exhaustion, cynicism, and professional efficacy, respectively.

In order to measure health, the General Health Questionnaire (GHQ-12) by Goldberg and Williams (1988) was used, utilizing the Spanish adaptation by Sánchez-López and Dresch (2008). It has 12 items referring to health problems suffered in recent weeks. It is assessed by means of a Likert scale of 4 points from 0 (*not at all*) to 3 (*much more than usual*), from which an average was calculated; in this case it must be taken into account that higher marks show worse perceived health, that is, greater discomfort. In this study, the reliability coefficient (Cronbach´s alpha) was .91.

Data Analysis

The statistical analyses were made with SPSS 20 (IBM Corp., Armonk, NY, USA). First, descriptive statistics, internal consistencies (Cronbach's alpha scores) of the scales, and the correlation coefficients between the variables were calculated. The possible differences in resilience, health, and the burnout dimensions were also analyzed dependent on the sociodemographic and work variables described above.

In order to examine the moderating role of resilience, a stepwise hierarchical multiple regression analysis was made, taking into account resilience and the burnout dimensions as independent variables, and psychological health as a dependent variable. The significance level was set to .5. The independent variables were introduced to the regression equation in four steps. First, age and sex were included to control for their possible effects (Schaufeli, Leiter, Maslach, & Jackson, 1996). The scores for the different variables were converted

Table 1. Descriptive Statistical and Pearson Correlations of the Main Variables in the Study ($N = 537$)[a]

Variables	M	SD	1	2	3	4	5	6
1. Age	41.38	9.72	—					
2. Resilience	3.42	0.37	0.08	(.83)				
3. Emotional exhaustion	2.81	1.09		0.06	−0.11*	(.86)		
4. Cynicism	2.30	0.99	0.03	−0.22**	0.49**	(.81)		
5. Professional efficacy	4.98	1.27	−0.02	0.22**	−0.11*	−0.26**	(.73)	
6. Psychological health[b]	1.67	0.34	0.12*	−0.26**	0.44**	0.32**	−0.05	(.91)

[a] The internal consistency (Cronbach's alpha) of the different scales is shown on the diagonal and in brackets.

[b] Psychological health was measured as frequency of the occurrence of symptoms of psychological discomfort.

*$p < .05$; **$p < .01$.

Table 2. Results of the Hierarchical Regression Analysis

Independent variable	β	Psychological health[a] R^2	ΔR^2
Step 1			
Age	.10*		
Sex	.10*	.16	.02**
Step 2			
Age	.10*		
Sex	.11*		
Emotional exhaustion	.35***		
Cynicism	.15**	.20	.19**
Step 3			
Age	.10*		
Sex	.11*		
Emotional exhaustion	.35***		
Cynicism	.12*		
Resilience	−.22**	.25	.05**
Step 4			
Age	.10*		
Sex	.11*		
Emotional exhaustion	.34***		
Cynicism	.10*		
Resilience	−.19**		
Exhaustion × Resilience	−.06 (ns)		
Cynicism × Resilience	−.02 (ns)		
Exhaustion × Cynicism × Resilience	−.09*	.26	.02*

Note. ns = not significant.

[a] Psychological health was measured as the frequency of symptoms of psychological discomfort.

*$p < .05$; **$p < .01$; ***$p < .001$.

into standardized marks and the suggestions of Aiken, West, and Reno (1991) were followed to estimate the interaction effects. The standardized marks for the three dimensions of burnout were introduced in the second step. The values for the resilience variable were also standardized and added in the third step. Finally, the product of the independent variables (the three dimensions of burnout) and the moderator (resilience) was introduced to the equation in the fourth step. It is considered that there is moderation if the interaction effect is significant and the adjusted R^2 of the equation is significantly higher after adding the term interaction than the adjusted R^2 of the third equation. Finally, a diagram was made with the high and the low values for each variable, taking their values in the first and the third quartiles as a reference in order to make the representation clearer.

Results

The means, standard deviations, and correlations between the different variables, as well as the results of the internal consistency analyses (reliability) of the scales are shown in **Table 1**. All scales showed an adequate internal consistency (Cronbach's alpha). Moreover, significant and positive associations were found between psychological health perception and the emotional exhaustion and cynicism dimensions, although not with professional efficacy. Statistically significant correlations matching the expected outcomes were also found between resilience and the three dimensions of burnout, and between resilience and psychological health.

Additional statistical analyses were made in order to determine possible associations and discrepancies between resilience, the dimensions of burnout, and perceived psychological health according to the sociodemographic variables. It should be highlighted that the professionals' age was significantly associated with perceived health ($r = .12$; $p < .01$), and that women obtained higher marks in the GHQ-12 scale, indicating that they perceive worse health ($t = 2.5$; $p < .001$).

Next, the stepwise multiple regression analyses described above were carried out (**Table 2**), analyzing psychological health as a dependent variable. Direct effects were found for two of the three dimensions of burnout (emotional exhaustion and cynicism), but not for professional efficacy. Moreover, a direct effect of resilience on health was observed. In the last step, the effects of the interaction between the variables considered independent (emotional exhaustion, cynicism, and resilience) can be seen.

In order to aid interpretation of the results, the significant interactions are shown graphically in **Figure S1**. As can be deduced from the diagram, these results show that the psychological health of the participating nursing personnel is worse (i.e., they report higher scores in self-perceived discomfort) when they report a combination of high emotional exhaustion, high cynicism, and low resilience. With regard to the moderating role of resilience, just one interaction indicated the pattern that is the combination of the two variables of burnout (emotional exhaustion and cynicism). This partially supports Hypothesis 4.

Discussion

The objective of this research was to analyze the relationships that exist between the dimensions of burnout syndrome, resilience, and perceived health in a sample of nurses working at Spanish public hospitals. The moderating role of resilience on the dimensions of burnout and perception of psychological health was also explored.

Correlations Between Resiliency, Burnout Syndrome, and Health Perceived

The results indicate a significant connection between psychological health (discomfort) and two of the three dimensions of burnout (emotional exhaustion and cynicism), but not with professional efficacy. Therefore, Hypothesis 1 is partially fulfilled. Resilience correlated significantly and negatively with emotional exhaustion and cynicism, and positively with professional efficacy, as was postulated in Hypothesis 2. Finally, a positive and significant correlation between resilience and psychological health was seen, confirming Hypothesis 3.

Therefore, according to these findings, the nurses in the sample who reported greater resilience also obtained higher scores in professional efficacy and, in the same way, lower scores in emotional exhaustion and cynicism. These findings are consistent with those of previous studies looking at other samples of professionals (Menezes, Fernández, Hernández, Ramos, & Contador, 2006; Rushton et al., 2015).

Regarding the connection between resilience and psychological health, the results reveal an association between the two variables in the sense that professionals with greater resilience showed better perceived health. These data are in line with the findings of other researchers (Arrogante, 2014; Mealer et al., 2012; Zou et al., 2016).

Significant and negative relationships between the emotional exhaustion and cynicism dimensions and psychological health were found. Various previous studies have also highlighted the connection between emotional exhaustion and cynicism and the onset of psychosomatic symptoms and psychological discomfort (Arrogante, 2014; Zou et al., 2016). In this sense, some studies have found the emotional exhaustion dimension to be the one most strongly linked with perceived health (Maslach et al., 2001; Piko, 2006).

In concordance with previous studies, perception of professional inefficacy did not show a significant connection with psychological health (Ríos-Rísquez, Godoy, & Sánchez-Meca, 2011). It is because of such findings that the lack of efficacy has been highly criticized as a dimension of burnout (Shirom, 2003), as it tends to have a low correlation with emotional exhaustion and cynicism when compared to the interconnections between these two more related dimensions (Bresó, Salanova, & Schaufeli, 2007). Moreover, a lack of efficacy is usually not linked to work stressors (Lee & Ashforth, 1996). Ultimately, emotional exhaustion and cynicism are considered to be the "core of burnout" (Schaufeli et al., 2002).

The Moderating Role of Resilience

The final hypothesis of this study aimed to explore the moderating role of resilience between the three dimensions of burnout and psychological health. The obtained results confirmed that resilience moderates the effect of emotional exhaustion and cynicism on health. These findings coincide with those obtained in previous studies (Arrogante, 2014; Treglown et al., 2016; Zou et al., 2016).

The direct effect of resilience on self-perceived health is clear: participating nursing professionals with high resilience had a greater capacity to adapt to work adversities, and they reported better health than those with low resilience in any of the possible combinations. Other studies in different work contexts have also highlighted the importance of resilience as a shock-absorber for stress perception, as a promoter of better adaptation, and as a reducer of the negative impact on health (Arrogante, Pérez-García, & Aparicio-Zaldívar, 2016; Catalano, Chan, Wilson, Chiu, & Muller, 2011).

The obtained results could be explained according to the proposal made by Windle (2011): resilience acts as a protecting variable. According to our results, health levels are different where perceived emotional exhaustion and cynicism are low, and where emotional exhaustion and cynicism are high, but where resilience is high, the differences seen in perceived discomfort under high levels of exhaustion and cynicism are less obvious (see **Figure S1**). This would support the idea that resilience can be mobilized when risks are apparent, that is, it works as a personal resource protecting health.

Limitations, Applications, and Avenues for Future Research

This study features several limitations that it is necessary to point out in order to better understand the results. Firstly, the collected data come exclusively from self-reported questionnaires, which may cause bias in the participants' answers, as well as artificially increase the correlations between variables. It was hoped that this limitation might be reduced with rigorous control of anonymity. Additionally, it can be argued that personal resources such as resilience are difficult to measure in ways other than self-reporting (Mäkikangas & Kinnunen, 2003).

Secondly, the cross-sectional study design restricts the possibility of establishing causal connections between the analyzed variables. In this sense, diverse studies have brought to light the necessity of conducting longitudinal studies that might help to demarcate and analyze the evolution of burnout syndrome and health in workers (Edwards, Burnard, Bennett, & Hebden, 2010; Rudman & Gustavsson, 2012). Moreover, future research should use more complex designs and statistical analyses in order to be able to better clarify the role played by resilience in the psychological health of workers.

The third limitation concerns the convenience sample. It is a possible selection bias because the decision of participating could depend on the interest of the topic. A convenience sample can lead to the under-representation or over-representation of particular groups within the sample. Therefore, the inferences are not as trustworthy as if a random sample had been used. Future studies should try to replicate our study among nurses of other hospitals and several units.

Our study concludes that nurses who expressed a higher level of resilience experienced better psychological health even if they perceived a high level of emotional exhaustion and high cynicism compared to those with lower levels of resilience and high emotional exhaustion and cynicism.

In practice, given the strong relationship established in the research between burnout, health, and different counterproductive behaviors (e.g., negative consequences for patient care, increased absenteeism, increased turnover, or decreased job satisfaction; Borritz et al., 2006; Hayes et al., 2012; Vahey, Aiken, Sloane, Clarke, & Vargas, 2004; You, Aiken, Sloane, Liu, & He, 2013), the nursing administrators and managers should seek solutions in order to maintain the nursing collective in top conditions of health and performance. The obtained findings indicate the necessity of promoting the development of this psychological capacity in order to prevent ill health in nursing personnel. The study of resilience as a personal resource that relates to difficulties caused by burnout syndrome and psychological ill health gain special relevance when the beneficial effects of interventions that may be implemented are considered (Robertson, Cooper, Sarkar, & Curran, 2015). The construction and development of resilience can be made in workplace contexts by means of training activities promoted by the management of health centers in order to promote health in their employees (McAllister & McKinnon, 2009). In this sense, it would also be interesting to help future professionals to develop this capacity by training within the undergraduate educational programs (Knight et al., 2012; Rudman & Gustavsson, 2012; Thomas, Jack, & Jinks, 2012).

Because of the lack of relevant studies, demonstration of the possible effects that a training and development program might have on health and on the prevention of burnout syndrome among nursing personnel would be a topic of interest for future research. Thus, interventions should be designed that both alleviate any paucity of professionals' abilities to adjust emotionally and manage stress and detect and modify the stressing aspects of the current health systems and organizations.

Clinical Resources

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

Figure S1. Interactions of the three independent variables emotional exhaustion x cynicism x resilience with psychological health–perceived discomfort.