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GUEST EDITORIAL

Advancing Science, Improving Lives: NINR's New Strategic Plan and the Future of Nursing Science

The future of nursing science has never been brighter. Because of nursing science, individuals and caregivers have a higher quality of life in spite of chronic conditions; we have a better fundamental understanding of symptoms such as fatigue, disordered sleep, and pain; people are learning better ways to keep themselves healthy and better manage their own health; and more of those with advanced illness are receiving the palliative care they need. At the same time, we recognize the many challenges that persist; we cannot rest on our laurels. Nursing science must be vigilant in looking toward the future to identify areas of science where we can continue to make major contributions to health and the research enterprise.

The National Institute of Nursing Research (NINR) recently commemorated its 30th anniversary at the National Institutes of Health. This anniversary was an opportunity to recognize past achievements in NINR-supported science, to examine the current state of NINR-supported research, and to carefully consider the next frontiers in nursing science. In September 2016, NINR released its new Strategic Plan: *Advancing Science, Improving Lives: A Vision for Nursing Science* (2016). Developed with input from interdisciplinary scientists, clinicians, other experts across the nation, and the general public, the Strategic Plan details a blueprint for NINR-supported research that we believe will lead to new, significant advancements in nursing science. The Plan also incorporates feedback from the NINR Innovative Questions Initiative, in which members of the scientific community and the public were asked to contribute their ideas for new research questions that could lead to rapid improvements in health and quality of life over the next ten years (Grady, 2014, 2015).

The new Strategic Plan describes four areas of scientific focus:

1. Symptom science: promoting personalized health strategies. As people live longer, they are also more likely to develop chronic conditions, many of which are accompanied by symptoms that lead to poor quality of life. Research is needed to better understand the underlying biological and genetic factors that contribute to adverse symptoms, as well as develop and test new interventions to reduce the disabling effects of symptoms and improve health outcomes.

2. Wellness: promoting health and preventing illness. The most effective way to overcome an illness is to prevent illness from occurring in the first place. NINR supports research to promote long-term health, including healthy behaviors, and to prevent illness and comorbidities across health conditions, settings, and the lifespan. Research supported in this area focuses on the physical, social, behavioral, and environmental causes of illness, determinants of health, and assessment of behaviors that lead to healthy lifestyle choices.

3. Self-management: improving quality of life for individuals with chronic conditions. Effective self-management programs engage individuals and families as active participants in maintaining and improving quality of life while living with a chronic condition or multiple chronic conditions. Self-management research encompasses health strategies that allow individuals and their healthcare provider to adapt treatments to distinct circumstances by accounting for social, cultural, economic, and emotional factors that can influence their health and quality of life.

4. End-of-life and palliative care: the science of compassion. There is a critical need to assist individuals, families, and healthcare professionals in managing the symptoms of advanced, serious illness, and planning for end-of-life decisions. In addition, high-quality, evidence-based palliative care is an important component of maintaining quality of life at any stage of illness, not just at the end of life. Research is needed in this area to address issues such as relieving symptoms and suffering; enhancing communication between patients, families, and clinicians; and understanding decision making surrounding care of advanced illness at the end of life.

In addition, two areas are presented that were deemed of high priority across all of NINR's scientific programs:

1. Promoting innovation: technology to improve health. Innovative technologies play a critical role in advancing health and health care. Research is needed to develop novel interventions that deliver tailored care and real-time health information to patients, families, clinicians, and communities. In addition, new

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efforts are needed to develop and refine technologies for improving symptom risk assessment, and to identify potential interventions.

2. 21st century nurse scientists: innovative strategies for research careers. The continued advancement of nursing science requires a scientific workforce that is innovative, multidisciplinary, and diverse. NINR will continue to support a variety of training opportunities for scientists and trainees at all career levels, particularly those at early career stages who are so critical to sustaining the future of leading-edge research and high-quality health care.

Within each of these focus areas, the Plan describes potential future research directions. These topics represent promising targeted areas of exploration that we believe will advance NINR-supported science and develop the next generation of nurse scientists. These future directions also serve to demonstrate the breadth and depth of nursing science, and the potential impact the field can have on health, quality of life, and the research enterprise.

Indeed, today is a time of extraordinary opportunity in research. Precision health offers the promise of tailoring treatment to individuals based on their genetics, lifestyle, and environment. Advances in data science are changing the way we collect, store, and analyze large datasets. These advances have the potential to transform the way we conduct clinical research and clinical trials and the way we explore the genetics of illnesses and their symptoms. Nursing science can lead in these areas, and NINR-supported scientists are already leading and contributing to the multidisciplinary teams at the forefront of these exciting frontiers in the health sciences.

We fully recognize that science is not static, that new advances or urgent new challenges can sometimes require us to change course. Therefore, we view the Strategic Plan as a dynamic document. On an ongoing basis, NINR will revisit its research priorities and adapt them to meet current needs or take advantage of new opportunities.

The field of nursing science must continue to move forward to meet the important health challenges of our society. The foundation is in place for nursing science to make remarkable strides in areas such as symptom science, caregiving research, and the science of palliative and end-of-life care. The future directions presented in the new NINR Strategic Plan represent only a sampling of what we could accomplish in the coming years. We must continue to recognize that nurses and nurse scientists are at the forefront of the patient experience, and we are in the best position to study, understand, and improve the lives of patients and caregivers. We must also be vigilant in communicating the results and impact of nursing science to ensure that the results of our studies reach the broader community and inform practice. At NINR, we are proud of what nursing science has achieved, and optimistic about what we can accomplish over the next 30 years, leading to better health and quality of life across the United States and around the world.

Patricia A. Grady, PhD, RN, FAAN

Director, National Institute of Nursing Research,
National Institutes of Health, Bethesda, MD, USA

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CLINICAL SCHOLARSHIP

Feasibility of Combining Common Data Elements Across Studies to Test a Hypothesis

Elizabeth J. Corwin, PhD, RN, FAAN[1], Shirley M. Moore, PhD, RN, FAAN[2], Andrea Plotsky, MPH[3], Margaret M. Heitkemper, PhD, RN, FAAN[4], Susan G. Dorsey, PhD, RN, FAAN[5], Drenna Waldrop-Valverde, PhD[6], Donald E. Bailey Jr., PhD, RN, FAAN[7], Sharron L. Docherty, PhD, RN, FAAN[8], Joanne D. Whitney, PhD, RN, FAAN[9], Carol M. Musil, PhD, RN, FAAN[10], Cynthia M. Dougherty, PhD, APRN, FAAN[11], Donna J. McCloskey, PhD, RN, FAAN[12], Joan K. Austin, PhD, RN, FAAN[13], & Patricia A. Grady, PhD, RN, FAAN[14]

1 *Alpha Epsilon*, Associate Dean for Research and Professor, Emory University Nell Hodgson Woodruff School of Nursing, Atlanta, GA, USA
2 *Alpha Mu*, Professor, Case Western Reserve University, Bolton School of Nursing, Cleveland, OH, USA
3 Research Informatics Analyst, Emory University Nell Hodgson Woodruff School of Nursing, Atlanta, GA, USA
4 *Psi-at-Large*, Professor, University of Washington School of Nursing, Seattle, WA, USA
5 *Pi*, Professor, University of Maryland School of Nursing, Baltimore, MD, USA
6 Associate Professor, Emory University Nell Hodgson Woodruff School of Nursing, Atlanta, GA, USA
7 *Beta Epsilon*, Associate Professor, Duke University School of Nursing, Durham, NC, USA
8 *Beta Epsilon*, Associate Professor, Duke University School of Nursing, Durham, NC, USA
9 *Psi-at-Large*, Professor, University of Washington School of Nursing, Seattle, WA, USA
10 *Alpha Mu*, Professor, Case Western Reserve University, Bolton School of Nursing, Cleveland, OH, USA
11 *Psi-at-Large*, Professor, University of Washington School of Nursing, Seattle, WA, USA
12 Clinical Advisor/Contractor, National Institutes of Nursing Research, Washington, DC, USA
13 *Alpha*, Consultant, National Institutes of Nursing Research, Washington, DC, USA
14 *Tau*, Director, National Institutes of Nursing Research, Washington, DC, USA

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Correspondence
Dr. Elizabeth J. Corwin, Emory University, Nell Hodgson Woodruff School of Nursing, 1520 Clifton Rd., Atlanta, GA 30322. E-mail: ejcorwi@emory.edu

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Abstract

Purpose: The purpose of this article is to describe the outcomes of a collaborative initiative to share data across five schools of nursing in order to evaluate the feasibility of collecting common data elements (CDEs) and developing a common data repository to test hypotheses of interest to nursing scientists. This initiative extended work already completed by the National Institute of Nursing Research CDE Working Group that successfully identified CDEs related to symptoms and self-management, with the goal of supporting more complex, reproducible, and patient-focused research.
Design: Two exemplars describing the group's efforts are presented. The first highlights a pilot study wherein data sets from various studies by the represented schools were collected retrospectively, and merging of the CDEs was attempted. The second exemplar describes the methods and results of an initiative at one school that utilized a prospective design for the collection and merging of CDEs.
Methods: Methods for identifying a common symptom to be studied across schools and for collecting the data dictionaries for the related data elements are presented for the first exemplar. The processes for defining and comparing the concepts and acceptable values, and for evaluating the potential to combine and compare the data elements are also described. Presented next are the steps undertaken in the second exemplar to prospectively identify CDEs and establish the data dictionaries. Methods for common measurement and analysis strategies are included.
Findings: Findings from the first exemplar indicated that without plans in place a priori to ensure the ability to combine and compare data from disparate sources, doing so retrospectively may not be possible, and as a result

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hypothesis testing across studies may be prohibited. Findings from the second exemplar, however, indicated that a plan developed prospectively to combine and compare data sets is feasible and conducive to merged hypothesis testing.

Conclusions: Although challenges exist in combining CDEs across studies into a common data repository, a prospective, well-designed protocol for identifying, coding, and comparing CDEs is feasible and supports the development of a common data repository and the testing of important hypotheses to advance nursing science.

Clinical Relevance: Incorporating CDEs across studies will increase sample size and improve data validity, reliability, transparency, and reproducibility, all of which will increase the scientific rigor of the study and the likelihood of impacting clinical practice and patient care.

The discovery and dissemination of knowledge that improves the health of individuals, families, and populations around the world is a fundamental goal of nursing science. While the work of individual researchers is essential to achieving this goal, individual efforts are often limited by sample size, participant characteristics, generalizability, lack of replication samples, and sometimes access to cutting-edge technology or appropriate tools and measures. Thus, a key strategy to accelerate the advancement in nursing science lies in expanding data-sharing methods and methodologies among research teams both within and across institutions.

Some large-scale data-sharing collaborations are well established and functioning, for example, those run through the National Cancer Institute and the Human Genome and Microbiome Initiatives, while other collaborations are in progress. Over the past 5 years, the National Institute of Nursing Research (NINR) has been spearheading efforts to advance nursing science by guiding researchers in the collection of data in ways that will allow sharing with other investigators, including across universities and practice settings. A core strategy of the NINR initiative has been their work towards defining sets of common data elements (CDEs).

Common Data Element

A CDE is a combination of a defined variable paired with a specified set of similarly coded responses to questions that are common to multiple data sets or used across different studies. CDEs are used in research where measurement, reproducibility, and comparison across studies is important. They can be structured as a single data element, or may be included in a collection of data such as a survey scale. Use of CDEs can facilitate data sharing and standardization to improve data quality and enable data integration from multiple studies (Sheehan et al., 2016). To develop CDE standards specifically within the symptom and self-management research community, in 2013 the NINR convened the NINR CDE Working Group. This group remains active and includes representatives from NINR extramural program staff and NINR-supported P20 and P30 center directors. The defined goals of the NINR CDE Working Group are to increase the efficiency and effectiveness of research studies, increase data quality, and facilitate data sharing.

The NINR CDE Working Group began by identifying data elements that were common across P20 and P30 research centers focused on symptom and self-management science. Through a consensus process, the CDE Working Group reviewed, agreed on, and developed a set of CDEs to be commonly collected in all symptom studies—sleep, fatigue, pain, and cognition or affect—regardless of diagnosis (Redeker et al., 2015), and to evaluate self-management of these symptoms (Moore et al., 2016)

Recommendations regarding the selection of CDEs for use in nursing research protocols involving biological samples are in progress, as is the development of a common data repository for nursing research, the latter also under the guidance of the NINR. Ultimately, by incorporating CDEs into research protocols, and depositing data generated in an accessible, common data repository, nursing researchers and others will have the opportunity to address more complex questions and advance the field in a way not possible when individuals work alone or in silos (Cohen, Thompson, Yates, Zimmerman, & Pullen, 2015; Corwin et al., 2014).

Purpose

The purpose of this article is to describe the efforts of a group of nursing scientists from five schools of nursing across the country (Case Western Reserve University [CWRU], Duke University, Emory University, University of Maryland, and University of Washington) working collaboratively to advance nursing science and bring

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momentum towards advancing methods for data sharing. Over the past 2 years, our group engaged in efforts to test the feasibility of data sharing with the goal of developing a common data repository directed towards hypothesis testing in an area of mutual interest.

We first present as an exemplar a pilot study in which retrospective data from previously completed studies at each school were collated. We contrast this with a second exemplar of CDE use in a center grant located in one of our five schools of nursing. The successes and challenges we encountered are described, as are recommendations for future initiatives.

Methods and Results

Exemplar 1: A Retrospective Approach to Building a Common Data Repository

The first exemplar began by identifying a completed study at each institution that included at least one of the symptoms supported by the NINR in its program announcements: sleep, fatigue, affect/cognition, or pain. The studies selected for inclusion in Exemplar 1 were not randomly selected, but rather, a consensus was reached to focus on understanding the characteristics and distributions of depression, the most common symptom included in most studies (i.e., $n = 6$) at the five institutions. Each site was asked to submit the matching data dictionary and one or more published papers from that study, and provide an example of the raw data. This first stage was conducted with the intent to compare the depression instruments used and the demographic measures collected. Once we determined these elements to be comparable, we planned to move forward to gather the details of the studies (e.g., design and procedures).

This approach allowed us to simulate the steps one would follow if placing data into a shared data repository so that a hypothesis, or hypotheses, could be tested. We began by examining the data dictionary for each study. The data dictionaries contained each variable (or concept) in the study, and the acceptable values that were allowed for each of the variables. For example, the “sex” concept may have had male or female as acceptable values, coding as M or F, respectively. In another study, the “sex” concept may have had values of male or female, but coding as an integer (e.g., *male* = 1; *female* = 2). After reviewing the demographic variables from the data dictionaries of each study, key variables were chosen to be included in a merged data set. These included age, gender (defined as identity), sex (biologically defined), education level, race, ethnicity, marital status, employment status, income, and health insurance status.

The next critical and complex step in our work involved determining if the values for each demographic variable were amenable to harmonization. Data harmonization is the process of combining variables from disparate sources, using an equivalent coding scheme such that they can be combined and compared. We analyzed the degree to which our data elements aligned with each other, as well as how well they aligned with the CDEs suggested by the NINR or other standardized vocabularies. The National Institutes of Health (NIH) common data element resource portal was used as the authority for determining candidate concept alignments (https://www.nlm.nih.gov/cde/). Where available, NINR concepts and values were considered the gold standard for comparison. If the NINR did not have a set of values for a particular concept (e.g., gender), then the CDEs from another standard source recognized by the NIH as having a major focus on demographics were used.

When comparing studies, we found that each differed on one or more of the following aspects necessary for complete harmonization: (a) the variables chosen to operationalize the study concepts, (b) their definitions, (c) the values assigned to them, or (d) the way the values were coded. For our purpose, a decision was made to ignore how variables were coded, since these could be recoded easily using any statistical software—that is, male or 1 could always be recoded to M if necessary; female or 2 could be recoded to F, as in the example given above. However, it was noted that such inconsistencies would inevitably slow down the harmonization process and carry the possibility of introducing errors. For the CDEs under investigation, a subset of these comparisons is shown in **Table 1** and discussed below.

Variables available. Given that each of the identified studies was designed, initiated, and in some cases completed prior to this data harmonization effort, not all studies included data on all preselected demographic variables; for example: (a) In two studies, sex was not included as a variable because all subjects were female; and (b) In one study, marital status was not collected, as the investigators were interested only in the status of partnered versus nonpartnered participants, since those who had a same-sex partner at that time could not have been married. While sex could have been imputed in the first example, a valid marital status value could not have been imputed for the second, since whether the subjects were married or in a nonmarital relationship was not known. If this was an essential variable (i.e., intended to be used for comparison or stratification when combining data), this study would have been disqualified.

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Table 1. Comparison of selected study concepts and values with their respective Gold Standard (standardized) concepts

Gold standard	Study 1	Study 2	Study 3	Study 4	Study 5	Study 6
Race American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown Not reported	African American Caucasian Latino Asian American	White Black Hispanic Asian/Pacific Islander American Indian/Alaskan Native Arabic Other (free text)	White, not Hispanic African American, not Hispanic Hispanic, White Hispanic, African American American Indian or Alaskan Native Asian Pacific Islander Other (free text)	African American American Indian/ Alaska Native Hispanic White, non-Hispanic Native Hawaiian /other Pacific Islander Other [free text] Did not answer	White African American Native Hawaiian/ other Pacific Islander American Indian/ Alaska Native Hispanic or Latino Other Prefer not to answer *[check 1 or more]*	Caucasian American Indian/Alaska Asian/Pacific Islander Black/African Hispanic/Latino
Ethnicity Hispanic or Latino Not Hispanic or Latino	[included with race]	[included with race]	[included with race, but could be separated]	[included with race]	[included with race]	
Employment status Working now Only temporarily laid off, sick leave, or maternity leave Looking for work, unemployed Retired Disabled (permanent or temporary) Keeping house Student Other, specify Unknown	[Are you currently working?] Yes No [If no:] On medical leave Unemployed Retired Other	[Do you work outside the home now?] Yes No	[What is your employment status? (Select all that apply)] Employed full time for pay Employed part time for pay Full-time student Unemployed (not officially or certified 100% disabled by the Veterans Administration) Retired officially Certified disabled		Retired Occupation categories	Full time Part time Not employed Retired Other Disabled [Above can be harmonized, but several categories are missing]
Depression measure used	CES-D (10) (yes/no response; instead of scaled)	Edinburgh Postnatal Depression Scale	PROMIS Depression 8a instrument	CES-D (20), BDI-II	BDI-II	CES-D (20)

Note. Bold values cannot be harmonized with the Gold Standard or other studies' concepts effectively. BDI-II = Beck Depression Inventory-II; CES-D = Center for Epidemiologic Studies Depression Scale; PROMIS = Patient-Reported Outcomes Measurement Information System.

Concept definition. The largest discrepancies in concept definitions were between race or ethnicity and sex or gender.

Race or ethnicity. According to most U.S. data standards, the concept "race" refers to the standard five categories for self-identification defined in 1997 by the Office of Management and Budget (OMB): White, Black or African American, Alaska Native, Asian, Native Hawaiian, or Other Pacific Islander. This standard further provides values for the ethnicity concept, defined as Hispanic or Latino or not Hispanic or Latino. With separate concepts for race and ethnicity, it is possible to define a subject as White Hispanic, Black Hispanic, White non-Hispanic, etc. In several of our studies, however, options for race included "Hispanic" as a possible value, thereby precluding defining a subject by both concepts (e.g., White Hispanic). In this case, because a participant would have had to choose either "White" or "Hispanic," the ability to use these data in a merged data set would be impossible if race was an important study variable. Furthermore, in one study subjects were allowed to mark more than one race, while in the others, selection of more than one value was not possible—thereby eliminating the ability to combine the data in a meaningful fashion. In addition, one study named the concept "ethnicity" but included values for the "race" concept. While this issue would not totally invalidate a data set, it could complicate down the process of compiling the data, and increase the chance for error. In five of the six studies, the values for race and ethnicity were different enough from the OMB or the NINR standard to preclude them from being harmonized into one data set as either race or ethnicity.

Sex and gender. According to the standard set by the World Health Organization, and adopted by many U.S. data repositories, the concept of sex refers to biological and physiological characteristics of a person. Gender refers to the sociological identification of a person. At the time of this pilot study, the NINR had not included sex as a concept in the CDEs. They have since added clarification to their definition for gender to use it for both "biological sex distinctions and/or cultural gender role distinctions" (U.S. National Library of Medicine, 2015). In the current study, these two terms were used interchangeably across the various studies, making the data difficult or impossible to harmonize, if one wanted to delineate sex from gender. None of the studies, including the NINR CDE's, included a "transgender" option.

Age. At the time of this pilot study, the NINR had chosen date of birth (DOB; specified as month, day, year) as the CDE for age; however, the Health Insurance Portability and Accountability Act (HIPAA) precludes the sharing of DOB or dates of medical visits. Four of the six studies used the HIPAA-preferred age variable (e.g., 21, 60) while the other two had the month, date, and year of birth. However, in these two studies the date of entry into the study was not a variable; thus, an absolute age of a subject at enrollment was not known. The NINR has since changed the coding of this variable to age in years (U.S. National Library of Medicine, 2015).

Education and income. The concepts of education and income had highly variable ways in which the data were gathered. For example, in one study, the education question was phrased "What was your highest level of education?" with options including "completed high school," "some high school," "completed college," and "some college." This question may not have yielded the same result as questions used by other studies, including "What's the highest grade completed?" or "How many years did you attend school?" The latter question was problematic as it would not differentiate if the subject skipped a grade and completed high school in 3 years, or had been held back and took additional years to complete elementary or high school. With these and other inconsistencies, we were unable to harmonize the data for these concepts.

The "income" concept was also variable in its wording. Were the subjects asked to provide annual income, monthly income, household income, or after-tax income? In none of the data dictionaries was the operationalization of the variable identified. While it may have been possible in studies of low-income subjects for the research team to assume that a stated income of $30,000 was an annual income, in studies that included a wide socioeconomic distribution of participants, making such an assumption could have been incorrect, reducing the rigor and reproducibility of the data set. Also, use of different breakpoints for income groupings precluded harmonization.

Remaining concepts. Similar to the issues described above, none of the values used for the concepts marital status, health insurance, or employment status allowed the data to be fully harmonized across studies due to ambiguities in definitions of their values. This was especially clear for marital status, where choices across studies varied from married or single, to married, divorced, partnered, widowed, etc. For example, trying to harmonize the data into a possible common denominator "married" versus "single" would have forced us as investigators to choose how to categorize the individual who had identified himself as a widower; was he married or was he single? This would have negatively impacted data integrity and scientific rigor.

Depression measures. When depression measures were compared, other harmonization issues arose. The measures used were the Center for Epidemiologic Studies Depression Scale (CES-D)-10 (Radloff, 1977), the CES-D-20 (Roberts, 1980), Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987), Patient-Reported Outcomes Measurement Information System (PROMIS) Depression 8a instrument (Reeve et al., 2007), and Beck Depression Inventory-II (BDI-II; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). While the CES-D-20 and the BDI-II have been validated against the PROMIS Depression instrument, the EPDS and the CES-D-10 have not. Therefore, either those studies that used a depression tool that had not been validated against the PROMIS instrument would have been eliminated, or the studies would have needed to be compared utilizing cut-off scores for depression. This would have been doable, although it would have forced a less granular analysis of the subjects' data, since the data point would be binary (Depressed? Yes or No) instead of indicating degree of depression. In addition, although some studies had baseline and post-treatment scores, others had only post-treatment scores, since they had been referred for the study because they were diagnosed with depression, but actual scores prior to treatment were not known. Having a field for delineating pretreatment and post-treatment scores would be necessary to make meaningful use of these data in comparisons across studies of intervention effects.

Conclusions and recommendations from Exemplar 1. In conclusion, this exemplar highlights the challenges in establishing a common data repository by merging data sets from studies already initiated or completed. Our experience made clear that harmonization plans and data repository characteristics need to be planned during study design phases well in advance of study initiation. Such an effort is presented in Exemplar 2.

Exemplar 2: A Prospective Approach to Building a Common Data Repository

The second exemplar describes the experience of developing CDEs for use across all pilot studies in a P30 center of excellence at the school of nursing at CWRU. The Self-Management Advancement through Research and Translation (SMART) Center is focused on examining the brain-behavior connections underpinning effective self-management behavior. Development of CDEs for the Center studies began in 2014 in preparation for the submission of the Center grant application. In response to the call for proposals and the requirement within the call for the incorporation of designated CDEs, a team of investigators at the school began to identify CDEs to be used across all the proposed pilot studies for the Center. In the grant application, all participants agreed to ensure common measurement and analysis strategies across not only the proposed pilot studies but to collaborate with other NINR-funded self-management centers in data sharing using those CDEs. The long-term goal was to be able to pool data across all of proposed Center studies to increase the knowledge gained about the effectiveness, mechanisms, and important contextual factors of a variety of self-management interventions targeted to different chronic illness populations.

Variables chosen. The first step in selecting CDEs involved developing a common model to be used for all of the Center pilot intervention studies. The focus of this research center was on uncovering the brain-behavior connections specific to the self-management of health and illness. Thus, the model incorporated biological, psychological, and social mechanisms, and contextual variables, as well as a set of proximal and distal outcomes of self-management interventions. The variables in this model became the framework for the design of the pilot studies and selection of CDEs. The Center leaders and the principal investigators of the first two pilot studies met to make decisions about the measures of the CDEs to be used. The group reviewed each proposed CDE, its conceptual definitions of constructs, and strengths and weaknesses of tools to measure each construct. Also taken into consideration were burden on subjects and study staff, level of data or dimensions captured, use across different populations, availability in different languages, and cost. As a beginning step to creating a manualized protocol for CDE use across the Center studies, a table listing each selected CDE variable, its measure, and details of its acquisition and use was developed. When the first pilot studies were started, the investigators were asked to develop a common code book (data dictionary) containing the CDEs. Although all Center pilot study investigators were expected to use the CDEs, they were also assured that they could use other measures of the same concept if they desired.

Concept definition. Seventeen CDEs were initially identified that were categorized using the Center model as: (a) outcomes (proximal behavioral outcomes of diet, activity, and medication adherence, and distal outcomes of quality of life and cost); (b) mediators (brain activation of specific target areas, hypothalamic-pituitary-adrenal

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[HPA] axis function, biological and perceived stress, self-efficacy, decision-making, self-regulation, and patient activation); and (c) moderators or confounders (social support, depression, anxiety, cognitive functioning, and demographic variables).

A year following the beginning of data collection for the initial two pilot studies, the first attempt at harmonization of data across the studies was made. The investigators found that even though one study had copied the questionnaires and codebooks from the other study, differences existed in the data sets that prohibited easy combination of the data sets. A frequent problem was the difference in the variable labels despite the use of what was thought to be a common data dictionary. Examples of these small, but important, differences in the data coding labels were a missing letter or underscore and the use of capitalization. Neither study data set included a variable for the data collection point (a restriction built into the vertical structure of the database system we used, which does not permit the use of unique labels in the database for the same variable, even when collected at different times). Some investigators had tried to manage this by using a question number as part of a variable label, but given that each study had a different number of questions, the use of question numbers in the variable name was problematic when data combining was attempted. Although it is obvious that the codes for missing data and "not applicable" responses should be identical across studies, they found that investigators handled these codes differently, and there was a need to standardize these codes as well.

The next set of revisions to the CDEs was done 2 years after the first two pilot studies began, when they were planning for the start of four new pilot studies. During training of the new study investigators on the Center CDEs, it was found that large differences existed in the way the demographic variables had been defined, coded, and labeled across the first two studies. Although they had specified the demographic variables to be obtained in each study, they did not identify the exact way to define and measure the demographic variables. Similar to the description given in Exemplar 1, study investigators used different definitions, measures, and coding for age, gender, race, ethnicity, education, marital status, and employment. Following considerable and difficult discussions, review of the literature, and review of other national CDE sets, they developed a common approach to the demographic variables.

Also, at this time, new CDEs were added to the Center CDE list. For example, two variables were added because new neurocognitive literature suggested that subject handedness (left, right, ambidextrous) and decentering (a cognitive referential process) are important to include. We also added intervention dose (definition, measure, and coding labels). CDEs for other measures of intervention fidelity were considered but ultimately left as recommendations, rather than as required CDEs.

Challenges and recommendations from Exemplar 2. One challenge in the attempt at data harmonization across one university's Center studies was the existence of multiple versions of instruments. For example, an instrument can have different versions that may create confusion among investigators. Investigators found this with the measure of self-regulation, which used the Index of Self-Regulation (ISR). The ISR originally had 16 items (Fleury, 1988), but the revised version of the ISR has 9 items (Yeom, Choi, Belyea, & Fleury, 2011). There also can be different versions of a measure that address either a general population or a specific population, which challenges instrument consistency across studies. For example, the initial studies used the original 13-item Patient Activation Measure (PAM; Hibbard, Stockard, Mahoney, & Tusler, 2004) but in the second round of studies that focused on caregiver self-management, the 10-item Caregiver PAM (Sadak, Korpak, & Boorson, 2015) was more desirable.

In addition, common problems, such as mistyping questions ("I can't ..." instead of "I can ...") or reversing response options, which are easily handled in a single study, require close vigilance and coordination to ensure harmonization of data and to prevent perpetuating mistakes across studies, such as miscopying into other files or into a template. The investigators recommend that at least two people reconcile questions and codebooks by reading aloud each question (and comparing it to the published instrument), response option, variable label, and variable description in order to catch even trivial mistakes that could be problematic at the data set combination stage.

The investigators also learned that more experienced investigators had strong preferences about operationalizing variables using favored instruments and measurement strategies. Interestingly, this was particularly true for the demographic CDEs. However, once investigators understood the usefulness of data harmonization, they were generally agreeable and willing to work toward group consensus.

The group recommends the creation of a master data dictionary that includes variable names and coding of the CDEs and that it be provided to investigators with clear instructions that any changes must be discussed with the cross-study data management team. They also recommend the development of a common manual of procedures for data collection and management. However, although in the ideal world codebooks and

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data dictionaries are created a priori, the real world of research is more dynamic, requiring close attention and coordination over time. Developing and using CDEs is an iterative and evolutionary process.

The CWRU SMART Center of Excellence is using CDEs in seven pilot studies. They have learned to view the use of CDEs as a developmental area in the conduct of research. Several new needs in research infrastructure have emerged, including the need for more knowledge about building data repositories and learning about how to define the metadata that go with putting data into a data repository (i.e., type of study, study design, study context). There is also a need for a centralized data manager and statisticians with skills in analysis of pooled data. Last, they are currently addressing the need for policies about the rights of an individual investigator's ownership of their data deposited into a repository. There is a need for a system that acknowledges that sharing data across self-management studies is rewarding. These investigators are now poised to begin analyses of the pooled data, with the goal to advance knowledge related to self-management faster and explore more directly differences among interventions, populations, and cultures.

Discussion

Although our group encountered challenges in our attempts at using CDEs across studies and institutions, we are of the unanimous consensus that the important advantages to including CDEs in nursing research make their use compelling. These include the practical advantage of reduced start-up time and cost if data collection tools are already available and coded, rather than needing to be developed. Less practical but perhaps more importantly, the use of CDEs will promote standardized, consistent data collection that will improve data quality and facilitate data sharing. This will lead to improved opportunities for meta-analysis and comparison of results from different studies, thereby increasing sample size, data rigor, and reproducibility, and, ultimately, the clinical impact our science will have on patient and population health.

It is essential, however, that the barriers that exist to the adoption of CDEs be addressed, including the lack of knowledge and familiarity with CDEs among many researchers, an increase in perceived burden to subjects, and concerns related to data storage and managing large data sets. The NINR and the P20 and P30 center directors are seeking to improve knowledge regarding CDE use by building greater awareness through outreach at the Council for Advancement of Nursing Science national research meeting and at the four regional nursing research society meetings. It is hoped that these outreach initiatives will promote the culture change necessary for CDE adoption and use. Moreover, researchers may have data collection protocols that do not incorporate the specific measures that have been developed into CDEs. In such situations, it may be necessary to collect data using more than one measure to ensure compatibility with legacy data, as well as to allow data from multiple laboratories to be easily aggregated as the field moves forward. Incorporating CDEs does not preclude the use of hypothesis-driven measures or the inclusion of other CDEs that would be necessary for a project. The barrier of perceived burden to subjects might be addressed by developing or choosing CDEs such as the PROMIS measures or others that are brief and easy to administer. Hesitation by researchers to manage large data sets is understandable; however, we believe this will be a necessary skill for the future as more complex questions are posed, some of which cannot be answered using small data sets. In addition, addressing such questions will require necessary storage and technology support.

Lessons Learned

Given our experiences with the use of CDEs and the development of a common data repository both retrospectively and with preplanning, we identify the following for consideration and discussion:

1. Plan data collection procedures and levels of measurement that facilitate simple harmonization. As the two cases above illustrate, a priori determination of data concepts including their definition, acceptable values, and coding schema are essential; without this, the barriers to the retrospective merging of data sets across studies described in Exemplar 1 were insurmountable. In addition, these illustrative cases show that collection of data values at the most precise level of measurement possible allows for flexibility in harmonization procedures such as categorizing of values into strata. The inclusion of a research team member with expertise in data science or complex data set management will assist in this goal.
2. Set standards for data quality. Preplanning effort needs to go into the development of guidelines and data set inclusion criteria to ensure that only data sets that meet these criteria will be included in a particular harmonization effort. This involves developing valid descriptions of the purpose for which the original data sets were collected. Such efforts will assist users of the data repository as they develop their rationale for the fit of the data to their research question.

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3. Commit to using available, published, and supported CDEs (e.g., NINR, National Institute of Neurological Disorders and Stroke) in order to contribute to national initiatives towards data harmonization. Professional research society-supported CDEs often are augmented by procedures for data collection and harmonization. The NIH has established a CDE resource portal (http://cde.nih.gov/) to assist investigators in identifying NIH-supported CDEs when developing grant proposals, protocols, case report forms, and other instruments for data collection. The portal also provides guidance about and access to NIH-supported CDE initiatives and other tools and resources in NIH-funded research. Investigators are encouraged to consult the portal and describe in their grant applications any use they will make of NIH-supported CDEs in their projects.
4. Continue to connect with professional nursing research societies and regional research meetings to further support data harmonization work already underway by the NINR CDE Working Group. These organizations may be able to provide infrastructure through devoted time/space and networking opportunities. Sharing resources, such as frameworks, analytic model expertise, and data collection expertise, will advance efforts in this field. Nursing societies and related meetings could organize panels or lectures on CDEs, and harmonizing data with built-in opportunity to network with colleagues about opportunities for shared data, identification of expertise, and areas where combining data would allow research questions to be considered in innovative ways
5. Collaborate and form partnerships with academic/industry/government to facilitate use of CDEs for data harmonization. Access to available data repositories that support and encourage data sharing will accelerate high-impact collaborative science occurring across multiple sites, including international partners. Early engagement and frequent communication will help to ensure that duplication of effort and infrastructure is minimized. These partnerships may also assist in alleviating or anticipating possible legal requirements for data sharing that may delay or deter data harmonization activities.
6. If a common data repository is established, ensure careful curation whenever new data are added. It is unrealistic to assume that new data sent to the repository will be uploaded automatically. Careful monitoring by the repository data managers will be essential, and clarifying discussions will be required between the curators and study investigators.

Conclusions

Combining data sets across studies focused on a common theme, problem, and construct or measurement tool can bring greater understanding and more powerful external validity as it permits aggregation of information across samples and populations. Such data aggregation and harmonization can lead to data comparisons to detect subtler and more complex associations among variables, allow greater statistical power and more robust point estimates than those derived from an individual study, promote greater collaboration across researchers in a field, and exert greater impact to change clinical practice and improve patient outcomes. The studies selected in Exemplar 1 were from a preselected pool; future efforts would benefit from a larger collection of studies. Larger data sets will also increase the scientific rigor of the composite studies and, by having the data housed in an accessible common data repository, will increase data transparency. The present report sought to demonstrate the challenges inherent in data harmonization approaches initiated post-hoc, or after variable operationalization choices have been made and data collection has begun. In contrast, when data harmonization is preplanned, opportunities for collaboration and significant advancement to the field is increased. The NINR CDE Working Group will continue to work with NINR-funded centers and others to collect feedback from the community to identify new CDEs. In the coming years, it is anticipated that an NINR-supported data repository will further support the discovery of new knowledge and enhance impactful, patient-focused nursing science research.

Clinical Resources

- National Institutes of Health common data elements resource portal: http://cde.nih.gov/
- National Institutes of Health data sharing repositories: https://www.nlm.nih.gov/NIHbmic/nih_data_sharing_repositories.html
- National Institutes of Health. NIH makes data sharing repositories publically viewable on Health Data.gov: https://datascience.nih.gov/Blog_HealthData.gov

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CLINICAL SCHOLARSHIP

Comprehensive Care Model for Sex Trafficking Survivors

Naomi M. Twigg, PhD, PHCNS-BC, RN

Alpha Lambda, Clinical Assistant Professor, University of Illinois at Chicago, College of Nursing, Chicago, IL, USA

Key words
Aftercare services, domestic minor sex trafficking, juvenile prostitution, sexual abuse

Correspondence
Naomi M. Twigg, 845 S. Damen Ave. (M/C 802), Chicago, IL 60612. E-mail: ntwigg2@uic.edu

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Abstract

Purpose: The purpose of this study was to identify aftercare services for domestic minor of sex trafficking (DMST) survivors provided by U.S. residential treatment centers.

Design: A qualitative research study was conducted with aftercare program personnel from five U.S. residential treatment centers for DMST survivors.

Methods: Interviews were conducted with staff from five different residential treatment centers providing services exclusively to domestic minor sex trafficking survivors.

Findings: Participants described the range of services offered to address survivors' posttrafficking needs. Participants' responses assisted in expanding an existing care model to include education re-entry, family reunification, family reconciliation, and emergency substance use services.

Conclusions: This study led to the refinement of an aftercare service delivery model and laid the foundation to develop best practice guidelines for providing aftercare services to DMST survivors.

Clinical Relevance: Sex trafficking is a global health problem affecting our youth today. Nurses have a vital role in combatting sex trafficking by raising awareness about the problem and restoring the lives of sex trafficking victims by implementing innovative care programs.

Sex trafficking is defined as "A commercial sex act induced by force, fraud, or coercion, or in which the person induced to perform such an act has not attained 18 years of age" (Trafficking Victims Protection Act, 2000, p. 8). Epidemiologically, sex trafficking is extremely difficult to track, and prevalence remains unknown, with conservative estimates between 50,000 and 100,000 trafficked victims a year in the United States. Globally, 1.2 million children are estimated to be trafficked annually, and the industry of human trafficking generates approximately US$32 billion annually (Davidson, 2013). The United States is known as a source, transit, and destination country for men, women, and children who are U.S. citizens and foreign nationals (U.S. Department of State, 2016). Trafficking victims are recruited from around the world to the United States. In 2015, the top three countries of origin for trafficking victims in the United States were from the United States, Mexico, and the Philippines. The most vulnerable populations at risk for trafficking are children in the welfare system and juvenile justice systems, runaway and homeless youth, persons with disabilities, and lesbian, gay, bisexual, transgender, and intersex (LBGTI) individuals (U.S. Department of State, 2016). Estimates from Clawson, Layne, and Small (2006) indicate that approximately 400,000 females are at risk for sex trafficking in the United States, with traffickers preying on youth as young as 12 years old (National Human Trafficking Resource Center, 2016). In 2014, the National Center for Missing and Exploited Children (2016) reported that one in six runaways were likely sex trafficked, an increase from one in seven runaways in 2013. Traffickers target these vulnerable populations and use tactics such as force, coercion, befriending, and seduction, the latter being the most commonly used tactic to recruit victims (Lloyd, 2011).

Domestic minor of sex trafficking (DMST) survivors endure an array of health consequences after having exited a trafficking situation. The psychological and behavioral

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effects include low self-esteem, loss of self-confidence, anxiety, panic attacks, depression, hopelessness, post-traumatic stress disorder (PTSD), substance abuse disorder, suicidal ideations, attachment disorders, mistrust of adults, antisocial behaviors, difficulty relating to others, developmental delays, language and cognitive difficulties, deficits in verbal and memory skills, and poor academic performance (End Child Prostitution, Child Pornography and the Trafficking of Children for Sexual Purposes, 2006; Rafferty, 2008; Shigekane, 2007; Twill, Green, & Traylor, 2010; Williamson, 2006; Williamson, Dutch, & Clawson, 2008; Zimmerman et al., 2008). The physical effects include complications from high-risk pregnancies and unsafe abortions; headaches; fatigue; dizziness; pain (e.g., back, stomach, pelvic); sexually transmitted diseases, including HIV/AIDS; and gynecological infections (Rafferty, 2008; Williamson, 2006; Zimmerman et al., 2008). Given the magnitude of health effects on trafficking victims, a holistic approach to address the physical, psychological, and emotional needs of DMST survivors is necessary (Mayhew & Mossman, 2007). Healthcare professionals working in an emergency room, primary care clinic, or school have a pivotal role in identifying and assisting DMST victims in exiting a trafficking situation and connecting them to aftercare services (Goldblatt-Grace, Starck, Potenza, Kenney, & Sheetz, 2012). The purpose of this study was to identify aftercare services for DMST survivors provided by U.S. residential treatment centers. The American Association of Children's Residential Centers (1999, p. 1) defines residential treatment centers as "An organization whose primary purpose is the provision of individually planned programs of mental health treatment, other than acute inpatient care, in conjunction with residential care for seriously emotionally disturbed children and youth, ages 17 and younger."

Previous research has shown that an array of aftercare services is recommended for sex trafficking victims. Willis and Levy (2002) emphasized the need for sustainable medical and psychological support, education, and vocational training after exiting a trafficking situation. Spear (2004) identified an expansive range of resources needed for providing services to trafficking survivors including medical care, education, substance detoxification, counseling, job skills, and residence. Williamson (2006) emphasized the need for case management, safe and long-term housing, education, vocational training, medication management, and trauma treatment, all under the care of qualified, educated, and empathetic staff. Busch-Armendariz, Nsonwu, and Heffron (2011) identified five long-term needs of trafficked women, including safety, medical health, emotional and psychological health, financial stability, and social and familial equilibrium. Legal advocacy to expunge misappropriated convictions (e.g., juvenile prostitution) from sex trafficking victims' records and to advise and represent victims in prosecuting their traffickers is a necessary aftercare service. Antitrafficking laws are shifting from a place of victim blaming where victims are penalized for criminal acts their traffickers forced them to engage in to a place where victims receive aftercare services to facilitate recovery, prevent retraumatization, and eliminate barriers for obtaining an education, housing, and future employment (U.S. Department of State, 2016). Thirty-four states have passed "safe harbor" laws that provide trafficking victims with immunity from prostitution offenses and increase participation in victim assistance programs (U.S. Department of State, 2016). Foreign trafficking victims are eligible for victim assistance services and benefits similar to refugees residing in the United States (U.S. Department of State, 2016). In the Trafficking in Persons report, an annual publication produced by the Office to Monitor and Combat Trafficking in Persons, provided a list of recommendations to reinstate psychological well-being of trafficking survivors, included ensuring survivors' safety, soliciting the support of health providers' knowledge in trauma-centered care, providing collaborative therapies, creating an environment that fosters empowerment, assessing for medical conditions and mental illness, providing unconditional support, supporting social and family reunification, rebuilding identity, and re-establishing skill sets and self-esteem (U.S. Department of State, 2012). Forms of psychosocial care are advised to begin as soon as possible after an initial assessment and development of an individualized treatment plan for trafficking victims (Clayton, Krugman, & Simon, 2013).

Trauma-focused cognitive behavioral therapy (TF-CBT), dialectical trauma-focused cognitive behavioral therapy (DTF-CBT), and eye movement desensitization and reprocessing are all trauma-based therapeutic approaches supported by evidence in treating individuals with PTSD or a history of child sexual abuse (Kotrla, 2010; Mannarino, Cohen, Deblinger, Runyon, & Steer, 2012). Substance abuse treatment programs may also be a necessary service for trafficking victims. Victims may either be forced or coerced into using substances while trafficked or they may engage in substance use as a negative coping mechanism posttrafficking, although it is important to note that not all victims are exposed to or develop a substance abuse disorder as a result of being trafficked (Lederer & Wetzel, 2014). Varma, Gillespie, McCracken, and Greenbaum (2015) found that 70% of commercial sexual exploitation of children (CSEC) youth used drugs or alcohol, and 50% of CSEC youth were found to use multiple drugs. Additionally, education has been found to be a significant factor in whether a trafficking victim builds safe, stable relationships to

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avoid vulnerability to re-exploitation after services are provided (Van der Keur & Touch, 2013).

In 2011, Macy and Johns published a framework for a continuum of aftercare services to address international sex trafficking survivors. Macy and Johns identified seven core services to address the needs of sex trafficking survivors based on findings from their comprehensive literature review. These core services included basic necessities (e.g., food, water); secure, safe shelter and housing; physical health care; mental health care; legal and immigration advocacy; substance abuse services; and job and life skills training (Macy & Johns, 2011). They categorized these core services into three domains, including immediate, ongoing, and long-term needs (Macy & Johns, 2011). Macy and Johns' framework was used in this qualitative descriptive research study to explore the aftercare services delivered at five residential treatment centers in the United States for DMST survivors. The University of Illinois at Chicago Institutional Review Board approved this research.

Methods

A comprehensive, Web-based search was conducted in 2011 identifying 14 U.S. residential treatment centers that met the inclusion criteria for this study, which were: (a) provided services exclusively to DMST survivors; (b) actively housed DMST survivors; and (c) provided services to males, females, and transgender DMST survivors 11 years of age or older. An additional 10 U.S. residential treatment centers were brought to the researcher's attention by a participant, a "gatekeeper" who contributed to the recruitment of additional participants for this study (Illingworth, 2001). Altogether, 10 out of 24 U.S. residential treatment centers met the inclusion criteria. Five service providers from these 10 U.S. residential treatment centers agreed to participate. Those who declined to participate were either too busy or did not respond to recruitment materials. The following inclusion criteria applied to participants: (a) held the job title of founder, program director and/or program manager of a U.S. residential treatment center; (b) was 21 years of age or older; and (c) spoke English.

In-depth telephone interviews were conducted with each participant following a 39-question semistructured interview guide. Participants were asked about the demographics of the DMST survivors served at their U.S. residential treatment center, the origin of referrals, general information about the U.S. residential treatment center (e.g., mission, vision, philosophy, organizational structure, etc.), information about employees and staff development (e.g., orientation, turnover, counseling services, satisfaction, etc.), the immediate, ongoing, and long-term needs of DMST survivors, and level of engagement with DMST survivors after leaving their U.S. residential treatment center. Verbal consent was obtained prior to the start of the interviews. All interviews were digitally recorded and lasted 60 to 120 min. After the completion of the interview, an online donation of $50 was made to the organization for their participation.

Digitally recorded interviews were then transcribed and accuracy of transcription was assured by listening and comparing the transcripts to the audio recordings. Creswell's (2009) six steps to qualitative data analysis were used to (a) organize and prepare data for analysis; (b) read through all the data; (c) code the data; (d) generate themes/categories for analysis; (e) provide representation of description/themes in the qualitative narrative; and (f) interpret the data. Glaser and Strauss's (1967) approach was selected as the preferred method to code data and began before the completion of data collection (Ulin, Robinson, & Tolley, 2005). Development of the original code list began after the first interview, resulting in 28 codes. Thereafter, the code list underwent six revisions with input from two independent team members, resulting in a final list of 27 codes. The coded transcripts were then uploaded to Atlas.ti (Atlas.ti Scientific Software Development GmBH, Berlin, Germany) to facilitate organization of the data. Across-case analysis was also conducted to identify the frequency of core services across U.S. residential treatment centers (Ayres, Kavanaugh, & Knafl, 2003).

Results

Immediate Needs

In comparison to Macy and Johns' (2011) framework, all participants reported immediate needs of crisis safety services, crisis shelter services, and emergency medical care; three participants reported basic necessities as an immediate need. Crisis safety services was viewed as imperative to the rescue and recovery of DMST survivors as exemplified in the following statement: "I think when they walk in the door their immediate need is to understand that they are protected and safe. So establishing a sense of safety and protection is important for these girls." In regards to crisis shelter services for incoming DMST survivors, participants believed that the provision of crisis shelter services was critical. One respondent stated,

> Well, ensure that they aren't an immediate victim of sexual assault and then offer them a shower. Or laundry services, food, and honestly a bed most of the time because even if they're just dropping in most of them have not slept, so just getting someplace where they can sleep in quiet for a little bit is a blessing.

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Participants also viewed emergency medical care as an immediate need of a DMST survivor and critical to their recovery. One respondent reported, “Health care is the first thing that is addressed.” The provision of basic necessities was also viewed as an immediate need. One respondent stated, “We try to make sure that all immediate needs, you know, food, clothing if they need it, shower, if they want it, and then rest is the first options for them.”

In addition to the previously mentioned immediate needs, all participants reported initial case management in the form of a biopsychosocial assessment and development of a person-centered care plan based on the survivors’ needs. One respondent stated, “Well, within 72 hours there’s a needs and service plan that’s done.”

Based on the five interviews, three additional categories were considered immediate needs for DMST survivors, including emergency substance abuse services ($n = 5$), emergency mental health care ($n = 4$), and family reunification ($n = 3$). Participants viewed emergency substance abuse services as an immediate need for DMST survivors as exemplified in the following statement:

> If a child comes in and says that I’ve used cocaine, I’ve used marijuana or what have you, we have a drug and alcohol assessment done, then from that assessment we determine how deep the problem is. If the child needs to be in inpatient therapy for substance abuse then that’s something that they need to go through first before they come back to our program.

Emergency mental health care was also viewed as an immediate need for DMST survivors. One respondent stated,

> We set up appointments with the psychologist, you know, then the psychologist determines. . . . You know, and we set-up an appointment with the doctor. The psychologist makes recommendations whether or not they think the child needs to be on medication. If the child needs to be on medication then we set up an appointment with the psychiatrist and, you know, so you’re talking about a week or two trying to get all that coordinated.

Family reunification upon a DMST survivor’s entry into the residential treatment center was viewed as an immediate need. One respondent stated,

> We know in congregate care that family involvement is the number one predictor of resiliency and so if they don’t have any family I will shake that tree and find an aunt in New York that’s willing to just talk to her once a week.

Participants commented on the importance of completing a comprehensive assessment to determine if DMST survivors had positive, healthy relationships with family members before reuniting them.

Ongoing Needs

All participants provided physical health care, mental health care, and safety services (e.g., home security systems); four participants reported the provision of legal advocacy. The ongoing provision of physical health care, mental health care, and safety services was viewed as essential to the recovery of DMST survivors. In regards to physical health care, one respondent said, “So that’s kind of it on a sort of week-to-week basis besides, you know, every now and then doctor’s appointments and there’s medication appointments.” The provision of mental health care as an ongoing need is reflected in this respondent’s statement: “You know, I run two of the [therapy] groups a week. Another therapist runs groups another day of the week and the caregivers, the direct care staff facilitate two of the other groups.” Safety services were provided through camera or door security systems. One respondent stated,

> Yes [referring to having cameras], we know who’s on the outside, inside, all other kind of sides. That’s their security and our security. Their safety and ours too. That keeps down accusations [referring to inappropriate relationships with staff or stealing] and all kinds of stuff.

While all participants did not report legal advocacy, it nevertheless was deemed a critical ongoing need to bring justice against victims’ traffickers. One respondent stated, “She had an attorney that was appointed, you know by the feds or whoever the attorney was appointed by and we collaborated with that attorney to be able to put that particular perpetrator behind bars.” All participants did provide a continuum of case management to meet survivors’ ongoing needs. One respondent stated,

> And in that service plan there are various goals and various service plans that they have to go by before they can be discharged. . . . So we look at every individual, individualized treatment planning and see, you know, what each individual needs and take it from there.

Participants identified no new categories addressing survivors’ ongoing needs.

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Long-Term Needs

All participants provided life skills training and long-term housing at their residential treatment centers, and three participants provided job skills training. Life skills training included building healthy relationships with peers, grocery shopping, navigating public transportation, cooking, and building a support network among healthcare providers. Two participants used an independent living curriculum at their residential treatment center. The independent living curriculum covered basic life skills, including budgeting money, cooking, cleaning, shopping, and navigating public transportation. Long-term housing was deemed important as indicated by one respondent who said, "We've gone through periods where we've housed individuals for a couple of months at a time . . . always trying to get them into a more secure, stable permanent housing." Job skills training included creating resumes, looking for employment, role-playing for job interviews, and participating in a vocational training program. One respondent stated,

> Here's how you look for a job and here's how you would look for a job in your area and here's the jobs that are locally available that see, okay, we can pull their applications online, let's fill it out. . . . Now go in and you want to talk to the manager or assistant manager and here's the conversation you want to have. We role play it. . . . A job interview, let's role play that.

All participants provided ongoing case management to meet survivors' long-term needs. Case management included assisting DMST survivors with finding jobs, locating housing, or applying to colleges.

All participants identified two additional categories regarding the long-term needs of DMST survivors, including family reconciliation and education. Family reconciliation included supervised or unsupervised visitations, family counseling, and re-establishment of family connections (if appropriate). Education focused on survivors' involvement in a GED program or alternative high school, encouragement to enroll in higher education, and the provision of information and assistance to apply for available college scholarships.

Discussion

Framework Expansion

The results from this study supports an expansion to Macy and Johns' (2011) framework addressing the aftercare service needs of sex trafficking survivors. Services aligned with Macy and Johns' framework to address DMST survivors' immediate needs included crisis safety services, crisis shelter services, emergency medical care, basic necessities, and initial case management. Additional services identified to address DMST survivors' immediate needs included emergency substance abuse services, emergency mental health services, and family reunification. Emergency substance abuse services and emergency mental health care were provided by four of five participating residential treatment centers to meet survivors' immediate needs. The development of a substance abuse disorder after entry into trafficking occurs due to traffickers using substances to coerce victims and/or victims using substances as a negative coping mechanism to deal with the emotional pain of sex trafficking (Hardy, Compton, & McPhatter, 2013; Heilemann & Santhiveeran, 2011). It is important to note that not all trafficking victims are exposed to substances while being trafficked, nor do all trafficking victims develop a substance abuse disorder during or after being trafficked, but substance abuse services should be available if needed. Emergency mental healthcare services focused on delivering trauma-informed care (Muraya & Fry, 2015). Three of five residential treatment centers viewed family reunification as a key service contributing to the recovery of DMST survivors. The reunion of trafficking victims with their respective family presents numerous challenges, including the inability to locate a DMST survivor's family, survivors' resentment towards their family due to a lack of understanding of their trafficking experience, the presence of trauma-related symptoms (i.e., anger, irritability, sadness), family's lack of knowledge on how to deal with these symptoms, financial strain on a victim's family to cover healthcare related costs, and stigmatization of being trafficked (Brunovskis & Surtees, 2015). These are core services providers should consider as they develop person-centered and survivor informed care plans to address survivors' immediate needs.

Aftercare services aligned with Macy and Johns' (2011) framework to address DMST survivors' ongoing needs included physical health care, mental health care, safety services, case management, and legal advocacy. No additional services were identified to address DMST survivors' ongoing needs. Instead, participants stressed substance abuse services as more of an immediate need rather than an ongoing need, and transitional housing as a long-term need rather than an ongoing need.

Aftercare services aligned with Macy and Johns' (2011) framework to address DMST survivors' long-term needs included life skills training, job skills training, long-term housing, and case management. Additional services identified to address DMST survivors' long-term needs included education and family reconciliation. More research is needed on DMST survivors' re-entry

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into school and home. It is important to note that determination of retransitioning back into their respective schools and homes is based on the presence of a safe environment and healthy relationships within the home. Job skills training was mentioned less than education, which could be due to the age of survivors, treated at these residential treatment centers.

Across the Macy and Johns (2011) continuum, some services (i.e., language services, crisis legal advocacy, immigration advocacy, language services, and language skills) were not identified as aftercare services for sex trafficking survivors. Since this was a national study and Macy and Johns' framework was an international representation of aftercare services for sex trafficking survivors, this finding could be related to the limited number of international sex trafficking survivors receiving services at these particular residential treatment centers.

Aftercare services to address DMST survivors' immediate needs are crisis safety services, crisis shelter services, basic necessities, emergency physical health care, emergency mental health care, emergency substance abuse services (if needed), family reunification (if appropriate), and case management. Aftercare services to address DMST survivors' ongoing needs are physical health care, mental health care, safety services, legal advocacy, and case management. Aftercare services to address DMST survivors' long-term needs are more focused on economic empowerment efforts, including life skills training, job skills training, long-term housing, family reconciliation, education, and case management. Other additions to the framework include accounting for relapse that is commonly experienced by DMST survivors along their path to recovery (Clawson & Grace, 2007).

Implications

There is a range of implications for nursing practice, policy, and future research that can be drawn from this study. In the climate of a tighter economy and insufficient allocation of funds to support aftercare services for DMST survivors, nurses can assist in coordinating care for DMST survivors across community agencies. Moreover, nurses maintain reputable positions across society and are pivotal to advocating for the needs of DMST victims. In particular, nurses can advocate for the passage of new legislation to identify youth as trafficking victims in need of aftercare services. Also, nurses can be influential in shifting individuals' perceptions on the treatment of DMST victims and bringing awareness to the needs of DMST survivors. Based on new findings from this study, further nursing research on the development of a framework for aftercare services to address sex trafficking survivors' needs and further evaluation of the effectiveness of these aftercare service programs for sex trafficking survivors is needed. Another area of further research is to evaluate the effectiveness of this model, residential treatment centers, in comparison to other care delivery models to meet the needs of DMST survivors. By studying the effectiveness of care delivery models, researchers will be able to better identify best practices for providing services to sex trafficking survivors. Lastly, the development of data collection systems is needed to better understand the demographics of DMST survivors seeking treatment; access to these data could result in nurses tailoring interventions to meet the population health needs of DMST survivors.

Limitations

This study was an initial step in understanding aftercare services provided at residential treatment centers for DMST survivors in the United States. Even though the sample size may appear small, it was adequate for this qualitative study given that 50% of the target population participated in this study. Limitations of this study included the inability to observe the natural settings of the residential treatment centers and inability to access data related to DMST survivors' outcomes from these residential treatment centers. Triangulation would have contributed to ensuring quality data; outcome data would have added to the richness of the data reflecting on the complexity of providing rehabilitative services to DMST survivors and evaluating the quality of services provided.

Conclusions

This study provided a deeper understanding of the range of services offered across five U.S. residential treatment centers and categorized these services accordingly based on the immediate, ongoing, and long-term needs of DMST survivors, as identified by Macy and Johns (2011). The major scientific advancement of this study was the refinement and expansion of Macy and Johns' framework. Overall, our understanding of aftercare services for DMST survivors continues to evolve. In the end, it will take a collective and coordinated effort among practitioners, researchers, politicians, law enforcement, court officials, and agency providers to expand our knowledge on aftercare services for DMST survivors in order to impact the care we provide to this vulnerable population.

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Clinical Resources

- Polaris Project: https://polarisproject.org/
- United Nations Office on Drugs and Crime: https://www.unodc.org/unodc/en/human-trafficking/
- U.S. Department of State. Office to Monitor and Combat Trafficking in Persons: http://www.state.gov/j/tip/
- U.S. Homeland Security: https://www.dhs.gov/blue-campaign/resources-available-victims

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The Influence of Social Capital on Nurse-Perceived Evidence-Based Practice Implementation in South Korea

Ji In Shin, MSN, RN[1], & Eunjoo Lee, PhD, RN[2]

1 Doctoral student, College of Nursing, Kyungpook National University, Daegu, Korea, Daegu, South Korea
2 Professor, College of Nursing, Research Institute of Nursing Science, Kyungpook National University, Daegu, South Korea

Key words
Evidence-based practice, nurses, nursing practice environment, social capital

Correspondence
Dr. Eunjoo Lee, College of Nursing, Research Institute of Nursing Science, Kyungpook National University, 101 Dong-in Dong Jung-gu, Daegu, South Korea, 700-422 E-mail: jewelee@knu.ac.kr

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Abstract

Purpose: To examine the relationship between evidence-based practice (EBP) adoption and social capital in nurses and to determine how social capital affected EBP adoption in South Korea.
Design: A cross-sectional, correlational design was used.
Methods: In total, 432 registered nurses from two university-affiliated teaching hospitals in South Korea completed the questionnaire, which included demographic items, the Developing Evidence-Based Practice Questionnaire, and the Social Capital Outcomes for Nurses scale. Data were analyzed using hierarchical regression to identify the predictors of EBP adoption.
Findings: Nurses with higher social capital scores reported fewer perceived barriers to finding and reviewing evidence, and changing practice. Higher social capital scores were associated with higher levels of perceived facilitators of EBP adoption and skills appraisal in finding and reviewing evidence. Social capital was a significant predictor of EBP adoption.
Conclusions: Nurses with greater opportunities to exchange and communicate their ideas freely are more likely to accept new evidence through diverse channels and trust-based relationships between nurses, which allows healthcare organizations to promote innovations such as EBP adoption. Therefore, social capital in nurses could serve as a driving force for EBP adoption and should provide a healthy foundation for changes in patient care practices.
Clinical Relevance: Nurses with higher social capital are tending to adopt EBP willingly. High trust enables nurses to facilitate and support change in practice. Therefore, to improve EBP adoption in patient care, it needs to be monitored that relationships between nurses are carefully structured and that they foster mutual interaction.

Evidence-based practice (EBP) is known to improve patient outcomes and has the potential to reduce costs. However, it may increase costs for the system delivering them (Magers, 2013; Melnyk, Feinstein, & Fairbanks, 2006). Despite the substantial benefits of EBP, its acceptance as the standard for patient care remains low at an international level (Kim, Kim, & Park, 2015; Melnyk, 2014), particularly in South Korea (Cho, Song, & Cha, 2011).

Although previous studies examining EBP adoption have reported that administrative support, autonomy, and collaboration between nurses and physicians in hospitals facilitate the adoption of EBP in clinical practice (Melnyk, 2014), interpersonal networks and interactions are now recognized as significant elements of nurses' work, and positive relationships among co-workers in the nursing work environment could facilitate the use of evidence in clinical practice (Read & Laschinger, 2015). Therefore, the psychosocial factors of individual nurses could be critical to successful EBP adoption.

Social capital is a product of collaboration and interaction between people who share ideas (Subramaniam

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& Youndt, 2005). When there are strong ties (close and frequent interactions) in a group, people are more willing to support and encourage innovative ideas and performance, because, through the social network, they receive the confidence needed to express their ideas and implement them (Carmona-Lavado, Cuevas-Rodríguez, & Cabello-Medina, 2010). Establishment of social capital via interpersonal relationships is widely believed to support organizational competitiveness (Watson & Papamarcos, 2002), knowledge exploration and exploitation (Mura, Radaelli, Spiller, Lettieri, & Longo, 2014), and innovation (Carmona-Lavado et al., 2010).

The interpersonal network in organization provides nurses with access to essential information for making informed decisions, and makes individuals strive to achieve common organizational goals (Capaldo, 2007). In addition, support from the organization or manager for nurses' involvement in decision making through shared governance could facilitate the development of nurses' social networks, which would improve their performance by allowing them to make decisions that have a direct impact on clinical practice (Jain, 2014). Nurses who share the governance are usually efficient, function cooperatively with managers and colleagues, and consider themselves partners in attaining organizational goals (Zuzelo, McGoldrick, Seminara, & Karbach, 2006). Therefore, nurses' participation in decision making and social capital development should be managed carefully in the development of innovations, such as EBP, in healthcare settings.

Many previous EBP studies focused on individual nurses' demographic characteristics and information-retrieval skills (Cho et al., 2011; Lim et al., 2011; Son, Kim, Park, Lee, & Lee, 2012). However, research examining the influence of psychosocial factors, such as social capital, on EBP adoption as an important part of the hospital's nursing environment is scarce (Kim, Gu, & Jo, 2013; Kim et al., 2015).

Therefore, the present study aimed to examine the relationship between EBP and nurses' social capital, and to determine how social capital affects EBP adoption in nurses in South Korea. The results could aid the development of improved strategies for EBP adoption that go beyond individual nurses' competence, via the development and stimulation of nurses' social capital, which could ultimately improve the care quality and patient outcomes in healthcare settings.

Background

Social Capital

Social capital refers to the trust and common values formed by social relationships embedded in the social structure (Coleman, 1988), the extent of the connectedness, and the quality and quantity of social relationships in a given population (Inkpen & Tsang, 2005).

Social capital consists of connectedness by three interrelated concepts: bonding, bridging, and linking. Bonding capital refers to the ties that people have within groups (e.g., individuals who are homogeneous in terms of their demographic characteristics (ethnicity, income, education, and age, such as family members, neighbors, close friends, or work colleagues). It fosters access to internal resources. Bridging capital refers to the horizontal connection between heterogeneous groups of people of more or less equal social standing, which increases access to external resources. Linking capital pertains to the ties between people of differential power status, such as across explicitly formal or institutionalized power, or authoritative rank (Sheingold & Sheingold, 2013).

Previous studies reported that social capital could be influenced by individuals' demographic variables such as gender and educational level, or variables related to time flow (i.e., age, position, and years of employment; Jang & Kim, 2006; Kim & Han, 2011; Lee & Lee, 2014; Sheingold & Sheingold, 2013; Wahl, Bergland, & Loyland, 2010). In general, social capital was higher in men than in women, and increased with age and years of employment, due to increased connectedness and quantity of interactions (Jang & Kim, 2006; Kim & Han, 2011; Lee & Lee, 2014). Moon and Huh (2008) also reported that people living in rural areas tend to have higher interpersonal networks and cohesion than do those living in urban areas.

However, in the studies conducted by Wahl et al. (2010) and Sheingold and Sheingold (2013), participants' demographic and social factors (i.e., number of people in the household, and belonging to an ethnic minority) only explained 7% and 10% of the variance in social capital, respectively. Educational level showed inconsistent results with the level of social capital (Jang & Kim, 2006; Kim & Han, 2011).

It is evident that social capital bridges differences and increases openness to considering different perspectives, and helps members collaborate to accomplish a common goal (Sheingold & Sheingold, 2013). Teams in which members know each other well and interact frequently are considered dense networks, which encourage co-operation and information sharing (Chang, Huang, Chiang, Hsu, & Chang, 2012). Thus, social capital could be facilitated through interactions, such as by engaging in enjoyable activities, sharing affection, or exchanging advice and information. In a study performed in nonhealthcare organizations, social capital was found to have a significant relationship with the presence of an innovative climate (Xerri & Brunetto, 2011) and with

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other performance factors such as production innovation, reduced employee turnover, or creation of intellectual capital (Mura et al., 2014).

Moran (2005) also reported that people with networks and relationships with others exerted a strong impact on innovation in organizational performance. Many researchers (Hult, Hurley, & Knight, 2004; Song & Thieme, 2006) have also suggested that intraorganizational knowledge sharing (social capital) exerted a significant impact on organizational innovativeness, as it supports creativity and inspires new knowledge and ideas (Aragón-Correa, García-Morales, & Cordón-Pozo, 2007).

Coleman (1988) suggested that closure and trustworthiness of social structures are important prerequisites of social capital. When individuals in an organization are closely linked and trust one another, they will be more likely to create social capital. Therefore, trust accumulated through cooperation is a core component of social capital and could stimulate innovation within and between organizations by reducing the need to monitor and control mechanisms, and by increasing freedom from rigid rules, enhancing idea generation via interactions between individuals (Doh & Acs, 2010; Inkpen & Tsang, 2005).

Evidence-Based Practice

EBP is a systematic approach to problem solving, characterized by the use of the best evidence available in clinical decision making, to provide the best care consistently (Pravikoff, Pierce, & Tanner, 2005). In response to demand for high-quality and effective patient care, nurses are required to use EBP, as it could result in higher care quality, better patient outcomes, and lower costs (Magers, 2013; Melnyk et al., 2006).

Many factors could influence EBP adoption, and researchers have reported that interpersonal contacts, including social capital, exert an important influence on the adoption of new behavior (Rogers, 2003). Valente, Chou, and Pentz (2007) posited that health service innovations are usually developed by trusted others who convince individuals to adopt new practices.

In South Korea, EBP was introduced into academia in the early 2000s (Kim et al., 2015), but it has not achieved widespread penetration into nursing practice. Further, many nursing practices are considered to be based on experience, tradition, intuition, and untested theories (Kim et al., 2013; Kim & Lee, 2016; Park, Ahn, & Park, 2015). Some South Korean studies reported that nurses' knowledge and perception of EBP were still low, but they showed positive and supportive EBP-related beliefs and attitudes (Park et al., 2015).

Aims

This study aimed to examine the perceived barriers, facilitators, and skills appraisal related to EBP adoption in terms of the level of social capital, and to explore the relationship between social capital and perceived barriers, facilitators, and skills appraisal related to EBP adoption.

Methods

Design and Participants

A cross-sectional, correlational design was used to examine the relationships between social capital and perceived barriers, facilitators, and skills appraisal related to EBP adoption in nurses. Nurses with more than 6 months' experience of working were recruited from two university-affiliated teaching hospitals in a metropolitan city, via convenience sampling.

The G*Power 3.0 program (Faul, 2006) was used to calculate the optimal sample size. In total, 395 participants were required for an effect size of .02, power ($1-\beta$) of .80, and a two-tailed alpha of .05 (Cohen, 1988; Faul, 2006) in the regression analysis with the maximum number of independent variables. Assuming a response rate of approximately 80%, 470 questionnaires were distributed to nurses who had been employed in the hospitals' acute care settings for more than 6 months. In total, 450 questionnaires were returned (response rate = 96%). High response rates, higher than over 90%, are often observed in studies conducted in South Korea (Kim et al., 2015; Lim et al., 2011). However, 18 questionnaires were incomplete; therefore, 432 questionnaires were included in the final analysis.

Measures

All measures were administrated in Korean. Instruments originally developed in English were translated into Korean using back-translation, as recommended for transcultural scale translations (World Health Organization, 2009). Two researchers independently translated the measures into Korean. A bilingual professor from a U.S. college of nursing, who had not seen the original instruments, performed the back-translation from Korean into English. Two researchers then compared the original and back-translated versions and agreed that there was no inconsistency in the meaning, and agreed to adopt these tools for the study.

Social capital measure. Social capital was measured using the Social Capital Outcomes for Nurses (SCON; Sheingold & Sheingold, 2013) scale, which was especially developed to measure the social dimensions of the nursing environment. It assesses comprehensive factors such as formal and informal networks, and nurses' relationships with other nurses or healthcare professionals (Sheingold & Sheingold, 2013). An exploratory factor analysis was performed prior to using the SCON scale, because social capital concepts could differ across countries, based on cultures and social norms. The five subscales, including 36 items that were yielded by a factor analysis with varimax rotation, accounted for 78.6% of the variance in social capital, and the on-factor loadings ranged from .60 to .86, while off-factor loadings were all <.41. A confirmatory factor analysis was performed to assess the convergent and discriminant validity of the five subscales. Fit indices indicated a reasonably good fit: $\chi^2(5) = 14.3$, $p < .05$, root mean square error approximation = .01, comparative fit index = .98, and Tucker Lewis index = .96.

The Internal Trust and Solidarity subscale (12 items) assesses trust, relationships between nurses, and minimal conflict perceived at the work-unit level. The External Trust and Solidarity subscale (9 items) assesses trust, solidarity, and reciprocity with hospital employees external to nursing and the work unit, including hospital executives. The Participation and Empowerment subscale (7 items) measures engagement with others in activities inside or outside the hospital, and that in the community and political arena. It also measures the control of decisions affecting nursing. The Conflict subscale (5 items) measures nurses' perceptions of conflict. The Social Cohesion with Coworkers subscale (3 items) measures social activity with colleagues outside the workplace.

Responses are made using a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate greater social capital. Cronbach's alphas for the SCON scale were .92 in Sheingold and Sheingold's (2013) study and .90 in the present study, with those for the subscales ranging from .72 to .85.

Evidence-based practice measure. Perceived barriers, facilitators, and skills appraisal related to EBP adoption were measured using the Developing Evidence-Based Practice Questionnaire (DEBPQ; Gerrish et al., 2007), which reflects EBP behavior and skill in nurses and assesses the impact of practice development, training, and other innovations on the extent of EBP adoption. The study included 26 items across four subscales: Barriers to Finding and Reviewing Evidence (10 items), Barriers to Changing Practice on the Basis of Evidence (5 items), Facilitators and Support to Changing Practice (3 items), and Skills Appraisal in Finding and Reviewing Evidence (8 items).

Responses are made using a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with the exception of those in the Skills Appraisal in Finding and Reviewing Evidence subscale, which are provided using a scale ranging from 1 (*complete beginner*) to 5 (*expert*). Higher scores indicate greater EBP-related barriers, facilitators, and skills. Cronbach's alphas for the DEBPQ were .87 in Gerrish et al.'s (2007) study and .83 in the present study, with those for the subscales ranging from .77 to .89.

Data Collection

Following institutional review board approval (KNU-IRB 2013–0023), the researcher visited the hospitals' nursing directors and executives to explain the study purpose and data collection methods and received permission for questionnaire distribution. The researcher then visited each unit personally and explained the study purpose to the head nurses, in an attempt to improve the response rate. Head nurses decided how many questionnaires would be distributed in their units based on the number of nurses who had worked on the ward for more than 6 months. The head nurses then placed the questionnaires in the nursing stations, and nurses who agreed to participate took a questionnaire and return envelope. The written consent form clearly stated that participation was voluntary. Nurses placed the completed questionnaires in a locked box. The completed questionnaires were collected from the locked boxes by a research assistant 1 or 2 weeks after the distribution.

Data Analysis

Data were analyzed using SPSS 22.0 and AMOS 22.0 (SPSS, Inc., Chicago, IL, USA). Nurses' demographic and employment characteristics were analyzed using frequencies (%), means, and standard deviations (*SD*s), while perceived barriers, facilitators, and skills related to EBP adoption were analyzed using means and *SD*s.

Differences in perceived barriers, facilitators, and skills related to EBP adoption, with reference to social capital, were analyzed using a one-way analysis of variance and Scheffé's test. In this step, social capital was tested for normal distribution using a Q-Q plot, skewness, kurtosis, and the Kolmogorov-Smirnov and Shapiro-Wilk tests. Social capital was then divided into three groups according to mean and SD (<1 *SD*, within 1 *SD*, and +1 *SD*).

Correlations between the five SCON scale dimensions and perceived barriers, facilitators, and skills related to EBP adoption were analyzed using Pearson's correlation coefficient. A hierarchical multiple linear regression analysis was performed to examine the independent effects of social capital on nurses' perceived barriers, facilitators, and skills related to EBP adoption. In the first regression

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Table 1. General Characteristics (*N* = 432)

Variables	Category	*n* (%)
Gender	Male	17 (3.9)
	Female	415 (96.1)
Age (years)	21–30	283 (65.5)
	31–40	92 (21.3)
	41 and above	53 (12.2)
Education	3-year college	175 (40.5)
	Bachelor's degree	171 (39.6)
	Master's degree and above	86 (19.9)
Years of experience in clinical practice	Less than 5	188 (43.5)
	5–9	111 (25.7)
	10–19	62 (14.4)
	More than 20	44 (10.2)
Years of experience in the present unit	Less than 1	115 (26.6)
	2–5	210 (48.6)
	6–10	34 (7.9)
	More than 10	18 (4.2)
Employment status	Permanent employee	393 (91)
	Temporary employee	39 (9.9)

step, demographic and employment characteristics were coded and entered as dummy variables (i.e., sex, marital status, work unit, and position). In the second step, after controlling for demographic and employment characteristics, all social capital subscales were entered into the model. In addition, multicollinearity, normality of errors, linearity, equal variance, and independence of errors were examined using tolerance, variance inflation factors, and a condition index via residual analysis.

Results

Participant Characteristics

The majority of respondents were female (96.1%), and the age of the participants ranged from 21 to 59 years; those between 21 and 30 years of age comprised the largest group (65.5%); and the average age of the participants was 30.43 years. In terms of educational level and clinical experience, 40.5% and 43.5% of the nurses were diploma holders and had less than 5 years of clinical practice, respectively, and 91% of the nurses were permanent employees (**Table 1**).

Evidence-Based Practice Adoption

Table 2 shows the perceived barriers and facilitators for EBP adoption, and Skills Appraisal in Finding and Reviewing Evidence. The mean score for Barriers to Changing Practice was 3.16 (*SD* = 0.14), signifying a neutral response. Of the DEBPQ subscales, the Skills Appraisal in Finding and Reviewing Evidence subscale showed the lowest scores ($M = 2.56$, $SD = 0.07$).

Table 2. Descriptive Statistics and Subscale Reliability for Perceived Barriers, Facilitators and Support, and Skills Appraisal Related to Evidence-Based Practice Adoption (*N* = 432)

Section	Number of items	$M \pm SD$	Range	Cronbach's α
Barriers to finding and reviewing evidence	10	2.92 ± 0.08	1.00–4.40	.89
Barriers to changing practice	5	3.16 ± 0.14	2.00–5.00	.77
Facilitators and support to changing practice	3	2.94 ± 0.05	1.00–5.00	.78
Skills appraisal in finding and reviewing evidence	8	2.56 ± 0.07	1.00–4.25	.88

Evidence-Based Practice According to Social Capital

Table 3 shows the perceived barriers and facilitators for EBP adoption, and Skills Appraisal in Finding and Reviewing Evidence, according to social capital level. Means and *SD*s for social capital were used as cutoff points based on the assumption of normal distribution, and the sample was divided into three groups (lowest to 2.68: low; 2.69–3.33: average; and 3.34–5: high). Specifically, 297 (69%), 65 (15%), and 70 (16%) of the participants reported an average, high, and low level of social capital, respectively.

Nurses with higher social capital scores showed lower scores on Barriers to Finding and Reviewing Evidence and Barriers to Changing Practice ($F = 5.264$, $p = .006$ and $F = 4.393$, $p < .001$, respectively) and higher scores for perceived facilitators for EBP adoption and Skills Appraisal in Finding and Reviewing Evidence ($F = 55.003$, $p < .001$ and $F = 7.513$, $p = .001$, respectively) relative to those of nurses with lower social capital scores.

Relationship Between Social Capital and Evidence-Based Practice

Table 4 shows the correlations between social capital, perceived barriers, and facilitators for EBP adoption, and Skills Appraisal in Finding and Reviewing Evidence. Participants' perceptions of barriers to EBP adoption and Skills Appraisal in Finding and Reviewing Evidence were significantly correlated with the Participation and Empowerment scale of the SCON ($r = -.26$, $p < .001$ and $r = .30$, $p < .001$, respectively). Of the social capital

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Table 3. Levels of Evidence-Based Practice According to Nurses' Social Capital Levels ($N = 432$)

Variables	n	Barriers to finding and reviewing evidence	Barriers to changing practice	Facilitators and support to changing practice	Skills appraisal in finding and reviewing evidence
		$M \pm SD$	$M \pm SD$	$M \pm SD$	$M \pm SD$
Low SCON[a]	70	3.03 ± 0.60	3.60 ± 0.51	2.42 ± 0.64	2.43 ± 0.54
Average SCON[b]	297	2.92 ± 0.54	3.14 ± 0.56	3.00 ± 0.49	2.59 ± 0.46
High SCON[c]	65	2.71 ± 0.62	2.78 ± 0.57	3.37 ± 0.47	2.77 ± 0.48
F (p)		5.264(.006)	34.393(<.001)	55.003(<.001)	7.513(.001)
Scheffé's test		a < b, c	a > b > c	c > b > a	c > b, c

Note. SCON = Social Capital Outcomes for Nurses. Mean overall SCON score = 3.005 ($SD = 0.323$).

[a] Low SCON scores: ≤2.681.

[b] Average SCON scores: 2.682–3.328.

[c] High SCON scores: ≥3.329.

Table 4. Correlations Between Nurses' Social Capital and Evidence-Based Practice ($N = 432$)

Variables	1	2	3	4	5	6	7	8	9
1. Barriers to Finding and Reviewing Evidence	1								
2. Barriers to Changing Practice	.45*	1							
3. Facilitators and Support to Changing Practice	−.22*	−.43*	1						
4. Skills Appraisal in Finding and Reviewing Evidence	−.46*	−.23*	.27*	1					
5. Internal Trust and Solidarity	−.12*	−.27*	.42*	.12*	1				
6. External Trust and Solidarity	−.13*	−.42*	.42*	.17*	.53*	1			
7. Participation and Empowerment	−.26*	−.29*	.43*	.30*	.48*	.50*	1		
8. Conflict	−.11*	−.29*	.38*	.11*	.54*	.49*	.34*	1	
9. Social Cohesion With Coworker	−.11*	−.18*	.22*	.08	.29*	.27*	.24*	.23*	1

*$p < .05$.

subscales, External Trust and Solidarity had a negative relationship with perceived Barriers to Changing Practice ($r = –.42$, p < .001), and perceived Facilitators to Changing Practice was positively related to Internal Trust and Solidarity, External Trust and Solidarity, and Participation and Empowerment ($r = .42$ and $p < .001$, $r = .42$ and $p < .001$, and $r = .43$ and $p < .001$, respectively).

Influence of Social Capital on Evidence-Based Practice

The results of the analysis of the influence of social capital on the perceived barriers and facilitators of EBP adoption are presented in **Table 5**. On controlling for the demographic and employment characteristics of the nurses, the social capital subscales explained 20% and 28% of the variance in Barriers to Changing Practice ($F = 14.24$, $p < .001$) and Facilitators and Support in Changing Practice ($F = 21.52$, $p < .001$) scores, respectively. The External Trust and Solidarity and the Conflict subscales of social capital were significant predictors of Barriers to Changing Practice, while all subscales, except for the Social Cohesion with Coworkers subscale, were significant predictors of scores on the Facilitators and Support to Changing Practice subscale (see Table 4). Social capital explained only 9% of the variance in Barriers to Finding and Reviewing Evidence and 11% of the variance in Skills Appraisal in Finding and Reviewing Evidence ($F = 2.02$, $p < .001$ and $F = 2.37$, $p < .001$, respectively). Further, Participation and Empowerment exerted a significant effect on Barriers to Finding and Reviewing Evidence and Skills Appraisal in Finding and Reviewing Evidence ($t = –3.35$, $p < .001$ and $t = 3.78$, $p < .001$, respectively).

Discussion

In the present study, the mean scores on the perceived Barriers to Finding and Reviewing Evidence, and Barriers to Changing Practice were 2.92 and 3.14, respectively. These scores were lower than those reported by Gerrish and Cooke (2013) and Ammouri et al. (2014), who reported higher levels of perceived barriers for

Table 5. Influence of Social Capital on Nurses' Perceived Barriers and Facilitators and Support to Changing Practice ($N = 432$)

	Barriers to changing practice				Facilitators and support to changing practice			
	β	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Step 1								
Education (years)	.11	.046	.08	.103	.03	.592	.02	.671
Total work experience (years)	−.05	.482	−.09	.176	−.01	.924	.03	.596
Position[a] (1 = staff nurse)	−.08	.212	−.05	.436	.14	.026	.08	.146
Step 2								
Internal Trust and Solidarity			−.02	.748			.18	.001
External Trust and Solidarity			−.30	<.001			.17	.002
Participation and Empowerment			−.08	.182			.18	.001
Conflict			−.15	.004			.11	.021
Social Cohesion With Coworker			−.08	.115			.08	.069
F(*p*)	2.03(.109)		14.24(<.001)		2.77(.041)		21.52(<.001)	
R^2	.01		.21		.02		.29	
Adjusted R^2	.01		.20		.01		.28	

[a] Dummy coded.

implementing EBP among 337 nurses in England and 600 nurses working in four governmental hospitals in Oman. This difference may be caused by the time difference in the data collection, since the adoption of EBP has increased recently. Another explanation for this discrepancy could be the differences in the educational level and employment status of the participants between the studies, as the nurses in the present study had a higher educational level and more of them were employed full time.

In the present study, nurses' mean score on Skills Appraisal in Finding and Reviewing Evidence was 2.56, which was lower than the 2.94 reported by Gerrish, Ashworth, Lacey, and Bailey (2008) in a study that examined EBP-related skills in 598 junior and senior clinical nurses. However, similar to the findings of Gerrish et al. (2008), the score on Finding and Reviewing Evidence was the lowest in the present study, as compared to those on the other EBP subscales. These results suggest that, despite the need for EBP adoption, Korean nurses' competence in finding and reviewing evidence remains low, even at an international level. Therefore, educational interventions aimed at improving nurses' skills in finding and reviewing research results should be implemented as part of continuing education. Continuing education should also include training in statistical analysis, research application, and Internet use, to encourage nurses to use EBP in clinical practice. This support is likely to improve nurses' confidence in EBP use (Majid et al., 2011).

The present results suggest that nurses with higher levels of social capital perceived greater facilitation and support and fewer barriers to EBP adoption, and were more likely to be competent and experienced less difficulty in finding and reviewing evidence, as compared to nurses with lower levels of social capital. Consistent with the results of the current study, Björk and Magnusson (2009) reported a relationship between members' network connectivity and the quality of innovation ideas, and Xerri and Brunetto (2011) reported a relationship between perceived usefulness of interpersonal networks during work and members' innovative behavior. In addition, Carmona-Lavaldo et al. (2010) found that collaborative effort provided by social capital improved innovation performance, particularly when people shared complex and ambiguous information for radical innovation. Furthermore, Ommen, Blut, Backhaus, and Woisetschläger (2016) reported that individuals' social networks exerted a significant effect on their performance capacity.

Participation and Empowerment scores were most strongly negatively associated with scores on Barriers to Finding and Reviewing Evidence. This indicates that nurses who participate and feel empowered perceive fewer barriers to finding and reviewing evidence. Nurses in dense networks have more chances to learn about the new technologies, ideas, and opportunities that are necessary to innovate quickly, through increased interaction within a collaborative network (Doh & Acs, 2010). The availability of resources through interpersonal relationships helps nurses use the equipment, supplies, and time that are required to find and review evidence. In addition, nurses who receive constructive feedback and support from their networks are encouraged to learn and consolidate their skills and abilities (Read & Laschinger, 2015).

Therefore, organizations and nurse managers must support self-led committees where staff nurses make decisions and have an influence over the resources required to perform their work. Additionally, they should engage in coordinating and facilitating the work of practicing nurses (Lamoureux, Judkins-Cohn, Butao, McCue, & Garcia, 2014). Providing nurses opportunities to be accountable for their practice is a major contributing factor to organizational success (Ommen et al., 2016).

Further, the External Trust and Solidarity subscale of social capital was the most influential predictor of scores on the Barriers to Changing Practice in this study, while the Internal Trust and Solidarity subscale was the most influential predictor of scores on the Facilitators and Support in Changing Practice subscale. Lee, Wong, and Chong (2005) stated that, as compared to individuals with less trust and friendship, those with greater trust and friendship were more willing to engage in social exchanges and cooperative interactions, such as reliance on others; asking for help; and sharing knowledge, information, and resources. Capaldo (2007) reported that interpersonal networks increased trust and encouraged individuals to make greater resource commitments via their relationships. This result is similar to those of other studies in which trust between members was reported to exert a significant positive effect on knowledge sharing (Chang et al., 2012) and innovation in organizations (Moran, 2005; Song & Thieme, 2006).

Trust between members can reduce both tangible and intangible barriers and can drive innovation within and between organizations by inspiring a deep feeling of challenge. Trust-based ties can also accelerate the sharing, flow, and accessibility of knowledge, skills, and information (Hessels, 2008) and can enhance the generation of ideas for innovation (Doh & Acs, 2010). Social capital between nurses allows hospitals to promote innovations such as EBP adoption; therefore, an organizational climate that generates social capital needs to be created through shared governance and development of positive interpersonal relationships in the nursing work environment. In addition, shared governance is closely associated with collaboration among nurses, horizontal relationships, and support from the management and administrative levels (Lamoureux et al., 2014).

The present study was subject to some limitations. Convenience sampling was used to recruit participants from only two academically affiliated hospitals in South Korea, limiting the generalizability of the results beyond this setting. Further research is required to confirm our findings. Additionally, the regression model explained 21% and 29% of the variance in scores on Barriers to Changing Practice and Facilitators and Support in Changing Practice, respectively, and the remaining variance was unexplained. This might have been caused by the overlap of some subscales of social capital with other subscales, or because EBP adoption was highly related with unmeasured characteristics of the nurses in the present study. Personality traits of nurses influence their interpersonal interactions, which are considered essential for creating social capital. Thus, future studies need to examine the quantity and quality of interpersonal interactions with reference to more narrowly defined personality constructs. In addition, other potential predictors, such as work environment, organizational characteristics, economic factors, and the characteristics of the communities in which the nurses lived and worked, could have been included. Therefore, further exploratory research is required to elucidate other predictors of EBP adoption. In addition, the SCON and DEBPQ scales were developed in a Western cultural context; therefore, there is a chance of a lack of cultural sensitivity to Asian cultures.

Conclusions and Implications

A significant finding of this study was that social capital played a critical role in the accumulation and sharing of knowledge, and in the generation of an atmosphere conducive to the adoption of EBP. In essence, social capital facilitates the exchange and combination of explicit and tacit knowledge, which enhances the adoption of EBP. Therefore, administrators should develop diverse strategies to create mechanisms that foster social capital as a means of increasing EBP adoption in nurses. In addition, the study focused on social capital, which has not been explored comprehensively in nursing research, and it identified the social capital components that are better predictors of EBP adoption. The results showed that high trust enabled nurses to facilitate and support change in practice. Therefore, to improve EBP adoption in patient care, it needs to be monitored that relationships between nurses are carefully structured and that they foster mutual interaction.

Social capital among nurses can act as a driving force for EBP adoption, and can provide a healthy environment for changing nursing practice. To enhance social capital in nurses, nurses should be supported in their participation in working groups, and nurse administrators need to be concerned to create networking-friendly environments, design interpersonal interactions, and make an effort to establish trust-based interactions between nurses in work environments in which they can adopt new evidence for better practice, share their opinions with others willingly, and dedicate their efforts and resources to nursing care innovation.

Clinical Resources

- American Nurse Today: https://www.americannursetoday.com/professional-social-networking-for-nurses/

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- NurseOne: https://www.nurseone.ca/en/tools/evidence-based-practice
- Social Capital Research: http://www.socialcapitalresearch.com/

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CLINICAL SCHOLARSHIP

SelfMED: Self-Administration of Medication in Hospital: A Prevalence Study in Flanders, Belgium

Toke Vanwesemael, MS, BN[1], Bart Van Rompaey, PhD, MS, BN[2], Mirko Petrovic, MD, PhD[3], Koen Boussery, PharmD, PhD[4], & Tinne Dilles, PhD, MS, BN[5]

1 Department of Healthcare, Thomas More University College, Belgium and Department of Nursing Science and Midwifery, Centre for Research and Innovation in Care (CRIC), Faculty of Medicine and Health Sciences, University of Antwerp, Wilrijk, Belgium
2 Department of Nursing Science and Midwifery, Centre for Research and Innovation in Care (CRIC), Faculty of Medicine and Health Sciences, University of Antwerp, Wilrijk, Belgium
3 Department of Internal Medicine, section of Geriatrics, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium
4 Pharmaceutical Care Unit, Faculty of Pharmaceutical Sciences, Ghent University, Ghent, Belgium
5 Department of Healthcare, Thomas More University College, Belgium and Department of Nursing Science and Midwifery, Centre for Research and Innovation in Care (CRIC), Faculty of Medicine and Health Sciences, University of Antwerp, Wilrijk, Belgium

Key words
Hospitalization, inpatients, medication, nursing, self-management, SAM

Correspondence
Toke Vanwesemael, Department of Healthcare, Thomas More University College, Antwerpsestraat 99, 2500 Lier, Belgium.
E-mail: toke.vanwesemael@uantwerpen.be

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Abstract

Background: Self-management is a key element in regaining and maintaining health. However, during hospitalization it becomes less obvious. Patient self-administration of medication during hospitalization is suggested to be beneficial to patient satisfaction, adherence to pharmacotherapy, and self-care competence.

Objectives: This study aimed to examine the prevalence of self-administration of medication during hospitalization, and possible contributing factors.

Design and Setting: A cross-sectional observational study was conducted in 12 Belgian hospitals from February 2015 until June 2015.

Participants: Data were collected on all hospitalized patients at 57 wards, based in 12 hospitals.

Data Collection: A structured questionnaire at ward level and patient level on medication management, self-administration of medication, and rationale for prohibiting or allowing patients to self-administer their medication was conducted in consultation with the head nurse.

Results: Of the 1,269 patients participating in this study, 22% self-administered at least one medicine during hospitalization and 13.8% self-administered at least 50% of their total amount of medication. In the opinion of the head nurse, 40.9% of the hospitalized patients would have been able to self-administer their medication during hospitalization. Only a few wards had an available procedure and screening tool to assess the competence of the patients to self-administer their medication. This did not affect the prevalence of self-administration. Self-administration occurred significantly more at surgical short-stay wards, compared to other wards. The self-administering patients were on average younger and female and had a lower number of different medications per day before and during hospitalization. These patients had a good health status and were independent to mildly dependent on nurses on the ward. Related factors were used to provide a multivariate logistic regression model.

Conclusions: Sometimes self-administration of medication was allowed. According to the surveyed nurses, however, more patients would be able to self-administer their medication during hospitalization. There seems to be a lack of

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procedures and screening tools to assess the competence or appropriateness of patients to self-administer their medication.

Clinical Relevance: This study provides new knowledge about the prevalence of self-administration of medication, contributing factors, the types of self-administered medications, and the organization of self-administration of medication on different wards.

In 1948, the World Health Organization (WHO; 1948, p. 100) defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Increasing criticism of the term "complete" in relation to well-being, and the complex measurement of "complete" health, have resulted in a new definition of health: "the ability to adapt and self-manage in the face of social, physical, and emotional changes" (Huber, 2011). As self-management is a key element in maintaining and regaining health, healthcare professionals need to support self-management.

In nursing literature, self-management of a chronic disease refers to the behaviors that persons use to manage the disease and its associated effects (Lorig & Holman, 2003; Trappenburg et al., 2013). Medication use is one of these behaviors used to manage the disease and its associated effects (Miller, Lasiter, Bartlett Ellis, & Buelow, 2015).

To support self-management of medication, healthcare professionals have the responsibility to evaluate to what extent a patient needs assistance, to detect self-management problems, to provide the care the patient needs, and to try to improve self-management abilities. Healthcare professionals should not take over actions without considering the patient's self-management abilities (Meleis, 2012; Orem, 2001).

However, during hospitalization, self-management of medication is not obvious. Recently, a guideline by Peninsula Community Health stated "Self-Administration of Medication (SAM) is the process where a patient, following assessment is able to administer their own medicines whilst in hospital" (Peninsula Community Health, 2014, p. 4).

Inconclusive study results indicate that self-administration of medication during hospitalization has advantages compared to administration of medication by nurses, for example, increased patient satisfaction and an improvement of adherence to pharmacotherapy and self-care competence. Additional quantitative data are needed (Barnason, Zimmerman, Hertzog, & Schulz, 2010; Richardson, Brooks, Bramley, & Coleman, 2014; Tran, Elliott, Taylor, & Woodward, 2011; Wright, Emerson, Stephens, & Lennan, 2006).

So far, prevalence rates of self-administration of medication during hospitalization are scarce. A Belgian pilot study conducted at a medical and a surgical ward showed that 32.1% of the included patients ($n = 81$) self-administered at least one medicine during hospitalization. The majority of these were oral medications (58%) or inhalation therapy (39%) (Vanwesemael, Hellemans, & Dilles, 2014a, b). A recent study on the medication systems and processes used within the U.K. National Health Service (NHS) described a presence of self-administration of medication policy in 93% of the hospitals ($n = 100$) (McLeod, Ahmed, Barber, & Franklin, 2014).

Considering the potential benefits of self-administration of medication, the aim of this study was to describe the prevalence of self-administration of medication during hospitalization in Flanders, Belgium, and the relationship with patient-related and organizational factors.

Methods

Design

A cross-sectional observational study was conducted in 12 hospitals in Flanders, Belgium, from February 2015 until June 2015. For each included patient, a questionnaire was completed in an interview with the head nurse. Data were registered on the prevalence of self-administration and demographic characteristics of each patient, and organizational characteristics of the included wards.

Participants

A convenience sample of three university hospitals, seven general hospitals, and two psychiatric hospitals participated in the study. The following wards were excluded: pediatrics, emergency departments, operating theatres, intensive care units, and day hospitals. A total of 65 wards were contacted. Eight refused participation because of time constraints, resulting in a sample of 57 wards. All patients of the participating wards were included.

Data Collection

For each included patient, a self-administration of medication questionnaire was completed in an interview

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with the head nurse. Furthermore, the head nurse completed a questionnaire to describe ward characteristics and self-management policies. Interviewing the head nurse (or representative) to provide data on all patients was chosen in order to be able to include all patients, independent of physical or mental status, and for practical reasons. Nurses consulted the patients' files and, if needed, other healthcare professionals to complete the questionnaires.

At the level of the ward, data were collected on the type of ward, number of (occupied) beds, procedures for self-administration of medication, intake of home medication, and the storage of medication in the patient's room.

At the level of the patient, patient and self-administration of medication characteristics were collected using a questionnaire per patient. Questions concerning patient characteristics included gender, age, source of admission, discharge destination, care dependency, and health status. Both care dependency and health status had to be indicated on a 4-point Likert scale. Data collected on medication characteristics concerned the number of medications taken at home, the number of medications taken during hospitalization, and the number and type of changes in the medication schedule used at home compared to the medication used during hospitalization. In the last part of the questionnaire, we questioned whether self-administration of medication was considered, who was involved in this decision-making process, and whether the nurse thought that the patient would have been able to self-administer medication during hospitalization. Also, the current medication management of the patient (self-administration or administration of medication by nurses) was questioned. If the patient did self-administer medication, the name and route of administration of self-administered medication were registered. Afterwards, they were coded using the Anatomical-Therapeutic-Chemical classification on the fourth level (WHO, 2014). Finally, the reasons why patients were considered able or not able to self-administer were questioned.

Instrument Development

The questionnaires were developed through literature review, pilot testing, and expert validation. Firstly, questionnaire items were developed based on a review of literature on self-administration of medication and influencing factors. Afterwards, the instrument was pilot tested for comprehensibility and item selection in a small-scale study on the prevalence of self-administration of medication in a regional hospital ($n = 81$) (Vanwesemael et al., 2014a, 2014b). As a result of this pilot test, five questions on demographic characteristics of the patient, two questions concerning medication characteristics, and three questions on self-administered medications were added. Afterwards, the adapted questionnaires were presented to a panel of practicing nurses, physicians, and a hospital pharmacist. This resulted in minor alterations in some answer categories.

Data Analysis

The Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc, Chicago, IL, USA) was used to analyze the data. Kolmogorov-Smirnov and Shapiro-Wilk tests showed non-normality of the distributions of age, number of different medications taken at home, number of different medications taken during hospitalization, and number of self-administered medications during hospitalization. Nonparametric statistics were used to analyze these data. Discontinuous data were described using frequency distributions. Continuous data were described using a mean value and standard deviation if normally distributed, or using a median and range if non-normally distributed. The differences between patients with or without self-administration of medication were calculated using nonparametric statistics (Mann-Whitney test for continuous variables and chi-square test for discontinuous variables). To explore the relationship between patient-related characteristics and self-administration of medication, stepwise multiple logistic regression was applied. Because we wanted to distinguish between patients who were allowed to self-administer a substantial part of their medication and those who were not allowed to (or only occasionally a limited number), we decided to use a cut-off of 50% self-administered medications in the multivariate analysis. Patients had to self-administer at least 50% of their medications in order to be included in the self-administering group of the logistic regression analysis. A p value of ≤ 0.05 was considered as statistically significant.

Ethical Considerations

Before the start of the study, approval was obtained from an ethics committee (reference B670201523494). For each participating ward, informed consent was provided to the head nurse. Patient data were collected by interviewing nurses. There was no direct patient contact and all collected data were coded (no identification data of patients). Patients received an information letter about the study and could refuse participation.

Table 1. Ward Characteristics ($n = 56$)

Type of ward	
Surgical ward	32.1
Medical ward	19.6
Rehabilitation ward	10.7
Geriatric ward	10.7
Psychiatric ward	8.9
Surgical short stay	7.1
Maternity	1.8
Other	8.6
Number of beds (mean ± *SD*)	29 ± 6.1
Number of occupied beds (mean ± *SD*)	24 ± 7.5

Results

Population

Of the 57 participating wards, 23 were based in a university hospital, 29 in a general hospital, and 5 in a psychiatric hospital. One questionnaire at the level of the ward was not completed and was therefore excluded from analysis. Most of the wards were medical, surgical, rehabilitation, or geriatric wards. As shown in **Table 1**, the wards had a mean of 29 available and 24 occupied beds.

At inclusion, 1,269 patients were hospitalized at the participating wards; none refused participation. The mean age was 64 years, and 51.2% were female. The majority of the patients were living at home before hospitalization (76.1%), and after discharge the majority (69.1%) returned back home. The largest group was functionally independent or mildly dependent (63.9%), with a good or rather good health status (64.2%; **Table 2**).

Additional analysis (**Table S1**, available with the online version of this article) showed differences based on gender. Men were on average younger (men: 63 years; women: 66 years; $p = .002$), were less likely to go home (men: 66.8%; women: 71.3%; $p < .001$), had higher care dependency levels (men: 22.0%; women: 15.0%; $p = .013$), and had a lower general health status (rather bad health status of men: 32.0%; women: 24.7%; bad health status of men: 9.6%; women: 5.6%; $p < .001$).

Hospitalized patients took on average six different medications at home and nine within the hospital. In 75.0% of the hospitalized patients, the transition from home to the hospital resulted in one or more changes in the medication schedule. The most frequent change was a new prescription in 84.5% of the patients, followed by an alteration in the brand name in 75.0% of the patients. Additional analysis of these results showed differences between the average amount of six medications taken by men and seven by women ($p = .002$). Furthermore, a correlation between the age and the amount of medications taken before hospitalization and during hospitalization, respectively $r = 0.276$ and $r = 0.232$, was found ($p < .001$).

Table 2. Participant Characteristics ($n = 1{,}269$)

	%
Male	48.8
Age (years; mean ± *SD*)	64 ± 18.7
Source of admission	
Home	76.1
Other hospital	8.8
Internal transfer	8.8
Nursing home	3.6
Rehabilitation	0.9
Unknown	0.2
Other	1.7
Discharge destination	
Home	69.1
Unknown	10.5
Nursing home	9.6
Rehabilitation	4.4
Other	4.2
Other hospital	2.2
Care dependency	
Independent	25.3
Mildly dependent	38.6
Dependent	17.7
Completely dependent	18.4
Overall health status	
Good	21.6
Rather good	42.6
Rather bad	28.2
Bad	7.5

Tables 3 and **4** show details on the medication management characteristics at both ward and patient level. Out of 56 wards, 10 wards (17.9%) had a procedure for self-administration of medication during hospitalization; only four wards (7.1%) had a screening tool to assess patients' competence to self-administer their medication during hospitalization. On 37 wards (74%), some patients used medication brought from home during hospitalization. In half of the included wards (55.4%), less than 20% of their patients stored their medication in their own room. These medications were most frequently stored in the patients' cabinet (64.3%), inside the regular medication package (62.5%), and inside a medication tray belonging to the patient (44.6%).

Prevalence of Self-Administration of Medication

Self-administration of medication was considered in 25.0% of the hospitalized patients ($n = 300$). The

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Table 3. Medication Management Characteristics at Level of the Ward ($n = 56$)

	%
Presence of SAM procedure	17.9
Presence of screening tool for SAM	7.1
Use of home medication during hospitalization	74.0
Storage of medication in the patient's room	
No storage	8.9
<20% of the patients	55.4
20%–50% of the patients	16.1
51%–80% of the patients	10.7
>81% of the patients	8.9
Way of storing medication in the patient room[a]	
Closet of the patient in the patient's room	64.3
Medication package	62.5
Medication tray	44.6
Safe of the patient in the patient's room	7.1

Note: SAM = self-administration of medication.
[a] Multiple answers were allowed.

Table 4. Medication Management Characteristics at Level of the Patient ($n = 1{,}091$)

	%
Number of medications taken before hospitalization (mean ± *SD*)	6 ± 4.6
Number of medications taken during hospitalization (mean ± *SD*)	9 ± 5.2
Changes in medications caused by hospitalization[a]	75.0

[a] Multiple answers were allowed.

decision-making process of allowing self-administration of medication was a generally shared endeavor. In 28.3% of cases the decision-making process was shared between the treating physician, the nurse, and the patient; in 26.3% of cases between the nurse and the patient; in 14% of cases between the treating physician and the patient; in 9% of cases between the nurse, treating physician, patient, and the patient's family; and in 6% of cases between the treating physician and the nurse. Hospital pharmacists were only involved in 0.1% out of 300 decisions. The general practitioners, providing the general medical treatment for the patient at home, were not involved.

Of 1,269 patients, 278 (22%) self-administered at least one medicine during hospitalization, with a maximum of 16 different self-administered medications and an average of 4 medications. On average patients took 13.1% of their total amount of medications in self-administration (ratio self-administered medications/number of medications taken during hospitalization). Moreover, 13.8% of the patients self-administered at least 50% of the total amount of prescribed medication, and 5.8% of these patients self-administered 100% of the total amount of prescribed medication. The majority of self-administered medications were oral medications (83.5%) and inhalation therapy (7.7%). The most frequently self-administered medications were grouped by the nervous system (23.3%), the cardiovascular system (21.7%), and the alimentary tract and metabolism (16.8%).

The head nurses were asked to judge the ability of every patient to self-administer medication. They estimated that 40.9% of the patients would be able to fully self-administer (prepare and take medication independently during hospitalization) their medication, 20.8% would be able to only self-administer their medication if their medications were prepared by the nurses at the ward, and 38.3% would still be fully dependent on the nursing staff for their medication management during hospitalization.

Reasons for Prohibiting or Allowing Self-Administration of Medication

Nurses indicated multiple reasons for prohibiting or allowing self-administration of medication for each patient. Reasons for prohibiting self-administration of medication were: procedures not allowing self-administration (56.3%), the health status of the patient (31.4%), and the caregiver's opinion on self-administration of medication (24.2%). Factors for allowing patients to self-administer their medication were: the patients' mental status (84.8%), the patients' motor skills (82.2%), the patients' ability to express themselves (82.2%), the patient was already self-administering medication at home (82.2%), and the patients' ability to ask for advice concerning their medication (80.8%; **Table S2**, available with the online version of this article).

Self-administration of medication was not considered in 78.1% of those patients who did not self-administer medication ($n = 967$).

Organizational Characteristics and Patient-Related Characteristics Associated With Self-Administration of Medication

In order to evaluate whether organizational characteristics influenced the prevalence of self-administration, the percentage of self-administering patients on different types of wards and wards with and without a procedure were compared. This comparison showed a difference between surgical short-stay wards (81.2%), psychiatric wards (32.1%), surgical wards (22.1%), medical wards (16.9%), rehabilitation wards (9.7%), and geriatric wards (5.6%; $p = .037$). The presence of a procedure for self-administration of medication did not influence the percentage of patients self-administering medication.

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Table 5. Influence of Patient- or Medication-Related Characteristics on Self-Administration of Medication: Logistic Regression Analysis

Characteristics related to self-administration of medication	%[c]	p	Univariate ($n = 1.269$) RR [CI 95%]	Multivariate[b] ($n = 1.250$) RR [CI 95%]
Gender				
Female	16.7	.003	1.65 [1.19–2.30]	1.55 [1.03–2.31]
Male	10.8		ref	ref
Care dependency				
Independent to mildly dependent	20.3	<.001	10.19 [5.46–19.00]	3.42 [1.71–6.84]
(Completely) dependent	2.4		ref	ref
Health status				
(Rather) good	20.3	<.001	10.14 [5.44–18.90]	3.70 [1.85–7.39]
(Rather) bad	2.5		ref	ref
Source of admission				
Home	16.0	<.001	2.43 [1.52–3.87]	/
Other	7.3		ref	
Discharge destination				
Home	17.5	<.001	3.70 [2.30–5.93]	/
Other	5.4		ref	
Changes in home medication schedule[d]				
Yes	10.9	<.001	0.40 [0.28–0.56]	0.49 [0.32–0.73]
No	23.7		ref	ref

	Mean[e] Yes	Mean[e] No	p	RR [CI 95%]	RR [CI 95%]
Age (years)	52.7	66.4	<.001	0.96 [0.96–0.97]	0.97 [0.96–0.98]
Number of medications taken during hospitalization	6.5	9.9	<.001	0.85 [0.81–0.88]	0.83 [0.77–0.89]
Number of medications taken before hospitalization	5.5	6.6	.005	0.95 [0.91–0.99]	1.16 [1.08–1.25]

Note. CI = confidence interval; ref = reference; RR = relative risk; / = these variables were not included in the model.

[a] Self-administration of medication; this concerned patients self-administering ≥50% of their medications.

[b] R^2 (Nagelkerke) = 0.303; p value of the model <.001.

[c] Proportion of patients self-administering medication.

[d] Changes in the home medication schedule of the patient caused by hospitalization.

[e] Mean value of self-administering or not self-administering patients.

To evaluate whether patient-related characteristics were associated with self-administration of medication, patients who self-administered at least 50% of their total amount of medications were considered as self-administering patients. As shown in **Table 5**, self-administration was related to gender, care dependency level, general health status, place of stay before admission and after discharge, and age. Patients who were self-administering their medication during hospitalization were more frequently female (16.7% women vs. 10.8% men, $p = .003$) and on average younger (self-administering patients: 52.7 years; non-self-administering patients: 66.4 years; $p < .001$). A lower level of care dependency and a better general health status corresponded with patients self-administering medication more often (respectively 20.3% and 20.3%, compared to 2.4% and 2.5%; $p < .001$). Patients living at home before hospitalization self-administered their medication more often (16.0%) compared to patients with other admission sources (7.3%; $p < 0.001$). Also, patients returning home after hospitalization self-administered their medication more often (17.5%) compared to patients with other discharge destinations (5.4%; $p < .001$).

Besides patient characteristics, changes in medication use were related to self-administration of medication. Changes in the home medication schedule negatively influenced the prevalence of self-administration (23.7% if medication schedule was not changed compared to 10.9% if medication schedule was changed; $p < .001$). Patients self-administering medication took a lower amount of different medications during their hospitalization and before admission compared to the not self-administering group (respectively, 6.5 at the hospital and 5.5 at home compared to 9.9 at the hospital and 6.6 at home; $p < .001$ and $p = .005$).

The multivariate analysis of the above-mentioned variables (see **Table 5**) resulted in a model explaining 30.3% of the variance ($p < .001$). In this model, being a woman resulted in 55% more chance to self-administer (relative risk [RR] = 1.55; 95% confidence

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interval [CI] [1.03–2.31]). Also, self-administration of medication was associated with lower care dependency levels, and a better general health status (respectively, RR = 3.42; 95% CI [1.71–6.84] and RR = 3.70; 95% CI [1.85–7.39]). If changes were made in the patients' home medication schedule, this resulted in a decrease of 51% to self-administration of medication during hospitalization (RR = 0.49; 95% CI [0.32–0.73]). For each year of age increased, the odds of self-administering medication decreased with 3.0% (RR = 0.97; 95% CI [0.96–0.98]). Each extra medicine taken during hospitalization resulted in 17.0% less self-administration of medication (RR = 0.83; 95% CI [0.77–0.89]). Compared to the medication taken at home, each extra medicine taken at home before hospitalization resulted in 16.0% increase of self-administration medications (RR = 1.16; 95% CI [1.08–1.25]).

Discussion

In Flemish hospitals, 22% of the patients self-administer at least one medicine. Nurses judged 40.9% of the hospitalized patients would be able to fully self-administer (prepare and take medication independently during hospitalization) their medication. These findings show that far more patients would have been able to self-administer their medication during hospitalization.

The study sample was representative for patients hospitalized in Flemish hospitals, as all patients of 57 participating wards were included. The sample was obtained by interviewing head nurses. Interviewing the head nurse (or representative) provided data on all patients, in order to be able to include all patients, independent of physical or mental status, and for practical reasons.

Self-administering patients were on average younger and female, and had a lower number of different medications per day before hospitalization and during their hospital stay. More often, they came from their own home environment and returned there after discharge. Self-administering patients had a better general health status and lower care dependency levels. Other research involving a population of patients who did not self-administer medication during hospitalization showed that patients under 60 years of age had a significantly greater desire to self-administer their medication in hospital, compared to patients over 60 years of age (Deeks & Byatt, 2000). Combined with the rationale to prohibit or allow self-administration of medication, these results described the type of patient who could possibly self-administer medication. These results should be used in further research on developing a screening tool to assess patients' competence to self-administer medication.

Although self-administration of medication was allowed and decisions concerning this topic were made, only 17.9% of the wards had a procedure for self-administration and only 7.1% of the wards had a screening tool to assess patients' competence to self-administer their medication during hospitalization. These data confirm the need for a uniform protocol and a uniform screening tool to assess patients' appropriateness to self-administer their medication. The differences in the progress of implementing self-administration in hospitals was also reported in an audit performed by the NHS, which provides health care for all U.K. citizens, in different NHS Trusts (London Audit Commission, 2001). A clear policy and protocols on self-administration are required in case of hospital accreditation. For example, the Joint Commission International (JCI) has set a standard on Medication Management and Use (MMU), or to be precise "Standard MMU.6.2 policies and procedures govern medications brought into the hospital for patient self-management or as samples." Moreover, JCI allows self-management if this is governed by policies and procedures (JCI, 2013).

A policy for self-administration of medication for inpatients is necessary. This policy should consist of a procedure on self-administration of medication during hospitalization; an assessment to decide whether patients are appropriate to self-administer medication; an observation tool to monitor medication adherence while self-administering medication; and support for both patients who need to self-administer medication and caregivers who support patients while self-administering (e.g., patient education). In an attempt to provide a facilitating context for self-administration of medication, a clear social and legal context should be provided, for example, responsibility in case of errors and delivery of medication. Legal concerns on self-administration of medication should be addressed in order to prevent the promotion of self-administration of medication to be problematic. A shared decision on allowing or prohibiting self-administration of medication has to be made. This decision has to be made in consultation between physicians, nurses, and patients, but also with the hospital pharmacist. Hence, the provision of medication remains the responsibility of the hospital pharmacists in active cooperation with the nurses who administer medication (Royal Decree, 1991). The involvement of hospital pharmacists during this study was practically nonexistent. Self-administration of medication requires an integrated multidisciplinary approach to ensure that patients maximize the benefits from their medication.

Another important factor in providing a facilitating context for self-administration concerns the approach of possible barriers for implementation, for example, possibly adapting the current medication management system, considering what schedule of drugs can be allowed, how and where to safely store self-administered medication, etc. Because of the significant impact of self-administration of medication on health care, the term "self-administration" might not be wide enough. Therefore, we suggest the term "self-management of medication," which includes a broader range of aspects: protocol, screening tool, observation tool, multidisciplinary approach, and social and legal context. Furthermore, self-management of medication demands not only that the patient administers medication, but demands more patient engagement.

Self-management of medication will affect the daily nursing practice. Rather than preparing and administering medication, nurses will be providing more person-centered care, thereby allowing more self-management of patients during hospitalization. The activity of preparing and administering medication will be partly replaced by the assessment of patients' competence or appropriateness concerning self-management of medication, supporting and providing education concerning medication, and evaluating the possibility of self-management of medication during the entire hospital stay.

Conclusions

During this study, 22% of the hospitalized patients self-administered at least one medicine during hospitalization. Although self-administration of medication was allowed, only 17.9% of the wards had a procedure for self-administration of medication during hospitalization and 7.1% of the wards had a screening tool to assess patients' competence to self-administer medication. Self-administering patients were on average younger and female, and had a lower number of different medications per day before and during hospitalization. These patients had a good health status, and were independent to mildly dependent on nurses on the ward.

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Clinical Resource

- Belgian Centre for Pharmacotherapeutic Information: http://www.bcfi.be/

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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. Differences in Participant Characteristics Between Men and Women

Table S2. Reasons for Prohibiting or Allowing Self-Administration of Medication

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CLINICAL SCHOLARSHIP

Trauma Exposure Among Women in the Pacific Rim

Elizabeth Reeves, BSN, RN[1], Pilar Bernal de Pheils, MS, RN, FAAN, FNP[2], Susan G. Silva, PhD[3], Diva Jaramillo, RN, MSN[4], Tulia Uribe, RN, MSN[5], Agnes Tiwari, PhD, DN, MSc, RN, RCNT, RNT, FAAN, CMgr FCMI[6], Gladys Eugenia Canaval, PhD, MS[7], Maria Eugenia Mendoza Flores, RN, MSN[8], Ruth Ann Belknap, PhD, RN, PMHCNS-BC[9], & Janice C. Humphreys, PhD, RN, FAAN[10]

1 Doctoral Candidate, Duke University School of Nursing, Durham, NC, USA
2 Clinical Professor, University of California, San Francisco, CA, USA
3 Associate Professor, Duke University School of Nursing, Durham, NC, USA
4 Professor, Universidad de Antioquia, Medellín, Colombia
5 Professor, Universidad de Antioquia, Medellín, Colombia
6 Professor, University of Hong Kong School of Nursing, Pokfulam, Hong Kong
7 Professor, Universidad del Valle, Santiago de Cali, Colombia
8 Licensed Nurse, Research Department of Public Health, Institute for Perinatology, Mexico City, Mexico
9 Professor, Marquette University College of Nursing, Milwaukee, WI, USA
10 Professor and Associate Dean for Academic Affairs, Duke University School of Nursing, Durham, NC, USA

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Correspondence
Ms. Elizabeth Reeves, DUMC 3322, 307 Trent Drive, Room 3068, Durham, NC 27710.
E-mail: Elizabeth.reeves@duke.edu

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Abstract

Purpose: Healthcare professionals who provide services in the immediate or long-term aftermath of traumatic events need to understand the nature and frequency of traumatic events in the lives of women. However, research on trauma exposure in women has only recently begun to assess events other than intimate partner and sexual violence and has not supported direct statistical comparison of cross-national and cross-cultural data. The purpose of this descriptive, correlational study was to describe and compare trauma exposure prevalence and type in community-based samples of women in the United States, Colombia, and Hong Kong.

Design: Women were recruited through posted notices at community health sites, snowball sampling, and online advertisements ($N = 576$). The Life Stressor Checklist-Revised (total score range 0 to 30) was used to determine the type and prevalence of trauma exposure. Data were collected by native language members of the research team.

Methods: Descriptive statistics were used to summarize demographic characteristics and trauma exposure for the total sample and each community-based sample (location). Between-location differences were tested using Fisher's exact tests for categorical measures and general linear models with pairwise a posteriori least squares t-test for continuous measures. Responses to open-ended questions were translated and categorized.

Findings: Over 99% of women in the total sample reported at least one traumatic life event. The mean number of traumatic life events per participant was 7, ranging from 0 to 24. Although there was consistency in the most commonly reported trauma exposures across locations, the rates of specific events often differed.

Conclusions: Historical, political, geographic, and cultural factors may explain differences in trauma exposure among women in the four locations studied.

Clinical Relevance: This study offers relevant knowledge for providers in diverse locations who provide services to women who have experienced traumatic events and provides evidence for the need for future research to further

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enhance knowledge of trauma exposure among women, and on the effects of trauma in women's lives.

Trauma is defined as experiencing or witnessing an event of actual or threatened death, serious injury, or physical, sexual, or emotional violence (American Psychiatric Association, 2013). Traumatic life events encompass diverse situations such as natural disasters, combat, childhood sexual abuse, intimate partner violence (IPV), unexpected deaths, motor vehicle accidents, and muggings. Research on trauma in the lives of women has only recently begun to assess events other than intimate partner and sexual violence. Healthcare professionals provide services to women in the immediate aftermath of traumatic events as well as long-term counseling and other services. Understanding the nature and frequency of the traumatic life events women are exposed to is an important first step in helping survivors heal from trauma.

Though less is known about the full scope of trauma exposure among women, existing research has explored the individual, social, and economic consequences of some traumatic life events. The World Health Organization (2013) reported that women who have experienced intimate partner or sexual violence also experience long-lasting and adverse health effects that negatively impacted their daily lives. Trauma also presents social and economic costs to communities, including health care, counseling and legal expenses, social service utilization, missed work, and unemployment. For instance, a 2013 study conducted in Ecuador estimated the total economic burden of IPV against women at approximately 109 million U.S. dollars (Roldos & Corso, 2013). However, the depth, diversity, and complexity of trauma and its consequences render the true costs incalculable. Further, understanding trauma in the lives of women without first considering trauma exposure more broadly and the ways in which culture defines perceptions, attributed meanings, and responses to trauma (Schnyder et al., 2016) is impossible.

The current body of trauma exposure research with women has evolved beyond the initial focus on IPV and sexual violence to begin documenting the role of culture in responses to trauma and to include a more expansive definition of what constitutes trauma. For instance, recent studies have documented exposure to a range of traumatic life events among diverse samples, including rural Australians (Handley et al., 2015); community-based adults in Detroit, Michigan (Horesh, Lowe, Galea, Uddin, & Koenen, 2015) and the Central African Republic (Vinck & Pham, 2013); displaced persons in Uganda (Vinck, Pham, Stover, & Weinstein, 2007); and Middle Eastern and South Asian refugees living in Australia (Haldane & Nickerson, 2016). Though these studies contribute data on diverse traumatic events among persons belonging to specific groups or living in specific locations, their findings do not facilitate between-group comparisons. There is still little cross-national data using shared instrumentation, which might enhance understanding of the differences in trauma exposure among diverse populations of women. Therefore, this article will describe and compare lifetime trauma exposure among community-based women from Colombia, Hong Kong, and the United States.

Trauma Exposure and Location

Variation in types and patterns of trauma exposure can result from diversity in geography, climate, government, politics, and social structures. The Pacific Rim, defined as the lands surrounding the Pacific Ocean, encompasses diverse nations, geographies, and cultures. Though the nations represented in the Pacific Rim have unique characteristics, the region is also connected by trade routes, commerce, and geography. The simultaneous diversity and connectivity of the Pacific Rim make this region a valuable starting place for comparing trauma exposure among diverse women. This study analyzes traumatic life experiences among women in four locations on three continents in the Pacific Rim—Medellín and Calí, Colombia; Hong Kong; and San Francisco, California—each with unique cultures, histories, and characteristics (**Table S1**).

Colombia has endured more than 50 years of armed internal conflict between the government and various rebel organizations in which both sides have engaged in innumerable acts of human rights abuse and violence, including kidnappings, forced disappearances, harassment of citizen groups, unjust and unlawful arrests, and violence against women (British Broadcasting Corporation, 2012). Likewise, women in Hong Kong have experienced varying degrees of political and civil unrest due to long-standing political and social conflict with Mainland China. Though border policies between Hong Kong and China are more relaxed, many migrant women from China are subject to violence and lack healthcare and legal service access (Wong, Holroyd, Chan, Griffiths, & Bingham, 2008). Finally, women in San Francisco are exposed to characteristics of large Western, urban centers such as increasing population density, crime, and poverty. Each

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of these unique contexts for trauma exposure also exists in a larger global context of economic inequality and pervasive violence against women, underscoring the importance of understanding both global and location-based trauma exposure in the lives of women.

Literature on Trauma Exposure

Many estimates of trauma exposure use informal *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV)-based checklists, rather than validated instruments (e.g., Roberts, Gilman, Breslau, Breslau, & Koenen, 2011; Sartor et al., 2012), and the types of traumatic events included in these assessments are often limited to experiences of bereavement, disaster, and violence. Some studies that include less-studied traumatic events do not provide detailed prevalence data. Rather, prevalence is reported for categories of traumatic events, such as "other child trauma" and "other adult trauma" (Myers et al., 2015, p. 247), limiting understanding on the full spectrum of women's traumatic experiences and their effects on health. Further, only a few studies (e.g., Horesh et al., 2015; Roberts et al., 2011) assess trauma exposure among community-based samples, that is, in the locations where participants perform the normal activities of their daily lives. Most measure trauma exposure among specific populations—women attending court for drug offenses (Sartor et al., 2012), women who are incarcerated (Briere, Agee, & Dietrich, 2016), or refugees seeking asylum (Haldane & Nickerson, 2016)—which restricts the diversity of women included in research.

Finally, we were unable to locate studies that compare women's trauma exposure across national and cultural groups. Though the effects of political and cultural contexts on trauma in the lives of women have been acknowledged (Schnyder et al., 2016), understanding differences in trauma exposure across these diverse contexts is difficult without the ability to draw direct comparisons. This study is the first to collect cross-national data from community-based women using the same, validated instrument to allow for comparisons of trauma exposure. The purpose of this article is to describe and compare trauma exposure by type and prevalence among community-based women in the three Pacific Rim nations. Data reported were collected from 2006 to 2010 in Medellín and Calí, Colombia; Hong Kong; and San Francisco, in the USA.

Methods

Samples

This descriptive research study is part of a long-term collaboration between faculty at the University of California at San Francisco (UCSF) School of Nursing; La Universidad de Antioquia School of Nursing in Medellín, Colombia; Instituto Nacional de Perinatologia in Mexico City, Mexico; and the University of Hong Kong Department of Nursing Studies. Samples recruited in Colombia, Hong Kong, and San Francisco provided data for women on three of the four continents that comprise the Pacific Rim. Convenience sampling through posted notices at community health sites and snowball sampling was used to recruit community-based women. Snowball sampling is a recruitment technique in which one participant encourages a friend or family member to also participate in a study. Researchers at UCSF also used advertisements posted on Craigstlist.org and in newspapers for recruitment.

Measures

The Life Stressor Checklist-Revised (LSC-R; Wolfe, Kimerling, Brown, Chrestman, & Levin, 1996), composed of 30 items, was used to determine the prevalence and type of trauma exposure. Two open-ended questions were added to the instrument: "Are there any events we did not include that you would like to mention?" and "Have any of the events mentioned above ever happened to someone close to you so that even though you didn't see it yourself, you were seriously upset by it?" The LSC-R fills an important niche in trauma research because it is an index tailored for women that includes life events not typically recognized in clinical settings or included in trauma-exposure research, such as abortion or miscarriage or being arrested and taken to jail or prison. The authors of the LSC-R recognized sex-based disparities in trauma exposure, and developed the LSC-R for use with women, beginning with focus group discussions with older women to learn about trauma across the lifespan to inform the content of the instrument (McHugo et al., 2005). A recent study found using a single, open-ended question resulted in underestimation of trauma exposure among women, as compared to a comprehensive multi-item assessment (Monson, Lonergan, Caron, & Brunet, 2016).

For each item, the LSC-R inquires whether a woman has experienced the event, her age at that time, the duration of the event, the extent to which the event affected her life, and the extent of associated distress. The LSC-R is scored by summing the number of events endorsed (range 0 to 30; Wolfe et al., 1996) and does not have a cut-off score for trauma exposure. The content validity of the LSC-R was established through a review of literature (Wolfe et al., 1996), and test-retest reliability ranging from 0.52 to 0.95 was established for each item, exceeding acceptability criteria ($k \geq 0.40$; McHugo et al.,

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2005). The LSC-R was translated into Spanish and Mandarin using forward and backward translation by bilingual nurse researchers in Colombia and Hong Kong who were knowledgeable about the instrument and cultural variations in language; this process has been described in detail by Humphreys and colleagues (2011).

Procedures

Ethical approval was obtained at each of the involved institutions. Members of the research team who spoke the primary language at each location followed the approved protocol to collect verbal consent and data from interested women who wished to enroll. Each participant independently completed the LSC-R.

Data Analysis

Statistical analyses were performed using SAS 9.4 software (SAS Institute Inc., Cary, NC, USA). Nondirectional statistical tests were conducted with significance set at .05 for all tests. The level of significance was not adjusted for multiple outcomes due to the exploratory nature of this study. Descriptive statistics were used to summarize the demographic characteristics, number of traumatic events, and type of trauma exposure for the entire sample as well as each community-based sample (location).

Fisher's exact tests were performed to test for between-location differences in proportion for categorical measures, followed by a posteriori pairwise comparisons when the overall test result was statistically significant. Fisher's exact tests were applied rather than chi-square tests due to the low expected cell counts for several traumatic events and sample characteristics. Analysis of variance procedures using general linear models (GLM) due to unequal sample sizes were conducted to test for between-location differences in continuous measures, followed by a posteriori pairwise comparisons using least-squares *t*-tests when the overall test result was statistically significant. Each completed LSC-R questionnaire was scanned for responses to the two open-ended questions, and responses were translated and categorized. For example, "brother's cancer" and "brother has epilepsy" were categorized as "Illness of family member."

Results

Sample Characteristics

A total of 576 women were recruited, including 217 women from Medellín, 159 women from Cali, and 100 women each from Hong Kong and San Francisco; samples are described in **Table S2**. A posteriori comparisons indicated that, on average, women in Cali were significantly older than women in Medellín, San Francisco, and Hong Kong ($p \le .05$); mean age did not significantly differ between the latter locations. Women in San Francisco reported significantly higher mean levels of education, followed in descending order by women in Cali, Medellín, and Hong Kong ($p \le .05$). Rates of employment did not differ significantly among women in Medellín, Cali, and San Francisco, but were significantly lower in Hong Kong ($p \le .05$).

Trauma Exposure

Only 4 women (0.7%) in the total sample reported no traumatic events of any kind, while 169 women (29%) in the total sample reported nine or more traumatic events (Medellin: 71 [33%]; Cali: 40 [25%]; San Francisco: 43 [43%]; Hong Kong: 15 [15%]). The mean number of traumatic life events per person for the entire sample was 7.0 ($SD = 4.0$; **Table S2**), with a median of 6.0 and range between 0 and 24. The GLM overall results indicated location differences in mean number of traumatic experiences per person ($p < .0001$), with the women in San Francisco reporting a significantly higher mean number of traumatic events when compared to women in each of the other locations (all $p \le .009$). Women in Hong Kong reported, on average, significantly fewer events than women in any other location ($p < .009$). There was no significant difference in the mean number of traumatic events reported by women in Medellín and Cali ($p > .05$). The analysis did not adjust for differences in demographic characteristics of the four cities.

Trauma exposure was further analyzed by comparing endorsement of individual LSC-R items by location (**Table S3**) and the rank order of reported traumatic events by location (**Table S4**). The four locations differed in the percentage of women reporting on 24 of the 30 traumatic events (**Table S3**). The six events for which the locations did not differ were (a) having someone close to you die, not suddenly; (b) physical abuse and/or neglect; (c) being divorced or separated; (d) being in foster care or adopted; (e) having a child with a severe handicap; and (f) other events happening to someone close.

The 10 most frequently reported traumatic events among the total sample are reported in descending order in **Table S5**. Having someone close die suddenly or not suddenly are the two most common events among three of the four locations. Having someone close die not suddenly and having an abortion or miscarriage are the two most commonly reported events by women in the Hong Kong. Among the five most frequently mentioned traumatic events, only the women in San Francisco reported

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emotional abuse or neglect. The five most frequently reported events were identical in rank order for women in Medellín and Cali, Colombia.

Open-Ended Questions

Among the locations, 7% to 27% of women reported at least one traumatic life event not included in the LSC-R and 19% to 30% of women reported at least one event that they had not witnessed, but were still affected by (summarized in **Table S6**). Drug or alcohol addiction is not an LSC-R item, but 30% of women in Medellín reported experiencing and 16% of women in Medellín reported witnessing this event. Other notable traumatic life events not assessed by existing LSC-R items included illness of family member, violence by armed groups or guerillas, infidelity, break-ups, and marital problems. Physical, sexual, and emotional violence or abuse and illness or deaths of family members were notable events that women reported that they did not witness, but were still affected by.

Discussion

The findings of this study document the pervasiveness of trauma in the lives of women; only 1% or fewer of women in each sample reported no traumatic life events of any kind. Another noteworthy finding is that despite cultural, geographic, and national differences, trauma exposure among women in different locations is more similar than different—for instance, having someone close to you die suddenly was commonly endorsed across locations. As might be expected, the 10 most commonly endorsed events were most similar between Medellín and Cali. Women in San Francisco reported being taken to jail or being abused (LSC-R items 5, 22–26, and 28; **Table S3**) more frequently than women in other locations. These findings are aligned with previous findings that trauma is defined by political and cultural contexts (Schnyder et al., 2016).

Historical, political, geographic, and cultural factors may explain some differences in trauma exposure among women in Columbia, Hong Kong, and San Francisco. For example, 44% of women in San Francisco reported being in a serious disaster, which may reflect the frequency of earthquakes in the Bay Area. Fifty-three percent and 54% of women in Medellín and Cali, respectively, reported being robbed, mugged, or attacked, which may be an effect of ongoing political conflict. Finally, 52% of women in Hong Kong reported having an abortion or miscarriage; this could be attributed to China's One Child Policy for respondents who were immigrants from the mainland.

Other differences in reported trauma exposure might be attributable to varying cultural norms of disclosure. For instance, qualitative literature indicates that Chinese cultural beliefs that privilege collective identity over individual identity contribute to barriers to disclosing IPV and help-seeking among women in Hong Kong (Yuen-Tsang & Sung, 2005). In a review of cultural differences in IPV disclosure, Montalvo-Liendo (2009) reported that desire to protect family honor and fear of shame, criticism, or disappointing family members were barriers to IPV disclosure among Asian and Chinese women. Cultural barriers to disclosing violence and familial events may partially explain why women in Hong Kong reported lower exposure to parental divorce, violence between parents, being abused at any age, being sexually touched at any age, and being forced sex at any age, and differences in the 10 most prevalent traumatic events reported by women in Hong Kong versus other locations. Research indicates that immigrant Latina and Asian women did not disclose or seek help for IPV due to beliefs that IPV was a private matter and that keeping their family together was important for their children (Bauer, Rodriguez, Quiroga, & Flores-Ortiz, 2000; Bent-Goodley, 2007). Latina women in a qualitative study reported that embarrassment, worry about children, and a cultural tradition against disclosure were barriers to discussing IPV with healthcare and service providers (Silva-Martinez, 2015). These cultural beliefs may partially explain why women in Colombia reported significantly less exposure to being abused, being sexually touched, and being forced sex than women in some of the other locations.

Women in San Francisco were likely more racially diverse than women in the other locations, and differences in trauma exposure across racial groups have been reported in other studies (e.g., Roberts et al., 2011). Research indicates that among women in racially diverse samples, fear for their personal safety and children, fear of legal or immigration consequences, mistrust, and perceived discrimination can act as barriers to disclosing IPV (Montalvo-Liendo, 2009; Stockman, Hayashi, & Campbell, 2015). However, rates of physical and sexual violence or abuse at any age among women in the San Francisco sample are consistent with estimates of prevalence for these traumatic events in the U.S. population (Centers for Disease Control & Prevention, 2013).

Different cultural beliefs and values or rates of racial and ethnic diversity may help explain differences in the reported prevalence of certain traumatic events between locations, but it is impossible to know whether differences in the frequency with which women in different locations reported these events are due to cultural or demographic

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differences. However, if cultural or racial or ethnic diversity did account for these differences, similarities in actual trauma exposure across samples might be even more substantial. Further, though prevalence of many traumatic events is comparable across diverse locations, trauma is culturally (Schnyder et al., 2016) and personally defined; traumatic events experienced with identical frequency will likely have different significance, meaning, and consequence for women in different locations and cultures and even between women in the same community-based sample.

Limitations and Strengths

One limitation of this study is that data on race and ethnicity were only collected for the San Francisco women, making it impossible to interpret within- and between-sample differences in trauma exposure that could be related to these factors in the other locations. For example, being a member of a race or ethnicity that experiences discrimination may increase the likelihood that a woman has experienced violence or arrest and incarceration. Collecting more data on race, ethnicity, and religion might have allowed for exploration of within-location differences in trauma exposure. Study samples provided data for women on three of the four Pacific Rim continents, and therefore, knowledge contributed by this study about trauma exposure does not represent the entire Pacific Rim region. Another possible limitation of this study is the use of snowball sampling, which may have limited the diversity of the sample in events where friends or family were referred to the study by participants were demographically similar to those participants. This nonprobability sampling method was applied due to the exploratory nature of the study, and samples in this study are limited in their representativeness and generalizability to all women in the Pacific Rim. Thus, future confirmatory studies should be based on probability samples, such as random sampling of all regions of the Pacific Rim, to ensure the findings are based in nonbiased, representative samples of women. Though consistency may have been compromised by the fact that researchers collecting data varied by site, all researchers followed the same approved protocol, and the fact that these researchers were native citizens or residents of each site was beneficial to recruitment and the data collection process. Finally, this study is limited because it is impossible to know whether differences in reported exposure to traumatic events are differences in interpretation of instrument items, differences based in cultural beliefs and values, or actual differences in prevalence. Recruiting community-based women in four diverse locations, collecting data on less-researched traumatic events, and adding open-ended questions to the original instrument are study strengths that support the novel contributions of this research to the existing literature on trauma exposure.

Implications for Practice

The results of this study indicate that trauma is pervasive in the lives of women and that many similarities in trauma exposure exist between women in diverse locations. Healthcare providers in each of the locations studied are more likely to encounter women who have experienced traumatic events than not, but many of the traumatic life events most commonly reported are not among the events routinely assessed by healthcare providers. For instance, the Patient Protection and Affordable Care Act provides guidelines for screening for violence or abuse and providing brief counseling to all women (Centers for Medicare and Medicaid Services, 2014). However, no such guidelines currently exist to support screening or providing counseling for other traumatic life events that women experience. Crosby (2013) and Felitti (2002) provide helpful examples of such open-ended questions: What traumatic events have happened? How are your body and mind repairing the injuries from those events? What have you done in your daily life to help yourself recover? (Crosby, 2013, p. 522), and How is what happened to you in the past affecting you now? (Felitti, 2002, p. 47). Including more open questions about trauma exposure beyond IPV or sexual violence could benefit women by giving them opportunities to discuss significant life events and by enabling providers to tailor counseling and resource referrals. Further, the results of this study indicate that most women do not experience a singular traumatic life event, but rather a multiplicity of events. Broadening screening questions can help providers assess the intertwined effects of multiple traumatic life events, and the enhanced needs of women who experience them.

Future Research

Future research on trauma exposure among women should continue to use validated instruments among diverse samples to generate further knowledge on how trauma exposure varies across location, culture, and geography. Using longitudinal designs in future research would enhance understandings of trauma exposure throughout the lives of women, rather than at a singular point of assessment. Once a better understanding of trauma exposure is established, future research can more effectively move to understand the multilevel, short- and long-term effects of trauma in women's lives. There is

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evidence of a long-lasting association between trauma exposure and symptoms (e.g., Dunn, Nishimi, Powers, & Bradley, 2017; Handley et al., 2015; Horesh et al., 2015), but these studies are still limited by assessing only specific symptoms or disorders (e.g., depression, addiction) or the inability to compare data across national and cultural groups. Globalization, migration, and other factors that contribute to within- and between-sample differences in trauma exposure beg further inquiry into cultural perceptions of traumatic life events, the significance and meaning assigned to these experiences, and the relationships between culture, location, trauma exposure, and symptoms. Future research aimed at improving how we inquire about trauma and fosters collaboration across locations for this research will be instrumental to understanding trauma in the lives of women and its consequences.

Conclusions

Trauma pervasively affects women across diverse nations in the Pacific Rim. The vast majority of women surveyed in Colombia, Hong Kong, and San Francisco had experienced at least one traumatic life event, and most women reported multiple events. Further, extensive similarities were found in the types of traumatic events most commonly reported by women; however, most of these common traumatic events are not those included in routine screening by healthcare providers. This study offers relevant knowledge on trauma exposure among women that providers in diverse locations can use to enhance practice, and supports future research to enhance knowledge on trauma exposure among women, and on the effects of trauma in the lives of women.

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Clinical Resources

- National Coalition Against Domestic Violence: http://www.ncadv.org/
- National Domestic Violence Hotline: http://www.thehotline.org/
- Futures Without Violence: https://www.futureswithoutviolence.org/
- Substance Abuse and Mental Health: https://www.samhsa.gov
- Nursing Network on Violence Against Women International: http://www.nnvawi.org/

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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:

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JOURNAL OF NURSING SCHOLARSHIP

CLINICAL SCHOLARSHIP

Barriers to and Facilitators of South Asian Indian-Americans' Engagement in Advanced Care Planning Behaviors

Kavita Radhakrishnan, PhD, RN, MSEE[1], Shubhada Saxena, MSW[2], Regina Jillapalli, RN, MSN[3], Yuri Jang, PhD[4], & Miyong Kim, PhD, RN, FAAN[5]

1 *Epsilon Theta,* Assistant Professor, School of Nursing, University of Texas – Austin, Austin, TX, USA
2 Director, South Asian Indian Volunteer Association, Austin, TX, USA
3 Doctoral Student, School of Nursing, University of Texas – Austin, Austin, TX, USA
4 Associate Professor, School of Social Work, University of Texas – Austin, Austin, TX, USA
5 *Epsilon Theta,* La Quinta Centennial Endowed Professor, School of Nursing, University of Texas – Austin, Austin, TX, USA

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Advanced care planning, focus group, South Asian Indians

Correspondence
Dr. Kavita Radhakrishnan, School of Nursing, University of Texas – Austin, 1710 Red River Street, Austin, TX 78701-1499. E-mail: kradhakrishnan@mail.nur.utexas.edu

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Abstract

Purpose: To identify barriers to and facilitators of older South Asian Indian-Americans' (SAIAs') engagement in behaviors associated with advance care planning (ACP).

Methods: Using a descriptive qualitative design guided by the transcultural nursing assessment model, data were collected in focus groups of community-dwelling older SAIA participants, SAIA family caregivers, and SAIA physicians. A directed approach using predetermined coding categories derived from the Transcultural Nursing Assessment model and aided by NVivo 10 software (Melbourne, Australia) facilitated the qualitative data analysis.

Results: Eleven focus groups with 36 older SAIAs (61% female, 83% 70+ years old), 10 SAIA family caregivers, and 4 SAIA physicians indicated prior lack of awareness of ACP, good health status, lack of access to linguistically and health literacy–tailored materials, healthcare provider hesitation to initiate discussions on ACP, trust in healthcare providers' or oldest sons' decision making, busy family caregiver work routines, and cultural assumptions about filial piety and after-death rituals as major barriers to engaging in ACP. Introducing ACP using personal anecdotes in a neutral, group-based community setting and incentivizing ACP discussions by including long-term care planning were suggested as facilitators to engage in ACP.

Clinical Relevance: The study's findings will guide development of culturally sensitive interventions to raise awareness about ACP among SAIAs and encourage SAIA older adults to engage in ACP.

Advanced care planning (ACP), defined as planning ahead for treatment during severe illness or end of life, involves informal discussions with family members, healthcare providers (HCPs), and important others about the kinds of care that will be considered appropriate when a patient cannot make decisions (Institute of Medicine [IOM], 2015). ACP encompasses not only preparation of legal documents such as advanced directives or healthcare proxies, but also discussions with family members and physicians about what the future may hold for people with serious illnesses, how patients and families want their beliefs and preferences to guide decisions, and what steps might alleviate concerns related to finances, family matters, spiritual questions, and other issues that trouble seriously ill or dying patients and their families (IOM, 2015). When patients engage in ACP, surrogate decision makers are five times more likely to know patients' preferences for care (Kirchhoff, Hammes, Kehl, Briggs, & Brown, 2010), and conflicts between family members and HCPs during end-of-life discussions are

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reduced (Song, Kirchhoff, Douglas, Ward, & Hammes, 2005). Moreover, it has been found that patients who had end-of-life discussions with their physicians had 35.7% lower costs of care than did patients who did not have such discussions (Zhang et al., 2009).

Culture is an important factor for ACP (Kwak & Haley, 2005), and effective ACP is therefore particularly important for minority communities. South Asian immigrants, for example, are one of the fastest growing minority communities in the United States, with a growth rate of 69.37% from 2000 to 2010 and a population of 3.5 million, of whom Asian Indians make up 2 million (Hoeffel, Rastogi, Kim, & Hasan, 2012). South Asian Indian-Americans (SAIAs) comprise American-born Indians and immigrants of Indian origin from India, the United Kingdom, Africa, and the Caribbean nations. Yet despite the growing numbers of SAIAs in the United States, only two small studies have explored end-of-life preferences and advance directives in this population (Rao, Desphande, Jamoona, & Reid, 2008; Sharma, Khosla, Tulsky, & Carrese, 2012) and have done so only with SAIAs fluent in English. In a study assessing advanced directive rates among Asian-Americans in central Texas (Jang, Park, Chiriboga, Radhakrishnan, & Kim, 2016), where the present study was also based, only 10% of SAIA participants reported completing advanced directives. Little is known about the barriers and facilitators related to ACP among SAIAs or about culturally sensitive strategies to engage older SAIAs and their families in the ACP process. Encouraging older SAIAs to participate in ACP discussions can empower them to communicate their preferences for care at the end of life or during periods of severe illness before they become too incapacitated to express such preferences. There is an urgent need for research to understand SAIAs' awareness of ACP, to identify the information that they need as well as facilitators for their engagement in ACP, and to tailor the ACP process to SAIAs' unique cultural context. The purpose of this study is to identify barriers to and facilitators of older SAIAs' engagement in behaviors associated with ACP.

Theoretical and Conceptual Framework

Traditionally, interventions for ACP have focused on providing patients and their surrogates with standardized information and forms (Bravo, Dubois, & Wagneur, 2008). However, ACP is increasingly being recognized as comprising interrelated health behaviors that include clarification of values; communication among patients, surrogates, and clinicians; and completion of written directives (Fried et al., 2010). As SAIA individuals can vary in their motivations, barriers, facilitators, and self-efficacy regarding their participation in ACP, the transcultural nursing assessment model (Giger, Davidhizar, & Fordham, 2006) was used to guide identification of the contextual aspect related to older adult SAIAs' ACP behaviors. The transcultural nursing assessment model provides a framework to collect and organize cultural information on SAIAs' ACP behaviors related to end-of-life concerns, completing advance directives, and communicating preferences for end-of-life care around six phenomena: (a) communication, (b) time, (c) space, (d) social organization, (e) environmental control, and (f) biological variations (Giger et al., 2006). The phenomenon of communication is concerned with decision making in the family, trust of healthcare providers or family members, and preference for communication on ACP behaviors and end-of-life issues. The phenomenon of time is concerned with past, present, or future time orientation for engaging in ACP behaviors. The phenomenon of space is concerned with impact of family closeness or proximity as well as location preference on engaging in ACP behaviors. The phenomenon of social organization is concerned with function of the cultural and religious institutions, role of family caregiving, and cultural preferences for after-death rituals on engaging in ACP behaviors. The phenomenon of environmental control is concerned with perceptions on internal and external locus of control as well as financial control on engaging in ACP behaviors. And finally, the phenomenon of biological variation is concerned with impact of health status and tolerance towards pain and suffering on perception and engaging in ACP behaviors (Giger et al., 2006).

Methods

A descriptive qualitative design was used to explore determinants of SAIAs' engagement in ACP behaviors. Data were collected in focus groups of community-dwelling SAIA older adults; participants were recruited from two SAIA senior citizen community-based organizations in central Texas and were fluent in at least one of the three languages of English, Hindi, or Gujarati; Hindi and Gujarati are the most commonly spoken Asian-Indian languages in the United States (Terrazas & Batog, 2010). The two SAIA community-based organizations invited the first author to introduce and explain the study during one of their weekly meetings, at which recruitment flyers in English, Hindi, and Gujarati were distributed. The Institutional Review Board of the University of Texas at Austin approved this study.

Focus groups were also conducted with physicians of SAIA origin and family caregivers of SAIA older adults living in the United States, who were recruited using word of mouth referrals and suggestions from SAIA community leaders. All focus groups were scheduled for

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90 min and conducted at a public City of Austin facility or participants' homes until data saturation was attained. The data collection period lasted from March to September 2015. The focus groups were conducted by the first author, who is well trained in qualitative research and has conducted several qualitative studies with older adults.

Participants were told that quotes from the focus groups might subsequently be used in publications to illustrate themes that were heard across all the groups; however, pseudonyms would be used and any identifying information would be removed. Eight focus groups were conducted in English, and three were conducted in Gujarati and Hindi, depending on participants' native Indian language preferences. A demographic survey was used to collect participants' age, gender, education level, income level, insurance status, and duration of stay. Due to the small number of physicians of SAIA origin in central Texas, we have not included physician participants' demographic data in this article in order to protect their confidentiality.

The focus group questions were in a semistructured format and were guided by Giger and Davidhar's transcultural nursing assessment instrument (Giger et al., 2006). The focus group questions addressed (a) barriers and facilitators related to participants' understanding and preparation for severe illness events; (b) participants' understanding of ACP and awareness regarding access to ACP-related resources; (c) barriers and facilitators to engage in ACP behaviors; and (d) culturally appropriate strategies to engage SAIA older adults in ACP behaviors. Follow-up questions were used to clarify participants' responses as needed.

All English transcripts were transcribed by a professional transcription service. All non-English (Hindi or Gujarati) transcripts were transcribed by an SAIA community member who was unconnected with the study, well-versed in all three languages, and a professional transcriber for Indian languages in the Texas court system. All transcripts were cross-checked for any errors or omissions by the first author, who is also fluent in English, Hindi, and Gujarati.

Qualitative Data Analysis

The English transcripts were analyzed by the first author and a graduate nursing student trained in qualitative analysis. Aided by NVivo 10 software (Melbourne, Australia), a directed approach in which a theory or relevant research findings guides initial codes (Hsieh & Shannon, 2005), was used for qualitative content analysis of the focus group data in this study. Existing theory can provide predictions about the variables of interest or about the relationships among variables, thus helping to determine the initial coding scheme or relationships between codes (Mayring, 2000).

Predetermined coding categories derived from the transcultural nursing assessment instrument were used to code key words or phrases that appeared to convey attitudes or perceptions about ACP behavior and their determinants. Coding reports were summarized and cross-checked to ensure consistency of interpretation. Whenever divergent interpretations occurred, transcripts were reviewed again and discussed until consensus was achieved on the subthemes and themes.

For the non-English transcripts, the first author summarized each transcript in English and coded the translated summary using the predetermined coding categories. She then cross-checked her translation and coding with the SAIA community member who had earlier transcribed the transcripts. This method was used due to the scarcity of professionals fluent in the three languages of English, Hindi, and Gujarati.

Results

The 11 focus groups were composed of 36 older SAIAs (61% female, 83% 70+ years old), 4 physicians of SAIA origin (75% male), and 10 family caregivers of SAIA older adults. Descriptive information and statistics for the SAIA older adults and SAIA family caregivers are provided in **Table 1**.

Qualitative Themes

The themes and subthemes for SAIAs' engagement in ACP behaviors were based on the six concepts of communication, time, space, social organization, environmental control, and biological variation in the transcultural assessment model. Inter-rater reliability for the eight English transcripts was 0.73. Inter-rater reliability for the non-English transcripts was 0.97. Total inter-rater reliability for all transcripts was 0.91.

Communication. Communication that can support SAIAs' engagement in ACP were impeded by several barriers. Lack of any prior awareness of ACP, as well as having received printed ACP forms from HCPs without any discussion about the purpose and benefits of ACP discouraged communication on ACP. Lack of communication protocols among physicians led to uncertainty as to whether a primary care physician or a specialist should provide ACP information. Physicians also feared alarming their patients about their health status by providing information on sensitive topics such as end-of-life care

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Table 1. Demographic Characteristics of Participants

Characteristics	Older adults ($n = 36$), n (%)	Family members ($n = 10$), n (%)
Age (years)		
40–49	0	1 (10)
50–59	0	7 (70)
60–69	7 (19)	2 (20)
70–79	20 (56)	0
80–89	8 (22)	0
>90	1 (3)	0
Female gender	22 (61)	7 (70)
Education		
Missing	2 (6)	0
High school or lower	11 (31)	0
Some college	6 (17)	0
Bachelor's	10 (28)	1 (10)
Graduate	7 (19)	9 (90)
Marital status		
Single	1 (3)	1 (10)
Married	30 (83)	7 (70)
Widowed	5 (14)	1 (10)
Divorced	0 (0)	1 (10)
Religion		
Hindu	33 (92)	8 (80)
Sikh	3 (8)	0
Muslim	0	1 (10)
Christian	0	0
Jain	0	1 (10)
Time in United States (years)		
<5	5 (14)	5 (50)
5–10	3 (8)	1 (10)
11–20	13 (36)	1 (10)
>20	15 (42)	3 (30)
Income		
Refused to disclose	3 (8)	1 (10)
<$5,000	12 (33)	1 (10)
$5,000–$34,999	18 (50)	0
$35,000–$49,999	1 (3)	0
$50,000–$74,999	2 (6)	8 (80)
>75,000	0	
English language fluency	17 (47.2)	10 (100)

during routine visits. Uday, a male SAIA cardiologist, for example, said,

> As physicians we are there to save lives, right? Make them better. We often are not doing the other side. So we're not talking about them dying. We're talking about them living. So that's always a focus. So generally we don't bring up that discussion because when you put that, it's considered negative for the patient.

Many older adult SAIA participants further confirmed that they had never received any information on ACP during their interactions with the healthcare system, whether during hospital stays or during visits to physicians.

Misconception about the ACP process was revealed as older adult SAIA participants reported fears of being denied basic health care during traumatic events such as accidents if they completed ACP forms. In addition, complete trust in adult children's (oldest sons') or the HCP's medical decision making were also barriers to engagement in ACP. Family caregivers feared engaging in ACP discussions with their older parents as that might foster their parents' suspicions about their care being burdensome to their children. Thus, for example, Shilpi, a 49-year-old woman, remarked that "the challenge became my brother didn't want to raise that topic because he didn't want dad to think that he's after dad's wealth."

Prior awareness of ACP through discussions with family members who were HCPs or with physicians who were aware of the SAIA culture was a facilitator for engagement in ACP discussions. Prior experience with difficult end-of-life decision making as well as lack of trust in HCPs' decision making were facilitators for engagement in ACP. For example, Indira, a 65-year-old female SAIA participant, remarked as follows:

> The life support, yes. If it comes to that, if they have to put me on life support, please don't do that because now my sister's daughter and mother is having the same problem. She was sick too. She was in the hospital for 3 months now. Now, she's gone to kidney failure. But the daughter can't take the responsibility. She can't shake and let go. She's still holding onto her. The doctor has given her there's no hope. So I don't want that.

Jignesh, a 72-year-old man who felt that his previous coronary artery bypass graft surgery had been unnecessary, reported that "Doctors in US can do anything and children can't say anything. Therefore, the living wills can be protective." At the same time, there were some older adult SAIA participants who reported that they trusted their physicians implicitly and, on further probing, reported sharing a pleasant rapport with the physicians whom they trusted.

Many older adult participants reported conveying their end-of-life wishes orally and informally, as opposed to using written forms. Participants who were not fluent in English also preferred receiving paper brochures with ACP information in their own language. Some older adult and family member participants suggested that discussions on financial or long-term care planning might serve as contexts to initiate discussions of ACP either personally with lawyers or on a community level.

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Time. Lack of time available to discuss ACP with relevant decision makers such as their physicians or with their adult children was a major constraint reported by participants. Their adult children had busy work schedules and daily routines, and physicians were restricted by the current healthcare reimbursement model, which favors episodic care. Physicians did not even consider the current Medicare policy of reimbursing end-of-life discussions to be an incentive, because reimbursement amounts were too small to justify time for such discussions. As Rema, a female Indian primary care physician, pointed out,

> If the patients came to see me, I have 15 minutes. First of all, first 5 minutes you have to get them an exam to be able to talk. Well, there's your 5 minutes gone. Then you take a list of drugs they're taking. That's another 5 minutes gone. So, you'll be lucky to spend 20, 25 minutes. And then you get into this discussion and you're going to feel so hurried. They're going to say, "Okay. So doctor, you want me to die now?"

At the same time, the onset of severe illness or a deterioration in health status either in patients or in elderly parents were considered to be suitable moments to begin discussion of ACP with SAIAs. Aslam, for example, a 57-year-old physician, said:

> My father-in-law is 74 now. My wife believes that he's developing some early Alzheimer's. With him we don't know yet, how he will progress. But certainly that will, I think soon we need to have a conversation with him about what he wants to do.

Space. Participants indicated that both geographical and emotional proximity of loved ones would facilitate engagement in ACP. Participants had mixed feelings about receiving initial ACP information from physicians in clinic settings, and they suggested that neutral, community-based group settings would be nonconfrontational contexts in which to initiate discussions about ACP. As Aarushi, a 47-year-old woman, explained,

> One might have town hall meetings, at library, that sort of thing. Where we give out this information. Then, it's easier to approach it with the family member who comes with the elderly person. Then it's easier to, when you're going home, and then the mother also maybe there, may feel comfortable, talking about it because it has become an open issue now.

Participants' preference to receive end-of-life care in the hospital due to prior positive experience, concerns about complicated caregiving at home, uncertainty about location of receiving end-of-life care whether in the United States or in India, as well as preference to receive end-of-life care in India, were all major barriers for older adult SAIAs to engage in ACP. Thus, for example, Seema, a 51-year-old woman, referred to having two people looking after him, because he's completely dependent. "In India it's easy for that kind of care. Somebody, taking him to the bathroom, somebody running the house, cooking this, that. For me to have him here it would be really, really difficult."

Participants' preference to receive end-of-life care at home as well as openness to the hospice model were facilitators to engage in ACP discussions. Anand, for example, an 85-year-old man, said that "I am afraid to be in a hospital and scared for myself. It is much freer to be in my home, but movements are restricted in a hospital. Nobody visits you in a hospital except the doctors."

Social organization. Although participants did not express discomfort about participating in this study, they did admit that a lack of cultural precedence in planning about end-of-life care as well as a cultural hesitance to talk about death or discuss private issues especially in families with older patriarchal parents were social barriers to engagement in ACP. As Joy, a male primary care physician, said,

> Our culture is, if I have a problem, I need to figure it out. Let's keep it under the rug. I'll find some solutions, but I don't want to talk about it. We came from society we never talked about anything.

Another SAIA family member, Aslam who is also a physician, said,

> Self-esteem and the role of a parent in the household of the Asian culture is different to an Indian than it is in US. And respect for the elder and so on. So, out of full respect for him we have not made the decision to have that conversation.

Expected protocols for after-death rituals such as cremation for Hindus were also barriers to engage in ACP discussions. For example, the 57-year-old male physician Aslam clarified,

> Especially in the Indian community there's no need to make preferences known because it's a closed unit—there isn't that special need to have that discussion with the parents about what, how would they like end-of-life to proceed. Because say if it's a Hindu then they would like to be cremated and that's just expected.

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On the other hand, a strong preference for organ donation was an incentive to engage in ACP. Arvind, a 72-year-old man, stated that "There should be a 'will' where I can say that my body has to be used by somebody. One should donate their body and that's one reason for the will."

Cultural assumptions about filial piety—the expectation that children should financially, physically, and emotionally care for older parents—were a barrier to engagement in ACP. However, a realization of changes in filial piety, wherein adult children can no longer be expected to provide complete care for their older parents, was a significant motivator for engagement in ACP. The SAIA primary care physician Joy observed,

> The younger generation, the younger children think it's burdensome to look after your parents. They don't want to take that responsibility. So increasingly those parents will have to go somewhere, some facility, nursing home where they'll get information anyway. I think that that's what's going to happen in our culture eventually.

In addition, participants suggested confusion about the role that cultural institutions might play in engaging SAIAs in ACP. For example, even though places of worship such as temples are frequent gathering places, the role of priests as counselors to initiate discussions about ACP in the community was unclear. At the same time, however, regional cultural organizations or influential cultural leaders were considered appropriate to introduce ACP to the SAIA community and encourage their engagement in ACP.

Environmental control. Some participants who had received high-quality care through Medicare perceived no need to plan for end-of-life care; they felt that all their expenses would be covered by their medical insurance. However, participants who knew that they lacked resources for caregiving and were aware of the financial expenses involved in end-of-life care stated a dire need to engage in ACP. Thus, Visalam, a 78-year-old woman, said,

> Who is going to take care of us in that old age, because our children are all working? They have their own career. There can be a lot of monies involved in the treatment. Very expensive, very, very expensive. They cannot spend out of their pocket. So that gets our apprehension. That's our fear in the back of our mind. What if we all fall sick? How are they going to cope with it?

External loci of control such as feelings of fatalism could preempt participants' need to engage in ACP. Narendra a 68-year-old male community leader, pointed out,

> Coming from the Indian perspective and the way the culture, the religion and everything governs you is it will happen. There's always a way. There's a planned way, it's going to take place. I think that's the idea and that's why they don't attach so much importance to it.

Biological variation. Perceptions of pain, suffering, and quality of life significantly influenced participants' beliefs about ACP engagement. A strong preference for quality of life as opposed to longevity, as well as a belief that prolonging life-sustaining treatment in the face of suffering would be tough on one's children, indicated high levels of readiness to engage in ACP. Anil, a 74-year-old man, remarked that "Everybody has a confirmed expiry date. It's better to respect that." Pramila, a 66-year-old female participant, remarked that "We are dead to the world, but they're suffering because they're looking at us. So we don't want that for them."

Discussion

This study is one of the first in which we have identified barriers and facilitators related to engagement in ACP among SAIAs, an understudied ethnic minority. Overall, participants acknowledged the importance of engaging in ACP but reported several barriers such as prior lack of awareness regarding ACP, good health status, lack of access to linguistically and health literacy–tailored materials, HCP hesitation to initiate discussions about ACP, trust in HCPs' or oldest sons' decision making, busy family caregiver work routines, and cultural assumptions about filial piety and after-death rituals.

Knowledge about ACP through this study appeared to increase older adult SAIA participants' motivation to engage in ACP, irrespective of their duration of stay in United States in this study. However, despite frequent interactions with the healthcare system, they had been unaware of ACP until they participated in the study, because no HCPs had discussed ACP with them. This was in part due to physicians' limits on time. Additionally, physicians' hesitation to address ACP could also have been caused by linguistic and cultural barriers, resulting in a disparity in the completion of advanced directives for SAIAs. Older SAIAs who did not speak English referred to a lack of educational materials in Hindi or Gujarati in the state of Texas, which meant that they had to depend on someone else to explain such concepts to them

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orally. In addition, despite recently established Medicare policies to reimburse physicians for ACP discussions, physicians in this study were hesitant to talk about ACP during routine visits because they feared scaring patients and lacked time to assure them. Specialists such as oncologists who manage terminal diseases routinely addressed ACP during patients' visits, as was also seen in the study by Periyakoil, Neri, and Kraemer (2015). Yet waiting for the onset of a severe health crisis or a terminal disease may be too late to initiate ACP for many SAIAs. Dedicated personnel such as nurses or social workers in healthcare offices could initiate discussions of ACP with older SAIAs in order to raise awareness of ACP; such counseling could allow longer meetings to address concerns and reduce possibilities of fearful or confrontational discussions with physicians. Making the effort to develop a rapport with older SAIA patients and addressing their concerns can also provide opportunities to HCPs to introduce ACP-related concepts. There is also an urgent need to develop and disseminate linguistically and health literacy–tailored materials on ACP for the SAIA population, especially in Hindi and Gujarati.

Traditional role expectations and filial duties were a barrier for family members to initiate ACP discussions with their older parents. However, awareness of the realities of the U.S. healthcare system and the low availability of caregiving resources increased older adults' intention to engage in ACP because they wanted to relieve their children of the burden of difficult decision making; this has been found in other Asian-American studies as well (Ko & Berkman, 2012; Sharma et al., 2012). Even though the focus group questions addressed ACP, almost all of the participants commented on the low availability of culturally appropriate resources for taking care of loved ones with severe illnesses at home in the US. Such concerns motivated them to consider reasonably priced final care in India, which was a barrier to their engagement in ACP in the United States. For this reason, as well as a lack of estate planning in this population (Sharma et al., 2012), some participants suggested that long-term care planning sessions might be used to induce discussions about ACP in order to increase awareness and rates of completed ACP forms.

This is the first study to have included older adult SAIA participants who emigrated to the US as a result of family reunification policies for immigration. Such older adults lack employment experience in the US and typically tend to be dependent on their children financially as well as for transportation and for navigation of the healthcare system. Therefore, initiatives to raise awareness about ACP among SAIAs must include their adult children because they play an important role in decision making and planning (Ko & Berkman, 2012). Suggestions to increase the rate of ACP in the SAIA community included raising awareness of ACP within a neutral, community-based group setting using personal anecdotes. Once the topic is in the open, patients could consult with their physicians or initiate discussions with their family members, including their adult children or older parents, for decision making. A model centered on *whanau* (Maori-language word for extended family) in which ACP is addressed much earlier in the healthcare process and within the community setting (Frey, Raphael, Bellamy, & Gott, 2014) or innovative community engagement exercises using conversation games can also help introduce the importance of ACP in the SAIA community (Van Scoy, Reading, Scott, Green, & Levi, 2016). Multiple doses of interventions involving a variety of media such as seminars, websites, smart phone apps, and printed ACP materials could further help increase SAIAs' engagement in ACP.

Limitations

Although we are confident that our methods of data collection and analysis allowed us to achieve data saturation for our themes and ensured trustworthy results, the analysis was based on data from participants who volunteered for the study. The results and subsequent conclusions represent the sample from which they emerged, so they cannot be generalized to other situations or SAIA populations without caution. However, to the best of our ability, we recruited SAIA participants diverse in their linguistic abilities, socioeconomic status, duration since immigration, and level of acculturation, all of which should enhance the generalizability of our results to other South Asian populations. Strengths of the study include the triangulation of the findings, enabling cross-checking of information in the collected data, facilitated by involving older adult SAIAs, their family members, and SAIA physicians.

Conclusions

This study revealed SAIAs' unique information needs and preferences related to engagement in ACP behaviors. This study's findings can help guide nurses and other HCPs to develop culturally sensitive interventions to raise awareness about ACP among SAIAs and encourage SAIA older adults to engage in ACP behaviors. This will empower SAIA older adults to communicate their end-of-life preferences to family members and HCPs, preventing unnecessary and unwanted treatment, and improving overall satisfaction with care at the end of life.

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Clinical Resources

- ACP Decisions: https://www.acpdecisions.org
- National Hospice and Palliative Care Organization: CaringInfo: http://www.caringinfo.org/i4a/pages/index.cfm?pageid=3277
- National POLST Paradigm. Advance care planning resources: http://polst.org/other-resources/

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Nurses' Experiences With Patients Who Die From Failure to Rescue After Surgery

Cynthia Thornton Bacon, PhD, RN, CNE

Assistant Professor, University of North Carolina at Greensboro, School of Nursing, Greensboro, North Carolina

Key words
Failure to rescue, patient outcomes, phenomenology, qualitative research, unexpected patient death

Correspondence
Cynthia Bacon, University of North Carolina at Greensboro School of Nursing, P.O. Box 26170, Greensboro, NC 27402-6170.
E-mail: c_bacon@uncg.edu

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Abstract

Purpose: To describe the lived experiences of hospital nurses caring for surgical patients who died from failure to rescue (FTR).
Design: A qualitative phenomenologic approach was used. Methods to ensure rigor and trustworthiness were incorporated into the design.
Methods: The investigator conducted one-on-one semistructured interviews with 14 nurses, and data were analyzed using Colaizzi's methods.
Findings: Six themes were identified: (a) the environment surrounding the FTR was unexpected; (b) FTR was unexpected but not preventable; (c) nurses were emotionally ill-prepared for the FTR; (d) nurse outcomes are different in unexpected versus expected death; (e) nurses' roles as protectors are important; and (f) FTR effects future nursing practice.
Conclusions: Nurses' reactions after an FTR surgical death may be different when there is no identified nursing error contributing to the event. There may be key differences between deaths that are simply unexpected and those that involve FTR. The importance of mentoring junior nurses in protective surveillance skills is vital.
Clinical Relevance: Developing an understanding of nurses' experiences with FTR can assist nurse leaders to better support nurses who experience FTR deaths. Insight into the environment surrounding FTR deaths provides a foundation for future research aimed at improving patient safety and quality through an improved working environment for nurses.

Nurses often report feeling unsupported and ill prepared to deal with the emotional consequences after a patient death in the hospital (Anderson, Kent, & Owens, 2012). This can be particularly troubling for nurses when dealing with a preventable death, labeled a "failure to rescue" (FTR) event in the hospital. FTR is one outcome indicator used by hospitals to measure the effectiveness of nursing care. The relationship between resource availability and FTR events has been studied most frequently. One factor consistently linked to FTR events is nurse staffing. When nurse staffing levels are deemed inadequate to provide safe, quality, and effective nursing care, research has found that the incidence of failure to rescue events increases in hospitals (Aiken et al., 2011; Seago, Williamson, & Atwood, 2006; Simpson, 2016).

The environment in which nursing care is delivered in U.S. hospitals is very complex and is often fraught with rapid change, high stress, and not enough resources to meet demands. In 2000, the Institute of Medicine estimated that hospital system complexities contributed to 44,000 to 98,000 deaths per year from preventable medical errors (Kohn, Corrigan, & Donaldson, 2000). New evidence suggests that the true number of premature deaths associated with preventable patient harm is even higher and is estimated at more than 400,000 per year (James, 2013). When preventable medication errors causing serious patient harm occur, nurses report feelings of guilt and shame, lose confidence in their abilities, and fear disciplinary action (Schelbred & Nord, 2007). It is not clear how the experience of failing to rescue a patient from

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death affects nurses; however, it is likely that these events will adversely affect their well-being and future nursing practice.

This qualitative research study was conducted in an attempt to understand the lived experiences of nurses caring for hospitalized surgical patients who experienced a preventable death described as an FTR event. No studies investigating nurses' perceptions of FTR deaths have been found in the literature to date.

Background and Significance

FTR describes "a clinicians' inability to save a hospitalized patient's life when he experiences a complication, a condition not present on admission" (Clarke & Aiken, 2003, p. 43). The FTR metric was originally developed for use with patients who develop postsurgical complications in hospitals (Silber, Williams, Krakauer, & Schwartz, 1992) and is used as the patient safety indicator "Death Rate among Surgical Inpatients with Serious Treatable Complications" by the U.S. Agency for Healthcare Research and Quality (AHRQ) for tracking FTR events in hospitals (AHRQ, 2013). FTR research has been primarily conducted with surgical patients because the FTR indicators need to identify a group of patients who experience particular complications, and the validity of the indicators can be compromised when coding of comorbidities is poor (AHRQ, 2013; Griffiths, Jones, & Bottle, 2013).

The use of FTR as a measure of effective nursing care has been utilized in nursing research for the past 15 years (Silber et al., 1992). Better nurse staffing, often measured as lower patient-nurse ratios, has been consistently linked to lower FTR rates (Aiken et al, 2011; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Griffiths et al., 2013; Seago et al., 2006). Greater amounts of nursing surveillance in hospitals have resulted in decreased odds of experiencing FTR for older, hospitalized patients having a hip procedure, diagnosed with congestive heart failure, or at risk for falling (Shever, 2011). However, economic constraints in implementing higher levels of nurse staffing and the lack of a consistent supply of qualified nurses have hampered the ability of U.S. hospitals to provide optimal nurse staffing.

The growing body of evidence linking nurse staffing and FTR can reflect negatively on a hospital if FTR rates are high because they may be perceived as less invested in nursing care (Clarke, 2004). When unfavorable outcomes occur, nurses are at risk for distress, particularly if they assume the psychological burden of responsibility for poor patient outcomes, when the outcome can be traced to inadequate surveillance, inadequate problem solving, or insufficient use of available resources (Clarke, 2004). Nurses are also at risk for moral distress when they are providing patient care under clinical conditions that do not provide them with adequate resources to provide the care that is needed, such as inadequate levels of nurse staffing, or when there are insufficient levels of qualified professional staff or beds available to deal with anticipated complications.

An unexplored area in the research literature is what happens to nurses when the safety net resources fail and an FTR occurs. This qualitative descriptive study explored the lived experiences of nurses caring for FTR patients who experienced preventable death. This research assists in filling the knowledge gap for nurses and nurse leaders. The grand tour question was, what is the lived experience of nurses caring for patients who had experienced FTR after surgery? Secondary questions included, what are nurses' attitudes and perceptions regarding their roles in prevention, surveillance, and detection of FTR in surgical patients? What are nurses' perceptions of why the FTR happened and could it have been prevented?

Munhall's (2007) conceptual model of phenomenology, which explores the uniqueness of the individual and the exploration of human experiences guided the study. In Munhall's model, the researcher must first adopt a perspective of unknowing to free themselves of biases. The researcher then uses phenomenological inquiry to understand the experience through immersion in the data, reflection, framing and processing the data, and analysis of the interpretive interaction (Munhall, 2007).

Methods

Exploring nurses' experiences with FTR patients in the hospital required a holistic approach to human experiences and a nursing perspective. After institutional review board approval was obtained from the four participating hospitals, a qualitative descriptive design using phenomenology was used to conduct in-depth semistructured interviews with nurses who experienced FTR events. Interview questions were designed to solicit information regarding demographics (age, gender, years of experience as a nurse, years of experience in current job), the FTR situation that occurred, their feelings about the event, their work group, and the environment surrounding the FTR event. Questions also focused on what happened before, during, and after the patient's death, the nurses' perceptions of why the event happened, and if they believed it was preventable. Final questions centered on the effects of the patient's death on the nurse and the team.

A purposive sample of registered nurses was selected using snowball sampling (Noy, 2008) from surgical units in the study hospitals. These units were chosen because

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they had a high incidence of FTR. Snowballing is a strategy used for locating samples that are difficult or impossible to locate in other ways. Snowball sampling takes advantage of social networks and the fact that people in specific groups will associate with people having similar experiences and characteristics (Haber, 2010).

Two nurse scientists from each of the two health systems assisted with subject recruitment. The nurse scientists introduced the researcher to key gatekeepers at the study sites, including the nurse managers on the surgical units, and worked with the researcher to facilitate recruiting activities such as posting recruitment fliers, making announcements at staff meetings, and sending email invitations. Data saturation was reached after 14 interviews; thus, no more interviews were conducted. Data saturation guides decisions regarding how many interviews are enough and is used to ensure that adequate and quality data are collected (Haber, 2010).

The primary instrument in this study was the researcher. The researcher utilized bracketing to set aside any preconceived ideas about FTR prior to each interview. Utilizing bracketing techniques allowed the researcher to remain unbiased and open during every interview. Audio recorders were used to record the interviews for transcription. The interviews were later transcribed verbatim, although the names of the nurses were changed to pseudonyms. The researcher also collected field notes to document responses, emotions, and the environmental context. The researcher also kept a personal journal, which was used as part of the audit trail and to ensure rigor. The researcher attempted to contact all participants after the initial interviews to validate themes and follow up on any additional questions. Interviews were conducted in a private setting of the subject's choosing that was free of distractions and able to protect his or her confidentiality. Written informed consent was obtained from all participants prior to the interviews. Protection in the form of follow-up mental health counseling was made available to all subjects and was encouraged by the researcher if they displayed signs of distress during or after the interviews.

Data analysis and data collection occurred simultaneously using Colaizzi's (1978) seven-step method: (a) Reading and rereading the participants' descriptions of the phenomena to acquire a feeling for their experience and make sense of their account. (b) Extracting significant statements that pertain directly to the phenomenon. (c) Formulating meanings for these significant statements. (d) Categorizing the formulated meanings into common thematic clusters and validating these clusters. (e) Providing an exhaustive description of the phenomenon by integrating these findings. (f) Validating the findings by returning to participants to ask how the researcher's story matches with their own. (g) Incorporating any changes offered by the participants into the final description of the phenomenon. The researcher spent time dwelling with the data until the essence and themes of the participants' experiences were identified. Dwelling included listening to recorded interviews several times and comparing the field notes with the recordings to allow for the researcher's full immersion in the data and engagement in the analytic process (Speziale & Carpenter, 2007).

Member checking was particularly important as the researcher returned to participants to validate findings. All participants were contacted and half of them completed the follow-up telephone interview. The interviews were used to validate findings and provided guidance to the researcher that the phenomena shared by the subjects were accurately captured. Member checking serves as an important quality control process in qualitative research (Harper & Cole, 2012).

Characteristics of the Sample

There were 14 nurses interviewed for the study. An additional nurse had agreed to participate but declined prior to the interview. The nurses worked in acute and critical care medical/surgical units and were involved in the care of a patient who experienced an FTR event in preparation for, during, or after surgery. There were 12 females (86%) and 2 males (14%). The nurses ranged in age from 26 to 67 years and had 1.5 to 45 years of experience as a nurse. The mean years of experience was 17.3 years and the mean age was 44.2 years. All 14 of the subjects completed the initial interview. Seven subjects (50%) completed the follow-up interview.

The nurses worked in a wide variety of areas, including the operating room (OR; five nurses), intensive care unit (ICU; five nurses), postanesthesia care unit (PACU; one nurse), emergency department (ED; one nurse), postoperative surgical floor (one nurse), and medical-surgical floor (one nurse). Most of the FTR events had occurred within the past 3 years; however, a few had occurred more than 10 years prior. All but one of these nurses had experienced an FTR patient death in the past. For one nurse this was their first experience with a patient death. Thirteen of the nurses worked as staff nurses when the patient death occurred and one worked as a nurse anesthetist.

Findings

The interview duration ranged from 30 to 90 min, with most lasting about 40 min. Probing questions were

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prepared, although most of the nurses spontaneously addressed many of the key research questions without prompting once they began their narrative. All patient scenarios discussed by the nurses involved unexpected deaths of surgical patients. All but one of these patients also fit the medical (physician's) criteria for FTR, which includes death after surgery from one of the following complications: gastrointestinal hemorrhage or acute ulcer, sepsis or shock, cardiac arrest, pulmonary embolism of deep vein thrombosis, acute renal failure, or pneumonia. The remaining patient was a surgical patient who died of hemorrhage (an FTR medical criteria) in the emergency department while being prepared for surgery. Because the patient was a surgical patient, this nurse's narrative was included in the analysis. The patients ranged in age from 12 to 91 years. The most frequent cause of death was cardiac arrest (six patients, 43%), hemorrhage (four patients, 29%), sepsis (two patients, 14%), and suspected pulmonary embolism (two patients, 14%).

Line-by-line coding was completed first. Sixty-one codes were developed, which were collapsed into 10 categories. For example, there were eight codes that described the unexpected nature of the deaths, which included shock, bewilderment, unexpected, surprise, alarm, distress, disbelief, and astonishment. Further, there were five codes that described the unpreventable nature of the deaths, including unpreventable, unavoidable, inevitable, unstoppable, and in God's hands. Further analysis revealed that the categories of unexpected and unpreventable were almost always mentioned together when describing the nature of the deaths. This led to an important theme of the study—that the deaths were unexpected but not preventable. The final analysis revealed six key themes: the environment; unexpected but not preventable; feeling emotionally ill-prepared; differences in unexpected versus expected death; nurses as protectors; and effects on future nursing practice. These are discussed, with illustrative interview extracts, in the ensuing sections.

The Environment: A Typical Day

Previous research has attributed staffing difficulties, lack of nurse surveillance, and lack of system resources as contributing to an error-prone hospital environment and an increased incidence of FTR (Clarke, 2004; Shever, 2011). The interviews, therefore, began with the researcher asking the nurse to describe the environment on the day of the FTR event. Surprisingly, the most common response from the nurses was that this was a ″typical″ day without staffing issues or other problems. No one identified staffing issues or lack of resources as a problem, and most related that they had worked with their usual team that day:

> Uh, it was a typical day and a routine case. This was the room that I usually worked in. (Teresa, age 31, OR nurse)

> We were in the ED. Plenty of staff. Good day. I was the nurse and I had several EMT students working with me. The patient walked in from the ambulance. She was *that* stable. (Tammy, age 31, emergency room [ER] nurse)

> It was an ordinary sort of day, regular shift, there was nothing out of the ordinary at all. Usual staffing, regular team. No issues. (Gathie, age 45, OR nurse)

> It was typical staffing that day, we all worked together, those were the nurses I always worked with. We worked together as a team. (Gloria, age 61, medical-surgical nurse)

Unexpected, but Not Always Preventable

Nurses across multiple practice areas perceived their FTR deaths as unexpected, but not usually preventable. The unexpected nature of the deaths was consistently mentioned in vivid detail, even for those nurses whose FTR events happened a decade earlier. The nurses expressed disbelief in many cases that these deaths they had experienced could be classified as preventable from a medical perspective:

> I remember every detail. And I was in shock. This shouldn't be happening, I mean she was going home after this procedure! This was so totally unexpected. It was a routine thing. There was nothing like malpractice or anything. I don't think anything was done wrong. We did everything right but she still died. I don't know how it could have been prevented. Really? (Chase, age 31, OR nurse)

> I remember this so clearly. She came in with severe abdominal pain and she ended up dying at 51, too young! We absolutely didn't expect that. I don't think we did anything wrong, she got good care. It can't always be prevented, no. We can't prevent something like this. (Amelia, age 57, ICU nurse)

> I remember this like yesterday. We were managing trying to keep his pressure up, trying to keep a heartbeat, but he expired. Everyone was in shock. He was 19 years old. No one expected him to die. We did everything we could and yet there was nothing else we could do. No, I don't see how this death could be called preventable. (Lori, age 67, ICU nurse)

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> We didn't do anything wrong. He was waiting for discharge and the most stable person on the unit, how could we prevent something like that? It was shocking. (Sally, age 47, post-op surgical floor nurse)

The nurses' perceptions that these deaths were not preventable is important because it differs significantly from the medical perspective that classifies these deaths as preventable. In fact, in only one case did a nurse label her patient's death as possibly preventable. The death that she described involved a surgical patient who was having problems on the medical-surgical floor and needed admission to her care in the ICU to manage his problems. This patient died in the ICU and she was concerned that delays in the transfer may have contributed to the negative outcome:

> A patient on the floor was having a problem with their blood pressure. The patient had come in for a simple surgery. And then they arrive and they looked bad—not responsive—and I was thinking, why did it take so long to get them here? I was a bit angry because I felt like oh my goodness this was an unexpected death. I don't know if it was their day to die or not. (Belinda, age 58, ICU nurse)

Feeling Emotionally Ill-Prepared

Nurses across multiple practice areas felt emotionally ill-prepared when the FTR events occurred irrespective of their background and experience level. They frequently expressed feelings of loss, shock, and disbelief, and some expressed guilt, and, although able to care for their patients, had difficulty processing what was happening:

> I was at a loss, this was something that never happens with this type of patient. I mean, they come in, they get the procedure done and then in 10 minutes they are wide awake, ready for a drink and they are out the door. I was truly at a loss. It was awful and even though I got through the day I was a mess inside. (Camille, age 45, PACU nurse)

> I talked to the patient and family before the surgery and reassured them that we would take good care of her. After the fact, I really had a hard time struggling with should I have said we're gonna take care of her, and I felt like I gave her and her family false reassurance ... then she, she just started bleeding. We were replacing blood, she was just drowning in fluid. And at that we called it. I was in disbelief; I can't believe this just happened. She was *FINE*! And then she was gone. I was in shock and shaken up the whole rest of the day. It was hard to keep going. But I did. (Lauren, age 34, OR nurse)

Despite many years of dealing with patient deaths, many of the nurses were not prepared for their responses to the FTR events. They expressed difficulty dealing with the situations but stressed that they were still able to care for the patients in their care. To those around them, their struggles appeared to be contained, but they related internal stress:

> I mean it was just, it was shaking. It was a shaking experience. Because I was emotionally spent that day. But I had to go on, you know? I had a job to do no matter what. (Camille, age 45, PACU nurse)

> It was kind of hard the rest of the day. I had dealt with death a lot in my previous job but I was a nurse for just a few months at the time this happened. When you are dealing with these kind of events you have to put your own feelings aside and go on autopilot. (Teresa, age 31, OR nurse)

Differences in Expected Versus Unexpected Death

The critical nature of unexpected death surfaced again for the nurses when they responded to questions about their feelings around expected versus unexpected patient death. All of them perceived distinct differences in the effects of expected versus unexpected death on their level of emotional distress. One nurse had previously worked in a palliative care unit and frequently experienced expected patient death. She noted distinct differences when dealing with expected versus unexpected patient death and aptly captured the feelings of shock and distress expressed by all of the nurses when dealing with unexpected patient death:

> I've seen a lot of death, by me workin' palliative. There's a difference if we know they are dying, it's good that we're there to keep them comfortable so they're not suffering and then, I see death as a good thing. But, when it is unexpected, it is really different because nobody expects it to happen and it's a shocker, so that's a big difference. With palliative the death is gonna happen, you just don't know when. But somebody just coming back from surgery you don't expect that! (Gloria, age 61, medical-surgical nurse)

Nurses as Protectors

The question about whether the nurse plays a role in preventing FTR generated a lot of discussion from the participants. Although most of the nurses did not identify a lack of surveillance as a contributor to the FTR events that they experienced, most of the nurses saw their role as that of a protector of their patients. They described the importance of surveillance, a factor noted to be critical in previous research to detect problems as they happen and prevent FTR events (Shever, 2011). The nurses described their role as watching their patients closely for changes and stated that it was their job to look for changes and report any that they might see. Many of them felt that many patients can be saved by close surveillance as is illustrated by the following comment from Camille:

> As a nurse you need to just keep a close eye on your patients. I mean, now we have the EWS [early warning score] and if you, if nurses watch their patients and just monitor closely, lots of things can be picked up before they happen. And with rapid response (teams), things can be picked up and cared for before they get to an arresting point. And patients can be saved before they get to a point of being to an arrest. (Camille, age 45, PACU nurse)

Several nurses expressed concern about how difficult it can be for new nurses to develop these skills. Gathie emphasized that nurses need to pay particular attention to mentoring junior nurses and other members of the health team so that they can develop these skills:

> Nurses must watch their patients. You are your patient's advocate and if you see that something that is not right, you need to be aware, We particularly need mentoring in this for the junior members of our staff. (Gathie, age 45, OR nurse)

> You never go on autopilot. You never let your guard down, no matter how simple something is. You know somethin' doesn't seem right, you need to speak up. I think with experience that's a lot easier for nurses to do. Starting out you don't know what you should speak up about, how strongly you should sometimes. (Chase, age 31, OR nurse)

Other nurses emphasized the nurses' role in getting assistance with a patient when needed. Simon explained the importance of using others to help assess a questionable situation:

> You are watching your vital signs, trending your labs so you can tell if there's subtle changes and see what's going on—I think that's where our rapid response team has come in handy ... they're able to be an extra set o' eyes so if somethin' doesn't quite feel right you've got a second opinion that you can get come and assess a patient and see what their expertise tells them. (Simon, age 44, ICU nurse)

And other nurses emphasized the need to be present at the bedside and keep the patients' needs paramount, often at the expense of their own needs:

> I barely take my eyes off my two patients. I'm in the room. I do not chart out at the desk. You have to be there for the patient. You have to watch and check and know what's going on. I chart in the room. If I don't have time for lunch I don't eat. (Lori, age 67, ICU nurse)

One nurse pointed out that surveillance may look difference from nurse to nurse depending on their specific roles:

> My role is both surveillance and action. I don't have to call anybody. I have the authority to do what needs to be done. However, all nurses can be vigilant with their surveillance and get who they need when they need it. (Lorraine, age 42, nurse anesthetist)

Effects on Future Nursing Practice

All of the nurses talked about how the FTR event affected their future nursing practice. They frequently thought back about the FTR deaths and reflected on them. They felt strongly that the experience shaped their practice from that point forward, particularly in making them more aware how quickly things can change. They also shared that these experiences made them more aware of their responsibility in anticipating unexpected changes:

> I think about it often. It was 4 years and it still weighs on me. I still care for patients after this procedure all of the time. I'm actually hyperaware now, always looking to be sure everything is okay. (Camille, age 45, PACU nurse)

Another nurse shared how it changed her status among the team and the team's anticipation of these events:

> I think back about it A LOT. I was glad to use my emergency medicine skills. We rarely have these negative outcomes in the OR because we screen patients so heavily. The other nurses in the room just got out of the way. It brought a new level of respect for me. We are now less complacent and more aware of what can happen. (Teresa, age 31, OR nurse)

Many of the nurses talked about the effect of the FTR death on their emotions and how it changed the way they deal with unexpected death:

> Hopefully I'm a little more empathetic now when things like this occur ... than I used to be. I think in

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> the past, I would just do what I needed to do and not worry about the feelings and what not. (Amelia, age 57, ICU nurse)

> I think back on it a lot. I realized that you can't keep your emotions tied up for too long with situations like this because that next patient, that person needs you, and they need you to think. In critical care you have to be on your toes. (Alicia, age 26, ICU nurse)

Discussion

Although there is a limited body of knowledge regarding nurses' experiences with unexpected death, this is the first published study describing nurses' experiences with FTR deaths in hospitals. This is an important distinction because in this study an FTR death specifically focused on a clinicians' inability to save a hospitalized surgical patient's life when they experienced a complication deemed preventable from a medical perspective.

The first question asked of the nurses in this study was to describe the environment surrounding the FTR patient death: ″tell me about the day the FTR death occurred.″ The researcher had expected to hear issues about staffing or lack of resources as these are factors that have been linked to FTR deaths in other studies. However, nurses overwhelmingly reported that that this was a ″typical″ day without staffing issues or other problems and they described working well with their team. Previous research has examined nurses' experiences with unexpected patient death on the night shift in medical units. Interestingly, all of the nurses in this study reported that the night in which the unexpected death occurred was unusually calm but busy and a ″typical day″ (Palese, Petean, & Cerne, 2013). It is possible that this is a normal reflection when looking back on a difficult event as the nurses may have been analyzing the situation and looking for clues as to what was to happen next.

The unexpected nature of the deaths was an important influence on how the nurse perceived the FTR deaths. However, their perception that these deaths were not preventable is at odds with the medical definition of FTR. Despite being told of the prevailing definition of an FTR death at the onset of the study and how the preventable criteria are determined, nurses' may have different criteria in mind when they think about factors that are preventable. The fact that only one nurse questioned the possible preventable nature of the patient death, due to the patient's delay in transfer, may indicate a positively skewed dataset from a contextual perspective. Nonetheless, this information presents the possibility that nurses' perceptions of what FTR means may be different from that of other health professionals. Further study is needed to examine this perception.

As with other studies examining nurses' experiences with death (Anderson et al., 2012), the nurses were ill prepared for the emotional distress that occurred with FTR deaths. The unexpected nature of the deaths had a major impact on their reactions and many nurses in the study described feelings of shock and disbelief. Palese et al. (2013) also found that nurses reported similar feelings of shock after unexpected death in the medical unit. Unlike the FTR deaths, those nurses also overwhelmingly expressed feelings of failure in the nursing role due to a perceived lack of nursing surveillance. This raises the possibility that nurses' reactions after an FTR surgical death may be different when there is no identified nursing error contributing to the event.

The findings that nurses across many different practice areas collectively perceived stark differences between the effects of expected versus unexpected death on their level of emotional distress is interesting, and there is some previous evidence to support these results. A study examining nurses' coping behaviors when dealing with expected death found that helping patients to a comfortable death was empowering for nurses and made coping with the death easier for them (Hopkinson, Hallett, & Luker, 2005). Thus, the unexpected nature of the death may add a new and difficult dimension to the nurses' abilities to cope with the death, because of the shock and lack of warning that accompanies it. The fact that the nurses in this study were unable to rescue their patients from death may compound their feelings of distress and may illustrate key differences between simply an unexpected death and an unexpected FTR death. Further study is needed to better understand the conditions under which this distinction may exist.

The finding that most of the nurses saw their role as that of a protector of their patients is supported by previous research. The importance of nurse protection through surveillance in both the detection and prevention of patient problems is well documented (Shever, 2011). Moreover, when nurses fail to provide adequate surveillance and their patients die, their prevailing emotion is one of failure in the nurse's protective role (Palese et al., 2013). An interesting finding from this study was the nurses' concern about new nurses and their difficulty in developing these important surveillance skills. Mentoring junior nurses and other members of the health team so that they can develop these protective surveillance skills is an area needing further examination through research.

As in other studies involving patient death, the effects of the FTR deaths lingered with the nurses and affected their future nursing practice. Nurses dealing with unexpected death report problems sleeping and feeling

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disturbed by the experience for long periods after the event (Palese et al., 2013). All of the nurses dealing with FTR deaths thought back about the FTR deaths and reflected on them. They all experienced a heightened sense of awareness regarding the pace and nature of changes that can happened in patient care and carried this forward in their practice. Similar effects on future practice were reported by the nurses who experienced unexpected patient deaths on medical wards, although they described a stronger tendency to increase their surveillance efforts in the future (Palese et al., 2013) that was not uniformly expressed by the nurses with the FTR deaths. This again raises the possibility that nurses' reactions after an FTR surgical death may be different when there is no identified nursing error contributing to the event.

Limitations

This study reports the lived experiences of nurses caring for hospitalized surgical patients who experienced a preventable death described as an FTR death. First, the nurses shared experiences that had happened weeks to years prior, and although they recalled these events vividly, it is possible that the lapsed time may have threatened the accuracy of their recall. Second, nurses self-selected for inclusion in the study. It is possible that nurses focused more on the emotional aspects of the experience and less on the contextual factors surrounding the FTR deaths, and this may have limited sharing of experiences where preventable error was a contributing factor in the death. Third, although the researcher contacted all of the participants, only 50% of them completed the follow-up interview and validated their responses. It is possible that there were some responses that were not clearly interpreted by the researcher.

Conclusion

This study describes the lived experiences of nurses caring for patients who had experienced an FTR death after surgery. Nurses did not report problems with staffing or other systems issues as a contributing factor in the FTR deaths, which was unexpected, because links between these factors and FTR have been consistently documented in other studies. This raises the possibility that nurses' reactions after an FTR surgical death may be different when there is no identified nursing error contributing to the event and should be examined in future research.

Nurses expressed significant feelings of distress after the FTR deaths. It is possible that the inability of these nurses to rescue their patients from death may have compounded their feelings of distress and may point to key differences between deaths that are simply unexpected and those that involve FTR. Further study is needed to better understand the conditions under which this distinction may exist. Finally, the importance of mentoring junior nurses and other members of the health team so that they can develop protective surveillance skills was stressed by the nurses and is vital to note. This is also an area needing further examination through research.

Information from this study provides nurse leaders with insight into nurses' experiences with FTR deaths in hospitals. This information gives nurse leaders a beginning understanding of the contextual factors in the nursing work environment that influence FTR events in hospitals. Nurse leaders can use this information to plan for the training, professional development activities, support, and guidance for nurses who experience FTR events. Moreover, the rich contextual data gathered provides unique insight into the factors that framed the FTR events that occurred. This insight into the nurses' work environment provides a foundation for future research aimed at improving patient safety and quality through an improved working environment for nurses.

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Clinical Resources

- Agency for Healthcare Research and Quality Patient Safety Network. Failure to rescue: https://psnet.ahrq.gov/primers/primer/38/Failure-to-Rescue
- National Center for Biotechnology Information. Failure to rescue: https://www.ncbi.nlm.nih.gov/pubmed/17415106

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CLINICAL SCHOLARSHIP

Systematic Review of Gender Differences in Sepsis Management and Outcomes

Kim Reina Failla, PhD, RN, NE-BC[1], & Cynthia D. Connelly, PhD, RN, FAAN[2]

1 *Gamma Gamma* and *Zeta Mu*, Clinical Adjunct Faculty, University of San Diego, Hahn School of Nursing and Health Science, San Diego, CA, USA
2 *Zeta Mu*, Professor and Director of Nursing Research, University of San Diego, Hahn School of Nursing and Health Science, San Diego, CA, USA

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Correspondence
Dr. Kim Reina Failla, University of San Diego
Hahn School of Nursing and Health Science,
5998 Alcala Park,
San Diego, CA, 92110. E-mail:
kimfailla@sandiego.edu

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Abstract

Purpose: Contributors to disparities in sepsis management have been attributed to genetic susceptibility, differences in clinical presentation, and healthcare delivery. The influence of gender on survival or mortality of patients with sepsis-related diagnoses is unclear. The purpose of the current study was to systematically review published research to identify factors and outcomes associated with sepsis management and outcomes based on gender differences.

Methods: Covering a period from 2006 to 2016, a literature search was conducted on four electronic data bases including the Cumulative Index to Nursing and Allied Health Literature (CINAHL), EBSCO, MedlinePlus, and PubMed. Content analysis of each article was performed independently by two authors. The guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement was the method used to assess the quality of evidence of the articles in this review.

Findings: A full review was completed on a total of 452 identified potentially relevant publications, and 7 publications met inclusion criteria. The methodological approaches included prospective and retrospective observational studies, and prospective and historical cohort studies. The aim of these studies was to identify if gender differences exist related to sepsis-related mortality, completion of Surviving Sepsis Campaign resuscitation bundle elements, sepsis-related care processes, and sepsis-related incidence and source.

Conclusions: Clinical sepsis studies evaluating gender and sepsis-related management and mortality are inconclusive and complex. Three different outcomes exist: no difference, higher risk in females, or higher risk in males. Further studies are needed to support the presence of gender disparities on sepsis-related healthcare outcomes.

Clinical Relevance: Providers should understand the importance of adhering to sepsis protocols and minimizing treatment disparities including gender differences.

Sepsis-related diagnoses are life-threatening conditions with outcomes linked to timing of identification and appropriate intervention management in the initial hours after sepsis develops. Despite advances in the recognition and treatment of sepsis, it is a leading cause of death and healthcare spending globally (Fleischmann et al., 2016; Torio & Moore, 2016; Xu, Murphy, Kochanek, & Bastian, 2016). Predictors of mortality for those with sepsis-related diagnoses are inconclusive; nonetheless, it is apparent, specifically in the United States, that all populations are not afflicted equally (Braveman, 2012; Madsen & Napoli, 2014; Madsen et al., 2014; Pietropaoli, Glance, Oakes, & Fisher, 2010; Soto, Martin, & Gong, 2013). Notably, disparities occur across a broad range

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Table 1. Systemic Inflammatory Response Syndrome Criteria[a]

Core temperature	>38.3°C or <36°C
Heart rate	>90 beats/min
Respiratory rate	>20 breaths/min
White blood cell count	>12,000/mm^3 or <4,000/mm^3 or >10% immature bands

[a]From Dellinger et al. (2013) and Society of Critical Care Medicine (2015).

of dimensions, including socioeconomic status, age, geography, language, disability status, citizenship status, sexual identity and orientation, race, and gender (Ubri & Artiga, 2016). Identifying disparities in the diagnosis and treatment of sepsis is an important step in the elimination of health inequalities and to inform efforts to reduce the overall rate of sepsis. Indeed, the Affordable Care Act (ACA), the Institute of Medicine (IOM), and the National Institutes for Health (NIH) advocate for research that exposes gaps in care delivery quality, including the care of the septic patient (Soto et al., 2013). In an attempt to fill the gap around sepsis care, the purpose of this systematic review is to identify factors and outcomes associated with sepsis management and outcomes based on gender differences.

Methods

A systematic review was conducted to examine if gender disparities exist in the care delivery for patients with sepsis-related diagnoses. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used as the guideline for this systematic review (Moher, Liberati, Tetzlaff, & Altman, 2009). Sepsis is defined as the presence of infection along with systemic manifestations of infection; severe sepsis is defined as having at least two systemic inflammatory response syndrome (SIRS) criteria (**Table 1**), a suspected source of infection, and at least one organ dysfunction criterion (e.g., lactate greater than 2 mmol/L); septic shock is defined as having at least two SIRS criteria, a suspected source of infection, and hypotension after a 30 mL/kg fluid bolus or hypoperfusion (e.g., lactate greater than 4 mmol/L; Dellinger et al., 2013).

Search Strategy and Inclusion Criteria

MedlinePlus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), EBSCO, and PubMed databases were accessed. The terms used in the search included: "sepsis" OR "sepsis bundle," OR "sepsis management," OR "sepsis protocol," OR "sepsis treatment," OR "Surviving Sepsis Campaign," OR "early goal directed therapy" AND "gender differences." Articles were included if the following criteria were met: peer-reviewed journals; English language; original research and data analysis; and published from 2006 to 2016.

The first author identified potentially relevant articles; then both authors independently selected studies for eligibility by title and abstract. If a discrepancy in study selection existed, the full-text articles were thoroughly reviewed and consensus was reached through discussion with rationale for exclusions documented. The selection of articles is shown in Figure 1. In the first round, 1,573 articles were identified in the electronic databases used, 4 articles were deleted because they represented the same study; 5 additional articles were identified using the articles' reference lists. In the second and third rounds, review for inclusion was conducted at the abstract and full-text level. From the 1,574 articles reviewed, 1,122 were excluded because they were not peer reviewed, not published in English, or not in the specified timeframe. Of the remaining 452 articles, 445 were excluded because the focus of the research was not the management of septic patients.

Summary of Studies and Key Findings

A summary for the seven articles that met the criteria for inclusion is presented in Table 2. All studies had an observational study design, reported frequencies of diagnoses, and study periods. Three studies were prospective and four were retrospective or historical. The studies were conducted globally and sites included the United States (Esper et al., 2006; Madsen & Napoli, 2014; Madsen et al., 2014), France (Adrie et al., 2007), Sweden (Jacobson, Liedgren, Johansson, Ferm, & Winso, 2012), Germany (Nachtigall et al., 2011), and Brazil, Canada, and the United States (Pietropaoli et al., 2010). All study data were extracted from acute care hospital settings, including two studies in academic healthcare systems. The size of the study samples ranged from 127 to 18,757. Six studies used sample sizes greater than 327.

Demographics

Gender was fairly evenly distributed in three of the studies, and ranged from 45% to 46% female and 54% to 55% male (Madsen & Napoli, 2014; Madsen et al., 2014; Pietropaoli et al., 2010). In contrast Adrie et al. (2007), Jacobson et al. (2012), and Nachtigall et al. (2011) reported approximately 20% fewer females than males, and frequency ranged from 37% to 40% female, 54% to 63% male. These findings are indicative of a higher percentage of males having sepsis, severe sepsis, or septic shock compared to females. Race was reported categorically in three studies (Madsen & Napoli, 2014;

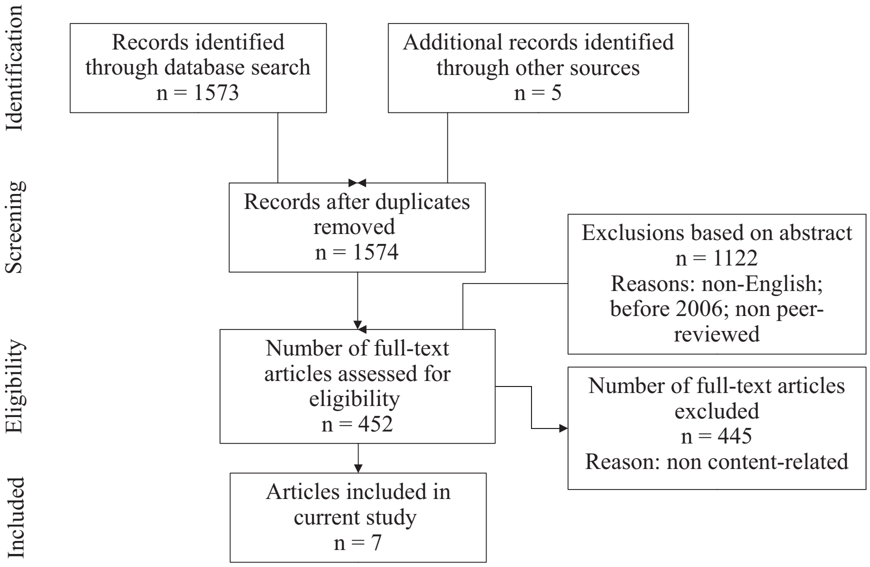

Figure 1. Flow of study selection process.

Madsen et al., 2014; Pietropaoli et al., 2010), and White was a consistent grouping across the three studies (75% to 81% White). In contrast, there was inconsistent reporting of non-White racial categories: 19% non-White (Madsen & Napoli, 2014; Madsen et al., 2014); 13% Black, 8% Latino/Hispanic, 1% Asian/Pacific Islander, <1% Native American, and 6% other (Pietropaoli et al., 2010). Esper et al. (2006) did not display by category, but did report an increased risk in males developing sepsis (average annual relative risk [RR] 1.27, 95% confidence interval [CI] 1.24–1.30), as well as an increased risk of Blacks and other races in developing sepsis (average annual Black RR 1.85, 95% CI 1.75–1.95). Age was reported in six studies, and five presented age ranges: 57 to 63 years (Esper et al., 2006), 64 to 68 years (Madsen et al., 2014); 50 to 78 years (Nachtigall et al., 2011), 65 to 68 years (Madsen & Napoli, 2014), and 52 to 76 years (Pietropaoli et al., 2010). Adrie et al. (2007) dichotomized age to under 50 or over 50 years.

Comorbidities

All studies reported comorbidities or degree of organ function through three scales: the Sequential Organ Failure Assessment (SOFA), the Acute Physiology and Chronic Health Evaluation II (APACHE II), and the Charlson-Deyo Comorbidity Index. Adrie et al. (2007) reported median (with interquartile range [IQR]) SOFA scores, for both females and males. For APACHE II scores, females and males had identical median scores. Jacobson et al. (2012) reported mean (*SD*) SOFA scores upon admission, and APACHE II score gender differences were not statistically significant. This supports the work of Pietropaoli et al. (2010), who reported non-statistically significant median (with IQR) APACHE II scores for females and males. Madsen et al. (2014) reported statistically significant gender differences in mean SOFA scores. Madsen and Napoli (2014) reported females had lower median (with IQR) SOFA scores than males; statistical significance was not reported. In contrast, Nachtigall et al. (2011) reported statistically significant median (with IQR) SOFA scores upon admission for gender. Esper et al. (2006) reported mean Charlson-Deyo scores for both genders; statistical significance was not reported.

Five groups of investigators used the SOFA scoring method to examine the extent of a person's organ function or rate of failure. The score is based on six different scores, one each for the respiratory, hepatic, renal, cardiovascular, coagulation, and neurological systems (the score range is 0 to 24; Adrie et al., 2007; Jacobson et al., 2012; Madsen and Napoli, 2014; Madsen et al., 2014; Nachtigall et al., 2011). Three groups of investigators used APACHE II (Adrie et al., 2007; Jacobson et al., 2012; Pietropaoli et al., 2010). The APACHE II is a severity-of-disease classification system and is applied within 24 hr of admission of a patient to an intensive care unit (ICU). The score range is from 0 to 71, and higher scores correspond to more severe disease and a higher risk of death (Knaus, Draper, Wagner, & Zimmerman, 1985). One group of investigators used the Charlson-Deyo Comorbidity Index (Esper et al., 2006) which contains 19 categories of comorbidity and predicts 10-year mortality. The higher the

Table 2. Gender Differences in Sepsis Management

	Citation, geographical region, and doi	Research aim	Research method	Study sample	Outcome measure	Theme[a]
1	Adrie, C., Azoulay, E., Francais, A., Clec'h, C., Darques, L., & Schwebel, C. (2007). Influence of gender on the outcome of severe sepsis. *Chest, 132*, 1786–1793. France doi:10.1097/CCM.0b013e3181ffde08	To investigate whether mortality from severe sepsis is higher in males versus females	Prospective observational nested case-control	$N = 1,692$ 63% males 37% females	Age ≤50 years: Mortality was 21% for males and 23% for females ($p = .98$). Age ≥50 years: Mortality was 34% for males and 28% for females ($p = .014$). Level of care and rate of invasive procedures similar.	1–5
2	Esper, A. M., Moss, M., Lewis, C. A., Nisbet, R., Mannino, D. M., & Martin, G. S. (2006). The role of infection and comorbidity: Factors that influence disparities in sepsis. *Critical Care Medicine*, *34*(10), 2576–2582. United States doi:10.1097/01.CCM.0000239114.50519.0E	To determine factors that influence occurrence of healthcare disparities in incidence of sepsis based on race and gender	Historical cohort study	$N = 12,505,082$	Case fatality rates were not significantly different across gender groups. Males had higher incidence rates of sepsis after age adjustment to the 2000 U.S. census.	2–5
3	Jacobson, S., Liedgren, E., Johansson, G., Ferm, M., & Winso, O. (2012). Sequential organ failure assessment scores differ between genders in a sepsis cohort: Cause or effect? *Upsala Journal of Medical Science*, *117*, 415–425. Sweden doi:10.3109/03009734.2012.703255	To identify if there are gender differences in patient characteristics, treatment, and outcome related to the occurrence of severe sepsis and septic shock at intensive care unit admission	Prospective observational cohort study	$N = 127$ 61% males 39% females	Gender was not associated with mortality. There were no gender differences regarding frequency or duration of treatment. Males had more respiratory infections (36% vs. 29%, $p < .01$) and females developed sepsis more from genitourinary sources (35% vs. 27%, $p < .01$).	1–5
4	Madsen, T., Simmons, J., Choo, E., Portelli, D., McGregor, A., & Napoli, A. (2014). The disparity study: Do gender differences exist in Surviving Sepsis Campaign resuscitation bundle elements, or sepsis mortality? *Journal of Critical Care*, *29*, 473e7–473e11. United States doi:10.1016/j.jcrc.2014.01.002	To explore if females have lower Surviving Sepsis Campaign resuscitation bundle completion rates	Retrospective observational study	$N = 814$ 55% males 45% females 80% White	No overall association between gender and bundle completion. Females less likely to receive antibiotics within 3 hr (60.5% vs. 68.8%, $p = .01$) and less likely to reach target $S_{CV}O_{2.} > 70$ (31.3% vs. 39.5%, $p = .05$).	1–5

Continued

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Table 2. *Continued*

	Citation, geographical region, and doi	Research aim	Research method	Study sample	Outcome measure	Theme[a]
5	Madsen, T., & Napoli, A. M. (2014). The disparity-II study: Delays to antibiotic administration in women with severe sepsis or septic shock. *Academic Emergency Medicine*, *21*, 1499–1502. United States doi:10.1111/acem.12546	To investigate whether gender and/or source of infection is associated with delays in antibiotics in patients with severe sepsis	Retrospective observational study	*N* = 771 55% males 45% females 81% White 19% non-White 8% Hispanic	Overall mean time to antibiotics was 153 min in males and 184 min in females. Urinary tract infection rates for females were 35% and pneumonia was present in 47% of males. Females experienced longer delays to initial antibiotics for severe sepsis or septic shock after adjusting for infection source. Pneumonia was associated with shorter times to antibiotic administration.	1–4
6	Nachtigall, I., Tafelski, S., Rothbart, A., Kaufner, L., Schmidt, M., Tamarkin, A., . . . Spies, C. (2011). Gender-related outcome difference is related to course of sepsis on mixed ICUs: A prospective, observational clinical study. *Critical Care*, *15*(3), R151. Germany doi:10.1186/cc10277	To describe the impact of gender on sepsis outcome for ICU patients	Prospective observational study	*N* = 327 60% males 40% females	For septic patients in the ICU, mortality was 23.1% for females versus 13.7% for males ($p = .036$). Males obtained a higher intensity/more invasive procedures of care in the ICU. Females had a higher rate of urinary tract infections and males had a higher rate of pneumonia.	1–5
7	Pietropaoli, A. P., Glance, L. G., Oakes, D., & Fisher, S. G. (2010). Gender differences in mortality in patients with severe sepsis or septic shock. *Gender Medicine*, *7*(5), 422–437. United States, Canada, and Brazil doi:10.1016/j.genm.2010.09.005	To test the hypothesis that hospital mortality is higher in males than females with severe sepsis or septic shock who require intensive care	Retrospective cohort study	*N* = 18,757 54% males 46% females 75% White 13% Black	Mortality for severe sepsis/septic shock was 35% for females and 33% for males ($p = .006$). Females were less likely to receive deep venous thrombosis prophylaxis and invasive mechanical ventilation. Females were more likely to receive red blood cell transfusions.	1–5

Note: ICU = intensive care unit.

[a] Theme 1: Care Processes and Clinical Variables; Theme 2: Comorbid Conditions; Theme 3: Diagnosis Incidence and Database Information; Theme 4: Infection Source; Theme 5: Mortality.

score, the higher the number of comorbid conditions, and the higher the risk of mortality (Deyo, Cherkin, & Ciol, 1992).

In summary, five of the studies showed lower comorbidity index or organ function scores in females versus males, and three of these findings were statistically significant (Esper et al., 2006; Jacobson et al., 2012; Madsen & Napoli, 2014; Madsen et al., 2014; Nachtigall et al., 2011). Two studies showed no difference in comorbidity index scores, using the APACHE II by gender (Adrie et al., 2007; Pietropaoli et al., 2010). On the other hand, Adrie et al. (2007) reported SOFA scores by gender, and this difference was statistically significant.

Infection Source

Six studies reported infection source data. Adrie et al. (2007) found the rate of pneumonia to be statistically significantly higher in males than females, and the rate of urinary tract infection (UTI) statistically higher in females compared to males. No statistically significant gender differences were found for chronic obstructive pulmonary disease as a site of infection. Esper et al. (2006) found females were less likely to have respiratory infections compared to males, yet more commonly developed sepsis from genitourinary sources. This supports the work of Jacobson et al. (2012), who reported the primary infection site for females was abdominopelvic and a non-statistically significant difference in the secondary primary infection site pneumonia. Similarly, Madsen and Napoli (2014) found fewer females had pneumonia, yet more UTIs compared to males; statistical significance was not reported. Nachtigall et al. (2011) reported non-significant gender differences when the primary source of infection was pneumonia. The secondary source was soft tissue and wounds for females, yet there were statistically significant gender differences for the third most prevalent infection source, the lower urinary tract. Females had more UTIs compared to males. Pietropaoli et al. (2010) found males had a statistically higher rate of infections related to the chest area compared to females and a lower rate of UTIs compared to females; the difference between genders in third most prevalent source of infection, bloodstream-related, approached statistical significance.

There are clear differences in infection sources based on gender. Two primary sites of infection emerged: chest (including pneumonia and the respiratory tract) and the urinary tract. Six studies reported higher rates of infection in the chest region in males (Adrie et al., 2007; Esper et al., 2006; Jacobson et al., 2012; Madsen and Napoli, 2014; Nachtigall et al., 2011; Pietropaoli et al., 2010). Only three studies cited statistical significance in these differences (Adrie et al., 2007; Esper et al., 2006; Pietropaoli et al., 2010). Five studies reported a higher rate of UTIs in females (Adrie et al., 2007; Esper et al., 2006; Madsen and Napoli, 2014; Nachtigall et al., 2011; Pietropaoli et al., 2010). All five studies cited statistical significance in these differences.

Outcome Measures

The studies addressed various outcome measures associated with gender, including care processes, clinical variables, and mortality (**Table 3**). The Surviving Sepsis Campaign (SSC) has provided a framework for patients with sepsis-related diagnoses (Society of Critical Care Medicine [SCCM], 2015). The framework includes guidelines for the septic patient, including administration of deep vein thrombosis (DVT) prophylaxis related to systemic inflammatory response, administration of packed red blood cells (PRBCs) related to shock, administration of invasive mechanical ventilation (IMV) related to respiratory failure, antimicrobial therapy, and vasopressor support for persistent hypotension. The framework also includes performance improvement indicators, including hemodynamic monitoring, tissue perfusion measurement (e.g., lactate), and assessment of infection through blood cultures (SCCM, 2015).

Care Processes and Clinical Variables

Six of the studies reported on a combination of care processes and clinical variables. Care processes include DVT prophylaxis, administration of PRBCs, IMV, antibiotic administration, and vasopressor administration. Clinical variables include central venous monitoring, lactate, and blood culture measurement.

Care processes. Three of the studies reported on care processes, including DVT prophylaxis, administration of PRBCs, and IMV. Two studies reported on DVT prophylaxis with inconclusive results. Pietropaoli et al. (2010) reported that fewer females received DVT prophylaxis, and their findings were statistically significant. On the other hand, in the study by Jacobson et al. (2012), more females received DVT prophylaxis, and these findings were not statistically significant. Two studies reported on administration of PRBCs with conclusive results (Jacobson et al., 2012; Pietropaoli et al., 2010). Both groups found more females received significantly more PRBC transfusions than males. Finally, four articles reported on IMV with inconsistent results (Adrie et al., 2007; Jacobson et al., 2012; Nachtigall et al., 2011; Pietropaoli et al., 2010). All researchers reported fewer females received IMV, yet only the study by

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Table 3. Gender Differences in Sepsis Outcomes

	Citation, geographical region, and doi	Demographics	Comorbidities	Infection source	Care delivery	Outcomes
1	Adrie, C., Azoulay, E., Francais, A., Clec'h, C., Darques, L., & Schwebel, C. (2007). Influence of gender on the outcome of severe sepsis. *Chest*, *132*, 1786–1793. France doi:10.1097/CCM.0b013e3181ffde08	$N = 1{,}692$ patients with severe sepsis. Female: 37% Male: 63% No race reported	Median (with IQR) SOFA scores: Females: median scores of 6 (4–8) Males: median scores of 6 (4–9) $p = .04$. For APACHE II scores, females and males had identical median scores (with IQR): 19 (14–24), $p = .95$.	Pneumonia: statistically significantly higher in males (47.1%) than females (35.8%), $p < .0001$. UTI: statistically higher in females (10.8%) compared to 4.8% in males, $p < .0001$. No statistically significant gender differences were found for COPD as a site of infection: Females: 14.7% Males: 14%	Females: statistically significant shorter mechanical ventilation times than males, 7 days versus 9 days, $p = .01$. Not statistically significant: more males received mechanical ventilation (35% vs. 30% females, $p = .12$), antibiotics (91% vs. 86% females, $p = .08$), and vasopressor support (51% vs. 50% females, $p = .62$).	Hospital mortality rates for patients >50 years old: statistically significantly lower in females (adjusted *OR*, 0.75; 95% CI 0.57–0.97; $p = .02$). Not statistically significant for overall hospital mortality for patients <50 years old (*OR*, 1.01; 95% CI 0.52-1.97; $p = .98$).
2	Esper, A. M., Moss, M., Lewis, C. A., Nisbet, R., Mannino, D. M., & Martin, G. S. (2006). The role of infection and comorbidity: Factors that influence disparities in sepsis. *Critical Care Medicine*, *34*(10), 2576–2582. United States doi:10.1097/01.CCM.0000239114.50519.0E	$N = 12{,}505{,}082$ patients with sepsis. No gender reported No race reported	Mean (with 95% CI) Charlson-Deyo scores. Females scores: 1.37 (95% CI 1.35–1.39) Males scores: 1.54 (95% CI 1.52–1.56) Statistical significance was not reported.	Females: less likely to have respiratory infections (29%) Males: 36% $p < .01$. Females: more commonly developed sepsis from genitourinary sources (35%) Males: 27% $p < .01$.		Mortality rates for females: 20.5% Mortality rates for males: 20.1%

Continued

Table 3. *Continued*

	Citation, geographical region, and doi	Demographics	Comorbidities	Infection source	Care delivery	Outcomes
3	Jacobson, S., Liedgren, E., Johansson, G., Ferm, M., & Winso, O. (2012). Sequential organ failure assessment scores differ between genders in a sepsis cohort: Cause or effect? *Upsala Journal of Medical Science*, *117*, 415–425. Sweden doi:10.3109/03009734.2012.703255	$N = 127$ patients with either severe sepsis or septic shock. Female: 39% Male: 61% No race reported	Mean (*SD*) SOFA scores upon admission: Females: (7.5 [*SD* 3.88]) Males: (8.1 [*SD* 3.87]), and APACHE II scores: Females: (19.6 [*SD* 6.01]) Males: (20.0 [*SD* 6.88]). Differences were not statistically significant, respectively.	Primary infection site for females: abdominopelvic (34% compared to 10% for males, $p = .002$). Secondary primary infection site: pneumonia (20% compared to 22% for males) and this was not statistically significant.	More females than males received PRBC transfusions (72% vs. 53% males, $p = .04$). There were no other statistically significant differences in other care processes by gender.	No gender-related differences in mortality rates.
4	Madsen, T., Simmons, J., Choo, E., Portelli, D., McGregor, A., & Napoli, A. (2014). The disparity study: Do gender differences exist in Surviving Sepsis Campaign resuscitation bundle elements, or sepsis mortality? *Journal of Critical Care*, *29*, 473e7–473e11. United States doi:10.1016/j.jcrc.2014.01.002	$N = 814$ patients with either severe sepsis or septic shock. Female: 45% Male: 55% White: 80%	Statistically significant gender differences in mean SOFA scores (with 95% CI): Females: (6.2, 95% CI 5.9–6.5) Males: (6.9, 95% CI 6.9–7.5) $p < .001$.		Females: less likely to receive antibiotics within 3 hr (60.5% vs. 68.8% males, $p = .01$); also less likely to reach a target central venous monitoring of >70 (31.3% vs. 39.5% males, $p = .05$). Nonsignificant results were reported for lactate measured (93.2% females vs. 94.7% males, $p = .37$), blood cultures performed (78.6% females vs. 81.5% males, $p = .30$), and vasopressor support (89.4% vs. 90.1% males, $p = .78$).	Females have greater non-statistically significant mortality than males (25.2% vs. 23.2%, respectively, $p = .55$).

Continued

Table 3. *Continued*

	Citation, geographical region, and doi	Demographics	Comorbidities	Infection source	Care delivery	Outcomes
5	Madsen, T., & Napoli, A. M. (2014). The disparity-II study: Delays to antibiotic administration in women with severe sepsis or septic shock. *Academic Emergency Medicine*, *21*, 1499–1502. United States doi:10.1111/acem.12546	$N = 771$ patients with either severe sepsis or septic shock. Female: 45% Male: 55% White: 81% Non-White: 19% (including 8% Hispanic)	Females: lower median (with IQR) SOFA scores 6 (4-8). Males: (7 [5–9]) Statistical significance was not reported.	Fewer females had pneumonia (35.8%, 95% CI 30.8%-40.8%) versus males (46.9%, 95% CI 42.1%–51.7%). More females had UTIs (35.2%, 95% CI 30.2%–40.3%) versus males (23.7%, 95% CI 19.6%–27.8%). Statistical significance was not reported.	The mean time to antibiotics in females was 1.18 times longer than in males (*OR* 1.18; 95% CI 1.07–1.30, $p = .01$) after adjusting for infection source and other covariates. Fewer females received antibiotics within 3 hr (61.3% vs. 68.7% males), $p = .03$.	
6	Nachtigall, I., Tafelski, S., Rothbart, A., Kaufner, L., Schmidt, M., Tamarkin, A., . . . Spies, C. (2011). Gender-related outcome difference is related to course of sepsis on mixed ICUs: A prospective, observational clinical study. *Critical Care*, *15*(3), R151. Germany doi:10.1186/cc10277	$N = 327$ subgroup patients with either severe sepsis or septic shock. Female: 40% Male: 60% No data on race reported.	Statistically significant median (with IQR) SOFA scores upon admission for gender. Females: 5 (3–7) Males 6 (4–9) $p < .05$.	Non-significant gender differences when the primary source of infection was pneumonia: Females: 53.8% Males: 62.9% Secondary source was soft tissue/wounds: Females: 29.2% Males: 27.9% Statistically significant gender differences for the third most prevalent infection source, lower urinary tract: Females: 23.1% Males: 5.6% $p < .05$.	No statistically significant differences for the time to antibiotics. The duration from onset of sepsis to antibiotic therapy for females had a median (with IQR) time of 0.54 hr (0.0–4.7 hr) versus 1.5 hr (0.0–6.3 hr), $p = .13$. Female patients: fewer IMV hours (85 hr [16–300 hr] versus 96 hr [22–305 hr] males; the differences were not statistically significant.	ICU mortality: Females: 23.1% Males: 13.7% $p = .037$

Continued

Table 3. *Continued*

	Citation, geographical region, and doi	Demographics	Comorbidities	Infection source	Care delivery	Outcomes
7	Pietropaoli, A. P., Glance, L. G., Oakes, D., & Fisher, S. G. (2010). Gender differences in mortality in patients with severe sepsis or septic shock. *Gender Medicine*, *7*(5), 422–437. United States, Canada, and Brazil doi:10.1016/j.genm.2010.09.005	$N = 18{,}757$ patients with either severe sepsis or septic shock. Female: 46% Male: 54% White: 75% Black: 13%	Non-statistically significant median (with IQR) APACHE II scores. Females: 21 (15–27) Males: 21 (15–27) $p = .49$	Males had a higher rate of infections related to the chest area (48%) compared to females at (37%), $p < .001$, and a lower rate of UTIs (19%) compared to females at 31%. The third most prevalent source of infection, bloodstream-related, approached statistical significance (females at 23% vs. males, 24%), $p = .06$.	Females: less likely to receive DVT prophylaxis ($OR = 0.90$; 95% CI 0.84–0.97, $p = .003$), or IMV ($OR = 0.81$; 95% CI 0.76–0.86, $p < .001$). Females: more likely to receive PRBC transfusions ($OR = 1.15$; 95% CI 1.09–1.22, $p < .001$).	Females: higher likelihood of hospital mortality than males ($OR = 1.11$; 95% CI 1.04–1.19, $p = .002$).

Note: APACHE II = Acute Physiology and Chronic Health Evaluation II; CI = confidence interval; COPD = chronic obstructive pulmonary disease; DVT = deep vein thrombosis; IMV = invasive mechanical ventilation; IQR = interquartile range; *OR* = odds ratio; PRBC = packed red blood cell; SOFA = Sequential Organ Failure Assessment; UTI = urinary tract infection.

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Pietropaoli et al. (2010) cited statistical significance. In the article by Nachtigall et al. (2011), researchers reported that females received fewer hours of ventilation than males, but this result was not statistically significant.

Four studies reported findings on antibiotic administration (Adrie et al., 2007; Madsen & Napoli, 2014; Madsen et al., 2014; Nachtigall et al., 2011). Adrie et al. (2007) reported fewer females received antibiotics than males, and this was statistically significant. Both Madsen and Napoli (2014) and Madsen et al. (2014) found females were statistically less likely than males to receive antibiotics within 3 hr. Madsen and Napoli (2014) also found the mean time to antibiotics was longer in females than in males. However, Nachtigall et al. (2011) found the duration from onset of sepsis to antibiotic therapy for females was shorter than for males, but this finding was not statistically significant. The SSC has indicated bundle elements are implemented from time of presentation, which is defined as the time of triage in the emergency department (SCCM, 2015).

Two studies looked at vasopressor support. Adrie et al. (2007) found fewer females received vasopressor support, but this result was not statistically significant. On the other hand, Madsen et al. (2014) also found fewer females received vasopressor support, and this result was statistically significant.

Clinical variables. The study by Madsen et al. (2014) was the only one to report findings on target central venous monitoring, lactate measured, and blood cultures performed. They found statistically significant results for central venous monitoring—females did not reach the target level compared to males. Nonsignificant results were found in lactate measured and blood cultures performed, which are key components of the SSC bundle (Madsen et al., 2014).

Mortality

Six studies reported mortality rates. Adrie et al. (2007) reported overall hospital mortality (for patients over 50 years old) was statistically significantly lower in females but not statistically significant for overall hospital mortality for patients less than 50 years old. In contrast, Esper et al. (2006) and Madsen et al. (2014) reported case-fatality rates as similar when stratified by gender. These findings were supported by Jacobson et al. (2012), who tracked patients for 2 years and during this follow-up period reported no gender-related differences in mortality rates. In earlier studies, Nachtigall et al. (2011) found ICU mortality higher for females compared to males; Pietropaoli et al. (2010) reported, after adjusting for differences in baseline characteristics and processes of care, that females had a higher likelihood of hospital mortality than males.

Despite the slight variations in research design used to answer specific questions related to the course of care and outcomes for septic patients, mortality was high in both females and males. Nevertheless, of the six studies with findings related to mortality, the mortality outcome was inconsistent. One study found a lower rate of mortality in females and when separated by age; those greater than 50 years old reported a statistically significant difference, with mortality lower in females; for the group less than 50 years old, there was not a statistically significant difference between gender (Adrie et al., 2007). Two studies showed no differences related to gender (Esper et al., 2006; Jacobson et al., 2012). It should be noted that Esper et al. (2006) included the diagnosis of sepsis, but cases were not delineated as severe sepsis or septic shock. In contrast, Jacobson et al. (2012) had a small sample size ($N = 127$) and only included patients diagnosed with severe sepsis and septic shock. Finally, three studies found mortality or the likelihood of mortality to be higher in females (Madsen et al., 2014; Nachtigall et al., 2011; Pietropaoli et al., 2010). All three studies included patients diagnosed with either severe sepsis or septic shock, and diagnoses and gender frequencies. Findings from Nachtigall et al. (2011; 44% female versus 56% male) and Pietropaoli et al. (2010; 46% female versus 54% male) were statistically significant. Findings from Madsen et al. (2014; 45% female versus 55% male) approached significance.

Discussion

This review sought to examine factors and outcomes associated with gender-related differences in sepsis management and outcomes, although not all studies reviewed included the same variables. Extant studies identify contributors to health disparities in sepsis management, including differences in clinical presentation and healthcare delivery systems (Soto et al., 2013). Currently, clinical sepsis studies evaluating the influence of gender on survival or mortality of patients with sepsis-related diagnoses are complex, inconclusive, and unclear (Adrie et al., 2007; Esper et al., 2006; Nachtigall et al., 2011; Pietropaoli et al., 2010). Other researchers reported care delivery differed based on gender for those with sepsis-related diagnoses (Madsen & Napoli, 2014; Madsen et al., 2014; Pietropaoli et al., 2010). Consequently, clinical sepsis studies reported conflicting results for the influence of gender on medical conditions and infectious disease processes. The seven

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studies included in this systematic review each contributed results relevant to the understanding of factors associated with sepsis-related diagnoses and gender differences.

Although articles published from 2006 through 2016 were selected, the study periods varied greatly. Esper et al. (2006) utilized database data for nearly 25 years, from 1979 to 2003. Although they did not differentiate the population by sepsis, severe sepsis, and septic shock, they did report the population mean with organ dysfunction systems, and this is indicative of the portion of the study sample with severe sepsis or septic shock. Adrie et al. (2007) collected data for nearly 9 years, from 1997 to 2005. Three studies collected data from the mid-2000s (Jacobson et al., 2012; Nachtigall et al., 2011; and Pietropaoli et al., 2010). Madsen and Napoli (2014) and Madsen et al. (2014) included more current information, with data collected from October 2005 through December 2012. This information is important because the definitions for sepsis, severe sepsis, and septic shock were officially launched in 1992 (Bone et al., 1992), yet the SSC was not formed until 2002. It was not until 2004 that the SCCM in conjunction with the Institute for Healthcare Improvement formed guidelines and bundles to treat septic patients (Dellinger et al., 2013; SCCM, 2016). The guidelines and bundles have been revised twice (in 2008 and again in 2012) based on new medical evidence. Participants in the revisions of these international guidelines and bundles include physicians from the United States, Brazil, Canada, France, and Germany, sites where the majority of the studies took place. These publications also show a substantial increase in the evaluation of gender differences in regard to patients with sepsis-related diagnoses. One explanation may be the passage of the Affordable Care Act in 2010 and the goal to eliminate health disparities in the United States (Soto et al., 2013). The ACA, IOM, and NIH have all advocated for research that exposes gaps in care delivery quality (Soto et al., 2013). Further research is warranted to assess SSC compliance since the bundle is evidence based. Are there gender disparities in the use of validated SSC bundle therapies? Additional studies may consider biological confounders, sex-steroid profiles, or baseline hormonal status for females, which may be a protective factor in critical illness.

Limitations

The findings of this systematic review must be viewed in the context of its limitations. The initial abstract screening was conducted by one investigator, and this review only included English language publications in peer-reviewed journals published from 2006 to 2016, thus potentially excluding other relevant articles. In the review, sample sizes varied greatly and used cross-sectional designs, thus limiting generalizability. The studies reviewed also clearly used different methods to look at gender differences and sepsis outcomes. For example, one researcher looked at the diagnosis of sepsis compared to the others, who looked at the diagnoses of severe sepsis and septic shock. It was not clear what the researchers meant by gender when collecting their data; consequently, assumptions had to be made about the care delivery and outcomes in this systematic review. Lastly, each of the studies did not capture all salient covariates (e.g., race). Nonetheless the covariates considered in this review captured as many potential factors as realistically possible, including comorbidity index scoring, clinical variables, care management processes, and infection source. Despite these limitations, this review provides important information for gender-related health disparities in the identification and treatment of sepsis.

Implications for Practice

Based on what is reported in this systematic review, it is importance for providers to receive education regarding treatment disparities, including gender differences for patients with sepsis-related diagnoses. Perhaps this education will elucidate the different presenting symptoms and provider impressions of the severity of illness. One could speculate septic females do not appear as sick as septic males upon admission to the hospital, resulting in less aggressive treatment. Enhancements to electronic medical records to include built-in alerts to notify providers if a patient is exhibiting the signs of sepsis may be helpful. Finally, an overall increased awareness of sepsis by healthcare providers, healthcare organizations, insurers, patients, and families may help to improve the overall health and wellness of septic patients.

Clinical Resources

- Centers for Disease Control and Prevention. Sepsis questions and answers: http://www.cdc.gov/sepsis/basic/qa.html
- National Institutes of Health. Sepsis fact sheet: https://www.nigms.nih.gov/Education/pages/factsheet_sepsis.aspx

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Effects of a Multicomponent Restraint Reduction Program for Korean Nursing Home Staff

Eun-Hi Kong, PhD, RN[1], Eunjin Song, MSHM, RN[2], & Lois K. Evans, PhD, RN, FAAN[3]

1 *Xi*, Associate Professor, Gachon University, College of Nursing, Gyeonggi-do, Korea (ROK)
2 Doctoral student, Kyung Hee University, College of Nursing Science, Seoul, Korea (ROK)
3 *Xi*, Professor Emerita of Nursing, University of Pennsylvania, School of Nursing, Philadelphia, PA, USA

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Correspondence
Dr. Eun-Hi Kong, Gachon University,
Seongnamdaero 1342 Bokjeong-dong,
Seongnam-si, Gyeonggi-do, 13120, Korea (ROK).
E-mail: ehkong@gachon.ac.kr

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Abstract

Purpose: Physical restraints are used frequently in Korea, suggesting a growing need for access to programs focused on reduction. The aim of this study was to evaluate the effects of a multicomponent restraint reduction program (MRRP) for nursing staff in Korean nursing homes.

Design: A cluster-randomized, single-blind, controlled pretest-posttest design was used. A total of 122 nursing staff (nurses and geriatric care assistants) in two Korean nursing homes participated in this study: 62 in the experimental group (EG) and 60 in the control group (CG).

Methods: Nursing staff in the EG home received the MRRP comprising three educational sessions (two classroom-based and one web-based) and two unit-based consultations. Three instruments were used to measure nursing staff's knowledge, perceptions, and attitudes regarding physical restraints. Data were collected immediately before and after the intervention, and again 1 and 3 months later.

Findings: Repeated measures analysis of variance showed significant differences between groups in knowledge ($p < .001$), perceptions ($p < .001$), and attitudes ($p = .011$) over time. These significant improvements in the MRRP group (EG) were sustained over the 3-month period.

Conclusions: The MRRP effectively improved the knowledge, perceptions, and attitudes of nursing home staff about restraint use with older adults. Additional studies are recommended to evaluate effects of its components while using larger samples and rigorous research methods and measurements, and the inclusion of boosters or other supports to sustain change.

Clinical Relevance: These results provide valuable knowledge regarding a multicomponent intervention for changing nursing home staff attributes that likely influence clinical practice. Elements of the educational content and methods found useful for nursing home staff may also be effective in vocational and continuing education as well as for families of older nursing home residents.

Physical restraint use has many harmful effects for older adults, including death, serious injury, falls, decreased activities of daily living, pressure ulcers, incontinence, and increased duration of hospitalization, as well as fear, anger, humiliation, dehumanization, and powerlessness (Evans, Wood, & Lambert, 2003; Hofmann & Hahn, 2014; Strout, 2010). However, physical restraints have been widely used as "common practice" in many nursing homes around the world. Definitions have varied across countries, prompting a recent Delphi study to develop an internationally accepted definition of physical restraint: "Any action or procedure that prevents a person's free

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body movement to a position of choice and/or normal access to his/her body by the use of any method, attached or adjacent to a person's body that he/she cannot control or remove easily" (Bleijlevens, Wagner, Capezuti, & Hamers, 2016, p. 2309).

Differences in operational definitions notwithstanding, the prevalence of physical restraint has significantly decreased over the past two decades in Western countries, especially in the United States and Europe. In Asia (except for Japan), however, the prevalence of restraint use in nursing homes remains very high: 62% in Taiwan, 23% in Singapore, and 20% in Hong Kong (Feng et al., 2009; Huang, Huang, Lin, & Kuo, 2014; Mamun & Lim, 2005). In Korea (ROK), "harmful effects of physical restraint use" became an important social and ethical issue following several events (misuse or overuse of physical restraints) reported in some long-term care hospitals. There are, however, no national statistics or research reports that give the incidence or prevalence of nursing home residents who are restrained in Korea. A recent study that examined 307 randomly selected older residents from 10 nursing homes reported that 78.2% of the elders were restrained by full-side bed rails and 31.9% of them by trunk restraints and/or chairs preventing rising (Yoo & Kim, 2016).

The Korean Ministry of Health and Welfare distributed a "Protection of Human Rights and Safety Management Guideline for the Elderly Living in Institutions" in 2015. The guideline requires a resident's or family's informed consent and detailed nursing records of physical restraint use, but does not clearly describe who is responsible for ordering physical restraint (Ministry of Health and Welfare, 2015). In its 2015 evaluation of Korean long-term care facilities, however, the National Health Insurance Service (2016) found that only 35.4% of 3,623 (90.8%) Korean long-term care facilities obtained residents' or families' informed consent for restraint use.

According to Korea's Elderly Welfare Act, long-term care facilities should employ at least one attending physician or make a contract with a medical institute for medical services. The Ministry of Health and Welfare (2016) recently reported that 68.7% of Korean long-term care facilities have an attending physician and 31.2% of them have a contract with a medical institute. That same report noted that 64.2% of the attending physicians visit long-term care facilities once every 2 weeks and the average time spent per resident is only 2–3 min (Ministry of Health and Welfare, 2016). Therefore, in many Korean nursing homes, a doctor's order for restraint use is, by default, based primarily on the nurses' opinions. In some nursing homes, nurses have the responsibility for ordering restraints. In addition, nurses in some Korean nursing homes suffer from heavy workloads so that restraint application and record of restraint use are delegated to geriatric care assistants (GCAs), resulting in incomplete or absent records. Furthermore, some nurses and many GCAs still view certain types of physical restraints (e.g., side rails, mitts, or geriatric chairs with fixed tray table) as "protectors," resulting in incomplete and incorrect records of restraint use.

A recent systematic review (Möhler & Meyer, 2014) reported that, although nurses in geriatric care described negative feelings about restraint use, they both perceived the need to restrain and also decided to use restraint when in doubt. Nurses' attitudes toward restraint use have remained essentially unchanged over the past two decades (Möhler & Meyer, 2014). In addition, nursing staff in different countries reported dissimilar attitudes towards use of physical restraint (Hamers et al., 2009). Two studies highlighted lack of education as an important barrier to physical restraint reduction in Korea (Kim, Kim, Kim, & Park, 2011; Kong & Evans, 2012), and the urgent need for education of nurses in appropriate decision making about physical restraint use has been argued by others (Goethals, de Casterlé, & Gastmans, 2012). Recently, a growing number of Asian gerontological researchers have stressed the need for education about restraint reduction strategies for nursing staff (Huang et al., 2014; Kong & Evans, 2012; Mamun & Lim, 2005). Also, Korean researchers have specifically pointed out educational needs—lack of practical education and lack of professional education about restraint reduction—for staff in Korean nursing homes (Kang, 2016; Kim & Oh, 2006; Kong & Evans, 2012). To date, however, there have been few randomized controlled studies of the effectiveness of educational programs in reducing restraint use around the world and especially in Asia, including Korea. Furthermore, a recent meta-analysis study reported that the effects of educational interventions on restraint practice are inconsistent (Möhler, Richter, Köpke, & Meyer, 2011).

Research Objectives

The purpose of this study was to evaluate the longitudinal effects on nursing home staff's knowledge, perceptions, and attitudes of a multicomponent restraint reduction program (MRRP) using a randomized controlled trial. While measuring behavioral change (reduction in restraint use) following implementation of the MRRP was desirable, the reluctance of nursing homes to participate in the study or to permit determination of restraint use through observation or chart review led us to limit our focus in this initial study to changing staff attributes. The research objective was to test two

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hypotheses: (H1) Following completion of the MRRP, the experimental group will have more improvement in knowledge, perceptions, and attitudes regarding restraint than the control group; (H2) The effects of MRRP will be maintained throughout 3 months following the intervention.

Methods

Theoretical Model

This study is based on Lewin's (1947) change theory: successful change includes three stages—unfreezing, moving (change), and freezing. The unfreezing stage includes motivating nursing staff for change (restraint reduction), the moving stage involves encouraging nursing staff to adopt change, and the freezing stage involves consolidating restraint reduction at a quasistationary equilibrium (Lewin, 1947; Strumpf, Evans, Wagner, & Patterson, 1992). Despite increased social awareness of the harmful effects of restraint use, many nursing staff in Korean nursing homes still regard certain physical restraints as protectors, show resistance to change, and frequently use physical restraints (Kong & Evans, 2012; Yoo & Kim, 2016). The MRRP targeted facilitation of nursing staff movement through the stages of restraint reduction by providing education and consultations.

Research Design

A cluster-randomized controlled trial was used to evaluate the effects of the MRRP, which included both education (two classroom-based sessions and one self-directed web-based component) and consultation (two unit-based sessions). Two nursing homes were randomized to either the experimental group (EG) or control group (CG) to avoid contamination across nursing staff within each nursing home. Nursing staff (nurses and GCAs) in the EG received MRRP, while those in the CG did not. Using a repeated-measures design, data were collected from the two groups immediately before the intervention (pretest) and again immediately following (posttest 1) and 1 and 3 months after (posttests 2 and 3) the intervention. Research assistants distributed and collected all questionnaires at all four time points, with assistance from the directors of nursing and head nurses in the two nursing homes. The study was conducted from January to June 2015.

Sample, Setting, and Recruitment

Administrators of eight nursing homes that met inclusion criteria were contacted and invited to participate in this study. To be invited, nursing homes needed to: (a) have more than 70 nursing staff; (b) be located in Seoul and Gyunggi provinces; (c) have used physical restraints; (d) have conducted no educational programs about restraint reduction within the past 6 months; (e) have no plan to initiate restraint reduction education within the next 6 months; and (f) be owned and operated by their city. Administrators of two nursing homes agreed to participate in the study. Six others declined for the following reasons: resistance (or ambivalence) to restraint reduction because of concerns about accidents, imminent plans to conduct educational programs other than restraint reduction, and lack of time or heavy workloads due to upcoming governmental inspections.

The two included nursing homes were evaluated as high-quality nursing homes (National Health Insurance Service, 2016) in Korea and received a resident's or family's informed consent for restraint use annually. In the EG nursing home, an attending physician had the responsibility for ordering restraints; decisions about restraint use, however, were usually made by nurses because the attending physician did not have enough time for this level of care. In the CG nursing home, nurses had the responsibility for ordering restraints. In both nursing homes, however, the physician's or nurse's decision about restraint use was affected by the opinions of GCAs who provided direct care to residents, including applying and removing restraints under supervision or with permission of nurses.

Within the two included homes, nursing staff were eligible to participate if they: (a) were permanent nursing home employees (nurses and GCAs), (b) had no problem in visual function or hearing, (c) could speak and read Korean fluently, (d) had not received any education about restraints within the past 6 months, (e) had had experience using physical restraints, (f) had no plan to participate in other restraint reduction educational programs within the next 6 months, and (g) had no plan to quit their job within the next 6 months.

In the previous studies that explored the combined effect of educational and consultation interventions (Evans et al., 1997; Huizing, Hamers, Gulpers, & Berger, 2009), no effect sizes were reported and, furthermore, results were inconsistent: statistically significant effects in Evans et al.'s study (1997) and no effects in Huizing et al.'s study (2009). In another study that examined the effect of solely an educational intervention (control group pretest-posttest design), there were small but statistically significant effects of the intervention (Kong, 2012). In our study, sample size was calculated by an independent researcher using G∗ power 3.0.10. software (Franz Faul, Kiel, SH, Germany; number of groups = 2, number of measurements = 4, $\alpha = .05$, power = .8, and effect size = .11), and total sample size was 114 persons.

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Estimating an anticipated 10% withdrawal rate, a total of 126 eligible participants were needed.

All eligible nursing staff (nurses and GCAs) in the two nursing homes were invited to participate and 126 nursing staff volunteered (66 in EG, 60 in CG; **Figure 1;** Schulz, Altman, Moher, & for the CONSORT Group, 2010). Four EG participants discontinued involvement in the intervention, giving no reason, and withdrew before posttest 1 (see **Figure 1)**. Finally, a total of 122 participants (62 in EG, 60 in CG) completed all waves of the study (see **Figure 1)**.

Randomization, Allocation, and Blinding

The two nursing homes were randomly assigned to either the EG or CG. To conceal the allocation sequence, sealed opaque allocation envelopes were used by a consultant (independent nurse researcher) who was not involved in this study. Nursing home staff from the both facilities were blinded to group. Neither directors of nursing nor participants knew about their allocation or the existence of the other nursing home. Research assistants were blinded, but investigators were not.

Intervention

The MRRP was composed of three educational sessions (two classroom-based and one self-directed web-based) and two unit-based consultations that were delivered over a 6-week period. All 62 participants in the EG completed the three educational sessions.

Session 1. The first 40-min educational session was held in a classroom in the EG nursing home. The primary researcher (E.K.) introduced the educational program and provided a definition of physical restraints and information about their harmful effects. As an experiential component, six participants agreed to be restrained during the session. All participants were asked to discuss their views about their reasons for using physical restraint in their practice, and the restrained participants were asked to express their feelings and discomforts while restrained. Session 1 was repeated once in the same week to assure that all EG participants could attend.

Session 2. The second session was composed of a self-directed web-based program for the reduction of physical restraint (www.restraint.co.kr) that had been developed and evaluated previously (Kong, 2012). It was based on U.S. Medicare guidelines about physical restraint, Kendal Corporations' guidelines for restraint-free care, Korean guidelines for physical restraint, and related published literature on restraint reduction. The 54.33-min program targets nursing home staff and consists of six video modules: (a) definition, prevalence, reasons, myths, and educational needs related to physical restraint (6.42 min); (b) untoward effects, rights of clients, and responses related to restraint use (6.36 min); (c) individualized care and restraint practice guide (11.01 min); (d) prevention and interventions for falls (12.36 min); (e) individualized care for behavioral symptoms of elders with dementia (8.07 min); and (f) elders interfering with treatment, restraint use, and legal issues (10.11 min). The website was designed to facilitate new users' easy access: participants needed only to type their ID and password and then just click on a menu of videos to access each of the six modules. Users were able to complete, stop, or return to the modules at their convenience. EG participants were oriented to the web-based program (website access, ID, password, and menu of videos) by the primary researcher at the end of session 1. In addition, research assistants provided more information about access for EG participants when requested. EG participants were invited to visit the website at any time over a 2-week period using computers in the nursing homes or in their own homes. The program itself permitted researchers to track each participant's login status and frequency and duration of using each of the six modules to assure completion.

Session 3. In the third session (second classroom session), the primary investigator shared success stories regarding physical restraint reduction using a DVD (Kong, 2014) of interviews made with experts in restraint reduction in other countries: United States, Japan, England, Germany, and Hong Kong. In addition, EG participants were asked to discuss their own experience with barriers to and strategies for restraint reduction. The third session lasted 40 min and was repeated once in the same week to assure that all EG participants could attend.

Consultations 1 and 2. After the conclusion of the three educational sessions, unit-based consultation was provided for selected EG staff in two separate 1-hour sessions over a 2-week period by two of the gerontological nurse authors (E.K. and E.S.). One author (E.K.) has a PhD degree in nursing and has conducted research and published extensively about restraint reduction. The other author (E.S.) has a master's degree, has worked in nursing homes as a unit manager, and also trained staff for restraint-free care in American nursing homes. One director of nursing, two head nurses, and five nurses (representing each of the three EG units) voluntarily participated in the two consultation sessions. In the first consultation, one director of nursing, two head nurses, and one nurse from each of three units participated. In

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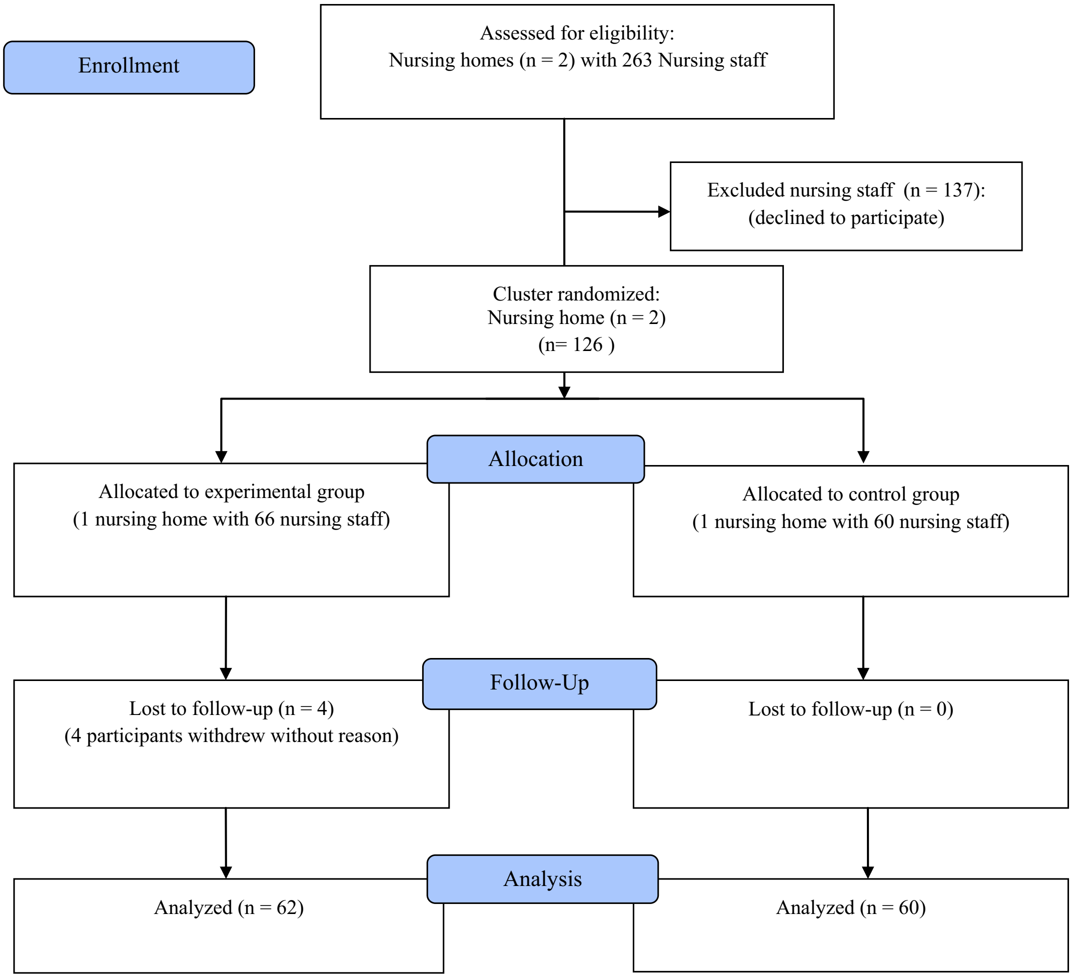

Figure 1. Flow diagram of participant recruitment and retention throughout the study.

the second consultation, four nurses representing each of the three units participated. In each consultation, nursing staff brought cases, questions, and problems related to physical restraint reduction. Consultants discussed solutions and strategies with nursing staff and provided practical guidance for restraint reduction.

Outcome measurements. All participants completed four questionnaires. The baseline demographic survey included age, gender, education, position, work experience, previous restraint education, beliefs about restraint use, frequency of computer and Internet use, and experience with web-based education. Three additional instruments comprising measures of knowledge, perceptions, and attitudes about physical restraint use were administered at four time points: immediately before the intervention (pretest), immediately following, and 1 and 3 months later (posttests 1 and 3).

Knowledge about restraint. The Knowledge About Physical Restraints (Janelli, Stamps, & Delles, 2006) instrument was used to assess the knowledge component. The scale consists of 18 items scored as 1 (*true*) or 0 (*false*). A higher score indicates more knowledge; total scores range from 0 to 18. The previously developed Korean version of this scale with a Cronbach's α coefficient of .74 (Kim et al., 2009) was used; in this study, the Cronbach's α coefficient was .72.

Perceptions about restraint use. To assess perceptions about restraint use, the Perceptions of Restraint Use Questionnaire (PRUQ; Evans & Strumpf, 1993) was used. The PRUQ is a 17-item self-report with a 5-point Likert scale ranging from 1 (*not at all important*) to 5 (*most important*); the range of total scores is from 17 to 85. A higher score indicates greater importance that caregivers ascribe to reasons for using physical restraints with elders. Cronbach's α coefficient was .94 (Evans &

Strumpf, 1993). The previously developed Korean version of the PRUQ with a Cronbach's α coefficient of .93 (J. Kim & Oh, 2006) was used; in this study, Cronbach's α coefficient was .92.

Attitudes toward restraint use. The Attitudes Regarding Use of Restraints (Janelli et al., 2006) scale was used to assess participants' attitudes about restraint use. The scale contains 12 items scored as 2 (*agree*), 1 (*undecided*), or 0 (*disagree*), with a range of total scores from 0 to 24. Higher scores indicate more negative attitudes about physical restraint use. The Korean version of the scale (Kim et al., 2009) was used, and Cronbach's α coefficient was .78 (Kong, 2012) and .63 (this study).

Ethical Considerations

Prior to starting the study, ethical approval was obtained from the institutional review board (IRB) in the primary author's university (IRB#1044396-201411-HR-029-01). Written informed consent was obtained from nursing home administrators and participants before starting baseline data collection. Nursing staff participated voluntarily in this study and were told about their right to withdraw. After all the data collection and data analysis were completed, staff in the control group was offered the opportunity to receive the same MRRP.

Data Analysis

Data were analyzed using IBM SPSS 23 (SPSS Inc., Chicago, IL, U.S.A.). Demographic characteristics were analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations). The unit of analysis was individual nursing staff in each of the two nursing homes. Baseline differences between the two groups were analyzed by using chi-square, Fisher's exact, and independent *t* tests. To test the two hypotheses, two-way repeated-measures analysis of variance (ANOVA) was used to compare the changes between the two groups in the outcome variables (knowledge, perceptions, and attitudes) over time. When the data violated the sphericity assumption in the repeated-measures ANOVA, the Huynh-Feldt correction (epsilon > .75) was employed. In all analyses, two-tailed statistical analyses were used and the significance level was set at $p < .05$.

Results

Characteristics of Participants

Table 1 summarizes participants' characteristics. The majority were GCAs, female, older than 50 years, and had completed at least a high school education. There were no significant differences between groups in demographic characteristics except for age and work experience (see **Table 1**). More than two thirds of participants reported receipt of one to more than four previous sessions of restraint education in the past year (66.1% in EG and 68.3% in CG); there was no significant difference between groups in amount of previous restraint education. On the single belief item at baseline, nearly all participants in both groups reported that restraint use was necessary or very necessary (98.4% in EG and 100% in CG); there was no significant difference between groups. The majority of participants in both groups used the computer and Internet once a week or more frequently. Nearly half (41.9% of EG and 48.3% CG) reported previous experience with web-based education. A homogeneity test showed no significant differences between groups on the three main variables (knowledge, perceptions, and attitudes) at baseline (**Table 2**).

Results of Hypothesis Testing

Effect of the MRRP on participants' knowledge. Repeated-measures ANOVA showed significant differences in knowledge between groups ($p < .001$) over time, indicating a significant effect of the MRRP program on knowledge about physical restraint (**Table 3**). The EG's knowledge improved between the pretest and each of the three posttests, with the greatest change in knowledge occurring at posttest 1 (immediately following the intervention; see **Table 3**).

Effect of the MRRP on participants' perceptions. Repeated-measures ANOVA revealed significant differences between groups in perceptions over time ($p < .001$), indicating a significant longitudinal effect of the MRRP program on improving perceptions about physical restraint use (see **Table 3**). The experimental group's perceptions score improved (declined) significantly between pretest and each of the three posttests, showing the lowest (best) score in perceptions at posttest 1 (immediately following the intervention; see **Table 3**).

Effect of the MRRP on participants' attitudes. Repeated-measures ANOVA showed significant differences between groups in attitudes over time ($p = .011$), indicating that the educational program had a significant longitudinal effect on improving attitudes regarding physical restraint (see **Table 3**). The experimental group's attitude improved between pretest and each of the three posttests, with the greatest improvement at posttest 3 (3 months following the intervention; see **Table 3**).

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Table 1. General Baseline Sample Characteristics and Homogeneity Test ($N = 122$)

Characteristics	Categories	EG ($n = 62$) n (%)	CG ($n = 60$) n (%)	χ^2	p value
Age (years)	30–39	3 (4.8)	1 (1.7)	12.41	.006*
	40–49	6 (9.7)	4 (6.7)		
	50–59	48 (77.4)	35 (58.3)		
	60–69	5 (8.1)	20 (33.3)		
Gender	Female	60 (96.8)	60 (100.0)	1.97[a]	.496
	Male	2 (3.2)	0 (0.0)		
Education	Middle school	5 (8.1)	12 (20.0)	6.91	.140
	High school	40 (64.5)	27 (45.0)		
	College	8 (12.9)	11 (18.3)		
	University	8 (12.9)	7 (11.7)		
	Graduate school	1 (1.6)	3 (5.0)		
Position	Geriatric care assistant	48 (77.4)	41 (68.3)	1.28	.259
	Nurse	14 (22.6)	19 (31.7)		
Work experience (years)	<1	4 (6.5)	1 (1.7)	19.59[a]	.001*
	1–4	17 (27.4)	6 (10.0)		
	5–9	22 (35.5)	45 (75.0)		
	10–14	16 (25.8)	6 (10.0)		
	≥15	3 (4.8)	2 (3.3)		
Restraint education (past 1 year)	0	21 (33.9)	19 (31.7)	1.69	.792
	1	19 (30.6)	22 (36.7)		
	2	10 (16.1)	9 (15.0)		
	3	5 (8.1)	2 (3.3)		
	≥4	7 (11.3)	8 (13.3)		
Belief about restraint use	Very necessary	14 (22.6)	23 (38.3)	4.25[a]	.076
	Necessary	47 (75.8)	37 (61.7)		
	Not necessary	1 (1.6)	0 (0.0)		
Frequency of computer use	≥Once a day	37 (59.7)	42 (70.0)	2.13[a]	.590
	≥Once a week	19 (30.6)	14 (23.3)		
	≥Once a month	1 (1.6)	0 (0.0)		
	Irregularly	5 (8.1)	4 (6.7)		
Internet use	≥Once a day	31 (50.0)	35 (58.3)	1.34[a]	.902
	≥Once a week	12 (19.4)	11 (18.3)		
	≥Once a month	2 (3.2)	2 (3.3)		
	Irregularly	12 (19.4)	8 (13.3)		
	Never	5 (8.1)	4 (6.7)		
Experience with web-based education	Yes	26 (41.9)	29 (48.3)	0.50	.478
	No	36 (58.1)	31 (51.7)		

Note. EG = experimental group; CG = control group.
[a] Fisher's exact test was used.
*Significance at $p < .05$.

These analyses, thus, support both hypotheses. The MRRP in the EG resulted in greater improvement in knowledge, perceptions, and attitudes regarding restraint compared with the CG (H1) and these effects were maintained at a statistically significant level across all time points to 3 months following the intervention (H2).

Table 2. Homogeneity Test for Variables Between Experimental and Control Group ($N = 122$)

Variables	EG ($n = 62$) Mean (*SD*)	CG ($n = 60$) Mean (*SD*)	t value	p value
Knowledge	10.19 (2.41)	9.55 (2.70)	1.39	.167
Perceptions	53.95 (11.19)	52.17 (11.04)	0.89	.377
Attitudes	17.74 (3.82)	17.00 (4.05)	1.04	.300

Note. EG = experimental group; CG = control group.

Discussion

These findings supported that an MRRP significantly improved the knowledge, perceptions, and attitudes of nursing home staff about the use of physical restraints with older residents, and this improvement was sustained over a 3-month period. The study used an enhanced learning model that combined face-to-face classroom with self-directed web-based education, the latter facilitating nursing home staff's individualized selection

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Table 3. Repeated-Measures Analysis of Variance of Main Outcome Variables ($N = 122$)

Variables Groups	Pretest Mean (*SD*)	Posttest 1 Mean (*SD*)	Posttest 2 Mean (*SD*)	Posttest 3 Mean (*SD*)	Comparison	*F* value	*p* value	Effect size[a] η_p^2
Knowledge[b]								
EG	10.19 (2.41)	13.87 (2.68)	12.15 (2.76)	12.76 (2.72)	Group	42.99	<.001*	
CG	9.55 (2.70)	9.58 (2.72)	9.45 (3.49)	9.57 (2.95)	Time	20.26	<.001*	
					Time∗Group	19.46	<.001*	.14
Perceptions[c]								
EG	53.95 (11.19)	42.77 (10.18)	43.23 (9.92)	44.58 (9.90)	Group	14.28	<.001*	
CG	52.17 (11.04)	51.60 (11.39)	52.92 (8.66)	52.05 (10.04)	Time	22.53	<.001*	
					Time∗Group	22.64	<.001*	.16
Attitudes[d]								
EG	17.74 (3.82)	19.76 (2.70)	19.29 (3.38)	19.94 (2.63)	Group	21.05	<.001*	
CG	17.00 (4.05)	17.13 (3.30)	16.92 (3.63)	17.30 (3.16)	Time	5.62	.001*	
					Time∗Group	3.82	.011*	.03

Note. EG = experimental group; CG = control group.

[a] As a measure of effect size, $\eta_p^2 = .01$, .06, and .14 represent small, medium, and large effect, respectively.

[b] A higher score indicates more knowledge about restraint.

[c] Lower score indicates less importance ascribed to *reasons* for restraint use.

[d] A higher score indicates more negative attitudes about restraint use.

*Significant at $p < .05$.

of time for participation, supplemented by small group, unit-based consultation about changing practice. Korea (ROK) is famous for its high online population (84.33% in 2014) and high Internet usage across all age groups (Statista, 2016), which supports readiness for web-based education. There is a dearth of studies, however, that employ web-based or web-enhanced education methods for the reduction of physical restraint in nursing homes. In addition, given the educational needs of nursing staff and the many barriers (such as lack of resources, support, motivation, and participation) to continuing education in long-term care settings (Aylward, Stolee, Keat, & Johncox, 2003; Kong, 2012; Kong & Evans, 2012), this study supports a useful method for staff development.

The results are consistent with those of earlier studies that reported positive effects of an educational program on nursing staff, at least in the short term. One such study (Pellfolk, Gustafson, Bucht & Karlsson, 2010) described the effects of a 6-month educational program conducted for staff in Swedish group-dwelling units for people with dementia and reported that staff knowledge and perceptions improved significantly. In another study (Kong, 2012), a web-based educational intervention significantly improved nursing staff's knowledge, perception, and attitudes in a Korean nursing home, but had a small effect on the nursing staff.

According to a recent systematic review (Möhler et al., 2011), there are only a small number (five) of randomized controlled intervention studies of restraint reduction, and all showed some methodological weaknesses, including insufficient published data, which made it impossible to conduct a meta-analysis. Furthermore, two early studies that tested the effects on practice of a restraint education-with-consultation intervention reported inconsistent results: positive effects in Evans et al.'s (1997) study and no effects in Huizing et al.'s (2009) study. In addition, the two studies did not explore the effects of the education-with-consultation intervention on the nursing staff's knowledge, perception, and attitudes. In this study, the MRRP had a large effect on nursing staff's knowledge and perceptions, but a small effect on attitudes. Given the lack of restraint-related intervention studies, in particular randomized controlled education- and consultation-based studies, especially in Asia, this study provides valuable knowledge. More studies using rigorous research methods are required to evaluate the effects of various restraint reduction interventions on various outcome variables for nursing home staff.

Additionally, while the difference between groups across 3 months remained significant, supporting the second hypothesis, the effects of the multicomponent intervention on knowledge, perceptions, and attitudes declined slightly at posttest 2 and on knowledge and perceptions at posttest 3 compared with posttest 1. This is likely due to the "wearing-off" effect, also reported in Evans et al.'s study (1997). Our results cannot be readily compared with previous studies (Pellfolk et al., 2010; Yeh et al., 2001) that examined the educational program's effect at baseline and posttest 1 only. Future studies need to evaluate the effects of each component of the restraint reduction intervention in the short and long term. In addition, investigators should explore strategies to prevent the "wearing-off" effect (e.g., the inclusion of boosters or other supports to sustain change).

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According to the literature, family members' expectations and requests also affect nursing staff use of physical restraints in nursing homes (Hennessy, McNeely, Whittington, Strasser, & Archea, 1997; Karlsson, Bucht, Rasmussen, & Sandman, 2000; Kong & Evans, 2012). Relatives of nursing home residents have more positive attitudes toward physical restraint use compared with nursing home staff (Haut, Kolbe, Strupeit, Mayer, & Meyer, 2010). Also, one study (Kurata & Ojima, 2014) reported that family caregivers of home-dwelling older adults have less knowledge and more positive perceptions regarding physical restraint use compared with home care providers. These investigators reported that 96.8% of family caregivers had never received physical restraint reduction education. There is a dearth of studies, however, that have evaluated the effects of restraint-related education for family members. Therefore, future studies need to provide and evaluate educational programs regarding restraint reduction for family members as well as for nursing home staff. A similar web-based program targeting family members may be an important vehicle to get the information to this critical group.

In terms of measurement, there are only a few instruments regarding staff knowledge, perceptions, attitudes and restraint-free care options for elders displaying behavioral communications of distress. The most frequently used scales for knowledge, perceptions, attitudes, and alternatives were developed 10 to 30 years ago (Evans & Strumpf, 1993; Janelli et al., 2006), and, thus, some items are no longer relevant or appropriate. In addition, the scale we used to measure attitudes had moderate Cronbach's α values: .63 (this study), .67 (Kontio et al., 2011), .69 (Kim et al., 2009), and .78 (Kong, 2012). Furthermore, nursing home staff have different definitions, attitudes, and opinions about physical restraint use across countries (Hamers et al., 2009), and they are bound by different regulations regarding restraint use across national boundaries. Existing studies, thus, often use policy- and culture-bound measurement scales regarding physical restraint, which inhibits direct comparisons of results among them. Future studies need to develop and use standardized measurement scales for staff knowledge, perceptions, attitudes, and care based on the recent international consensus definition of physical restraint (Bleijlevens et al., 2016). In addition, considering the importance of family members' influence on restraint use, measurement scales for family knowledge, perceptions, and attitudes regarding physical restraint need to be developed.

In this study, only about one third of participants (33.9% in EG and 31.7% in CG) had no previous restraint education, yet most participants (98.4% in EG and 100% in CG) reported at baseline that restraint use was necessary or very necessary; this suggests their previous training was not effective. Korea has faced a high prevalence of physical restraint use, lack of staff and family education, lack of awareness on the part of both professionals and government, lack of regulations or guidelines, and lack of legal protection related to physical restraint reduction in nursing homes (Kong & Evans, 2012). Therefore, the Korean government and researchers need to conduct a national survey to reveal the current prevalence rate of restraint use in nursing homes. Simultaneously, the Korean government must provide clear and consistent policies and regulations regarding physical restraint use in nursing homes. In addition, the Korean government must add more quality indicators related to physical restraint in the national evaluation and inspection of nursing homes. Given that educational deficits are one of the barriers to restraint reduction (Kong & Evans, 2012). Korean nursing homes need to arm staff with evidence-based knowledge and tools to use in practice through mandatory continuing education. Also, Korean nursing schools must include education regarding restraint reduction in gerontological nursing-related courses for all nursing students.

Study Limitations

This study had some limitations. The study was conducted in only two nursing homes. In addition, nursing homes' reluctance to permit direct observation and chart review precluded our ability to study the effects of the MRRP on actual practice (e.g., prevalence, type, or intensity of restraint use). Furthermore, a dearth of outcome measures that are cross-culturally suitable and reliable may also be a limitation. We chose the most appropriate of those available for our purposes, yet the Attitudes Toward Restraint Use scale, in particular, had a low Cronbach's α value (.63), in part because of the small number of items ($n = 12$). The knowledge and attitudes measures used 2-point or 3-point scales that might affect results and Cronbach's α values in this study. Additionally, the self-directed web-based restraint reduction educational component may not be effective in countries or settings with low Internet usage or access.

Conclusions

This study found that an MRRP effectively improved the knowledge, perceptions, and attitudes of nursing home staff about this practice. Given that lack of knowledge is a major barrier to restraint reduction, nursing homes need to provide their staff with training for restraint reduction as required continuing education.

Future studies are requested to evaluate the effects of educational interventions for nursing home staff on restraint reduction using rigorous research methods and measurements.

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Clinical Resources

- Centers for Medicare & Medicaid Services. Revisions to state operations manual (SOM), Appendix PP-Revised Regulations and Tags: https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Policy-and-Memos-to-States-and-Regions-Items/Survey-and-Cert-Letter-17-07.html
- Kendal Corporation. Virtual elimination of physical restraint use in Pennsylvania nursing homes: http://www.kendal.org/blog/news/parri-at-20/
- Korean Ministry of Health and Welfare. Protection of human rights and safety management guideline for the elderly living in institutions: http://www.mohw.go.kr/front_new/jb/sjb030301vw.jsp?PAR_MENU_ID=03&MENU_ID=032901&CONT_SEQ=337298&page=13
- Korean web-based educational program for restraint reduction and restraint-free care: http://www.restraint.co.kr/
- The National Coordinating Center (NCC) for Improving Individual Patient Care (IIPC). Resource guide to support eradicating the use of unnecessary physical restraints: https://healthinsight.org/Internal/assets/Nursing%20Home/PhysicalRestraints/PR_Resource_Guide1_from_NCC.pdf

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PROFESSION AND SOCIETY

Career Cartography: From Stories to Science and Scholarship

Deleise S. Wilson, PhD, RN[1], Marie-Anne S. Rosemberg, PhD, RN[2], Moira Visovatti, PhD, RN[3], Michelle L. Munro-Kramer, PhD, CNM, FNP-BC[4], & Suzanne Feetham, PhD, RN, FAAN[5,6]

1 *Rho,* Professor, Director, Division of Nursing, Kettering College, Kettering, OH, USA
2 *Psi,* Assistant Professor, University of Michigan, School of Nursing, Ann Arbor, MI, USA
3 *Rho,* Assistant Professor, University of Michigan, School of Nursing, Ann Arbor, MI, USA
4 *Rho,* Assistant Professor, University of Michigan, School of Nursing, Ann Arbor, MI, USA
5 *Lamda,* Professor, Emerita University of Illinois at Chicago
6 *Lamda*, Nursing Research Consultant, Children's National Health System, Washington, DC, USA

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Correspondence
Dr. Deleise S. Wilson, Division of Nursing, Kettering College, 3737 Southern Blvd, Kettering, Ohio 45429. E-mail: Deleise.Wilson@kc.edu

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Abstract

Purpose: To present four case scenarios reflecting the process of research career development using career cartography.
Organizing Constructs: Career cartography is a novel approach that enables nurses, from all clinical and academic settings, to actively engage in a process that maximizes their clinical, teaching, research, and policy contributions that can improve patient outcomes and the health of the public.
Methods: Four early-career nurse researchers applied the career cartography framework to describe their iterative process of research career development. They report the development process of each of the components of career cartography, including destination statement, career map, and policy statement.
Conclusions: Despite diverse research interests and career mapping approaches, common experiences emerged from the four nurse researchers. Common lessons learned throughout the career cartography process include: (a) have a supportive mentorship team, (b) start early and reflect regularly, (c) be brief and to the point, (d) keep it simple and avoid jargon, (e) be open to change, (f) make time, and (g) focus on the overall career destination.
Clinical Relevance: These four case scenarios support the need for nurse researchers to develop their individual career cartography. Regardless of their background, career cartography can help nurse researchers articulate their meaningful contributions to science, policy, and health of the public.

Career cartography, also known as career planning, career mapping, or legacy mapping, refers to creating a visual depiction of long-term career goals and the steps or processes necessary to meet those goals (Messmer, 2003). As described by Feetham and Doering (2015), career cartography is "the science of designing, drawing, communicating, and producing a map to guide researchers toward their intended career destination" (p. 71). This concept is currently utilized within the disciplines of business, finance, and the broader realm of health care to help individuals and their mentors chart a pathway to success. Career cartography has also been identified as a tool to help an individual attain work meaning (Hinds et al., 2015). In this sense, career cartography becomes a tool to help individuals take ownership of their success and attain work meaning (Hader, 2005; Hinds et al., 2015). As such, it has been described as a tool to help an individual achieve purpose and meaningful work engagement as opposed to the more routine aims of promotion or achieving a leadership position (Hinds et al., 2015). For nursing, career cartography may also move the discipline and science forward as practitioners, educators, administrators, and researchers thoughtfully plan and achieve personal goals that benefit individual patients, communities, or populations. However, this article is an exemplar of using the career cartography process for nursing researchers.

Early-career nursing scientists enter their academic positions with a multitude of responsibilities, including

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teaching, mentoring, research, clinical practice, and service (Brody et al., 2016). These competing demands are difficult to juggle as the faculty member is often teaching classes for the first time while trying to obtain funding and publishing. This often leads the junior faculty member to "try to make it through the day" without considering their long-term career and research goals (Hofler & Thomas, 2016). Past research indicates that professional development opportunities such as mentoring, institutional support, and role modeling provide opportunities for professional growth and success in nursing science (Boyden, 2000; Drummond-Young et al., 2010; Hofler & Thomas, 2016). Another method of providing this professional direction, development, and growth is using the career cartography process.

As nurses consider their professional roles and chart their individual career paths, it is imperative that they reflect on how they want to contribute to the discipline of nursing while working to improve the lives of others. This reflection on the long-term plans helps nurses identify and achieve their professional goals while contributing to a meaningful and satisfying career. For academics, career cartography is an iterative process of visually portraying one's career development that highlights the areas of research, practice, and policy (Feetham & Doering, 2015). It is essential that nurses incorporate the elements that will help determine their success, which are a clearly written destination statement, identification of relevant policy issues, a visual depiction of their career mapping, a supportive mentorship team, and wide dissemination of their contributions to nursing. The ability to develop a succinct yet compelling depiction of the many facets of a career necessitates deliberate actions to facilitate the career cartography process.

One of the key factors aiding the successful navigation of the career cartography process is the supportive relationships from a team of mentors and sponsors (Feetham & Doering, 2015; Shirey, 2013). Mentors are individuals with significant experience or knowledge who provide instruction or guidance to others on how to advance in their career (Nies & Troutman-Jordan, 2012). Mentors can provide support in day-to-day work (sounding board, coach), direction on career challenges, and expertise in content or skills needed for career development (Byrne & Keefe, 2002; Feetham & Doering, 2015). Mentors can come from an individual's organization, profession (superiors, peers), or outside the work place (parent, spouse, friend) and may differ depending on the individual's stage of career. Successful early-career professionals tend to have multiple sources of mentors within the organization and profession (van Eck Peluchette & Jeanquart, 2000). Sponsors are different from mentors and are defined as individuals who can provide access to research, academic, and policy development opportunities for early-career professionals. These opportunities allow for the attainment of salient skills, knowledge, and experience needed for career development (Feetham & Doering, 2015; Shirey, 2013). Building a career cartography team is important and requires early-career professionals to know their strengths as well as areas in need of further development; have realistic expectations (there is no single perfect mentor); and take responsibility for their own career development by finding mentors and negotiating benefits, taking risks, and learning from their experiences (Wills & Kaiser, 2012).

The goal of this article is to describe how the authors, four early-career nurse researchers, used the career cartography process as described by Feetham and Doering (2015) to develop individual career maps. Key insights from the process and steps to the career cartography process will be discussed to help guide the career of other researchers.

Career Cartography Components

According to Feetham and Doering (2015), the career cartography process is composed of four major components. They include a destination statement, identification of the policy context of a career, and a career map.

Destination Statement

A destination statement captures the significant areas of contribution and the objective of a career in a succinct sentence (Feetham & Doering, 2015). The destination statement can be likened to the branding of a career so that one's contributions to science and capacity to serve a targeted population over an extended period of time can be highlighted (Kasprzak, 2014). Before a destination statement is crafted, it is necessary to be aware of the compelling policy, political, and scientific mandates relevant to the individual's area of interest (Beck, 2008; Feetham & Doering, 2015). Destination statements are not limited by the status of the researcher, but instead are built upon a premise that there will be full access to all the resources necessary to attend to the evolving needs of the population or outcome of interest (Feetham & Doering, 2015).

Although destination statements represent the main features of one's career, they should be presented in multiple versions to reach a variety of audiences and stakeholders (Green, 2009). For example, knowing how to pitch one's contribution to a policy group will be much different from presenting a job talk that highlights one's contribution to science. However, the different versions of the destination statement must maintain consistency

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in message (Green, 2009). Destination statements should be rehearsed so that they can be given in one or two compelling sentences that give a clear vision of one's career contributions. For this reason, it is also called the "elevator speech" or the "pitch" curriculum vitae (Elsbach, 2003).

Policy Statements

Policies are defined as "governmental or organizational guidelines about allocations of resources and principles of desired behavior" (Trostle, Bronfman, & Langer, 1999, p. 104). Knowing the policy context for a program of research is essential, as policy is a primary determinant of health (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, n.d.). Knowing the policy context enables researchers to identify potential support and barriers to their research. Inclusion of policy statements links research to public health and thus can reach a wider audience. Policies can inform nursing research and evidence-based practice. Research influences change across various levels, including individuals, families, communities, states, nations, and the global world. Thus, a conscious consideration of the relationship between research and policy is essential to demonstrate the link between research, political structures, and sustainable impacts (Villarruel & Fairman, 2015). Consideration of the policy relevance forces the researcher to be aware of all the stakeholders (i.e., patient, health providers, taxpayers, policymakers, and governmental institutions) involved or influenced by the issue at hand and to describe the impact of their science to these different stakeholders (Bensing, Caris-Verhallen, Dekker, Delnoij, & Groenewegen, 2003).

Development of policy statements in the career cartography process can show promise for higher-level change to address a phenomenon. It can also enable access to funding opportunities given that the subject would be aligned with the priorities of the organizations of interest providing financial support to carry out the research.

Career Maps

A career map is the physical document that displays the steps, processes, or components necessary to achieve one's career goals. It provides a depiction of an individual's career plan with the "measurable metrics" necessary to achieve that goal (Hinds et al., 2015, p. 212). In this sense, the career map provides the documentation that keeps the nurse or nurse researcher on track to attain his or her goals and can be monitored on a regular basis personally and by mentors, supervisors, or peers.

While the career map is a very useful benchmarking tool (Tin & Wiwanitkit, 2015), it requires constant attention as it is a fluid document that is continually changing based on evolving career goals, new opportunities (i.e., funding, promotion, new collaborators), or new developments in the science. Despite its fluctuating status, the career map remains inextricably linked to the individual's destination statement, policy context, and feedback from the mentorship team.

Methods

The authors of this article were all postdoctoral research fellows at the same institution and met as a group on a monthly basis during their postdoctoral research fellowships in order to navigate the career cartography process. Utilizing personal experiences, each author describes their individual process using career cartography with an emphasis on the destination statement, policy context, and career map. These individualized first-person case scenarios are intended to illustrate the career cartography process as it applies to four early-career nurse scientists with very diverse research interests. It illustrates the similarities in the process as well as the unique challenges that each of the authors faced when utilizing the career cartography process.

Four Case Scenarios: Applying Career Cartography to One's Academic Career

Case Scenario 1: What Is Your North Star?

Destination statement. After successfully moving through several rounds of interviews for a postdoctoral position, my confidence in obtaining the great opportunity was almost shattered during the final interview by the question, "What is your North Star?" It was clear that I was not being asked to recite the impressive accomplishments listed in my curriculum vitae, which was clearly reviewed before this interview. What was also uncomfortably obvious to me was that I did not know how to effectively connect and communicate my recent successes with significant goals for the future. Hence, it was very appealing when given the chance to be mentored by Dr. Suzanne Feetham and to collaborate with three other postdoctoral fellows to engage in the career cartography process.

The first and probably the most elusive part of the career cartography process is the destination statement. The initial drafts of our destination statements were steeply couched in the specialized language and concepts of our research areas. For example, my destination statement stated "the goal of my research is to implement an

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innovative mindfulness staff ride to reduce falls and fall injuries among hospitalized older adults." There are several limitations in the statement, which only became obvious when reviewing it with my team members and Dr. Feetham. First, the stated goal is "to implement," which describes a singular research activity and not a viable long-term research plan. Second, the phrase, "mindfulness staff ride" used language that was specific to a narrow cross-section of organizational behavior science. The term was not easily translated into a healthcare concept. The difficulty of explaining the staff ride intervention to my postdoctoral peers emphasized the futility of using that term to multiple stakeholders. Third, by only mentioning falls in my destination statement, I inadvertently limited the contribution of my extensive research training to one outcome. Multiple iterations finally produced the statement "My program of research is to reduce hospital-acquired conditions by the implementation of systems-level safety interventions that engage patients, caregivers and healthcare providers."

Policy. Feetham (2011) stresses the importance of knowing the political will for a broad area of research. That knowledge is critical to advance timely and relevant advancements in science. The Deficit Reduction Act of 2005, which requires a quality adjustment of Medicare Severity Diagnosis Related Group payments for preventable hospital-acquired conditions, provided a comprehensive platform of adverse events that included falls and fall injuries. These expectations of Medicare demonstrated the political will to support my program of research.

Career map. I developed my career map according to the stages towards independence of a nurse researcher. The research stages are anchored in a destination statement. The first stage of my career map represents the development of my program of research, which included my doctoral education that focused on patient safety and a postdoctoral fellowship in implementation science. The second stage captures the current work involved in being an early-stage investigator, such as development and testing of a systems-level patient safety intervention and submission of grant proposals to funding agencies relevant to my area of focus. In the third stage, as an independent researcher, my research will extend across multiple outcomes, settings, and samples with the use of a variety of research methods. The career map shown in **Figure 1** represents the most current juxtaposition of my destination statement, policy context, and the resulting career map, which will continue to evolve as I progress along my career journey.

Case Scenario 2: The Pathway to Intervention Development

Destination statement. My first attempt to get organized and identify what my research career focus would be was to meet with my peers, the other postdoctoral researchers in my school of nursing who were grappling with the same issues. We started our year by attending a session on career cartography. We thought this would be a terrific way to be organized and set upon creating our personal career maps. Our first step was to write our destination statements. My first destination statement was wrought with context-specific terminology that was unintelligible to my colleagues. Furthermore, I focused intently on only one intervention and not on how the culmination of my projects would affect science and policy. After discussing the destination statement with my peers and research mentors, it became apparent that revisions were needed and that this might be easiest to do once I visually displayed how my past, current, and future research projects all impacted my long-term scientific goals. My destination statement is "to improve the health outcomes of women and children by increasing reproductive health choices and impacting reproductive health policy changes for vulnerable women of childbearing age in domestic and international contexts."

Policy. After practicing clinically as an advanced practice nurse in women's health, I entered graduate school with a specific phenomenon of interest in mind. I wanted to improve postassault care for sexual assault survivors, specifically those that wanted to "self-treat." This did not mean that I wanted to change the current structures in place for postassault care, but instead that I wanted to find a way to provide survivors with the knowledge and resources they needed to make the best decisions for themselves. I completed my dissertation at the same time that sexual assault on college campuses was gaining national headlines because of poorly handled incidents at some major public universities and due to the passage of the Violence Against Women Reauthorization Act (2013) in 2014. During this time, I also became involved in international work focusing on improving reproductive health and decreasing maternal mortality. My research focused on a number of somewhat controversial policy issues, including reproductive health, sexual assault, maternal mortality, and improving access to care. I quickly realized that I needed to find a way to articulate the intersection of policy in these areas in order to demonstrate where I wanted to make a difference.

Career map. My initial attempt at creating a career map to visually display all of these components consisted

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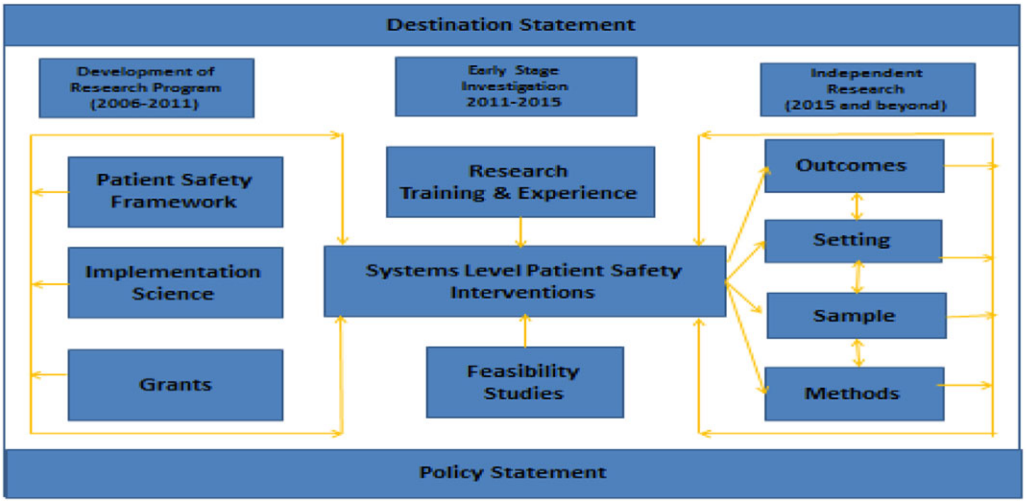

Figure 1. Skeleton of a research career cartography map focused on systems level patient safety outcomes.

of a hodgepodge of past research experiences and ideas for future projects without any indication of how these were all connected and what the end goal was. Again, I was disheartened to learn how difficult it was to display my long-term career goals. However, once I focused on my long-term goals, an iterative process began where I was able to fill in the "gaps" necessary to reach them. The process also included further refinements to my policy and destination statement until all components of the career cartography process coalesced (**Figure 2**). Additionally, I continued to seek feedback from peers not familiar with my area of interest and from my mentors until all components of the career cartography map made sense to everyone. I was so relieved to have a coherent career map to utilize to display my past research efforts, current projects, future plans, publications, and potential impact to science that I initially did not consider that this is a living, breathing document that will continue to change. After only one summer and an unfunded project, I found that I once again needed to revisit my career map to tweak my plan. This did not entail changing my destination statement, policy issues, or long-term goals but simply necessitated that I reconsider alternative pathways to achieve these long-term goals. While it is not without its challenges, I truly believe that this is something I could have started using while a graduate student to help frame my research goals and career.

Case Scenario 3: From Abstract to Concrete (Putting It on Paper)

Destination statement. Feetham and Doering (2015) emphasized the importance of the clarity of one's destination or end goal before undertaking any project or other scientific or professional development–related steps. In this sense, since my undergraduate studies, I knew I wanted to change individuals' lives and influence their health through scientific exploration and discoveries. Nursing became the ideal vessel through which to gain the necessary training and expertise to achieve this goal. During my studies, I continuously tackled my work with the understanding that I had to be working towards an endpoint, a health outcome, a scientific contribution.

Writing the destination statement was interesting as my peers and I debated about the difference between the "destination statement" and the "purpose of the program of research." As I came to understand the true definition of a destination statement (as described in Feetham & Doering, 2015, pp. 2–3) I had to go back to the drawing board and figure out "what I am all about." Only through this self-reflective process was I able to conjure one sentence that describes my long-term contribution throughout my scientific journey. The destination statements continued to evolve throughout our regular meetings, as it needed to not only reflect my long-term goals but also convey those goals in a language that was clear enough to be understood by individuals whose training, work, and scientific vocabulary differed from mine.

From this process, I developed the following destination statement: "to optimize the health of low-wage workers who are experiencing and/or at risk for developing chronic health conditions." This statement is broad enough to allow me to contribute to the occupational health field in a variety of ways that will span my entire career. However, the statement is also specific enough to enable anyone to determine my line of work, population of interest, outcomes, and potential contributions. Regardless of its variation, the basis of this destination

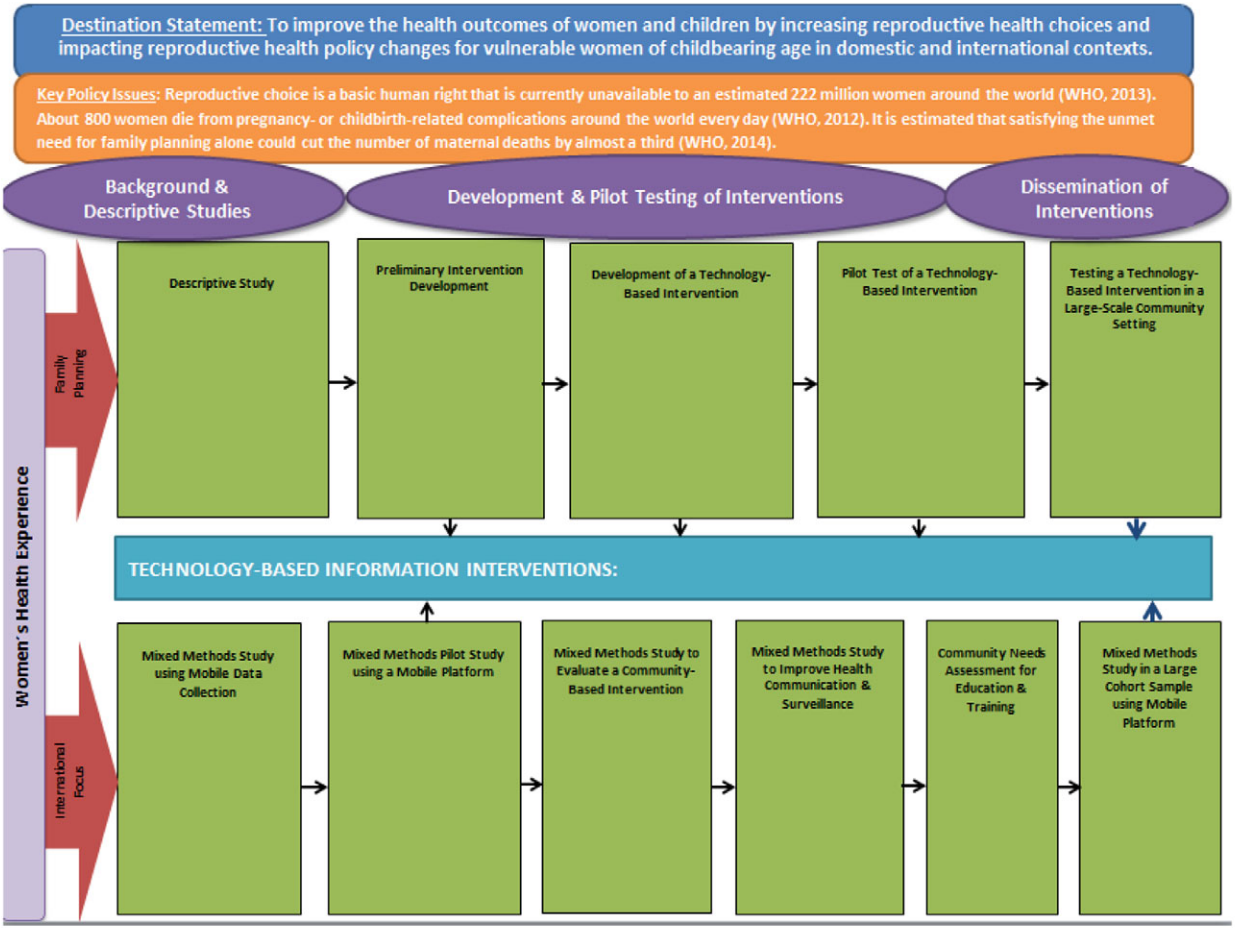

Figure 2. Skeleton of a global reproductive health career map.

statement will remain the same. I can focus on a specific group of low-wage workers (i.e., hotel housekeepers) or a specific health outcome.

Policy. My work focuses on systems and population level changes. Thus, connecting the work to a policy made sense. Regardless of whether interventions have an individual or systems focus, a connection with policy is likely to yield more sustained and effective changes. When a policy implication is involved, the issue at hand becomes a public health concern. Working through the career cartography process has enabled me to push beyond the individual health outcome and think about how my work will impact the world. My work has policy implications across various public health issues such as worker health, workplace improvement, vulnerable populations, toxic stressors, psychosocial stressors, and chronic conditions. An example of a policy relating to my work is the Affordable Care Act, which emphasizes the importance of using the workplace as a platform to promote worker health. Thinking about the career cartography process required me to grasp the need for transparency in my science as it relates to policy or system-level outcomes and clear communication with key stakeholders. Stakeholders may vary depending on the researcher's interests and program of research. For my work, stakeholders would include, but are not limited to, nurses, employers, employees, and federal entities that focus on workers' health such as the Occupational Safety and Health Administration.

Career map. To make sense of the skeleton for my career maps, I considered everything in chronological order, with the understanding that there will be ongoing projects to reach my end goal. It made sense to depict the projects, the rationale for how they relate to my long-term scientific career plan, and their funding source (**Figure 3**). However, I came to realize that like any other graphic, it is best to note what is most important with the least amount of wording possible.

The ideology behind my career map was influenced by my epistemology and ontological understandings

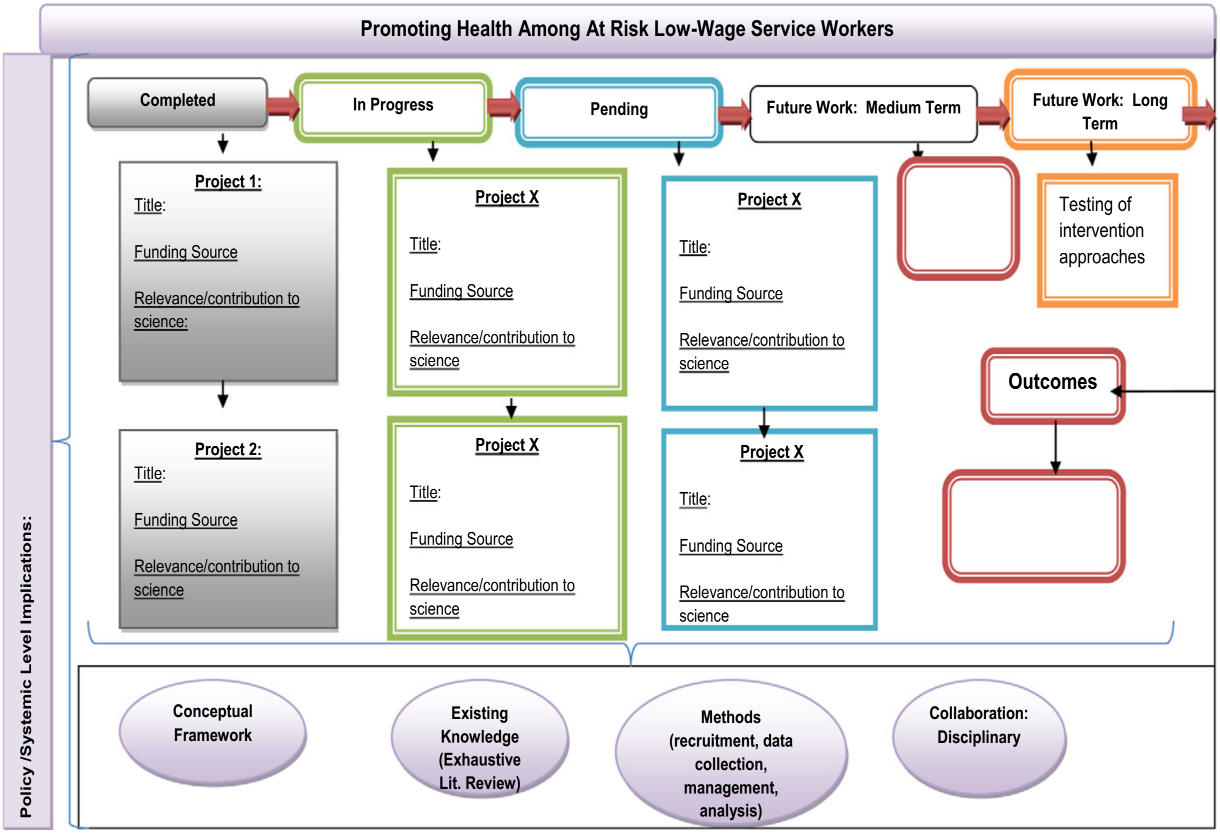

Figure 3. Skeleton of promoting health among at-risk low-wage service workers map.

of the world and what impacts individuals’ health and well-being. Although the drawing of the map required much creativity and graphic skills, connecting the dots across research projects and the constant reference to the “endpoint” and the “so what question” proved to be more challenging and complex. Specifically, when drawing my career map I felt the need to differentiate the research projects and still show how they connect with my career progress. The terms “leadership” and “contribution” continued to resonate throughout my process. Having the guidance of Dr. Feetham and her work was instrumental in considering the development of my career cartography in sections: (a) writing a destination statement; (b) relating my work to current policies; and (c) putting everything together via a drawing that depicted the research, career progress, scientific contribution, and policy implications.

Case Scenario 4: Looking Forward

Destination statement. One of the most difficult aspects for me in creating a destination statement was thinking broadly and determining long-term goals for my program of research. I found that I was very comfortable with short-term goals but was not able to articulate and had little practice creating long-term goals. As such, I spent a significant amount of time reflecting on how my research trajectory would evolve. This involved reviewing other destination statements, discussing long-term goals with peers and faculty mentors, and rewriting the destination statement. It felt like a significant accomplishment to create a destination statement. Since there is not a right or wrong to the destination statement, I am looking forward to regularly reviewing and modifying the destination statement as my career advances.

Key policy issue. My career cartography process was developed within the context of cancer survivorship health policy, which focuses on both improving the quality of patient care as well as quality of life of individuals with cancer (National Coalition for Cancer Survivorship, 2017). Understanding policy (health, science, and public) and linking my program of research to it was another challenge for me. My research interest and program of research developed from my clinical practice as an oncology nurse and desire to improve the quality of life of patients. My formal education (undergraduate and graduate) did not include courses or seminars in policy, so

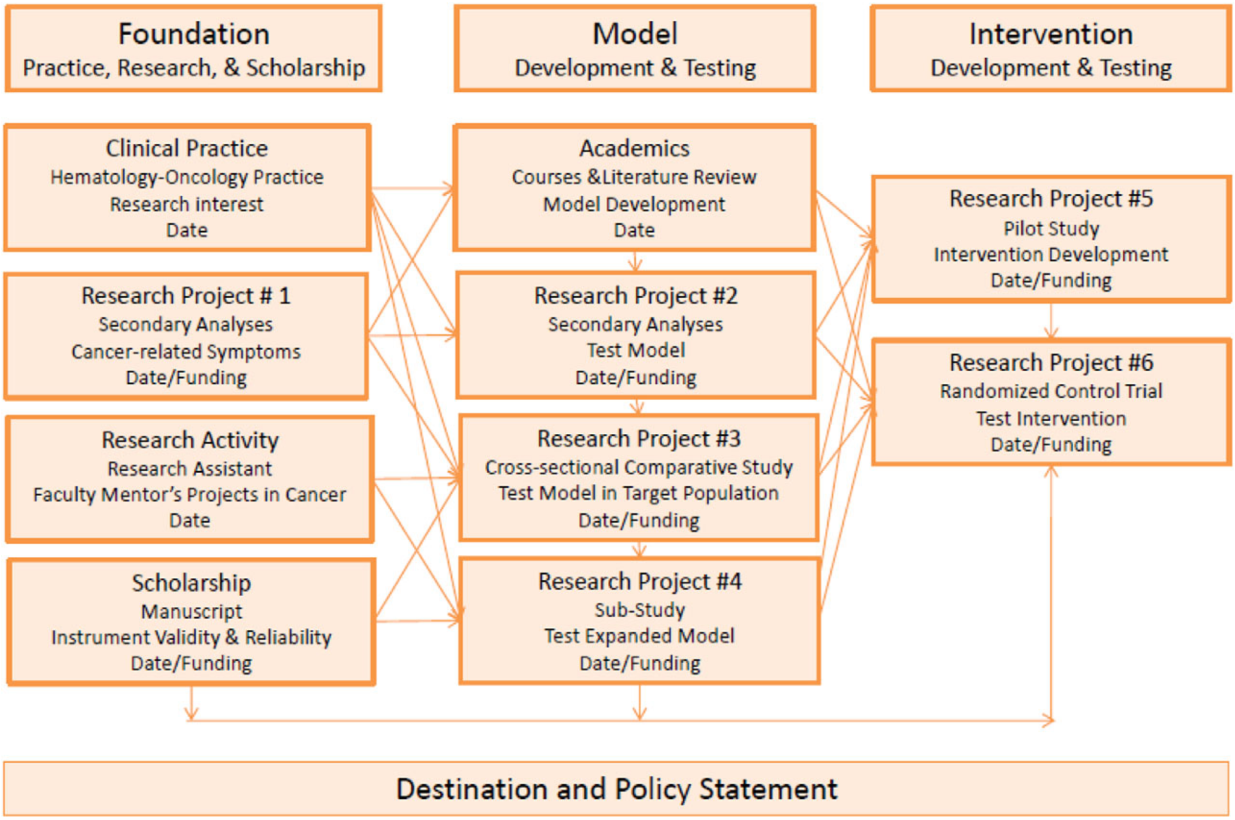

Figure 4. Skeleton of promoting health and well-being of individuals with cancer map.

the challenge for me was to achieve a basic understanding of policy and identify key policy issues for cancer survivors. To do this, I started by talking with colleagues about their program of research and how health policy informed it. I subsequently identified cancer-related health policy coalitions, read their position statements, and reflected on my program of research. Looking forward, I feel I need further education and hands-on experience with health and public policy so that my program of research can make a meaningful contribution to the health of cancer survivors. I am currently looking at furthering my policy education through course work, programs, and special interest groups.

Career map. There were many iterations of my career map **(Figure 4)**. The first map included only boxes with main research projects and research-related activities but no direction or flow. It also lacked details about the activities, why it was important, and the outcomes. Over time, I began to identify patterns in my experiences and group these experiences into broad themes, including (a) practice and research-related activities that were building blocks for my program of research, (b) activities related to model development and testing, and (c) activities related to intervention development and testing. Additionally, I began to include information about the type of study or activity, dates, and sources or potential sources of funding. The feedback from my postdoctoral colleagues was a main part of the process. It was a rewarding process and I enjoyed seeing my work mapped out. The process and the product also helped me see gaps in my research and allowed me to work with my research mentors to develop training goals for my postdoctoral fellowship and identify learning activities to achieve those training goals.

Lessons Learned

The creation of a career map is heavily dependent on effective implementation of the career cartography process. Feetham and Doering (2015) identified the career cartography process to be inclusive of the following components: a destination statement, the policy context, and the depiction of the actual career map. During the experience of creating career maps, the authors recognized that the cartography process had additional features beyond a supportive team that were critical to successfully crafting a career map in a timely manner. The authors have identified seven "lessons learned" that we encourage others to consider if they embark on the cartography process.

Supportive Mentoring Team

As mentioned in the introduction, having a supportive mentoring team is necessary for nurse researchers to have the guidance and feedback in order to develop clear and succinct career cartography. In each of our case scenarios, we discussed the importance of having the mentorship of a team of people including content experts, process experts (including Dr. Feetham), and peer support, which in our case included our career cartography support team. The supportive career cartography team serves the purpose of developing an individual's career as well as advancing science and supporting the continued growth of the nursing profession (Byrne & Keefe, 2002). We were members of a postdoctoral group that adopted the process of career cartography with the creation of career maps as a main objective. Our group routinely met to review each other's work and share experiences. The homogeneity in rank of our group members affirmed the common urgent task to define and design a research path that would maximize the tenure of the postdoctoral contract, which led to a reduction in fears of vulnerability. In addition, each of us had a network of other supporters that included content and process experts, nursing leaders that understood the steps needed to launch a successful research career, and an expert in the process of creating the career maps (Dr. Feetham). Faculty members across all ranks shared experiences and exchanged ideas on what works and what does not. Faculty mentors from outside the School of Nursing also provided additional mentorship and expertise throughout the career cartography process

Start Early and Reflect Regularly

We learned it is important to start early and reflect regularly. In fact, when reflecting on the career cartography process, all of us wished it was something we would have started when we were doctoral students. We concluded that it was important to take the time to think about and reflect on our personal and career goals throughout the academic process, including while we were in school and throughout our career. Knowing our goals and getting started on our career cartography early in our careers helped us to be thoughtful about our next steps. We also sought opportunities to gain experiences in areas to advance our clinical practice or program of research. Starting this process early also allowed us time to make meaningful contributions to nursing and the health of the public. Seeking out others interested in career cartography and creating a supportive group to encourage collaborations during the career cartography process were keys to our group.

Be Brief and to the Point

It is essential that the career maps are brief and to the point. We found that our career maps are documents that we share with colleagues, mentors, and supervisors. It is therefore important to keep them short (ideally one page) and clear. We also found that we were developing different maps to convey different career components such as research outcomes, funding, or teaching. We recognized that we all wanted to include everything in our career cartography process, but it is important to include only what is salient. This led us to start the career cartography process by including all the information we thought was necessary, and then we worked on analyzing and editing it. For every piece of information included, we also asked ourselves if it was important and why. If it was not important, then we removed it.

Keep It Simple and Avoid Jargon

As noted during our case scenarios, many of us started with career maps loaded with jargon that no one else could understand. We quickly recognized that if we are the only ones who understand our career map, then we are limiting its reach. As such, we determined it was important to evaluate our destination statements, policy statements, and career maps for context-specific jargon and remove it. Sharing our career maps with others was another important method for identifying jargon, gaps, and novel paths to advancement.

Be Open to Change

It was extremely difficult to prevent being attached to our career maps. It was a painful process to remove information or edit it. This document is an outline of our career goals and passions. However, we found it was necessary to be open to change and to not get too attached. It was also necessary to have a safe space to share the drafts of our career maps with a supportive group. Often the map may have seemed clear but to a colleague the map was vague or overly ambitious. Thus, we finally came to terms with the fact that we must be willing to make changes during the career cartography process in order to help improve our final product. Letting others see our work also served to inspire us and bring fresh perspectives about ways to highlight the practice, teaching, and research contributions we have made.

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Make Time

One major barrier to completing the cartography process for our group was time constraints. As we previously alluded to, junior faculty are often struggling to juggle a number of commitments and often do not have the time to devote to professional growth. The career cartography process is usually not required for a job. It is a personal journey, which required us to set aside time to create. However, we strongly believe that nurses must make time to outline their career goals in a comprehensive manner in order to fuel personal and professional growth.

Focus on the Overall Career Destination

We continually asked ourselves, “Where do we want to be at the end?” We used the process of starting with our destination statement and then mapped out our research projects, work goals, and future accomplishments starting backwards from our future goals. This helped us determine exactly what steps were necessary to achieve those goals. It was important to focus on the overall career destination.

Utilizing the career cartography process has provided us the opportunity to look at the bigger picture. We were able to reflect on what we have accomplished thus far, where we wanted to go, and what will be the level of impact of our work. It has also enabled us to become more attuned with the current policies that speak to our work and the public health needs both on a national and international level. Although this article reflects only the research aspects of our careers, the career cartography framework also helped generate conversations about the type of service we will be involved in, the type of courses we will be teaching, and the method in which we will approach all of the important components of an academic career.

Conclusions

The purpose of this article was to show how four early-career nurse researchers concretely applied the career cartography framework to develop their research career paths. Each of us, as nurse researchers, has taken a slightly different approach to utilize the career cartography process to develop our career maps as exhibited through our case scenarios. Regardless of the differences in our approaches, research interests, and health outcomes, what became clear among the four cases is the importance of the “so what.” Using the visual depiction of the career map allowed us to articulate our scholarship trajectory with our peers, mentors, department heads, the Dean, and colleagues across our discipline. The supportive mentoring team proved to be very critical to move us through the career cartography process in a timely manner, validating Feething and Doering’s (2015) work.

We agreed that creating the career maps using the career cartography process gave us the organization, confidence, and ability to assert ourselves as nurse scientists with important research trajectories. Unfortunately, nurses tend to undersell themselves. Components of career cartography can be applied across all areas of nursing (Hinds et al., 2015). The career cartography process allows nurses to visually depict their contributions to science and to appreciate their value in nursing and health of the public. As in the hospital setting, nurses must remember that their work is never done. As noted by Feetham and Doering (2015), “there is neither a right map, nor are maps ever finished” (p. 73). Thus, the career cartography process and the visual depiction of the career map must be a malleable document that evolves with nurses as their careers grow and change.

Acknowledgments

We are greatly indebted to Dr. J. J. Doering for her insightful contributions to our manuscript.

Clinical Resources

- Career cartography: A conceptualization of career development to advance health and policy: https://www.ncbi.nlm.nih.gov/pubmed/25154922
- Career mapping: Developing nurse leaders, reinvigorating careers: https://www.ncbi.nlm.nih.gov/pubmed/19820525
- Essentials of building a career in nursing research: https://www.ncbi.nlm.nih.gov/pubmed/27424961
- Living on Purpose: http://www.living-on-purpose.net/finding-your-true-purpose/personal-legacy
- Learning by Shipping: https://blog.learningbyshipping.com/2013/03/28/defining-your-career-path-journey-or-destination/
- Professional excellence and career advancement in nursing: A conceptual framework for clinical leadership development: https://www.ncbi.nlm.nih.gov/pubmed/22157789

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HEALTH POLICY AND SYSTEMS

Relationships Between Nurse Staffing and Patients' Experiences, and the Mediating Effects of Missed Nursing Care

Sung-Hyun Cho, PhD, RN[1], Barbara A. Mark, PhD, RN, FAAN[2], George Knafl, PhD[3], Hyoung Eun Chang, MPH, RN[4], & Hyo-Jeong Yoon, RN[5]

1 Professor, College of Nursing, Research Institute of Nursing Science, Seoul National University, Seoul, South Korea
2 Sarah Frances Russell Distinguished Professor, School of Nursing, University of North Carolina, Chapel Hill, NC, USA
3 Professor, School of Nursing, University of North Carolina, Chapel Hill, NC, USA
4 Doctoral Student, College of Nursing, Seoul National University, Seoul, South Korea
5 Doctoral Student, College of Nursing, Seoul National University, Seoul, South Korea

Key words
Adverse events, missed nursing care, nurse staffing, patients' experience

Correspondence
Prof. Sung-Hyun Cho, College of Nursing,
Research Institute of Nursing Science,
Seoul National University,
103 Daehak-ro, Jongno-gu, Seoul 03080,
South Korea. E-mail: sunghcho@snu.ac.kr

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Abstract

Purpose: The aims of this study were to examine the relationships between nurse staffing and patients' experiences, and to determine the mediating effects of patient-reported missed care on the relationship between nurse staffing and patients' experiences.
Design: The study included 362 nurses and 208 patients from 23 nursing units of six hospitals in South Korea.
Methods: Nurse staffing was measured by patient-to-nurse ratios and by nurse- and patient-perceived staffing adequacy. Patients' experiences included adverse events, communication with nurses, and overall hospital rating. Patient-reported missed care was measured using the MISSCARE Survey–Patient with three domains: communication, basic care, and timely response.
Findings: Lower nurse-perceived staffing adequacy was associated with more patient-reported missed communication. Lower patient-perceived staffing adequacy was associated with more missed care and adverse events, and a lower likelihood of experiencing good communication with nurses and of giving a high overall rating to the hospital. Patient-reported missed care mediated the relationship between nurse staffing and patients' experiences.
Conclusions: Nurse staffing adequacy, particularly as perceived by patients, was significantly associated with patient-reported missed communication and basic care, as well as patients' experiences.
Clinical Relevance: Appropriate nurse staffing is required to reduce missed care and to improve patients' experiences.

Adequate nurse staffing has been associated with more positive patient outcomes, including improvements in patient satisfaction and reductions in adverse events (American Nurses Association, 2015). An emphasis on value-based purchasing and patient-reported experiences requires nurses to provide high-quality nursing care and to improve patient experiences and outcomes (Dempsey, Reilly, & Buhlman, 2014; Kavanagh, Cimiotti, Abusalem, & Coty, 2012). In the United States, Medicare has implemented programs linking quality of care to reimbursements. For example, the Hospital Value-Based Purchasing Program adjusts hospital payments based on hospital performance in the four domains of clinical processes, patient experiences, outcomes, and efficiency (Centers for Medicare & Medicaid Services, 2015). Scores in the domain of patient experience of care are composed of eight metrics, including communication with nurses and overall hospital rating, using the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey (Centers for

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Medicare & Medicaid Services, 2015). Previous studies have reported nurse staffing to be associated with HCAHPS (Jha, Orav, Zheng, & Epstein, 2008; Kutney-Lee et al., 2009; Martsolf et al., 2016). In South Korea, the National Health Insurance Service has utilized 36 indicators to evaluate the appropriateness of healthcare service reimbursements, and recently announced the inclusion of patients' experiences as a new indicator in 2016 (Health Insurance Review Agency, 2016). International studies conducted in different healthcare systems are expected to enhance empirical evidence of nursing impacts on patient experiences.

A growing area of interest in research on nursing care quality and outcomes is the role of missed care, also called care left unperformed, unfinished nursing care, and/or implicitly rationed care. Kalisch and colleagues defined missed nursing care as an error of omission, in which standard required nursing care is not provided (Kalisch, Landstrom, & Williams, 2009). They proposed a theoretical model in which inadequate nurse staffing increases missed nursing care, which in turn influences patient outcomes (Kalisch, Tschannen, & Lee, 2011). Martsolf et al. (2016) also proposed a conceptual model in which nurse staffing affects patients' experiences through missed care and patients' perceptions of missed care. Recent studies have reported that better nurse staffing is associated with less missed nursing care and that more missed care is associated with decreased levels of patient satisfaction and an increased incidence of adverse events (Jones, Hamilton, & Murry, 2015). Kalisch, Tschannen, and Lee (2012) found that missed care mediated the relationship between nurse staffing and patient outcomes (patient falls). A study from a Korean hospital reported less missed nursing care in high-staffing than low-staffing units when the hospital implemented a government policy of increasing nurse staffing to reduce informal caregiving by patients' families and caregivers privately hired by patients or their families (Cho, Kim, Yeon, You, & Lee, 2015). These studies thus suggest that missed care is an underlying mechanism explaining the effect of nurse staffing on patient outcomes (Jones et al., 2015).

Another issue in nurse staffing and outcomes research is how to measure nurse staffing. Previous studies have reported that empirical measures (e.g., patient-to-nurse ratios) and perceptual measures (e.g., nurse-reported perceptions of staffing adequacy) may not be highly correlated with each other, but rather reflect different aspects of nurse staffing (Kalisch, Friese, Choi, & Rochman, 2011). For example, the patient-to-nurse ratio provides objective numbers, but it does not capture the effects of patient turnover (admissions, discharge, and transfers) on nurse workload (Mark, Salyer, & Harless, 2002), whereas nurse-perceived staffing adequacy is a comprehensive judgment of nurse workload influenced by various factors. Using both empirical and perceptual measures of nurse staffing is expected to allow a more complete assessment of the effect of nurse staffing on missed care and patients' experiences.

Unlike most of the above studies, which focused on missed care reported by nurses, a recent study examined missed nursing care reported by patients (Kalisch, Xie, & Dabney, 2014). In light of the increasing emphasis on patients' perceptions and experiences, research on the relationships among nurse staffing as assessed using empirical and perceptual measures, patient-reported missed care, and patients' experiences is expected to enhance our understanding of how nurses and nursing care contribute to patients' experiences. The purposes of this study were (a) to examine the relationship of nurse staffing, as measured by nurse-perceived and patient-perceived staffing adequacy as well as by the patient-to-nurse-ratio, with patient experiences, and (b) to determine the mediating effects of patient-reported missed care on the relationship between nurse staffing and patients' experiences.

Methods

Study Sample

Hospitals were recruited by distributing a notice of this study among the members of the Korean Hospital Nurses Association after the study was approved by the institutional review board of the university with which the first author is affiliated. Six hospitals agreed to participate in three surveys for nurse managers, registered nurses, and patients. Each hospital was asked to select a maximum of four medical or surgical inpatient units excluding other specialty units (e.g., pediatric or psychiatric units), and 23 nursing units were selected from six hospitals. The nurse managers and all registered nurses of the 23 nursing units were asked to participate in the nurse manager survey and the nurse survey, respectively. A total of 23 nurse managers and 362 nurses completed the survey questionnaire. The patient survey was conducted in 23 nursing units, and 210 patients voluntarily participated in the survey. The responses of two patients who did not answer a key question about nurse staffing adequacy were excluded from the study sample.

Measures

The nurse manager survey was conducted to measure the patient-to-nurse ratio. The patient-to-nurse ratio was calculated as the average number of patients at midnight over the last 7 days divided by the average number of nurses per shift. The nurse survey included nurse-perceived staffing adequacy by asking nurses to

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indicate whether they thought that there was a sufficient number of nurses to provide quality nursing care on the unit. We used a 4-point scale (1, *very insufficient*; 2, *insufficient*; 3, *sufficient*; and 4, *very sufficient*), such that a higher score indicated a more positive perception of staffing adequacy. In the patient survey, patient-perceived staffing adequacy was measured using the same question and scale of nurse-perceived staffing adequacy. Thus, nurse staffing was measured using three variables: the patient-to-nurse ratio, nurse-perceived staffing adequacy, and patient-perceived staffing adequacy.

The patient survey also collected data on patient-reported missed care and patients' experiences. Patient-reported missed care was measured using the MISSCARE Survey–Patient (Kalisch et al., 2014) after obtaining permission to use it from the developer. The scale contained 13 items divided into three domains (communication, basic care, and timely responses). All items were measured using a 5-point scale, and a higher score indicated more missed care. Patients could also indicate that a question was not applicable; for example, patients could reply "unable to get out of bed" to the question "how often did the nurse help you or monitor that you got out of bed and sat in a chair?" The Cronbach alpha values for communication, basic care, and timely responses were .78, .86, and .78, respectively.

Patient-reported experiences included four measures: adverse events, communication with nurses, and overall ratings of the nursing unit and hospital. Using the MISSCARE Survey–Patient, patients were asked whether they had experienced six types of adverse events (falls, skin breakdowns or pressure ulcers, medication administration errors, new infections, IV running dry, and IV leaking into skin) or other problems; they could also choose a response of "unsure" for each adverse event. Patients' experiences of communication with nurses and the overall ratings of the nursing unit and hospital were measured using the HCAHPS survey. The composite measure of communication with nurses included three items (nurses treat the patient with courtesy and respect, listen carefully, and provide clear explanations) answered using a 4-point scale ranging from "*never*" to "*always*." The Cronbach alpha value for communication with nurses was .82. Patients were also asked to rate their hospital from 0 (*the worst hospital possible*) to 10 (*the best hospital possible*). Although an overall rating of the nursing unit is not an item in the HCAHPS survey, we additionally asked patients to rate their nursing unit on a scale ranging from 0 to 10 points.

The instruments were translated using a forward-translation from English to Korean followed by back-translation, reviews by a panel of clinical nurses, and pilot tests conducted among 11 practicing nurses and 9 inpatients. One modification was that the phrase "nursing staff" in the MISSCARE Survey–Patient was replaced with "nurses" because this study aimed to examine nursing care provided by nurses only.

Data Collection

Nurse managers and nurses completed a consent form accompanied by an explanation of the study. The nurse survey was conducted as a mobile survey, in which nurses answered questionnaires on their mobile phone, to ensure the voluntary participation of the nurses. For the patient survey, independent interviewers who were not nurses working in the participating units visited the patients and obtained consent from them after explaining the study. The interviewers responded to patients' questions and collected questionnaires directly from the patients. The data did not include personal information that could identify individual nurse managers, nurses, and patients. All surveys were conducted between June and August 2015.

Data Analysis

The summary scores of the three domains of missed care, adverse events, and communication with nurses were computed for all patients who returned surveys in which fewer than 30% of the responses were invalid (i.e., did not respond or responded "not applicable"). Adverse events were analyzed by computing the proportion of patients experiencing each type of adverse event. Patients were further categorized into two groups: those who experienced none of the six types of adverse events versus those who experienced at least one adverse event. Communication with nurses and the overall ratings of the nursing unit and hospital were analyzed following the public reporting method using the "top box" (the most positive survey response) on the Hospital Compare website (Centers for Medicare & Medicaid Services, 2016). Patients were dichotomized into those who answered "always" (the most positive response) for all three items of communication with nurses versus those who did not. The overall ratings of the nursing unit and hospital were also dichotomized into two groups: 9–10 (the most positive responses) versus 0–8 points.

The dependence of the two continuous dimensions of missed communication and basic care on nurse staffing was analyzed using linear mixed models, while the dependence of the dichotomous dimensions of patients' experience (adverse events, communication with nurses, and overall hospital rating) were analyzed using generalized linear mixed models. The unit of analysis was the patient under the assumption that patients were clustered at the nursing unit level. Nurse-perceived staffing adequacy

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was aggregated at the nursing unit level (i.e., using the unit average) because it was impossible to match nurses with specific patients. Because the overall rating of nursing units was highly correlated with the overall rating of the hospitals, with a regression coefficient of 0.87 ($p <$ .001) in a linear mixed model, it was not analyzed further after descriptive analysis.

Results

Nurse Staffing and Missed Care

The average patient-to-nurse ratio within the 23 units was 11.5 patients per registered nurse (**Table 1**). Only 10.2% of nurses reported that sufficient nurses were present to provide quality nursing care, whereas 77.4% of patients felt that sufficient nurses were present in the unit. The average patient perception of staffing adequacy was 1 point higher than the average nurse perception (2.87 vs. 1.85), but these values were correlated with each other (r = .55, p = .006) when aggregated at the nursing unit level. Additionally, more positive perceptions on the part of the patients were associated with higher nurse-perceived scores (**Table 2**). Among the three domains of missed care, basic care had the highest mean score (3.57), followed by communication and timely responses (see **Table 1**). Since many patients answered "not applicable" to questions within the domain of timely responses, this domain was excluded from further analysis.

Table 2 shows the mean scores of missed care according to patient-perceived staffing adequacy. More positive patient perceptions were associated with statistically significant reductions in missed communication and missed basic care. In the linear mixed model analyses, the patient-to-nurse ratio was not significantly associated with missed care (**Table 3**). Nurse-perceived staffing adequacy showed a significant inverse relationship with missed communication (regression coefficient = –0.58, p = .029) but a nonsignificant relationship with missed basic care (regression coefficient = –0.69, p = .088). Each 1-point increase in nurse perceptions (e.g., from insufficient to sufficient) was associated with a 0.58-point decrease in missed communication. When patients' perceptions were collapsed into two groups to simplify the model, perceiving nurse staffing to be very sufficient (vs. very insufficient, insufficient, or sufficient) was associated with a 0.69-point decrease in missed communication (p < .001) and a 0.82-point decrease in missed basic care (p = .004). Thus, nurse and patient perceptions had a greater effect on missed basic care than on missed communication.

Table 1. Responses Regarding Nurse Staffing, Missed Nursing Care, Adverse Events, Communication With Nurses, and the Overall Ratings of the Nursing Units and Hospitals

	N^a	n (%) or $M \pm SD$
Nurse staffing		
Patient-to-nurse ratio	23	11.5 ± 3.1
Nurse-perceived staffing adequacy	362	1.85 ± 0.61
Very insufficient		95 (26.2)
Insufficient		230 (63.5)
Sufficient		34 (9.4)
Very sufficient		3 (0.8)
Patient-perceived staffing adequacy	208	2.87 ± 0.72
Very insufficient		11 (5.3)
Insufficient		36 (17.3)
Sufficient		130 (62.5)
Very sufficient		31 (14.9)
Missed nursing care		
Communication	208	2.02 ± 0.83
Basic care	202	3.57 ± 1.23
Timely response	91	1.29 ± 0.54
Adverse events		
Fall	207	5 (2.4)
Skin breakdown/pressure ulcer	204	16 (7.8)
Medication administration error	203	7 (3.4)
New infection	203	4 (2.0)
IV running dry	203	35 (17.2)
IV leaking into skin	198	23 (11.6)
Patients who experienced at least one adverse event	202	65 (32.2)
Communication with nurses		
Nurses treat the patient with courtesy and respect (answered "always")	208	135 (64.9)
Nurses listen carefully (answered "always")	207	134 (64.7)
Nurses explain clearly (answered "always")	208	124 (59.6)
Patients who answered "always" for all 3 items	207	95 (45.9)
Overall rating of nursing unit (9–10 points)	208	118 (56.7)
Overall rating of hospital (9–10 points)	208	106 (51.0)

Note. M = mean; SD = standard deviation; IV = intravenous.
[a] Excluding patients who did not respond or answered "not applicable" or "unsure."

Nurse Staffing and Patients' Experiences

Approximately one third of patients experienced at least one adverse event (see **Table 1**). In the composite measure of communication with nurses, 45.9% of patients answered "always" for all three items. The overall ratings of the nursing units and hospitals showed a left-skewed distribution, with an average of 8.51 and 8.16, respectively; 56.7% and 51.0% of patients gave their

Table 2. Comparison of Nurse-Perceived Staffing Adequacy, Missed Nursing Care, Adverse Events, Communication With Nurses, and Overall Hospital Ratings According to Patient-Perceived Staffing Adequacy: Percentage or *M* ± *SD*

	Nurse-perceived staffing adequacy	Missed care		Adverse events		Communication with nurses		Overall hospital rating	
		Communication	Basic care	Experienced	Not	Always well	Not	9–10 points	0–8 points
Patient-perceived staffing adequacy									
Very insufficient	1.70 ± 0.28	2.38 ± 1.14	4.00 ± 0.86	54.5	45.5	54.5	45.5	45.5	54.5
Insufficient	1.80 ± 0.20	2.17 ± 0.90	3.78 ± 1.11	42.9	57.1	33.3	66.7	44.4	55.6
Sufficient	1.87 ± 0.23	2.09 ± 0.80	3.65 ± 1.20	31.7	68.3	41.1	58.9	45.4	54.6
Very sufficient	2.02 ± 0.25	1.43 ± 0.49	2.85 ± 1.33	13.3	86.7	77.4	22.6	83.9	16.1
Missed nursing care									
Communication				2.33 ± 0.99	1.87 ± 0.71	1.64 ± 0.61	2.32 ± 0.85	1.69 ± 0.65	2.36 ± 0.87
Basic care				4.06 ± 1.13	3.33 ± 1.22	3.15 ± 1.33	3.92 ± 1.01	3.10 ± 1.25	4.05 ± 1.00

nursing unit and hospital a rating of 9 or 10 points, respectively.

More positive patient perceptions of staffing adequacy were associated with better patient experiences. For example, 13.3% of the patients who perceived nurse staffing as very sufficient experienced adverse events, in comparison to 54.5% of those who perceived nurse staffing as very insufficient (see **Table 2**). The odds ratios (ORs) from generalized linear mixed models analyzing nurse staffing and patients' experiences are presented in **Table 3**. Only patient-perceived staffing adequacy had a significant relationship with patients' experiences. Perceiving nurse staffing as very sufficient (vs. not) was associated with a 73% decrease in the odds of experiencing adverse events (*OR*, 0.27; 95% confidence interval [CI], 0.09–0.86; $p = .027$), a 5.18-fold increase in the odds of reporting that the nurses always communicated well, and an 8.82-fold increase in the odds of giving the hospital a rating of 9 or 10 points.

Missed Care and Patients' Experiences

Patients who experienced adverse events had a significantly higher mean score for missed communication (2.33 vs. 1.87) and missed basic care (4.06 vs. 3.33) than those who did not experience any adverse events (see **Table 2**). Additionally, patients who reported that the nurses always communicated well and who provided a rating of 9–10 experienced less missed communication and missed basic care than those who did not. As shown in **Table 3**, missed communication and basic care had a positive relationship with adverse events and an inverse relationship with communication with nurses and overall hospital ratings. Missed communication had a greater effect on the three measures of patients' experiences than did missed basic care. For example, missed communication had a greater OR (*OR*, 1.93; 95% CI, 1.34–2.79; $p < .001$) than missed basic care (*OR*, 1.73; 95% CI, 1.30–2.30; $p < .001$) for experiencing adverse events.

Mediating Effects of Missed Care

We examined the mediating effects of missed communications and basic care on the relationships between patient-perceived staffing adequacy and patients' experiences. The patient-to-nurse ratio and nurse-perceived staffing adequacy were excluded from the analysis of mediation effects because they showed no significant relationships with missed care or patients' experiences. As shown in **Figure 1**, adding missed communication to the model reduced the effect of patient-perceived staffing adequacy on adverse events, with a change in ORs from 0.27 to 0.42 (95% CI, 0.13–1.32; $p = .135$). In other

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Table 3. Regression Coefficients (95% Confidence Intervals [CIs]) From Linear Mixed Models of Nurse Staffing on Missed Nursing Care and Odds Ratios (95% CIs) From Generalized Linear Mixed Models of Missed Nursing Care on Adverse Events, Nurse Communication, and Overall Hospital Ratings

	Missed nursing care (regression coefficients)[a]		Patients' experiences (odds ratios)[b]		
	Communication	Basic care	Adverse events (experienced vs. not)	Communication with nurses (always well vs. not)	Overall hospital rating (9–10 points vs. not)
Patient-to-nurse ratio	−0.001 (−0.05, 0.05)	0.003 (−0.07, 0.08)	0.97 (0.87, 1.07)	1.08 (0.98, 1.20)	1.10 (0.98, 1.25)
Nurse-perceived staffing adequacy (unit average)	−0.58 (−1.09, −0.06)*	−0.69 (−1.50, 0.11)	1.17 (0.35, 3.95)	1.05 (0.33, 3.30)	1.21 (0.28, 5.36)
Patient-perceived staffing adequacy					
Very insufficient	0.98 (0.41, 1.56)**	1.09 (0.17, 2.02)*	8.56 (1.55, 47.1)*	0.35 (0.08, 1.52)	0.08 (0.01, 0.54)**
Insufficient	0.73 (0.34, 1.13)***	0.90 (0.30, 1.51)**	5.24 (1.38, 19.9)*	0.15 (0.05, 0.44)***	0.11 (0.03, 0.41)**
Sufficient	0.64 (0.32, 0.97)***	0.78 (0.29, 1.27)**	3.18 (0.99, 10.3)	0.20 (0.08, 0.51)***	0.12 (0.04, 0.37)***
Very sufficient	0 [reference]	0 [reference]	1 [reference]	1 [reference]	1 [reference]
Patient-perceived staffing adequacy					
Very sufficient	−0.69 (−1.02, −0.35)***	−0.82 (−1.32, −0.31)**	0.27 (0.09, 0.86)*	5.18 (2.04, 13.2)***	8.82 (2.81, 27.7)***
Not (very insufficient, insufficient, or sufficient)	0 [reference]	0 [reference]	1 [reference]	1 [reference]	1 [reference]
Missed nursing care					
Communication			1.93 (1.34, 2.79)***	0.27 (0.17, 0.43)***	0.29 (0.18, 0.46)***
Basic care			1.73 (1.30, 2.30)***	0.58 (0.45, 0.75)***	0.46 (0.34, 0.62)***

[a] Each staffing indicator was included in a separate model.

[b] Missed communication and basic care were included in a separate model.

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

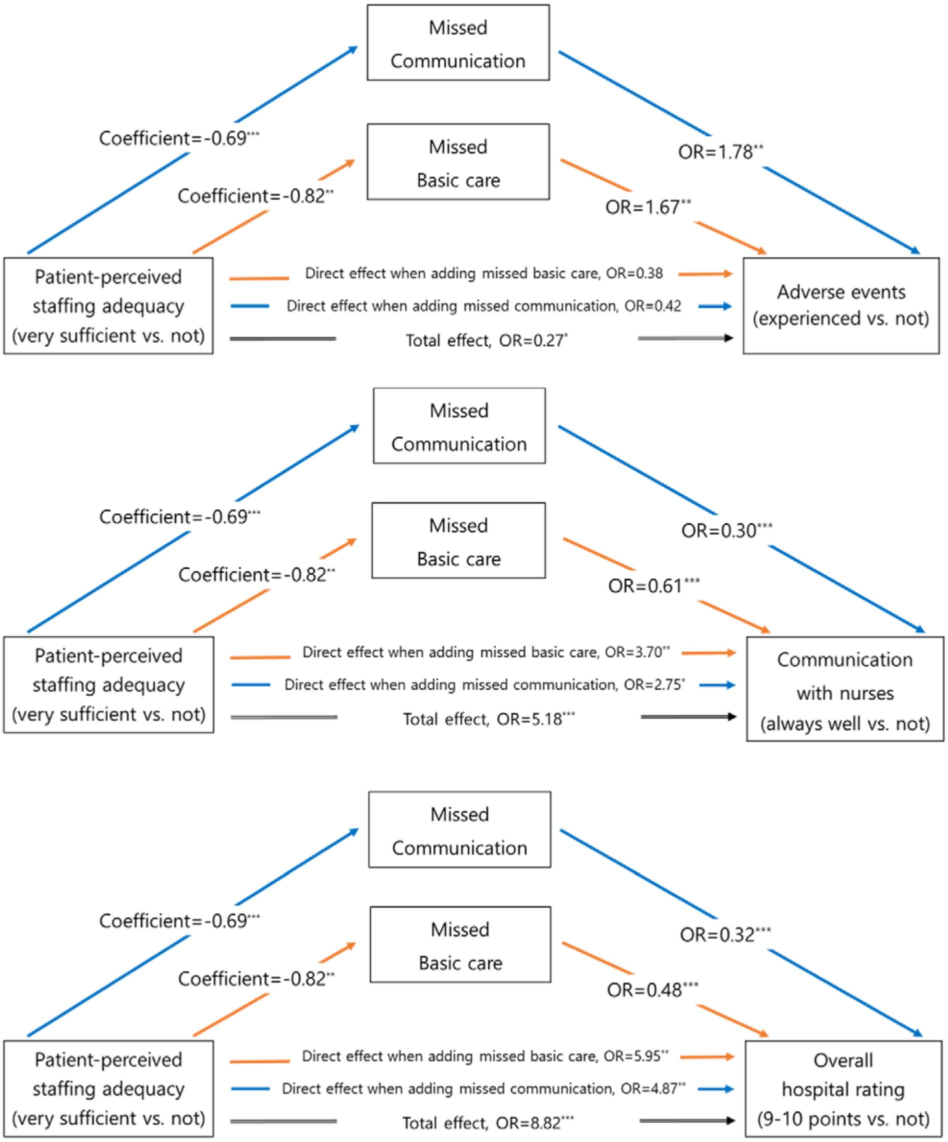

Figure 1. Relationships among patient-perceived staffing adequacy, missed nursing care, and overall hospital ratings. OR = odds ratio. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

words, the direct effect of patient-perceived staffing adequacy on adverse events decreased due to the mediation of missed communication. Similarly, the effect of patient-perceived staffing adequacy on adverse events also decreased after adding missed basic care to the model (*OR*, 0.38; 95% CI, 0.12–1.23; $p = .106$). After adding missed communications or basic care to the models, the relationships between patient-perceived staffing adequacy and adverse events were no longer significant. The *OR* for the effect of patient-perceived staffing adequacy on communication with nurses decreased from 5.18 to 2.75 (95% CI, 1.06–7.16; $p = .038$) due to the mediation of missed communication and from 5.18 to 3.70 (95% CI, 1.40–9.76; $p = .009$) due to the mediation of missed basic care. The *OR* for the effect of patient-perceived staffing adequacy on overall hospital ratings also decreased due to the mediation of missed care. These findings indicated the mediating effects of missed care on the relationship between nurse staffing and patients' experiences.

Discussion

In this study, we found that patient-perceived staffing adequacy was associated with patient-reported missed care and all three measures of patients' experiences (adverse events, communication with nurses, and overall

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hospital ratings). Since these relationships are not causal, this finding may indicate either that better staffing adequacy perceived by patients resulted in less missed care and better patient experiences, or that patients perceived better staffing adequacy because they had less missed care and better experiences. Nurse-perceived staffing adequacy, which was measured independently from patient perceptions, also showed a significant relationship with missed communication. Nurse and patient perceptions correlated with each other, although they had a 1-point mean difference. The empirical measure of nurse staffing (i.e., the patient-to-nurse ratio), however, was not associated with missed care or patients' experiences. Based on these findings, we suggest that perceived staffing adequacy is an important factor in improving patients' experiences, and that perceptual measures in addition to empirical measures therefore need to be used in examining the effects of nurse staffing more comprehensively.

Another major finding of this study was that patient-reported missed care mediated the relationship between staffing adequacy and patients' experiences. The direct effects of patient-perceived staffing adequacy on patients' experience decreased due to the mediating effects of missed care. These findings support the conceptual model proposed by previous studies (Kalisch, Tschannen, et al., 2011; Martsolf et al., 2016), according to which nurse staffing affects missed care and patient perceptions of missed care result in negative patient experience and outcomes. In addition, although nurse and patient perceptions had a greater effect on missed basic care than on missed communication, missed communication had a greater mediating effect than missed basic care. Missed communication also had a greater direct effect on patients' experiences. These findings suggest that communication with nurses is very important in improving patients' experiences. The smaller effect of missed basic care could be attributed to informal caregiving by the patients' families and caregivers (hired privately as a substitute for families) who stay at the patients' bedside and provide patients with basic care, which is a feature unique to Korean hospitals (Cho et al., 2015). Therefore, patients might not expect their nurses to provide basic care, and consequently communication with nurses may have been considered more important than receiving basic care from nurses. This pattern of informal caregiving may also explain why our study found a higher mean score regarding missed basic care (3.57) than the mean scores reported in U.S. hospitals (2.20 and 2.35; Kalisch et al., 2014).

This study has certain limitations. First, the associations among nurse staffing, missed care, and patients' experiences do not reflect causal relationships, because they were obtained from cross-sectional data. Second, our findings may not be generalized to other countries that have different nurse staffing patterns and hospital systems due to unique aspects of the Korean context (e.g., family caregiving). Third, patient and hospital characteristics that may have affected patients' experiences were not adjusted for in this study. Fourth, missed care might not indicate that patients did not receive the care in question due to the possibility that patients' families or caregivers were able to provide the care. Fifth, effect sizes were not available to conduct a power analysis prior to data collection, and so the obtained sample may not have been of sufficient size to identify some effects.

In conclusion and despite these limitations, our study found that nurse staffing adequacy, particularly as perceived by patients, was significantly associated with patient-reported missed communication and basic care, as well as patients' experiences. Hospitals must provide appropriate nurse staffing to improve the staffing adequacy perceived by patients and nurses and to ensure positive patient experiences during hospitalization.

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Clinical Resources

- Centers for Medicare & Medicaid Services. Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS): http://www.hcahpsonline.org/home.aspx
- Hospital Compare. Linking quality to payment: https://www.medicare.gov/hospitalcompare/linking-quality-to-payment.html
- Hospital Compare. Survey of patients' experiences (HCAHPS): https://www.medicare.gov/hospitalcompare/about/survey-patients-experience.html

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