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EDITORIAL

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Dear Readers,

Florence Nightingale Journal of Nursing (FNJN), one of the oldest journals in the nursing field in Turkey, was first published in 1981. To date, a total of 60 issues and 610 articles have been published. FNJN has been published regularly for nearly 40 years. In 2013, the journal began to be published electronically. Our journal was included in the TR index in 2008 and it started to be indexed in ESSCI (Web of Science and Indexed in the Emerging Sources Citation Index (ESCI)) in 2017. As of this issue, all of our articles will be published in English. Our PubMed (BMC) process will start in 2020.

The contributions of our readers and rewievers are very important for our journal to reach this level. Therefore, we would like to thank you as the editorial team. Our next goal is to include our journal in the Science Citation Index-Expended. In order to achieve this goal, it is important to increase the number of citations of our journal. In this regard, we look forward to your support.

In this issue, we have included 7 research and 2 review articles. I would like to state that we also have two articles from Malaysia and Sweden in this issue. The subjects of two of our research articles are educational environments of nursing and medical students and Social Innovation Tendencies. Two researches are related to infection control, medical errors, costs and simulation use in terms of nursing practice. The subject of the other study is Understanding the Diffusion of Theoretical Knowledge in Nursing: A Citation Analysis of Meleis's Transition Theory. We believe that these articles on different fields of nursing science will contribute to the theoretical and practical capacity of nursing science.

We are waiting for your comments and suggestions for our journal,

Sincerely

Prof. M. Nihal ESİN
Editor in Chief

Florence Nightingale Journal of Nursing

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Research Article

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Student-Based Analysis of Perception Regarding the Educational Environment Using the Dundee Ready Education Environment Measure Questionnaire at Chattagram Maa-O-Shishu Hospital Medical College, Bangladesh

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ABSTRACT

Aim: The educational environment is the most significant manifestation of the curriculum. The Dundee Ready Education Environment Measure questionnaire is the precise quantitative assessment tool for the EE for medical- and health-related professional schools.

Method: This was a cross-sectional study conducted in Chattagram Maa-O-Shishu Hospital Medical College, Chittagong, Bangladesh during the study period of 2017–2018. The DREEM questionnaire was distributed to the paraclinical and clinical students in their regular classes. Data were analyzed using SPSS version 19.

Results: A total of 170 students responded to the questionnaire, of which 27.6% were male, and 72.4% were female. The mean total Dundee Ready Education Environment Measure score of the present study was 130.46. Paraclinical students scored statistically significantly higher than clinical students ($p=0.040$). Students' social self-perceptions were significantly higher for male than for female students ($p<0.05$). Most of the students opined that a positive learning experience (80.6%), appropriate teaching method (81.2%), and academic self-perceptions were positive (77.1%), and positive learning atmosphere (65.9%) as well as social surroundings were in acceptable range (70.6%) in Chattagram Maa-O-Shishu Hospital Medical College.

Conclusion: The findings and evidences of the present study will hopefully provide the basis to take effective measures to improve teaching and learning environment of this medical school.

Keywords: DREEM questionnaire, educational environment, medical students, perceptions of learning

INTRODUCTION

Education means learning and teaching, and "environment means all things that surround us. Thus, in a broad sense, the educational environment (EE) can be defined as all things that are experienced in an educational institution (Salam et al., 2014). The educational environment is the most significant manifestation of the concept of curriculum (Genn, 2001). The success of an effective curriculum is determined by this most important factor: "EE." This is subsequently considered as an important regulator for the student's academic success (Tripathy, & Dudani, 2013). Everything that is occurring in the classes, departments, and medical college constitutes the curriculum. For an effective curriculum to be maintained, two important factors should be kept in mind: (1) the meaning of EE should be understood and (ii) the diverse students' needs should be met (Bassaw et al., 2003).

In an educational institution, usually, students come from different ethnic heritage, and at the same time, they differ in perspective experiences, expectations, and approaches to learning (Hixson, 1991). These diverse norms and values should be respected by the educational system. Along with this respect, learners must be prepared to show a positive response to those values (Baginda, 2005). Awareness of diversity in the form of various lifestyles and cultures by an educational institution indicates that a positive EE or system is existing there (Baginda, 2005; Elizabeth, Rider, & Nawotniak, 2007).

The learning environment influences the learning of medical students and, in the future, their practice as a physician (Al-Kabbaa, Ahmad, Saeed, Abdalla, & Mustafa, 2012). Comprehensive measurement of outcome of what is going on from the students' perspective could be done by assessing the medical EE (Genn, 2001). Social behavior, academic development, and sense of comfort of a medical student are significantly affected by their perception of the environment within which they study (Genn, 2001; Genn, & Harden, 1986; Pimparyon, Roff, McAleer, Poonchiai, & Pemba, 2000; Roff, & McAleer, 2001; Till, 2005). Fostering of deep self-directed learning in students could be done if a motivating learning environment could be assured. This could subsequently lead to a good medical practitioner during their professional life (Veerapen, & McAleer, 2010).

The definition of an ideal academic environment is one that helps the students to be prepared for their future professional life and, at the same time, contributes to their own development along with the social development (Divaris et al., 2008). It is globally agreed by the medical and allied health educators that effective learning can occur only if the optimal educational climate could be maintained. High quality medical education could be delivered if the emphasis is given on appraisal of the educational climate. At the same time, an institution can improve their curriculum by receiving useful feedback from such appraisal (Yusoff, Jaafar, Arzuman, Arifin & Pa, 2013).

The Dundee Ready Education Environment Measure (DREEM) questionnaire is a well-planned and designed tool for the precise quantitative assessment of the EE for medical- and health-related professional schools. To collect information about the EE, it has been used worldwide in many institutions (Abraham, Ramnarayan, Vinod, & Torke, 2008; Avalos, Freeman, & Dunne, 2007; Jiffry, McAleer Fernando, & Marasinghe, 2005). Students' learning experience can be more relevant and more meaningful if their perception of the EE is positive (Veasuvalingam, & Arzuman, 2014).

It has been observed that if the EE could be encountered by medical students, then this

could have been impacted on several outcomes, such as enjoyment during the study, feeling good, and academic accomplishment (Lizzio, Wilson, & Simons, 2002; Mayya, & Roff, 2004; Plucker, 1998). The DREEM study also allows the provision of the enhancement of the quality of the EE and medical education process (Genn, & Harden, 1986).

Important notification in this matter has not yet been given in Bangladesh. Such an important issue should be considered as a vital measure for student concern. As part of the teaching methodology, our concern should be very clear about the medical EE. On this basis, with the use of the DREEM questionnaire, the aim of the present study was to achieve an important outcome regarding the EE from the students' perspective from the medical college in which they belong and to search the strong points and flaws of the current medical curriculum and thus help to supply useful information to the curriculum review committee.

Research Questions

Keeping in mind the context and rationale of the study as mentioned in the previous sections, the following research questions were formulated for the study:

1) What is the students' perception of the EE of Chattagram Maa-O-Shishu Hospital Medical College (CMOSHMC) using the DREEM questionnaire as a tool?

2) Are there any stronger and weaker areas of each of five domains?

3) Is there any influence of academic year and gender on students' perception?

METHOD

Study Design

This was a cross-sectional study.

Sample

The present study was conducted in CMOSHMC, Chittagong, Bangladesh during the study period of 2017–2018. All third through fifth year students could participate in the study. The undergraduate medical curriculum of Bangladesh is a five-year training program that is divided into three periods: 1.5 years of preclinical study, 2 years of paraclinical study, and 1.5 years of clinical study.

Data Collection

The DREEM was used to study the students' perception of the EE of CMOSHMC. This is an internationally valid and reliable tool and well accepted to measure the medical EE (Roff et al., 1997; Swift, Miles, & Lienster, 2013; Tontus, 2010). It was originally designed in English and then translated into Swedish, Greek, and Spanish. Institution-based feedback on the strong points and flaws of the educational climate can be provided by the DREEM (Dimoliatis, Vasilaki, Anastassopoulos, Ioannidis, & Roff, 2010; Jackobsson, Danielsen, & Edgren, 2011; Requelme et al., 2009; Roff et al., 1997). It may highlight areas of student-based concern that could be unintentionally neglected by educators (Yusoff, 2012a; Yusoff, 2012b; Yusoff, 2012c). For these reasons, the DREEM questionnaire is used worldwide, and many highly reputed journals have published many studies' findings (Al-Hazimi, Al-Hyani, & Roff, 2004; Finn, Avalos, & Dunne, 2014; Jeyashree, & Patro, 2013; Kiran, & Gowdappa, 2013; Kossioni, Varela, Ekonomu, Lyrakos, & Dimoliatis, 2012; Roff et al., 1997; Thomas, Abraham, Alexander, & Ramnarayan, 2009; Tontus, 2010; Whittle, Whelan, & Murdoch-Eaton, 2007; Varma, Tiyagi, & Gupta, 2005). Malaysian medical schools also have done several studies, notably Universiti Sultan Zainal Abidin (Al-Naggar et al., 2014; Arzuman, Yusoff, & Chit, 2010; Rahman et al., 2015; Said, Rogayah, & Hafizah, 2009; Salam et al., 2014; Yusoff, 2012a, 2012b).

The DREEM inventory consists of 50 items that measure the EE in five domains: "Students' perceptions of learning (SPL)-12 items," "Students' perceptions of teachers (SPT)-11 items," "Students' academic self-perceptions (SASP)-8 items," "Students' perceptions of atmosphere (SPA)-12 items," and "Students' social self-perceptions (SSSP)-7 items." The students answered all the statements via a five-point Likert scale ranging from "strongly agree" to "strongly disagree." The scoring of items was as follows: "4=strongly agree," "3=agree," "2=uncertain," "1=disagree," and "0=strongly disagree." Items 4, 8, 9, 17, 25, 35, 39, 48, and 50 were reversely scored. The total score for all subscales is 200 (Table 1). The interpretation of the DREEM score is "0–50 very poor," "51–100 many problems," "101–150 more positive than negative," and "151–200 excellent" (Al-Kabbaa et al., 2012; Al-Naggar et al., 2014; Rahman et al., 2015; Roff et al., 1997; Salam et al., 2014; Swift, Miles, & Lienster, 2013; Tripathy & Dudani, 2013; Yusoff et al., 2013).

Table 1. Interpretation of the DREEM score based on domain

Domain	Score	Interpretation
SPL	0–12	Very poor
	13–24	Teaching is viewed negatively
	25–36	A more positive approach
	37–48	Teaching highly thought of
SPT	0–11	Abysmal
	12–22	In need of some retraining
	23–33	Moving in the right direction
	34–44	Model teachers
SASP	0–8	Feeling of total failure
	9–16	Many negative aspects
	17–24	Feeling more on the positive side
	25–32	Confident
SPA	0–12	A terrible environment
	13–24	There are many issues that need changing
	25–36	A more positive atmosphere
	37–48	A good feeling overall
SSSP	0–7	Miserable
	8–14	Not a nice place
	15–21	Not too bad
	22–28	Very good socially

SPL: students' perceptions of learning; SPT: students' perceptions of teaching; SASP: students' academic self-perceptions; SPA: students' perceptions of atmosphere; SSSP: students' social self-perceptions; DREEM: Dundee Ready Education Environment Measure

Before going into the survey, the participants were informed about the objectives and process of the study that the data gathered would be anonymized and used for publication, and that study participation was totally voluntary. Written consent was then obtained before the questionnaires were distributed. Respondents were asked to provide information on their socio-demographic characteristics. The "DREEM questionnaire" was distributed to the paraclinical (3rd and 4th year) and clinical (5th year) students in their regular classes, and 1 day was given to complete the study.

Ethical Considerations

The study was approved by the Institutional Review Board of CMOSHMC (8th Meeting of IRB, April 6, 2016).

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences version 19 (SPSS Inc., Chicago, IL, USA). The independent *t*-test was used to determine statistically significant differences between the mean scores of sexes and academic years. A p value <0.05 was considered statistically significant.

RESULTS

A total of 170 students responded to the questionnaire. Table 2 shows that the highest response was from fourth year students

Table 2. Educational profiles of the participants (n=170)

Variable	n	%
Academic year		
Paraclinical	127	74.71
Third	51	30
Fourth	76	44.71
Clinical		
Fifth	43	25.29

(44.71%), and that the lowest response was from fifth year students (25.29%). The study included 47 (27.6%) male respondents and 123 (72.4%) female respondents.

The analysis of the SPL subscale showed that the global scores for the paraclinical and clinical years were 29.10 and 29.26, respectively, out of 48 (Table 3). Across the years of the study, all item scored between 2 and 3 indicating that their perception about learning is satisfactory.

Table 3. The domain and item mean score of the DREEM of CMOSHMC

Domain	Item	Mean (SD)			p
		Paraclinical	Clinical	Overall	
Students' perceptions of learning (SPL)		29.10 (4.41)	29.26 (4.82)	29.14 (4.51)	0.85
1	I am encouraged to participate	2.11 (0.74)	2.16 (0.97)	2.13 (0.80)	
7	The teaching is often stimulating	2.52 (0.96)	2.67 (0.99)	2.56 (0.97)	
13	The teaching is student-centered	2.76 (0.89)	2.65 (0.90)	2.74 (0.89)	
16	The teaching is helpful to develop my skills/competency	2.18 (0.89)	2.00 (0.53)	2.14 (0.81)	
20	The teaching is well focused	2.42 (0.91)	2.49 (0.86)	2.44 (0.90)	
22	The teaching is sufficient to develop my confidence	2.40 1.03	2.12 (0.88)	2.33 (0.99)	
24	The teaching time is put to good use	2.53 (0.84)	2.70 (0.83)	2.57 (0.84)	
25	The teaching over-emphasizes factual learning*	2.41 (0.97)	2.49 (0.80)	2.43 (0.93)	
38	I am clear about the learning objectives of the course	2.32 (0.74)	2.37 (0.90)	2.34 (0.78)	
44	The teaching encourages me to be an active learner	2.45 (0.92)	2.60 (0.95)	2.49 (0.93)	
47	Long-term learning is emphasized over short-term learning	2.28 (0.94)	2.40 (0.90)	2.31 (0.93)	
48	The teaching is too teacher-centered*	2.71 (1.00)	2.60 (1.03)	2.68 (1.01)	
Students' perceptions of teaching (SPT)		27.95 (4.28)	26.72 (3.75)	27.64 (4.17)	0.09
2	The teachers are knowledgeable	2.32 (1.05)	1.88 (0.85)	2.21 (1.02)	
6	The teachers place emphasis on being patient-centered during their interaction with patients	3.06 (0.97)	3.47 (0.85)	3.16 (0.96)	
8	The teachers ridicule the students*	2.38 (1.11)	1.95 (1.17)	2.27 (1.14)	
9	The teachers are authoritarian*	2.40 (1.17)	1.63 (0.95)	2.21 (1.17)	
18	The teachers have good communication skills with the patients	2.26 (0.84)	2.26 (0.76)	2.26 (0.82)	
29	The teachers are good at providing feedback to students	2.76 (0.95)	2.86 (0.94)	2.79 (0.94)	
32	The teachers provide constructive criticism here	2.45 (0.90)	2.51 (1.03)	2.45 (0.94)	
37	The teachers give clear examples	2.59 (0.91)	2.51 (0.88)	2.57 (0.90)	
39	The teachers get angry in class*	2.40 (1.03)	2.11 (0.88)	2.33 (1.00)	
40	The teachers are well prepared for their classes	2.20 (0.72)	2.33 (0.81)	2.23 (0.75)	

50	The students irritate the teachers*	3.15 (1.07)	3.21 (0.94)	3.16 (1.04)	
Students' academic self-perceptions (SASP)		21.46 (3.36)	19.95 (3.86)	21.08 (3.54)	0.02
5	Learning strategies which work for me before, continue to work for me now	2.72 (0.86)	2.65 (1.00)	2.70 (0.89)	
10	I am confident about passing this year	2.75 (0.82)	2.60 (0.88)	2.71 (0.83)	
21	I feel I am well prepared for my profession	2.69 (0.85)	2.44 (0.91)	2.63 (0.87)	
26	Last year's work has been a good preparation for this year's work	2.76 (0.89)	2.23 (0.78)	2.63 (0.89)	
27	I can memorize all I need	3.50 (0.93)	3.40 (0.98)	3.47 (0.94)	
31	I have learned a lot about empathy in my profession	2.09 (0.84)	1.95 (0.69)	2.05 (0.80)	
41	My problem-solving skills are well developed here	2.68 (0.83)	2.47 (0.83)	2.62 (0.83)	
45	Much of what I must learn seems relevant to my career in health care	2.28 (0.80)	2.21 (0.64)	2.26 (0.76)	
Students' perceptions of atmosphere (SPA)		34.66 (5.44)	32.40 (4.68)	34.09 (5.34)	0.02
11	The atmosphere was relaxed during ward teaching	2.94 (1.06)	3.02 (1.01)	2.96 (1.04)	
12	The school is well timetabled	3.19 (1.17)	2.30 (0.86)	2.96 (1.17)	
17	Cheating is a problem in this school*	2.81 (1.15)	2.93 (1.18)	2.84 (1.15)	
23	The atmosphere is relaxed during lectures	2.71 (0.99)	2.63 (1.00)	2.69 (0.99)	
30	There are opportunities for me to develop interpersonal skills	2.87 (1.04)	2.44 (0.83)	2.76 (1.00)	
33	I feel comfortable in class socially	2.51 (0.87)	2.35 (0.97)	2.47 (0.89)	
34	The atmosphere is relaxed during seminars/tutorials	2.88 (1.06)	2.16 (0.75)	2.70 (1.04)	
35	I found the experience disappointing*	2.85 (1.03)	3.02 (0.99)	2.89 (1.02)	
36	I am able to concentrate well	2.85 (0.94)	2.74 (0.85)	2.82 (0.92)	
42	The enjoyment outweighs the stress of studying medicine	3.50 (1.02)	3.40 (1.05)	3.48 (1.03)	
43	The atmosphere motivates me as a learner	2.72 (0.99)	2.77 (0.97)	2.73 (0.98)	
49	I feel able to ask the questions I want	2.82 (1.03)	2.63 (1.00)	2.77 (1.03)	
Students' social self-perceptions (SSSP)		18.61 (3.20)	18.19 (3.05)	18.51 (3.16)	0.45
3	There is a good support system for students who get stressed	3.59 (1.08)	3.72 (0.98)	3.55 (1.05)	
4	I am too tired to enjoy this course	2.39 (1.02)	2.51 (1.22)	2.42 (1.07)	
14	I am rarely bored on this course*	3.05 (1.28)	2.74 (1.18)	2.97 (1.26)	
15	I have good friends in this school	2.07 (0.92)	1.77 (0.68)	1.99 (0.88)	
19	My social life is good	2.34 (1.09)	2.19 (0.96)	2.30 (1.07)	
28	I seldom feel lonely	2.82 (1.10)	2.77 (1.17)	2.81 (1.12)	
46	My accommodation is pleasant	2.46 (0.96)	2.49 (0.94)	2.46 (0.95)	
Total DREEM score		131.80 (14.17)	126.51 (14.90)	130.46 (14.50)	0.04

*Represents items with negative statements. DREEM: Dundee Ready Education Environment Measure; CMOSHMC: Chattagram Maa-O-Shishu Hospital Medical College

The analysis of the SPT subscale showed that the global scores for the paraclinical and clinical years were 27.95 and 26.72, respectively, out of 44 (Table 3). Item 6 "The teach-

Table 4. Association between sex with the mean score of the DREEM of CMOSHMC

Domain	Sex	Mean (SD)	p
SPL	Male	28.96 (5.42)	0.74
	Female	29.21 (4.13)	
SPT	Male	27.77 (4.39)	0.81
	Female	27.60 (4.10)	
SASP	Male	21.72 (3.34)	0.15
	Female	20.83 (3.60)	
SPA	Male	34.00 (5.86)	0.90
	Female	34.12 (5.14)	
SSSP	Male	19.21 (2.85)	0.04
	Female	18.20 (3.23)	
Total	Male	131.74 (16.07)	0.48
	Female	129.97 (13.89)	

SPL: students' perceptions of learning; SPT: students' perceptions of teaching; SASP: students' academic self-perceptions; SPA: students' perceptions of atmosphere; SSSP: students' social self-perceptions; DREEM: Dundee Ready Education Environment Measure; CMOSHMC: Chattagram Maa-O-Shishu Hospital Medical College

ers place emphasis on being patient-centered during their interaction with patients" and item 50 "The students irritate the teachers" consistently scored >3 indicating their agreement with the statement. Item 2 "The teachers are knowledgeable," item 8 "The teachers' ridicule of the students," and item 9 "The teachers are authoritarian" scored <2 by clinical medical students indicating the weakness of the EE.

The analysis of the SASP subscale showed that the global scores for the paraclinical and clinical years were 21.46 and 19.95, respectively, out of 32 (Table 3). Item 27 "I am able to memorize all I need" consistently scored >3. Item 31 "I have learned a lot about empathy in my profession" scored <2 by clinical medical students indicating the weakness of the EE.

The analysis of the SPA subscale showed that the global scores for the paraclinical and clinical years were 34.66 and 32.40, respectively, out of 48 (Table 3). Item 42 "The enjoyment outweighs the stress of studying medicine" consistently scored >3 indicating the strength of the EE. Item 11 "The atmosphere was relaxed during ward teaching" scored >3 by the clinical year medical students, and item 12 "The school is well timetabled" scored >3 by the paraclinical year medical students indicating the strength of EE. Item 35 "I found the experience disappointing" scored >3 by the clinical year medical students indicating that they disagreed with the statement.

The analysis of the SSSP subscale showed that the global scores for the paraclinical and clinical years were 18.61 and 18.19, respectively, out of 28 (Table 3). Item 15 "I have good friends in this school" scored <2 by the clinical year medical students indicating that they disagreed with the statement. Item 3 "There is a good support system for students who get stressed" scored >3 indicating that students were enjoying the EE.

The mean total DREEM score of the present study was 130.46 indicating that the EE of CMOSHMC was more positive than negative (Table 3). Paraclinical students scored statistically significantly higher than clinical students (p=0.040). Paraclinical students also scored statistically significantly higher than clinical students in the SPA domain (p=0.020) and SASP domain (p=0.020) (Table 3).

In relation to sex, SSSP were significantly higher for male students than for female students (p=0.040) (Table 4). There were no significant differences between male and female students with respect to the other domains.

Table 5 shows the respondents' perceptions and interpretation regarding the EE of CMOSHMC. Most of the students said that a positive learning experience (80.6%) and an appropriate teaching method (81.2%) were ongoing in CMOSHMC. They also thought that their academic self-perceptions were positive (77.1%), and they agreed that a positive learning atmosphere (65.9%) was ongoing. They also felt that their social surroundings were in acceptable range (70.6%).

Table 5. Domain interpretation score of CMOSHMC (n=170)

Score based on domain	No. of respondents, n (%)
Students' perceptions of learning	
Very poor	0 (0)
Teaching is viewed negatively	21 (12.4)
A more positive approach	137 (80.6)
Teaching highly thought of	12 (7.1)
Students' perceptions of teaching	
Abysmal	0 (0)
In need of some retraining	17 (10)
Moving in the right direction	138 (81.2)
Model teachers	15 (8.8)
Students' academic self-perceptions	
Feeling of total failure	0 (0)
Many negative aspects	14 (8.2)
Feeling more on the positive side	131 (77.1)
Confident	25 (14.7)
Students' perceptions of atmosphere	
A terrible environment	0 (0)
There are many issues that need changing	2 (1.2)
A more positive atmosphere	112 (65.9)
A good feeling overall	56 (32.9)
Students' social self-perceptions	
Miserable	0 (0)
Not a nice place	19 (11.2)
Not too bad	120 (70.6)
Very good socially	31 (18.2)

CMOSHMC: Chattagram Maa-O-Shishu Hospital Medical College

DISCUSSION

The mean DREEM score of the present study was 130.46 (Table 3). Based on the DREEM practical guideline, the accepted range is 101–150 points (Al-Kabbaa et al., 2012; Al-Naggar et al., 2014; Rahman et al., 2015; Roff et al., 1997; Salam et al., 2014; Swift, Miles, & Lienster, 2013; Tripathy, & Dudani, 2013; Yusoff et al., 2013). Thus, it indicates that students have a "more positive than negative perception" regarding the EE of CMOSHMC. Several studies also reported similar DREEM scores, but Veasuvalingam and Arzuman (2014) and Varma et al. (2005) reported higher total DREEM scores than the present study, indicating that there were rooms for improvement (Abraham et al., 2008; Al-Hazimi, Al-Hyani, & Roff, 2004; Al-Kabbaa et al., 2012; Al-Naggar et al., 2014; Arzuman, Yusoff, & Chit, 2010; Bassaw et al., 2003; Jiffry et al., 2005; Rahman et al., 2015; Thomas et al., 2009; Yusoff et al., 2013). The EE of CMOSHMC needs to provide a more student-centered approach to education.

As is observed in the present study, there were four overall areas of strength: "The teachers place emphasis on being patient-centered during their interaction with patients," "I am able to memorize all I need," "The enjoyment outweighs the stress of studying medicine," and "There is a good support system for students who get stressed." These indicated that the EE is in a healthy state. The faculty members had a good relationship with their patients and students. The teachers are concerned about their patients and student's thinking or feeling and are prepared to provide the best care to them.

In addition to these, there were two overall areas of concern: "I have good friends in this school" and "the students irritate the teachers." It reflected poor social relationships and academic dishonesty among the medical students. A similar result was reported in several studies regarding academic dishonesty, which was an area of concern (Al-Kabbaa et al., 2012; Al-Naggar et al., 2014; Rahman et al., 2015; Yusoff et al., 2013). The medical college should look carefully to improve the social relationships of the students with their peer. Issues should be taken to avoid unnecessary stress for the medical students.

The present study also showed the strengths and weakness of each phase of medical training. It was observed that the paraclinical phase scored the highest (131.80/200) than the clinical phase (126.51/200), which was statistically significant (p=0.040). Overall, all phases of medical training showed a "more positive than negative perception" regarding the EE of CMOSHMC. Paraclinical students also scored statistically significantly higher than clinical students in the SPA domain (p=0.020) and SASP domain (p=0.020). The SPA domain influences "learning and teaching." It is essential to improve the atmospheres in the clinical phase.

The strength of the paraclinical phase was "The school is well timetabled," and the strength of the clinical phase was "The atmosphere was relaxed during ward teaching." The weakness of the paraclinical phase was "I found the experience disappointing." There were more weaknesses in the clinical phase: "The teachers are knowledgeable," "The teachers ridicule the students," "The teachers are authoritarian," "I have learned a lot about empathy in my profession," and "I found the experience disappointing." Several studies also reported similar findings especially in the clinical phase (Abraham et al., 2008; Al-Hazimi, Al-Hyani, & Roff, 2004; Al-Kabbaa et al., 2012; Al-Naggar et al., 2014; Bassaw, 2003; Jiffry et al., 2005; Requelme et al., 2009; Yusoff et al., 2013). It indicated that the teachers were harsh to the students during the teaching session that would damage the teaching quality. The students perceived that the teachers poorly take care of them during the teaching session. It would lead to less interest in the teaching session and unproductive learning experience among the students. Students expect some improvement in the teaching methodology. The teachers need to be more careful about this matter. In relation to sex, SSSP were significantly higher for male students than for female students (p=0.040). There were no significant differences between male and female students with respect to the other domains. However, Rahman et al. reported a significant difference between male and female students in all domains (Rahman et al., 2015).

CONCLUSION AND RECOMMENDATIONS

The result of the present study indicates that students have a more positive than negative perception regarding the EE of CMOSHMC. Overall, paraclinical students have more positive perception than clinical students, especially regarding SASP and SPA. Male students have a more positive perception in SSSP. Thus, the result of the present study will be helpful to take effective measures to improve the teaching and learning environment of the medical college in which they belong.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Institutional Review Board (IRB), Chattagram Maa-O-Shishu Hospital Medical College. Agrabad, Chittagong, Bangladesh for the study "Students based analysis of perception regarding educational environment using DREEM questionnaire at Chattagram Maa-O-Shishu Hospital Medical College". Ethical approval signed by the Chairman and Member Sectary of IRB dated April 10-2016.

Informed Consent: Written consent was then obtained before the questionnaires were distributed.

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Research Article

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The Effect of a Guide Based Application Bundle on the Catheter-Related Infection

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ABSTRACT

Aim: Central venous catheters are used extensively in intensive care units but can sometimes lead to catheter related blood stream infections. This study was carried out to determine the effect of guideline-based care bundle on possible catheter-related bloodstream infection in the application and care of central venous catheter in patients receiving follow-up and treatment in anesthesia intensive care unit.

Method: The study is a retrospective and experimental one. The study population consisted of patients who were treated in an anesthesia intensive care unit of a university hospital between June 2015 and June 2016, to whom the central line was inserted in this unit by the team working in the unit and who required central line insertion for at least 48 hours. The patients in the study population also comprised the study sample. The guideline-based application and care bundle was administered under the supervision of the researcher in the intensive care unit and the patients were evaluated on a daily basis for bloodstream infection.

Results: When comparing data obtained from the study with data from the previous period, it was found that the guideline-based application and care bundle decreased the catheter-related bloodstream infection rate from 10.59/1000 to 2.88/1000 and this reduction was considered statistically significant ($p<0.05$).

Conclusion: According to this study's data, the guideline-based care bundle is an effective and useful way to reduce infection.

Keywords: Bundle, care bundle, central venous catheter, infection, intensive care

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INTRODUCTION

Central venous catheters (CVC) is a procedure in which a catheter with various specifications is inserted into a central vein leading directly to the heart (Bell, & O'Grady, 2017; Ergül et al., 2016). CVC can be used for different purposes in each patient.

Although CVC contributes to the improvement of the health status of patients, it can also be the main cause of complications such as Central Line-Associated Blood Stream Infections (CLABSI), hemorrhage and thrombosis. CLABSIs are one of the most important problems experienced in intensive care units and the leading cause of morbidity and mortality (Galpern, Guerrero, Tu, Fahoum & Wise 2008). It is reported that although the CLABSI rate decreased by 46% between 2008 and 2013 in the US, there are still 30000 cases of CLABSI every year (Bell, & O'Grady, 2017). CLABSIs are also the leading cause of morbidity and mortality in the intensive care settings in Turkey. According to the National Nosocomial Infections Surveillance Network (NNISN) report (2014), in Turkey, the ratio of the CLABSI in Anesthesia Reanimation Intensive Care Units to CVC days was 2044/436494 and the weighted mean value was 4.7.

The measures to be taken and the rules to be followed during the placement, use and care of the central line to prevent these infections have been given in detail in international guidelines such as Our Lady's Children's Hospital, Crumlin's (OLCHC) Guideline, Central Venous Access Devices (CVAD) Guidelines, Healthcare Infection Control Practices Advisory (HICPAC) and Centers for Disease Control and Prevention (CDC) Guideline (Healthcare Infection Control Practices Advisory Committee, 2011). Of these guidelines, CDC and HICPAC takes the lead. In the Guidelines, Care Bundles, one of the current approaches towards the patient care and prevention of infections, are emphasized. Care bundles are defined by the Institute for Health Improvement (2012) as 'a small set of evidence-based interventions for a defined patient segment/population and care setting that, when implemented together will result in significantly better patient outcomes than when implemented individually'. Care bundles do not represent the comprehensive care required of a process, their purpose is to test a theory 'when compliance is measured for a core set of accepted elements of care for a clinical process, the necessary teamwork and cooperation required will result in high levels of sustained performance and improved outcomes' (Institute for Healthcare Improvement-IHI, 2012). A care bundle refers to the simultaneous and precise use of interventions as a set each of whose positive contribution to the healing process and outcomes of the healing process has been scientifically proven, to achieve better outcomes than the outcomes when they are used singly (Furuya et al., 2016; Klintworth et al., 2004).

Recently, internationally conducted studies have shown that central line-associated blood stream infections can be prevented by implementing a care bundle (Galpern et al., 2008; Hebbar, Cunnigham, McCracken, Kamat & Fortenberry, 2015; Jeong, Park, Lee, Song & Lee, 2013; Jones 2013; Kim, Holtom & Vigen, 2011; Klintworth et al. 2014). However, in Turkey, two national studies investigating the effect of a care bundle on the prevention of central line-associated blood stream infections have been published (Durak et al.,2014; Polat et al., 2014). In Polat et al.'s study (2014), a care bundle was implemented on a group of patients to whom the central line was inserted in the external diseases services or operating room, and it was observed that the rate of CLABSIs decreased after the implementation, but that the decrease was not statistically significant. In the same study, the care bundle im-

plementation checklist was filled out not by the researcher but by other clinicians. In Durak et al.'s study (2014) aiming to reduce tool-related infections in Turkey by implementing the care bundle, it was determined that the care bundle was not effective in CLABSI. Therefore, in other international and national studies in the literature, it was thought that a study to investigate the effective implementation of a care bundle in the prevention of CLABSIs should be carried out under the supervision of a researcher in accordance with the all or none principle.

This present study was conducted to investigate the effect of the care bundle developed by the CDC and HICPAC on the Central Line-Associated Blood Stream Infection rates in patients to whom a central line was inserted in the anesthesia and reanimation intensive care unit of an Application and Research Hospital.

Hypotesis

Hypotesis 1

H 0: The use of a care bundle developed by CDC and HICPAC has no effect on the development of CLABSI when the CVC is opened to patients treated in intensive care.

H 1: The use of a care bundle developed by CDC and HICPAC has an effect on the development of CLABSI when the CVC is opened to patients treated in intensive care.

Hypotesis 2

H 0: The use of a care bundle developed by CDC and HICPAC in the treatment of CVC in patients who were treated in ICU and who were treated with CVC had no effect on the development of CLABSI in the patient.

H 1: The use of a care bundle developed by CDC and HICPAC in the treatment of CVC in patients who were treated in ICU and who were treated with CVC had an effect on the development of CLABSI in the patient.

METHOD

Study Design

This retrospective and quasi-experimental study was conducted in the anesthesiology and reanimation intensive care unit of a university hospital. The Anesthesia and Reanimation Intensive Care Unit has 25-bed capacity. In the unit, 9 physician assistants and 32 nurses work. The central line is inserted by a physician assistant, and a nurse performs the care of the insertion site of the central line using povidone iodine. The presence of infection in the central line is checked by nurses during care.

Sample

The study population consisted of patients who were treated in an anesthesia intensive care unit of a university hospital between June 2015 and June 2016, to whom the central line was inserted in this unit by the team working in the unit and who required central line insertion for at least 48 hours. The patients in the study population also comprised the study sample. Patients who were pregnant, transferred from another unit or center to the anesthesia intensive care unit with central line, or previously diagnosed with CLABSI, or in whom central line were inserted or central line care were given beyond the researcher's knowledge were excluded from the study. During the 6-month study period, 218 patients were reached and according to the inclusion and exclusion criteria of the study only 58 patients were included in the study group. 62 patients were evaluated between the dates indicated in the study and 4 of these patients were excluded from the study due to death.

Data Collection

The following three tools developed by the researcher were used to collect data: "The Care Bundle Checklist for the Prevention of CLABSI

in Patients with a Central Line Inserted", "the Daily Evaluation Form of Patients with a Central Line", and "the 6-Month Data Checklist Regarding the CLABSI" prepared by the Infection Control Committee.

The first tool is an application tool which includes 6 main and 5 sub-items questioning the appropriate hand hygiene, maximum barrier precautions, appropriate central line site selection, skin antisepsis with chlorhexidine, and compliance with aseptic techniques when central lines are inserted and post-administration hand hygiene all of which recommended by the CDC and HICPAC. This tool also questions sociodemographic characteristics of the participants. The second tool including 10 main and 5 sub-items questions the following: the duration of the infusion set if the patient has one, whether or not blood transfusion has been performed, whether the unused lumens are closed, whether central line dressing care has been performed, whether the hubs have been cleaned with alcohol before the medication is put in the sets, the kinds and number of blood products received through the central catheter, the amount of parenteral nutrition, assessment of daily need for the central line for the hemodialysis therapy, removal of the central line if it is not needed, whether there are local infections in the catheter area. The third tool is "the 6-Month Data Checklist Regarding the CLABSI" prepared by the Infection Control Committee. The tool has 6 items which question the number of central line insertions, the number of CVC days, CLABSI rate, the number of patient days, the number of patients, and the incidence of CLABSIs.

The 6-month retrospective data from the beginning date of the study on the number of central line insertions, the number of CVC days, CLABSI rate, the number of patient days, the number of patients, and the incidence of CLABSIs were obtained from the Infection Control Committee of the University Hospital. The Infection Control Committee makes the diagnosis of CLABSI based on the Blood Stream Infections diagnostic criteria verified by the CDC's laboratory in patients having infection signs and symptoms. These three tools were filled out by the researcher every day for 6 months.

At the beginning of the study, a 30-minute meeting was held with the clinical staff including the nurses and physician assistants in a classroom in the Anesthesiology Intensive Care Unit to improve their compliance with the care bundle. This meeting was held by the researcher, in direct instruction tecnique and in a one session. There were no health personnel who did not want to participate in the meeting.

The meeting was later repeated several times with the same participants and the other health personnel joined them during the study. At the meetings, the participants were informed about the care bundle defined in the guidelines, as well as its aim and importance. It was emphasized that if compliance with even one of the five strategies listed in the guidelines was not performed, no positive effects could be obtained from the patients' infection-related outcomes since the full compliance with the bundle was not achieved. The main objective of these meetings was to ensure the team's compliance with the bundle by enabling them to act together with the researcher.

Another action taken by the researcher during the study process to increase the compliance with the care bundle was to observe and support the physicians' compliance with the aseptic techniques while they inserted the central line to the 58 patients. The fact that physicians did not fully comply with the aseptic techniques during the insertion of the central line in previous clinical observations made it necessary for the researcher to display such an approach during the study.

In the study process, another important application regarding the compliance with the care bundle was the use of chlorhexidine instead of povidone iodine in central line dressings. Dressings were changed by the researcher every other day, and the central line insertion sites of the patients were evaluated and recorded for infection symptoms.

Statistical Analysis

The data obtained were analyzed using the IBM Statistical Package for Social Sciences v.22 (IBM SPSS Corp.; Armonk, NY, USA). The data on patients' sociodemographic characteristics were given in numbers and percentages. Quantitative data were calculated as median. Because the parametric test assumptions were not met (Kolmogorov Simirnov), the Mann-Whitney U test was used to compare two independent groups, and the Fisher exact chi-square test was used to compare the qualitative data. The error margin was accepted as 0.05.

The incidence of CLABSI was calculated as the 'rate of CLABSI'. This numerical value calculated refers to the number of infections developed during the use of a central line, and the duration of central line use is calculated as 1000 catheter days.

$$\text{CLABSI rate} = \frac{\text{the number of central line–associated blood stream infections}}{\text{CVC–days}}$$

The CVC-days refer to the number of the days during which the patients staying in the clinic had central lines during the period they underwent treatment. The rate of central line use refers to the ratio of the number of the days patients have the central line to the number of patient days in the intensive care unit.

$$\text{The rate of central line use} = \frac{\text{the number of CVC–days}}{\text{the number of patient days}}$$

The number of patient days refers to the number of the days when all patients with or without central line stay in the clinic for a certain period of time.

Ethical Considerations

Before the study was conducted, the ethics committee approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Cumhuriyet University and the written permission was obtained from the hospital where the study was to be conducted. The study was conducted in accordance with the Declaration of Helsinki. If the patient was conscious, the patient, if not, his/her relatives were informed of the implementation and its results, and then their informed consent was obtained.

RESULTS

Of the participants, 53.4% were female. In the present study, CLABSI were detected in 2 (6.45%) of the 31 female patients and 2 (7.40%) of 27 male patients. There was no statistically significant difference between the central line-associated blood stream infection rates in terms of gender ($p>0.05$). The analysis of the patients' ages, length of intensive care stay, duration of central line use, and whether the service length of the physician inserting the CVC affected the development of CLABSI revealed that the mean age of the patients who developed CLABSI was 76 ± 2.44, whereas the mean age of the patients who did not develop CLABSI was 73.4 ± 10.59, and that the difference between them was not statistically significant ($Z=0.323$, $p>0.05$) (Table 1).

While the mean length of hospital stay in 4 patients who developed CLABSI was 142 ± 62.70 days, it was 29.74 ± 4.26 days in 54 patients who did not develop CLABSI. Similar to this finding, although the mean of the retention days of central line in the patients with CLABSI was 70.5 ± 7.6, it was 20.4 ± 3.15 in the patients without CLABSI. The difference between the patients with and without CLABSI in terms of

the mean length of stay in intensive care unit (Z=2.794; p=0.005) and the mean of the retention days of central line (Z=2.922; p<0.05) was statistically significant (Table 1).

The mean service length of the physicians inserting the central line to the patients with CLABSI was 1.5±0.28 years whereas it was 2.25±0.11 years in the physicians inserting the central line to the patients without CLABSI. However, the difference between them was not statistically significant (Z=1.766; p>0.05) (Table 1).

The patients were classified into three groups in terms of receiving a special treatment: (1) those who received Total Parenteral Nutrition (TPN), (2) those who received hemodialysis treatment and (3) those who received neither treatment. When the patients in these 3 groups were analyzed in terms of developing CLABSI, the rate was 10.52%, 14.28% and 3.12% respectively in those with CLABSI, and 89.47%, 85.71% and 96.88% respectively in those without CLABSI. The difference between the three

Table 1. Distribution of developmental conditions in the CLABSI

	CLABSI		
	Existent (n=4)	**Absent (n=54)**	**Data Analysis**
Age of patients (year)	76±2.44	73.4±10.59	Z=0.323
			p=0.747
Length of intensive care stay	142±62.70	29.74±4.26	Z=2.794
			p=0.005
Duration of central line use	70.5±7.60	20.4±3.15	Z=2.922
			p=0.003
Whether the service length of the physician inserting the CVC	1.5±0.28	2.25±0.11	Z=1.766
			p=0.077
TPN treatment	2 (% 10.52)	17 (% 89.47)	p=0.591
Hemodialysis treatment	1 (% 14.28)	6 (% 85.71)	p=0.411
Those who do not receive TPN or Hemodialysis treatment	1 (%3.12)	31(%96.87)	p=0.747

CLABSI: central line-associated blood stream infections; CVC: central venous catheters; TPN: total parenteral nutrition

Table 2. Distribution of data related to central venous catheter related to research during the ımplementation period of the study according to previous periodicals

	June-December 2015 (Routine Application)	**December-June 2016 (Bundle Application)**	**Data Analysis**
Total Number of Patients (n)	264	58	
Patient's Day	4215	2174	
Central Venous Catheter Day (n)	3116	1387	
Central Venous Catheter Utilization Rate	0.74	0.67	t=0.23
			p=0.765
Catheter Related Blood Stream Infections (n)	33	4	
Catheter Related Blood Stream Infections Rate	10.59/1000	2.88/1000	t=11.01
			p=0.001

groups in terms of developing CLABSI was statistically insignificant (p>0.05) (Table 1).

Of the maximum barrier measures, mask compliance was not achieved by the physicians in 2 of the 58 patients who were subjected to care bundle in the study, and hand hygiene was not performed by the physician who inserted the central line in 1 patient. After the researcher warned the physicians, they complied with the care bundle.

While the total number of patients in the intensive care unit with central lines was 218 in the study period, it was 264 in the previous period. The comparison of the patient days during the two periods demonstrated that the number of the patient days was 3982 during the study period and 4215 during the previous period.

Based on the data obtained from the Hospital Infection Control Committee, in the intensive care unit during the 6-month period before the study, central venous catheter use was 4215 catheter days, central venous catheter rate was 0.74 and the ratio of the CLABSI to catheter days was 10.59/1000 catheter days. During the six months of the study period, 58 patients who met the inclusion criteria were included in the study. In these patients, the central venous catheter use was 1387 catheter days, central venous catheter rate was 0.67 and the ratio of the CLABSI to catheter days was 2.88/1000 catheter days (Table 2). Of the patients included in the study, four (6.89%) developed CLABSI. The CLABSI rate determined in the study period was statistically significantly lower than that determined in the 6-month period prior to the study, (t=11.01; p<0.05) (Table 2).

DISCUSSION

The comparison of the data on CLABSIs developed by the patients participating in the present study obtained during the study period with those of the previous period revealed that the number of cases developing CLABSIs decreased from 33 to 4, and the ratio of the CLABSIs to CVC days decreased from 10.59/1000 catheter days to 2.88/1000 catheter days, which was statistically significant (t=11.01, p=0.001). A study investigating the relationship between CLABSIs and the central line care bundle obtained results similar to the results of the present study. In that study, during the 24-month period which included 1395 central lines and 9938 CVC days, the mean of the CVC days decreased from 8.5±1.3 to 6.8±0.97 and the mean of the CLABSI days decreased from 5.0±4.3 to 0.90±1.3 (p<0.001) (Galpern et al., 2008). In Apisarnthsnarak, Thongphubet, Yuekyen, Warren & Fraser's 3-year study (2009), no CLABSIs occurred in the third 6th-month period of the study, and when compared with the first period, the mean of the CVC days decreased significantly (4.9±1.5 days) in the second period (p<0.001).

In present study, this decline in the CLABSI rate could be explained by the fact that within the scope of the care bundle, in the present study, chlorhexidine was used for the catheterization and central line care instead of povidone iodine which was routinely used in the intensive care unit before the study, and that the researcher observed and supported the physicians' compliance with the aseptic techniques while they inserted the central line to the 58 patients. In addition, it can be said that this significant decrease was also influenced by the meetings at which compliance with the care bundle was emphasized.

The analysis of the development of CLABSIs by gender demonstrated that there was no statistically significant difference between men and women. However, in their study on the development of CLABSIs, O'Neil et al. (2016) reported that the rate of development of CLABSIs was higher in men than in women (p=0.031).

As the length of stay in hospital and duration of central line use increase so does the risk of developing CLABSI (Guerin, Wagner, Rains & Bessesen, 2010; Mehndiratta, Nayak, Ali & Sharma, 2016; Polat et al. 2014). In the current study, it was determined that as the length of hospital stay increased, so did the rate of development of CLABSIs and that there was a statistically significant relationship between these two variables (Z=2.794, p=0.005). Mehndiratta et al. (2016) demonstrated that the incidence of CLABSIs increased significantly as the duration of central line use increased (p=0.0072). In their study, Guerin et al. (2010) reported that the patients developed an infection on average of 12 days after the insertion of the central line. CLABSIs increase the length of stay in the hospital by about 12 days (between 4.5 and 19.5 days) and the average cost for each patient by $ 18.432 (between $3.59 and $34.410) (Jones, 2013). Therefore, in order to avoid the development of CLABSIs, it is vital to shorten the duration of central line use as much as possible.

In the present study, it was found that although the CLABSI development rate was lower in the patients who did not receive a special treatment through the central line (3.12%), the rate was higher in the patients who received TPN (10.52%) or in patients who underwent hemodialysis treatment (14.28%). However, there was no statistically significant difference between these rates due to the small size of the sample (p>0.05). On the other hand, in Hakyemez, Yıldırmak, Çetmeli & İris's study (2016), the patients receiving TPN developed statistically significantly more infections (p=0.003).

CONCLUSION AND RECOMMENDATIONS

Central line is a widely used tool in the observation and treatment of patients in intensive care units. These catheters, which serve many purposes, increase the risk of morbidity and mortality in the patient due to CLABSIs, and can cause significant problems by increasing the length and cost of hospital stays. CLABSIs whose treatment is costly.

In this 6-month study, the rate of CLABSIs was reduced by implementing the CVC care bundle recommended by the CDC and HICPAC, and the decrease was statistically significant. It was determined that gender and age did not affect the development of CLABSIs. However, an increase in the length of stay in hospital and duration of central line use increased the rate of CLABSIs. It was also determined that the administration of TPN and implementation of hemodialysis through the central line increased the rate of CLABSIs, but did not lead to a statistically significant difference.

Similar to the present study, studies in the literature were not randomized controlled studies. Therefore, we recommend that future studies should include a randomized control group, and that care bundles should be implemented in both intensive care settings and throughout the country.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Cumhuriyet University (Date: 02.07.2015, Reference Number: 2015-07/04).

Informed Consent: Written informed consent was obtained from his/her relatives who participated in this study.

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Research Article

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Perceptions of Infection Control Practices and the use of Vignettes to Alter Infection Control Behavior: A Feasibility Study

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ABSTRACT

Aim: To explore the perceptions of infection control practices among healthcare personnel and evaluate the use of authentic vignettes as a means to alter infection control behavior.

Method: Four authentic vignettes were used as a part of reflective dialogues with healthcare personnel. An evaluation of the dialogues was performed with six healthcare personnel using the focus group technique. Qualitative content analysis was used to analyze the data.

Results: The mind-set to help one another and do one's best in every situation was described as a core aspect in preventing the transmission of microorganisms. Having support, taking personal responsibility, being knowledgeable about infection control practices, and having a reasonable workload were seen to play decisive roles in controlling the spread of infection. Discussing authentic comprehensible vignettes with colleagues during the allotted time was considered a valuable method for improving infection control practices.

Conclusion: Meaningful insights on how best to use vignettes as a means to improve infection control practice were gained. These findings should be considered when designing theory-driven interventions in different contexts, which are aimed at improving infection control practices in health care.

Keywords: Feasibility test, healthcare-associated infection, healthcare personnel behavior, infection control practices, qualitative research

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INTRODUCTION

Patients' safety is constantly endangered due to the risk of acquiring infections from healthcare procedures (Pittet, & Donaldson, 2005), despite the fact that several risk factors for such infections are modifiable. Some of these factors are: poor application of infection control practices (ICP), improper use of invasive devices, insufficient application of isolation precautions, unfavorable ward occupancy, and understaffing (Loveday et al., 2014; Storr et al., 2017). The main risks for potential organism transmission in health care come from direct contact between patients, healthcare personnel (HCP) who spread nosocomial pathogens from contaminated hands or clothing (Loveday et al., 2014), and indirect transmission by means of medical equipment or surfaces (Livshiz-Riven, Borer, Nativ, Eskira, & Larson, 2015). Thus, it is of great importance to increase infection prevention behavior in clinical practice and among personnel to deliver safe patient care (Pittet, 2004).

Despite available comprehensive recommendations for preventing healthcare-associated infections (Loveday et al., 2014), effective ICPs remain a complex problem in the clinical healthcare setting. Interruptions in the delivery of care can make this even more difficult (Lindberg, Lindberg, & Skytt 2017; Lindberg, Skytt, Wågström, Arvidsson, & Lindberg, 2018). The need to understand the underlying psychological processes that could explain infection prevention behavior among HCP has long been seen as a key factor in improving clinical practice (Pittet, 2004). Such an understanding could be a significant step in accomplishing the changes that are needed to be made structural conditions (Kanter, 1993) and behaviors (Pittet, 2004) for a more effective ICP. Several factors are described by HCP as influencing their infection prevention behavior. Among these are motivational factors such as social stimuli, the acuity of patient care, and a perceived need for self-protection. Furthermore, factors regarding perceptions of the work environment such as resources, knowledge, and organizational culture are also important (Smiddy, O´Connell, & Creedon, 2015). Accordingly, a shared understanding regarding beliefs, values, and social constructs in relation to ICP is of paramount importance in behavioral interventions (Sandberg, & Targama, 2007). To ensure a theoretically and empirically plausible and a feasible intervention that is timely and meaningful for the staff and organization, a framework was used for guidance before establishing a full-scale intervention (Craig et al., 2013) intended to alter HCP behavior. Vignettes describing the care situations can provide information regarding the rationalizations behind the reflections of the HCP on ICP (Jackson, Lowton, & Griffiths, 2014). Hence, the aim of this feasibility study was to explore HCP's perceptions of infection control practices and evaluate the use of authentic vignettes as a means to alter infection control behavior.

METHOD

Creating Authentic Vignettes

In a medical ward, one of the researchers (MaL) conducted nonparticipant-observations (Lindberg, Lindberg & Skytt 2017) that focused on care situations involving behaviors that carried a risk for microorganism transmission. Based on these observations, we created authentic vignettes, i.e., descriptions of situations in which respondents are asked to express their reactions (Polit & Beck, 2017), which were to be used in a feasibility test. The authentic vignettes covered a) Upper and lower body washing of patients with diarrhea, b) Hand disinfection in patient care, c) Use and misuse of gloves in patient care, and d) Clean and unclean surfaces, and e) cleaning of equipment. An example of these vignettes is presented in Box 1.

Box 1. Illustration of vignette "Upper and lower body washing of patients with diarrhea."

In your group, discuss and reflect on the risks for organism transmission in the daily delivery of nursing care. Use the situation that is described on the back page of this paper, which has been lifted from your ward. Mark within the text those places you perceive that the persons in question have acted in a way that prevents organism transmission or occasions where their actions led to a risk for organism transmission. Two people were involved in the observed situation, and they are referred to nursing assistant (NA) 1 and 2. Summarize your discussion and reflections below.

NA 1 and NA 2 go into the anteroom and put on protective aprons and double gloves. NA 1 takes out a draw sheet and an bed-covering from the cabinet in the anteroom and they both go into the patient's room. NA 1 places the items on the patient's bedside table, lowers the head of the bed, and raises the bed while NA 2 turns on the overhead light. NA 1 opens the blinds and goes into the attached private patient bathroom, fills a washbasin with water, and sets the basin on the bedside table. NA 2 stands at the bedside and waits. NA 1 goes out through the anteroom and disappears down the hall, while NA 2 talks to the patient. NA 1 returns to the anteroom with a package of disposable washcloths, removes the plastic wrapping and throws it away in the anteroom garbage bag. He places the washcloths on the shelf in the anteroom, takes a couple of washcloths, and comes back into the patient's room. NA 1 puts the washcloths on bedside table and goes back out into the anteroom, opens a cabinet door, and takes out towels, after which he goes back into the patient's room and places the towels on the bed. NA 1 turns around, removes a receptacle for trash from the wall, and places it on the bed. The NAs help each other remove the patient's t-shirt, following which NA 1 gives a washcloth to NA 2, who washes the patient's face. The used washcloth is thrown away, NA 2 takes a new washcloth, washes the patient's upper body, takes a towel that is lying on the bed, and dries the patient. NA 1 takes a t-shirt hanging on the back of a chair and dresses the patient. After that, NA 1 removes the patient's blanket and places it on the chair, takes some washcloths from the washbasin, and begins to wash the patient's lower body. NA 1 stops and goes out into the anteroom, takes off the apron and gloves, throws them away, and goes out into the hall. NA 2 goes into the patient's bathroom, retrieves a urine bottle and paper, goes back to the bedside and drains the patient's catheter bag, and dries the opening with paper. NA 1 comes back into the anteroom and puts on an apron and gloves. At the same time, NA 2 goes to the toilet, empties out the urine, throws the paper away, flushes the toilet, and places the urine bottle in the bedpan cleaner that is in the bathroom, after which he removes gloves, throws them away, and returns to the patient's bedside. NA 1 comes back into the patient's room and resumes washing the patient's lower body. He then throws the washcloth away, removes his gloves and puts them on the bed, turns the patient on their side, goes out into the anteroom, throws the used gloves away, puts on new gloves, goes back into the patient's room, removes the diaper and the underpad and throws them in in the trash. NA 1 then takes paper from the bedside table and applies skin cleanser, washes the patient's perineum, throws this away, removes the outer gloves, throws them away, takes paper from a roll of toilet paper on the bedside table, wipes away the feces, throws this away, and repeats this procedure three more times. NA 1 removes gloves, throws them away, takes an underpad from bedside table, places it on the bed, goes out into the anteroom, puts on double gloves, returns to the bedside, takes the draw sheet from the bedside table, drops it on the floor, picks it up, folds it away, and removes the draw sheet and sheet. Both the NAs help to turn the patient while they change the sheets. To be continued...

The Feasibility Test

Reflective dialogues among colleagues were used as an intervention to raise the awareness of risk behaviors and thereby reach a shared understanding of ICP. On a weekly basis, an authentic vignette was presented to the ward. The HCP that worked together during a predetermined shift participated in a 15-minute self-managed reflective dialogue. The groups were given instructions regarding the character and aim of the discussions. Each group wrote a summary of the different vignettes based on their discussion and returned it to the researchers.

Participants in the Feasibility Evaluation

The clinical nurse responsible for the ward's staffing schedule arranged a date for a focus group interview with the HCP who had participated in the reflective dialogues. The purposive sample included 6 HCP; 5 females and 1 male, who were aged 24–55 years (mean: 36.2 years) and had been employed for 0.5–14 years (mean: 5.2 years). Five HCPs were registered nurses and 1 was a nursing assistant.

Data Collection

A descriptive design with a qualitative approach was used. Data were collected using a focus group interview technique. The facilitator (BS), who has had experience with group interviews, guided them to remain focused on the topic and ensured that all of the informants contributed to the discussion. An assistant (MaL) who was experienced with group interviews and had incidentally maintained a previous professional relationship with three of the informants, took field notes to record non-verbal expressions. The interview focused on the informants' thoughts and reflections regarding their perceptions of ICP and the experiences from their participation in the reflective dialogues that pertained to the vignettes. The interview guide is presented in Appendix 1. The focus group interview session that lasted 60 minutes took place outside the medical ward at the local hospital in April 2013. Immediately afterwards, the facilitator and the assistant reflected on the interview. The interview was digitally recorded and transcribed verbatim.

Statistical Analysis

The transcript was read and re-read to achieve an understanding of the text. The field notes, i.e., the tone and context of the comments and specific group dynamics were used to facilitate the analysis. The qualitative content analysis (Patton, 2015) was performed in [Swedish] and then translated to English. When reading through the transcript, two areas were identified that addressed different elements of the study's aim. The meaningful units were highlighted, condensed, and labeled with a code. The codes were interpreted and compared to assess differences and similarities and then abstracted into a set of categories. A theme addressing the respective content area that integrated the underlying content of the interview was formulated and named. Finally, the transcript was re-read to identify and select relevant quotations. The analysis was carried out as a dynamic process that moved between the parts and the whole and was continuously discussed by the authors until a consensus was reached.

Ethical Considerations

The Regional Ethical Review Board in [Uppsala] approved the research plan (Reg. no. 2012/373). Written informed consent for the voluntary participation was obtained from each participant and confidentiality was ensured.

RESULTS

The demographic data of the participants is presented in Table 1. The analysis of the fo-

Table 1. Participant demographics

	Mean	SD	Range
Age (years)	36.2	13.0	24–55
Employment (years)	5.2	5.1	0.5–14
	Female	**Male**	
Gender (number)	5	1	
	Registered Nurse	**Nurse assistant**	
Occupation	5	1	

SD: standard deviation

cus group interview resulted in two themes: A mind-set to help one another and do your best, and a reflective dialogue as a valuable means of reaching a shared understanding. The themes and categories described in the text were supported by quotations from the focus group interview. After each quotation, a roman numeral (I, II, etc.) identified the informant.

A Mind-Set to Help One Another and do Your Best

The mind-set to help one another and do your best in every situation was described as a core aspect of preventing transmission of microorganisms. Having support, taking personal responsibility, being knowledgeable about ICP, and having a reasonable workload were seen to play decisive roles in the successful prevention of microorganism transmission.

To have the support and the right conditions

Support to prevent microorganism transmission in the form of written guidelines and helpful colleagues and infection control specialists played a vital role. The informants reported positive experiences with skilled colleagues who were understanding and helpful. The HCP found it easy to contact infection control specialists, as their offices were close to the ward and the HCP were already familiar with them. Getting help was difficult during night shifts, when nurses were often occupied in the patients' rooms. The staff from the cleaning services who cleaned the patients' rooms after discharge were appreciated and considered competent. The informants described the physical layout of the ward as practical and conducive to the prevention of microorganism transmission as opposed to the anteroom and dirty utility rooms with sinks nearby.

The informants described how being allotted only three sets of work clothes at one time was a limitation. This could prove especially difficult on the weekends. The basement location and limited opening hours of the supply room resulted in the personnel storing dirty work clothes in their lockers or washing the clothes themselves. The informants pointed out that it would be easier to do the right thing if used/dirty work clothes could be left near the changing rooms and there was an unlimited access to work clothes. The informants described that heavy workloads made it difficult to prioritize and act in accordance with ICP, e.g., when they were dressed in protective attire in a patient's room and had forgotten to bring an item. Moreover, heavy workloads were said to cause absent-mindedness. Except when the workload was heavy or in emergencies, the informants reported that they were aware of their noncompliance with ICP.

"...a person knows that everyone else has just as much (informant V), *yes (Facilitator),* so there is no one that can help right away (informant V). *Yeah its somewhat similar situations... (Facilitator).* That's a little how it can go (informant V) absent-mindedness and workloads (informant I), yes precisely (informant V). Yes it's sort of why a person lifts or transfers a patient a little dumb, although one should actually be two (informant VI)."

Have responsibility for compliance

The informants said that they often knew when they were not compliant with ICP, which made them reflect over their own actions. The reasons were described as stupidity and carelessness. The importance of taking personal responsibility was stressed. Addressing non-compliant colleagues was described as important, but delicate as well. The informants expressed that it was difficult to correct someone who was respected, experienced, and should ideally know the correct protocol to follow. When it was perceived as too difficult to correct someone, the manager was consulted. The informants further said that it was easier to talk to colleagues regarding compliance when they themselves had more experience and confidence. Addressing compliance issues with temporary employees was described as a difficult but important responsibility, because the temporary hospital employees lacked knowledge regarding the guidelines. When temporary employees did not correct their actions despite being given information, the informants questioned whether they were providing sufficient information. They felt that experienced personnel needed to be more explicit and explain clearly why one should act in a specific way.

"Sometimes a person is just stupid (informant VI). For sure (informant V), and careless (informant VI), more careless I think (laughter) though then you know (informant V). Yeah, out in the anteroom with gloves and an apron on and take hold of the cabinet handle (informant I)… *yes (Facilitator),* yes although I'm actually clever to open it with my foot (informant V)."

The same level of knowledge regarding infection control

Informants described how they suspected that by the misuse of gloves, hand disinfectants, aprons, and the lack of knowledge on how to use the anteroom doors to sustain the negative room pressure, the temporary employees had low levels of knowledge regarding infections and ICP. The need to change the personnel's focus from the risk of their becoming infected to a focus on the risks for the patients was described. It was perceived as easier to know how to act when patients had a specific diagnosis or an identified contagion.

"But I think that many believe they have an apron and gloves on to protect themselves (informant V), mm (informant II), not in the sense of spreading infection (informant V). Precisely (informant VI), *Mm (Facilitator),* really (informant V). So, a person doesn't get their work clothes dirty (informant I). Yes, yes (informant V). Yes, you can often get the answer, I'm not afraid (informant VI)."

Reflective Dialogue is a Valuable Means for Reaching a Shared Understanding

To discuss authentic vignettes with colleagues was considered a valuable method for improving ICP. The possibility for all colleagues to participate, the use of authentic and comprehensible vignettes, and having time allotted for discussing the vignettes were described as significant requisites for successful implementation.

Authentic and comprehendible basis for discussion

The informants stated that it was valuable to reflect on the different care situations exemplified in authentic vignettes. The content was described as important and was considered thought-provoking. Reading and discussing a vignette could be accomplished in 15 minutes without previous preparation by the personnel even though 1 vignette was somewhat complex. The informants underscored the importance of having something to discuss, i.e., prepared vignettes that made the discussions meaningful and limited the risk that the ambitiousness of the group discussions would fade.

The questions and statements provided with the vignettes helped facilitate the discussions. The HCP described how the vignettes and discussions opened their eyes on how to act in different situations.

"...after the first discussion you started thinking, do we really do things like that (I)? At first we didn't think it was from our ward (informant II) (a little laughter and agreement is heard). We thought that we can't have it like this (informant II). We don't really do like that (informant I). *Mm (Facilitator),* but it seems we did, at least somewhat (informant V) (small laughter)."

Good planning combined with flexibility facilitates implementation

The informants expressed the importance of all ward personnel having the opportunity to think and reflect together on a predefined topic that was central to the delivery of care. They further explained that it could be advantageous if the group's composition was varied. That could lead to "new" constellations of personnel having different discussions, which could lead to discussion and reflection on new aspects. The informants said it would be worthwhile to have group discussions for 15 minutes every week. Adequate practical preconditions were important for the informants. Despite the fact that the management had encouraged participation, it was hard to prioritize group discussions when it was evident that members of the nursing staff were needed by patients or by tired and crying colleagues. A place to sit outside the ward eased the discussion as it provided peace and quiet. It also reduced guilty feelings among the HCPs of not being available in the ward. Planning for participation was described as important but difficult, as many aspects needed to be taken into consideration. It was proposed that participants should not be from the same care team and that members of the groups should be varied due to the work schedules. It was also suggested that time should be allotted to suit everyone, but to do this, better staff was needed. The informants took matters into their own hands and decided, from time to time, when it would work best for them to meet. Moreover, they had discussed two vignettes on one occasion in order to accomplish the planned discussions. There was no predefined designated time for the group discussions, and if there had been, it was suggested that the discussions would have been perceived as more important and would have been more prioritized by the informants and their coworkers. Even though it was considered difficult to find time to participate at a predetermined time, e.g., at the end of a shift the same day each week, it could be helpful to do so because everyone would understood that those who had worked that day would be participating. The informants said that group discussions would be easier to execute when everyone knew the time, day of the week, and number of participants. It was also suggested that after some weeks of discussions, a pause of a few weeks could be a good strategy to bring about a new start and focus to the discussions. Discussing reoccurring topics was considered to be a good way to keep the discussions updated and new personnel involved.

"We don't all work at the same time .../... yes about this... it wouldn't work otherwise because you seldom always work with the same people (informant I). *Mm (Facilitator).* The combination of those of us who have met has been steered by who has worked (informant VI)... *mm (Facilitator)* at the same time (informant VI).../... a plan, everyone that goes away can't be on the same, be on the same care team, then that side would be rather vulnerable (informant I). *Yes that's right (Facilitator).* So a person has to think (informant I). *Yes (Facilitator).* Even if it is only for fifteen min-

utes there has to be someone to answer the calls (informant I). *Yes (Facilitator).* Yes, but like today its rather precarious because four of us are from the same, no three of us (informant VI), mm (informant III) are from the same care team (informant VI)."

DISCUSSION

To acknowledge one´s own incorrect infection prevention behavior and lack of compliance regarding the guidelines inspired the informants to reflect upon and identify other risk behaviors for microorganism transmission. This in turn led to the identification of inadequacies in structural conditions, which impedes one from acting in a correct manner when it comes to ICP. In order to enhance compliance to ICP, it is important to consider the determinants of infection prevention behavior (Pittet, 2004) and engage the HCPs to describe significant aspects in the prevention of microorganism transmission. Since nurses might justify their own incorrect ICP despite receiving a good education and sufficient knowledge (Jackson et al., 2014), it is of particular importance to perform interventions that influence the HCP's perceptions and behaviors when attempting to improve ICP. In theory, Kanter (1993) describes workplace empowerment structures that are essential to organizational effectiveness. The social structures of the organization/workplace rather than personality predispositions enable the personnel to fulfill their duties. Power 'to get things done' is described as being derived from the ability to access and mobilize information, support, resources, and opportunities. Access to information means having the information needed to carry out one's work. In this study, the importance of written ICP guidelines was laid out. Support is made up of feedback and guidance from coworkers and superiors, which enables autonomous decision-making and innovation. The informants had good experiences regarding the support they received from colleagues and knowledgeable specialists, and that was expressed as playing a vital role. Resources refer to the access to sufficient time, supplies, materials, and funds. The informants said, in general, their experiences of getting help from their colleagues were good. Due to lack of resources, the possibility to get help during the night shifts was limited. The shortage of and problems described with work clothes are other examples of lack of resources. Opportunity is provided when employees have the possibility to develop knowledge and skills, and to advance in the organization. The need for knowledge in the personnel group regarding ICP was emphasized; and in particular, for the temporary employees who were perceived as being less familiar with ICP. According to Kanter (1993), it is the management's responsibility to create preconditions for their staff so they can properly perform their duties such as complying with ICP. This is achievable through interventions that are timely and meaningful for the staff and organization. However, there needs to be a shared understanding regarding infection control and the risk for organism transmission (Lindberg et al., 2017; Sandberg & Targama, 2007).

Feasibility evaluations are often undermined by problems of acceptability, compliance, delivery of the intervention, recruitment, and retention (Craig et al., 2013). That acceptability was obtained is illustrated by the theme for the content area, i.e., "Reflective dialogue is a valuable means for reaching a shared understanding." The fact that there is value in groups discussing their own everyday work permeates both categories in that theme. This, in our opinion, will lay a foundation for the improvement in infection prevention in clinical practice. As the group discussions were free to evolve on their own, the discussions of the vignettes could be adapted and made meaningful by the groups. Meet-

ing once every week to discuss the vignettes was considered meaningful but was considered difficult in terms of managing scheduling and staffing. It is our understanding that it is of particular importance, which is to be open-minded regarding how the discussions and reflections over the vignettes are delivered since clinical practice is complex with highly fluctuating prerequisites for the personnel participating in the group discussions. We had no difficulties recruiting or retaining participants in the feasibility test, which might be attributed to the fact that the topic was highly relevant. The focus group interview also gave us an understanding about the importance of getting all the personnel on the ward involved, as infection prevention is a common problem. The possibility for all HCP to participate in the intervention is essential when there is a focus on achieving a shared understanding (Sandberg & Targama, 2007). Another important aspect regarding the intervention delivery is the vignettes. In our case, authentic vignettes were crucial for the fulfilment of the intervention test. However, it is also important that the vignettes are comprehendible.

Study Limitations

Our study was conducted in a rigorous manner to ensure trustworthiness. Nevertheless, the limited generalizability to other hospital settings is inherent in any qualitative study. Using a questionnaire to reach everyone on the ward who participated in the reflective dialogues was a possibility, but we chose to use a group interview technique with participants from different discussion groups to facilitate a deeper exploration of their experiences. Moreover, focus group interviews are known to promote enriched dialogue, which we experienced during the discussions. The informants shared their experiences and opinions from many different aspects. From the exemplifying quotations, one may get the impression that only a few informants expressed their experiences. However, those specific quotations were chosen because they are examples of the interactive group dialogue. This can be noted by the interposed murmuring and nodding. In the transcribed text from the interview, it can be confirmed that all informants contributed with their experiences and opinions. A cautionary note is that the assistant previously had a formal professional relationship with three of the informants. However, there are no indications that this had any influence on the findings.

CONCLUSION AND RECOMMENDATIONS

This feasibility study has revealed important standpoints central for preventing microorganism transmission during the delivery of health care. Likewise, meaningful insights on how to best use vignettes as means to improve infection prevention behavior have been gained. These findings should be considered when designing plausible theory-driven interventions aimed at improving infection control practice in health care.

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Appendix 1. Guide for the focus group interview

Narrate and discuss your thoughts and reflections with each other.
Regarding the use of group discussion based on authentic care situations from your daily work to prevent the risk for spread of infection.

- Can you give some examples of when it has been easy or difficult to carry out these discussions?
- Is it a suitable way to work?

Regarding the opportunity to maintain such work at your department.

- What obstacles have you encountered?
- What conditions are needed to be improved?

Regarding your own responsibility for adherence to hygiene routines and preventing the spread of infection in healthcare.

- Can you give examples of when it has been easy or difficult to take such responsibility?
- What makes it easy or difficult to take responsibility for preventing the spread of infection in healthcare?

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Research Article

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Effect of Professionalism Level on Tendency to Make Medical Errors in Nurses

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ABSTRACT

Aim: The aim of the present study was to examine the relationship between the occupational professionalism level of hospital nurses and their tendency to make medical errors. This was a descriptive, correlational, and cross-sectional study.

Method: The study was conducted between June 2013 and January 2015 in four hospitals providing general diagnosis, treatment, and care services. Four hundred fifty-nine nurses were included in the study. A questionnaire including a Personal Information Form, Professional Manner in Occupation Inventory, and Tendency to Medical Error in Nursing Scale was used to collect data. The study was approved by the hospitals' ethics committees and institutions. Data were analyzed using Cronbach's alpha analysis, frequency and percentage distributions, descriptive statistics, Pearson product-moment correlation coefficient, Dunnett T3 Post Hoc test, simple linear regression analysis, and t-test.

Results: Nurses' occupational professionalism levels were high (M=137.06±15.23), and tendency to medical error levels were low (M=223.24±25.28). The majority of the nurses considered themselves quite professional and had not made any medical errors previously. There was a strong and highly significant negative relationship ($p<0.001$) between their occupational professionalism and their tendency to medical error. There was a difference between the occupational professionalism levels of nurses who made and did not make an occupational error ($p<0.05$), as well as significant differences between their tendency to medical error according to their perception of themselves as professionals ($p<0.05$). The occupational professionalism manner of the nurses was determined to be 30% effective in their tendency to medical error.

Conclusion: The occupational professionalism manner of the nurses was found to negatively affect their tendency to medical error.

Keywords: Medical errors, nursing, nurse, professionalism

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INTRODUCTION

Professionalism, considered an important subject by contemporary communities, is defined as "being adequately qualified" or "the expertise, knowledge, ability, and behavior shown in a specific area" (Karaçam & Güleç, 2016; Saraçoğlu, 2010). Occupational professionalism serves to transform personal professionalism into institutional professionalism (Erbil & Bakır, 2009).

Today's rapid social change and technological developments require occupational professionalism (Sabancıoğulları & Doğan, 2012). A professional is a person who regularly performs an occupation or a duty with minimal error (Karamanoğlu, Özer & Tuğcu, 2009). Professional people are expected to be competent in applying the rules of their occupation, to act rationally and ethically, to evaluate any social rule according to the needs of the individuals affected by it, to be steady and disciplined, and not to obey the rules automatically (Orak & Alpar, 2012). They should also have the ability to freely control the work they do (autonomy) and a sense of responsibility to their colleagues and society. The fact that the members of this occupation perform their duties professionally both increases the value referred to the occupation by the society and other occupations and ensures the continuity of the occupation (Karamanoğlu et al., 2009).

Occupational professionalism, which has an indisputable role in maintaining a healthy life for the individual, gains an increasing importance in nursing, one of the occupations most affected by social, technological, legal, and economic changes. The rapid changes in the health sector give increasing prominence to the need for professional nurses (Adıgüzel, 2010).

A professional nurse is defined as a person who can integrate the scientific and intellectual knowledge, skills, and manner that s/he obtained from higher education into his/her theoretical knowledge; produce scientific information by means of his/her studies and use this information in healthcare studies; get to the root of problems; judge, decide, and solve problems; give good care; contribute to the development, promotion, and recognition of this occupation autonomous; and who is a researcher, educator, and director (Özel, 2010; Özkaraca, 2009; Sezer, Esenay & Korkmaz, 2017). A professional nurse is also someone who protects the occupation's ethical values, is highly autonomous, follows scientific developments, participates in occupational activities, acts appropriately according to professional ethics, participates in occupational organizations, and is loyal to the occupation (Sabancıoğulları & Doğan, 2012).

If nurses do not have adequate knowledge of occupational practices, do not continuously improve themselves, cannot perform their duties independently, do not perform their duties based on scientific proof, do not support the development of the occupation, or do not act professionally in this complex service area, then healthcare services are hindered and delayed, quality of care decreases, the people they serve become dissatisfied, and medical errors can occur that can cause disability or death (Karamanoğlu et al., 2009).

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) defines medical error as "the patient's being damaged due to inappropriate and unethical behavior, and inadequate and negligent action of a professional providing health services in occupational practices" (JCAHO, 2006). Most errors in nursing occur due to unprofessional behaviors, such as not performing the required service and care, performing their

occupational duties incompletely or badly, performing a service or procedure that they must not perform, not having adequate skills and behaving negligently, and lack of knowledge and experience. These errors cause great damage to served individuals, their relatives, serving healthcare workers, and serving institutions and countries (Ertem, Oksel & Akbıyık, 2009; İntepeler & Dursun, 2012). The World Health Organization (WHO) emphasized that as many as 1 in 4 patients is harmed while receiving primary and ambulatory healthcare, and 134 million adverse events occur each year in hospitals in low- and middle-income countries, contributing to 2.6 million deaths annually due to unsafe care (WHO, 2018).

Nurses are an inseparable part of health staff; therefore, they should try to protect, improve, and recover individual, family, and community health and try to avoid mistakes and to work in a professional manner. They should work to prevent irremediable medical errors resulting from unprofessional performance of both their own duties and other team members' duties (Adıgüzel, 2010). However, no studies in the literature on the effect of nurses' occupational professionalism levels on their tendency to make a medical error were found. This raised the thought that this important subject should be studied and added to the literature. The present study was conducted based on this need and aimed to determine the effect of the occupational professionalism level of hospital nurses on their tendency to make a medical error.

Research Questions

- What is the occupational professionalism level of hospital nurses?
- What is the tendency to make medical error of hospital nurses?
- Does the level of occupational professionalism of nurses have an impact on their tendency to make medical error?

METHOD

Study Design

This was a descriptive, correlational, and cross-sectional study.

Sample

The study was conducted in four public hospitals providing general diagnosis, treatment, and care. Of the four hospitals, two were research and training hospitals, and two were state hospitals. The population of the study consisted of all nurses working in the four hospitals (n=1291).

All nurses who were available, were not on leave or sick leave, etc., within the study period, and were accepted to participate (n=550) were included in the study. A total of 459 nurses provided usable data, and 42% of the population and sample were achieved.

Data Collection

Personal Information Form, Professional Manner in Occupation Inventory (PMOI), and Tendency to Medical Error in Nursing Scale (TMENS) were used for data collection.

Personal Information Form: This form was prepared by the researchers. It includes 13 questions on age, gender, marital status, unit, position, educational status, occupational experience, weekly working hours, the number of patients, self-perception as a professional, reasons for not feeling professional, making medical errors, and noticing other nurses making medical errors.

PMOI: This inventory was developed by Erbil and Bakır (2009) based on the nursing-specific professionalism of Miller. Erbil

and Bakır tested its validity and reliability (Adams & Miller, 2001; Erbil & Bakır, 2009; Miller, Adams & Beck, 1993). The components of professionalism in Miller's nursing model include education, publication, research, participation in occupational organizations, social service, ethical codes, theory, autonomy, sufficiency, and continuous education (Adams & Miller, 2001; Miller et al., 1993). PMOI is a single-scale inventory consisting of 32 questions and answered in a 5-point Likert type (5-entirely applies to me, 4-slightly applies to me, 3-I'm undecided, 2-does not apply to me, and 1-does not apply to me at all). It is evaluated over the total score obtained by adding the scores of each question. The minimum and maximum scores of the inventory are 32 and 160, respectively. The higher the scores of the participants, the higher their professionalism levels. The Cronbach's alpha coefficient by Erbil and Bakır (2009) was found to be 0.89 and 0.90, respectively.

TMENS: This scale was developed by Altunkan (2009) to determine the tendency to make medical errors of the nurses directly charged with patient care. Its validity and reliability were tested. It consists of 5 subscales (Medication and Transfusion Applications-18 questions, Hospital Infections-12 questions, Patient Follow-up/Material Safety-9 questions, Falls-5 questions, and Communication-5 questions) and 49 questions and is answered in a 5-point Likert type (1-never, 2-rarely, 3-sometimes, 4-usually, and 5-always). It is evaluated over the total score and subscale scores obtained by adding the scores of each question. The higher the total score, the lower the tendency to make a medical error; the lower the total score, the higher the tendency to make a medical error (Altunkan, 2009). In Altunkan's (2009) study, the Cronbach's alpha coefficient of TMENS was found to be 0.95, but it was found to be 0.97 in total and between 0.79 and 0.95 in subscales.

Statistical Analysis

Data for the present study were collected between June 2013 and January 2015. A statistician evaluated the data. Data were evaluated using IBM Statistical Package for the Social Sciences for Windows 22 software. Data were analyzed using Cronbach's alpha analysis, frequency and percentage distributions, descriptive statistics, Pearson product-moment correlation coefficient, Dunnett T3 Post Hoc test, simple linear regression analysis, and t-test.

Ethical Considerations

Permission from the authors who developed PMOI and TMENS was obtained via email before starting the study so they could be used for data collection. The study was approved by the ethics committee of Atatürk University Faculty of Health Sciences (approval date: 06.10.2013) and the written official permission of the institutions where data would be collected. The nurses were informed about the study during data collection. Oral informed consent was obtained from the nurses volunteering to participate in the study.

RESULTS

A total of 459 nurses were included in the study. Of the 459 nurses, 38.3% were between the ages of 23 and 27 years, 81.7% were female, 51% were single, 62.5% were in internal units, 92.4% were service nurses, and 51.2% had a bachelor's degree. Furthermore, 61.2% of the nurses had 0–5 years of occupational experience, and 54.2% were working sometimes in the daytime and sometimes at night for 43 h/week on average and were

giving care to 19 patients/day on average. In addition, 51.4% of the nurses considered themselves professional, 30.7% considered themselves a little professional, and 15.3% considered themselves as completely professional. Moreover, 21.1% of the nurses had made a medical error previously, 78.9% had not made a medical error before, and 50.5% noticed medical errors made by the nurses they work with.

The nurses' PMOI score was M=137.06±15.23 on average, and their TMENS score was M=223.24±25.28 on average (Table 1). The highest average score of the subscales of TMENS was obtained from the "Medication and Transfusion Applications" (M=84.73±9.16) subscale; the lowest average scores were obtained from the "Falls" (M=21.61±3.79) and "Communication" (M=21.99±2.60) subscales. These findings indicate that the nurses' occupational professionalism manner was high on the scale. The medical errors that the nurses most tended toward were falls and errors in communication, and the medical errors they least tended to make were in medications and transfusions (Table 1). The professional manner or PMOI scores of nurses who said that they had made a medical error before were lower (M=133.81±15.56) than those of nurses who said that they had not made a medical error (M=137.93±15.04), and a significant differ-

Table 1. Nurses' PMOI and their average scores of TMENS

PMOI	Scales	n	Min.	Max.	M	SD
		459	66	160	137.06	15.23
TMENS	Medications and transfusion	459	22	90	84.73	9.16
	Falls	459	3	25	21.61	3.79
	Hospital infections	459	15	60	54.54	7.49
	Patient follow-up/material safety	459	16	45	40.42	5.60
	Communication	459	11	25	21.99	2.60
	Total score	459	97	245	223.24	25.28

Min: minimum; Max: maximum; SD: standard deviation

Table 2. Comparison of the TMENS scores of the nurses according to how professional they considered themselves

TMENS Subscales Status of Considering Tthemselves Professional	Medication and Transfusion Applications	Falls	Hospital Infections	Patient Follow-up/Material Safety	Communication	TMENS Total Score
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Considers self not professional at all (n=12)	83.33±11.61	20.25±4.20	52.17±11.57	37.75±6.12	20.83±3.53	214.33±33.89
	83.82±9.48	20.80±4.00	53.11±7.71	39.38±5.25	21.49±2.65	218.46±24.91
Considers self a little professional (n=141)	85.94±7.00	22.00±3.47	55.73±6.01	41.21±4.78	22.18±2.36	227.07±20.24
Considers self very professional (n=236)	82.70±13.22	22.13±4.07	53.77±9.82	40.29±7.90	22.57±2.87	221.46±35.92
Considers self completely professional (n=70)	KW=10.610 p=0.014*	KW=16.209 p=0.001**	KW=14.677 p=0.002*	KW=19.570 p=0.000**	KW=15.263 p=0.002*	KW=20.092 p=0.000**

*p<0.05, **p≤0.001.

ence was found between these two groups (p=0.018, t=2.374). There was no significant difference (p=0.680, t=0.412) between the PMOI scores of the two groups regarding the fact that nurses notice the medical errors of the other nurses they work with.

The average scores of the nurses who considered themselves very professional and completely professional in all subscales of TMENS were higher. The more the nurses considered themselves professional, the higher their TMENS scores and the lower their tendency to make a medical error. There were significant differences between the groups in all subscales ($p<0.05$ and $p\leq0.001$). Dunnett T3 Post Hoc test revealed that these differences are generally due to the nurses who consider themselves quite professional (Table 2).

The correlation analysis showed a positive, very strong, and extremely significant relationship ($p<0.001$) between the total scores and all subscale scores of PMOI and TMENS (Table 3). These findings indicate that the higher the professional manner, the higher the scores on the tendency to medical error scale-in other words, the lower the tendency of nurses to medical errors.

Simple linear regression analysis was performed to determine the effect of nurses' professional manner on their tendency to make a medical error (Table 4). Medium and extremely significant relationships were found between occupational professionalism manner and "Medication and Transfusion Applications" ($R=499$, $R^2=0.249$, $p<0.05$), "Falls" ($R=0.429$, $R^2=0.184$, $p<0.05$), "Hospital Infections" ($R=0.481$, $R^2=0.232$, $p<0.05$), "Patient Follow-up/Material Safety" ($R=0.524$, $R^2=0.275$, $p<0.05$), and "Communication" ($R=0.430$, $R^2=0.185$, $p<0.05$).

Nurses' occupational professionalism was found to explain 25% of their tendency toward medical error in "Medication and Transfusion Applications," 18% of their tendency toward medical error in "Falls," 23%

Table 3. Correlation values of the relationship between the PMOI and TMENS scores

		1	2	3	4	5	6	7
1. Professional Manner in Occupation Inventory	r	–						
	p							
2. Medication and Transfusion Applications	r	0.499	–					
	p	0.000*						
3. Falls	r	0.429	0.650	–				
	p	0.000*	0.000*					
4. Hospital Infections	r	0.481	0.796	0.700	–			
	p	0.000*	0.000*	0.000*				
5. Patient Follow-up/Material Safety	r	0.524	0.733	0.672	0.735	–		
	p	0.000*	0.000*	0.000*	0.000*			
6. Communication	r	0.430	0.563	0.585	0.619	0.720	–	
	p	0.000*	0.000*	0.000*	0.000*	0.000*		
7. Total Score of the Tendency to Medical Error Scale	r	0.550	0.917	0.804	0.920	0.880	0.741	–
	p	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	

*p<0.001.

of their tendency toward medical error in "Hospital Infections," 28% of the tendency toward medical error in "Patient Follow-up/ Material Safety," and 19% of the tendency toward medical error in "Communication" (Table 4).

Finally, a medium and extremely significant relationship (R=0.550, R^2=0.303, p<0.05) was found between occupational professionalism manner and tendency to medical error. The occupational professionalism of nurses is determined to affect their tendency toward medical error and explains 30% of their tendency.

DISCUSSION

Occupational professionalism plays an important role in creating occupational standards and providing quality care. The low profes-

Table 4. The results of simple linear regression analysis to determine the effect of occupational professionalism on tendency to medical error

Variable	Beta	Standard error	Beta	t	p
Stable	43,562	3363		12,953	0.000
Medication and Transfusion Applications subscale	0.300	0.024	0.499	12,316	0.000
R=0.499	R2=0.249				
$F_{(1,457)}$=151.691, p=0.000					
Stable	6961	1455		4785	0.000
Falls subscale	0.107	0.011	0.429	10,127	0.000
R=0.429	R2=0.184				
$F_{(1,456)}$=102.562, p=0.000					
Stable	22,110	2780		7953	0.000
Hospital Infections subscale	0.237	0.020	0.481	11,736	0.000
R=0.481	R2=0.232				
$F_{(1,457)}$=137.722, p=0.000					
Stable	14,006	2020		6933	0.000
Patient Follow-up/Material Safety subscale	0.193	0.015	0.524	13,153	0.000
R=0.524	R2=0.275				
$F_{(1,457)}$=173.003, p=0.000					
Stable	11,930	0.993		12,012	0.000
Communication subscale	0.073	0.007	0.430	10,195	0.000
R=0.430	R2=0.185				
$F_{(1,457)}$=103.938, p=0.000					
Stable	98,046	8941		10,966	0.000
Total	0.913	0.065	0.550	14,088	0.000
R=0.550	R2=0.303				
$F_{(1,457)}$=198.470, p=0.000					

sionalism of the members of this occupation negatively affects the other members of the occupation, the served individuals, and the institution; hinders care; and reduces the quality of care, hurting the people who give and receive service and leading to institutional problems (İntepeler & Dursun, 2012; Özlük & Sur, 2017). The most significant problem is medical errors (Bari, Khan & Rathore, 2016; Özata & Altunkan, 2010).

The occupational professionalism levels of nurses are not at the desired level (Kavaklı, Uzun & Arslan, 2009; Yılmaz & Vermişli, 2016). In addition to many other factors that increase the nurses' risk of making a medical error, their low occupational professionalism levels also increase this risk (Adıgüzel, 2010; Er & Altuntaş, 2016). One of the reasons for conducting the present study is that no research was found on this subject.

The nurses participating in the present study were generally young, single, and childless women with a bachelor's degree and a low level of experience who were in charge in internal services and as service nurses, were working for 43 h/week on average in shifts, and were caring for an average of 19 patients/day.

The majority of the nurses stated that they considered themselves professional. This may be because the majority of the participants work in training and research hospitals, have a bachelor's degree, and are at the start of their career so their knowledge is still new, they have not lost their occupational excitement, and they consider nursing a professional occupation. Previous studies have indicated that a high level of education affects the professionalism levels of nurses, and the nurses working in hospitals for educational purposes have higher professionalism levels (Adıgüzel, Tanrıverdi & Sönmez, 2011; Altıok & Üstün, 2014; Çelik & Hisar, 2012; Dikmen, Karataş, Gürol Arslan & Ak, 2016; İntepeler & Dursun, 2012). Furthermore, studies showed a statistically significant difference between the nurses' education levels, the hospital they work in, and the occupational professionalism average scores (Bayraktar, Yılmaz & Khorshid, 2016). These findings support the findings of the present study. The rapid developments in Turkey, especially in nursing, recently also contribute to nurses' seeing themselves as professional. Recent updates to the legal definition of nursing jobs, recognition of the specialization in nursing, and increasing interest in university level nursing education may also contribute to nurses' considering themselves professional in Turkey.

The occupational professionalism manners were quite high. Studies on the occupational professionalism levels of nurses also determined that the professional manner scores of nurses were high, similar to the results of the present study (Çelik, Ünal & Saruhan, 2012; Dikmen et al., 2014; Erbil & Bakır, 2009; Karadaş, Duran & Ergün, 2018; Karamanoğlu et al., 2009; Kaya, 2011; Özpekin & Erdim, 2016; Reyhanoğlu, 2011; Yüksekol, 2010). The findings that nurses consider themselves professional are in parallel with these findings. Recent developments and improvements, such as raising the vocational education to university level, increasing research and publication rates, stronger theoretical knowledge, and especially increasing membership in occupational associations, are considered to positively affect nurses' occupational professionalism.

The tendency to medical errors was generally low. Other studies on the tendency of nurses to medical errors also indicated that nurses' tendency to medical error was low (Altunkan, 2009; Cebeci, Gürsoy & Tekingündüz, 2012; Kıymaz & Koç, 2018; Öztürk & Özata, 2013). Considering that the majority of the nurses in the present study were

working 43 h/week and caring for 19 patients/day on average, this is a pleasing finding. The statements of 78.9% of the nurses that they had not made a medical error before also support the findings of low tendency to medical errors. Approximately half of the nurses (50.5%) noticed the medical errors made by other nurses. Altunkan (2009) also found in his study that 93.8% of the nurses state that they have not made a medical error that would endanger patient safety, and that these statements are similar to the findings of the present study.

The nurses were determined to make the least medical errors in medication and transfusion applications and the most medical errors in falls and communication. More than half of the nurses had recently received their bachelor's degree, and their knowledge was still fresh, which may have led to their high level of occupational professionalism and low tendency to make medical errors. The further knowledge and experience of the nurses gained from their education may have contributed to their making fewer errors in medication and transfusion applications, which are among the applications that they perform most frequently. These findings comply with the findings of other studies, which found that nurses make fewer errors in medication and transfusion applications, and the higher the education levels of nurses, the lower the number of medication errors (Altunkan, 2009; Başer & Manav, 2018; Öztunç, 2012).

The tendency of nurses to make errors in falls and communication also complies with the literature. Previous studies have showed that the most frequently observed error types with regard to patient safety are problems with falls and communication. The highest rate of errors is found in falls (Altunkan, 2009; Cebeci et al., 2012; Gökdoğan & Yorgun, 2010; İntepeler, Soydemir & Güleç, 2014; Öztunç, 2012; Teixeira & Cassiani, 2014; Zencirci, 2010). One of the main reasons for complaints and cases against hospitals is patient injury due to falling, indicating that nurses have difficulty in preventing falls (Hempel et al., 2013; Young et al., 2008; Zencirci, 2010).

Occupational professionalism has a strong, positive, and extremely significant relationship with the general tendency to medical error and all types of medical errors according to the correlation analysis. This finding indicates that as occupational professionalism increases, the tendency to medical error decreases. Furthermore, nurses who considered themselves very or completely professional were found to have a low tendency to medical errors; the tendency to make medical errors decreased as occupational professionalism increased, and there were significant differences between the groups. These findings and the findings of the high occupational professionalism scores of the nurses who stated that they had not made a medical error before are considered to support each other and show the effect of occupational professionalism on decreasing the tendency to make medical errors.

The regression analysis showed that 25% of the tendency to medical errors in the area of medication and transfusion applications, 18% of the tendency to medical errors in the area of falls, 23% of the tendency to medical errors in the area of Hospital Infections, 28% of the tendency to medical errors in the area of Patient Follow-up/material safety, 19% of the tendency to medical errors in the area of communication, and 30% of the general tendency to medical errors are due to issues of occupational professionalism. These rates of effect are high and show that the effect of occupational professionalism on the tendency to medical errors is quite strong.

These findings indicate that nurses' occupational professionalism should be kept at maximum level, and that nurses should be supported by their managers.

Study Limitations

Our study has limitations. First, the study is limited to public hospitals in a certain region. Second, the findings of the present study were based on the nurses' own statements. Finally, the lack of studies directly on this subject in the literature further limited discussion of the data.

CONCLUSION AND RECOMMENDATIONS

To the best of our knowledge, this is the first study on the effect of occupational professionalism on the tendency to medical errors both in the field of health and in the field of nursing. This will guide future studies on this subject and hopefully create institution managers' awareness of the importance of professional nurses in preventing medical errors.

The occupational professionalism levels of the nurses in the present study were found to be high, the majority of the nurses had not made a medical error but had tended to make the fewest medical errors in "medication and transfusion applications" and the most in "communication" and "falls," and there were differences between the occupational professionalism levels of the nurses who had made and had not made medical errors before. Moreover, there were significant differences in nurses' tendencies to medical errors according to how professional they considered themselves, and their tendency to medical errors decreased as their occupational professionalism levels increased.

Based on these results, we suggest periodically evaluating the occupational professionalism of nurses to keep it at a high level and thereby decrease their tendency to medical errors and performing activities that will decrease nurses' tendency to medical errors, especially in the areas of falls and communication. In addition, we suggest using different methods to evaluate the occupational professionalism of nurses in future studies since the findings of the present study were obtained from the nurses' own statements and to repeat the study using different sampling groups as, to our knowledge, this is the first study on this subject.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Atatürk University Faculty of Health Sciences (approval date: 06.10.2013).

Informed Consent: Oral informed consent was obtained from the nurses volunteering to participate in the study.

Peer-review: Externally peer-reviewed.

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Research Article

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The Cost of Prenatal Care Services in the City of Aydın: A Cross-Sectional Study

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ABSTRACT

Aim: To determine the cost of prenatal care services provided to pregnant women in the city of Aydın, Turkey.

Method: This cross-sectional study was conducted over the period of February-December 2016 at the Aydın Maternity and Children's Hospital. The convenience sampling method was used to recruit 403 women who were in weeks 36-42 of pregnancy into the study. Data for the study were collected with the Descriptive Information Form and the Prenatal Care Service Usage Form. Descriptive statistics, Mann-Whitney U and Kruskal-Wallis tests were used to analyse data.

Results: It was determined that the pregnant women were followed up an average total number of 10.94±4.30 times and 97.0% received care at the state hospital. It was found that for each pregnant woman, the mean total cost of prenatal care was $138.77±$93.44, the sum paid by general health insurance was $96.12±$46.38, individual contributions stood at $25.05±$10.43 and payments made to the private institutions was $110.32±$142.31. It was observed that the total prenatal care cost was not influenced by some of the characteristics of the pregnant women.

Conclusion: It was revealed in the study that most pregnant women received prenatal care at the state hospitals and at family health centers and that they had approximately 11 prenatal care follow-ups amounting to a total mean cost of about $139. A contribution can be made to making prenatal care more cost-effective by organizing the number and scope of prenatal care sites on the basis of the individual characteristics of risk factors pregnant women.

Keywords: Cost, follow-up, prenatal care, Turkey

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INTRODUCTION

Prenatal care is of vital importance in terms of starting a new life on a healthy path and reducing mother and infant mortality and morbidity rates. Throughout pregnancy, women are faced with many different health risks that adversely affect their health as well as the well-being of their babies. It is therefore important and necessary that all pregnant women be monitored by healthcare professionals. The World Health Organization (WHO) (2016) advises that mothers and newborns are provided with evidence-based and cost-effective care services during pregnancy and in the postpartum period.

In 2016, 1.309.771 live births were reported in Turkey (Turkish Statistical Institutes, 2017). According to the 2013 data of Turkish Population and Health Research, 97% of pregnant women in Turkey received prenatal care and 90% of these women began prenatal care before the fourth month of their pregnancy, and 89% received care four or more times. The family budget and health insurance of women is important for the care received throughout their pregnancy and significant topic both from the individual's point of view and from a national perspective.

The total number and scope of prenatal care visits is significance in terms of the sufficiency of the care provided and in the context of assessing costs. The prenatal care program recommended by the Republic of Turkey Ministry of Health for low-risk pregnancies is a check-up up every month until the 7th month of pregnancy (for the first 28 weeks), then every two weeks until the 36th week, and later, every week until the 40th week or the delivery. Accordingly, a woman needs to receive at least 10 sessions of prenatal care during her pregnancy (Akadlı-Ergöçmen, Çavlin, & Abbasoğlu-Özgören, 2014). The number of sessions may be more for pregnant women at high risk (Turkish Ministry of Health Turkish Public Health Institution Department of Women and Reproductive Health, 2014).

Prenatal care services in Turkey are provided at Family Health Centers, the state and university hospitals and at private hospitals. Additionally, pregnant women may also choose to be monitored by independent ObGyn specialists. In accordance with Republic of Turkey legislation, all pregnant women are required to be monitored by family health centers (Implementing Regulation of Family Medicine, 2013). At the same time, they may receive services at will or by referral from the public and university hospitals. A portion of the examination fees and the investigations and testing charged to pregnant women is paid for by General Health Insurance. On the other hand, pregnant women with health insurance pay in a contribution for the fees of services obtained from the public institutions and private hospitals (Turkish Social Security Institution, 2017). Furthermore, pregnant women receiving services from private hospitals working on contract with General Health Insurance also pay a share of examination fees, an amount that is higher than what they would pay public hospitals and one that varies according to the particular private hospital. Also, pregnant women being examined at private doctor's offices pay for the entire service themselves.

With the increase in the use of new technologies, healthcare costs have risen, becoming an issue for healthcare consumers, health insurers and governments alike. It is imperative that a balance is maintained between healthcare costs and the quality of the care provided (Caughey, & Burchfield, 2014). A review of studies conducted indicate that the focus of research on the relationship between prenatal care and cost has been on areas such as gestational diabetes screening (Cavassini,

Lima, Calderon, & Rudge, 2012; O'Dea, Infanti, Gillespie, Tummon, Fanous, & Glynn, 2014; Weile, Kahn, Marseille, Jensen, Damm, & Lohse, 2015), asthma management (Grzeskowiak, et al., 2014), Human Immunodeficiency Virus (HIV) and syphilis (Kahn, et al., 2014; Owusu-Edusei, et al., 2014), genetic screening (Evans, Sonek, Hallahan, & Krantz, 2015), congenital heart disease (Pinto, Nelson, Puchalski, Metz, & Smith, 2014) and myelomeningocele (Werner, et al., 2012). In this context, there is a need to know what the total cost of prenatal care services amounts to. Knowing the cost of prenatal health services to individuals, families and institutions is important in terms of service receiving and presentation. Individual contributions to health expenditures in our country are steadily increasing and this situation constitutes a significant burden on the individual and family budget. In addition, the increase in the institutional cost can negatively affect the provision of prenatal care services in terms of quality and quantity as prescribed by the Ministry of Health and WHO. On the other hand, in Turkey's western regions with high socio-economic status and a place in Aydin province, it can serve as an example for the country's western region. It is expected that the data obtained on this may make a contribution to both individuals and service-providing institutions that will be useful to the planning and presentation of prenatal care services. Based on the findings, both health service managers and individuals and families can determine the number of follow-up and places of prenatal health services in a cost-effective manner.

In this study, our purpose was to determine the cost of prenatal care services provided to pregnant women in the city of Aydın, Turkey.

Research Questions

1. What is the total cost of prenatal care services provided to pregnant women?
2. What payment is made by pregnant women's health insurance toward prenatal care services?
3. How much is the individual payment contribution that the pregnant woman and family must pay for prenatal care services?
4. How much do pregnant women pay private hospitals for prenatal care services?
5. Does the total cost of prenatal care services vary according to certain characteristics of women?

METHOD

Study Design

This cross-sectional study was conducted over the period February-December 2016 at the Aydın Maternity and Children's Hospital.

Sample

A total of 403 pregnant women in their 36th-42nd gestational weeks presenting at the hospital for prenatal care participated in the study. The convenience sampling method was used in the sampling of pregnant women. Since no other research on the cost of prenatal care services was detected in the literature, a calculation of the least number of pregnant women needed for the study sample was made based on the data of the first 50 pregnant women participating in the research. Assuming that the ANOVA and t tests would be used, the calculation was carried out with G*Power 3.1.9.2 at a power of 0.95 and α=0.05; it was found that the sample should consist of 300 participants. In the later analysis based on all the data derived from the study, the calculation made with G*Power 3.1.9.2 at power=95%, alpha=0.05, sample size: 400 and group number= 4 and 2 indicated that effect size would be 0.16 (for the t test) and 0.21 (for ANOVA). The effect size according to these results was

small (Kılıç, 2014) and it was therefore concluded that the sample size was sufficient.

Women of the age of 18 and over, in or above their 36th gestational week, who could read and write Turkish and were at least elementary school graduates, were recruited into the study. Pregnant women with psychological and physical problems were excluded from the study.

Data Collection

Data for the study were collected with the Descriptive Information Form and the Prenatal Care Service Usage Form. The Descriptive Information Form was prepared by the researchers based on the literature and contained a total of 23 questions on the women's socio-demographic such as age, education, income, health insurance, family type, history of chronic illness and medicine used, and obstetric characteristics (Beulen, Grutters, Faas, Feenstra, van Vugt, & Bekker, 2014; Cavassini, et al., 2012; Özçelik, & Karaçam, 2014). The Prenatal Care Service Usage Form too, was drawn up by the researchers (O'Dea, et al., 2014; Pinto, et al., 2014; Werner, et al., 2012). The form queried the place where the pregnant women received prenatal care, the diagnostic procedures, the testing they underwent and the payments they made for these services. There were 20 areas in the form of which all information could be recorded (including those requiring further examination). A second (reserve) form was used for the pregnant women who had more follow-ups than this number. The data collection forms were self-reporting instruments that were filled out by the pregnant women under the supervision of the second researcher. Because it is known that pregnant women receive services from different units (family health centre, state or university hospital, private hospital, doctor's office), data could not be obtained retrospectively from registration systems and individual inquiry method was applied. Data on private health expenditures were also obtained through individual inquiry.

In order to improve the comprehensibility and applicability of the data collection forms, a preliminary application was launched with 10 pregnant women who were in weeks 36-42 of their pregnancy. At the end of the application, the forms were revised after some changes were made.

A team made up of an academic project coordinator (the third author) and two academic researchers (the first and second authors) carried out the study. Data were collected while the pregnant women were in the polyclinic waiting room awaiting their appointments or during Non-stressful Testing. After the selection of the pregnant women in weeks 36-42 of their pregnancy who matched the research criteria, the women were informed about the research and invited to participate in the study. The written or verbal consent of those who agreed to participate was obtained. Later the pregnant women were provided information about the descriptive information form and the Prenatal Care Services Usage Form and asked to fill out the forms according to the prenatal care services they had received at the current follow-up visit. The pregnant women were supervised during this process and any questions they had were answered. The data collection procedure was completed in approximately 15-20 minutes.

Ethical Considerations

The Adnan Menderes University, Faculty of Medicine Ethics Committee approved the study protocol (Approval number: 2015/742). The official permission of the Republic of Turkey, Aydın Provincial Health Directorate was obtained for the collection of the research data. The women recruited into the research were informed about the study and their verbal and written consent was obtained.

Table 1. Identifying characteristics of pregnant women (n=403)	
Variables	
Mean age±SD (min-max), (n=400)	27.01±5.34 (16-43)
Educational status (n=395), n (%)	
Elementary School	135 (34.1)
Middle School	136 (34.5)
High School	77 (19.5)
University and Graduate School	47 (11.9)
Spouse's Educational status (n=393), n (%)	
Literate† and Elementary school	126 (32.1)
Middle School	117 (29.8)
High School	88 (22.4)
University and Graduate School	62 (15.8)
Civil status, (n=397), n (%)	
Officially married	378 (95.2)
Not officially married	19 (4.8)
Working status (n=400), n (%)	
Income-earning	48 (12.0)
Housewife	352 (88.0)
Spouse's income-earning status (n=398), n (%)	
Yes	363 (91.2)
No	35 (8.8)
Health insurance, (n=392), n (%)	
Yes	347 (88.5)
No	45 (11.5)
Income status (n=395), n (%)	
Income less than expenditure	121 (30.6)
Income equal to expenditure‡	274 (69.4)
Family type (n=395), n (%)	
Extended family	69 (17.3)
Nuclear family	331 (82.8)
History of any diagnosed chronic illness (n=395), n (%)	
Yes	12 (3.0)
No	389 (97.0)
Taking medicines (n=401) n (%)	
Yes	37 (9.2)
No	364 (90.8)
Planned pregnancy (n=403), n (%)	
Yes	326 (80.9)
No	72 (19.1)
Wanted pregnancy (n=403), n (%)	
Yes	400 (99.3)
No	3 (0.7)
No. of pregnancies±SD (min-max), (n=403)	2.31±1.46 (1-9)
No. of live births±SD (min-max), (n=255)	1.72±1.04 (1-7)
No. of living children±SD (min-max), (n=255)	1.71±1.03 (1-7)

SD: standard deviation. †5 of the individuals in this group were literate but without schooling. ‡One individual reporting that their income was greater than expenditure was added to the income-equal-to-expenditure group

Data Analysis

The Statistical Package for the Social Sciences Version 15 (SPSS Inc.; Chicago, IL, USA) was used in the data analysis. The socio-demographic and obstetric characteristics of the pregnant women were analyzed using descriptive statistics. The calculation of the cost of prenatal care services was made according to the pricing issued as current for December 2017 by the Republic of Turkey Social Security Administration (2017). The fees of the laboratory and diagnostic tests were obtained from the hospital where the research was conducted. The total cost of payments made by General Health Insurance and individual pregnant women was calculated for each woman according to the place they received care. The number of their follow-ups and then these individual costs as well as total costs was entered into the SPSS medium. The SPSS program was used to calculate the total cost of prenatal care services, the average cost of services procured from family health centers, public hospitals, private hospitals and other units, as well as the average cost reflected on family budgets. The average cost figures were first calculated on the

basis of Turkish Lira (TRY) and then converted to dollars at the 2016 average dollar exchange rate ($1=TRY 3.532 TRY) (Turkey Department of Budget and Financial Control, 2017). The distribution of these calculated averages by institutions, General Health Insurance and the cost to the individual was analyzed with the Mann-Whitney U and Kruskal-Wallis tests since the data did not display normal distribution. Mann-Whitney U and Kruskal-Wallis tests were also used to analyze the distribution of prenatal care cost according to some characteristics of pregnant women. Values of $p<0.05$ were considered statistically significant.

RESULTS

It was found that the mean age of the women participating in the study was 27.01±5.34 years (range: 16-43). The majority of the pregnant women were elementary school (31.1%) and middle school (34.4%) graduates, 88.0% were housewives and 11.5% did not carry health insurance. Moreover, 19.1% of the women had not planned their pregnancies, 3.0% experienced prenatal problems and 9.2% were taking medications. Data on the women's income levels, smoking status and obstetric characteristics are given in Table 1.

It was determined that the women had attended a mean total number of 10.94±4.30 (range: 2-30) pregnancy follow-ups and that most (97.0%; n=391/403) had attended a mean number of 8.28±1.97 (range: 1-11) follow-ups and received this service mostly from the state hospital. It was observed that the average total cost of prenatal care was $138.77±$93.44 (range: $27.75-$1184.60). The number of pregnancy follow-ups and their average costs can be seen in Table 2. Furthermore, the cost of prenatal care services was also examined in this study in terms of the educational level and the employment status of the pregnant women and their husbands, insurance coverage, marital status, family type, perceived income, obstetric characteristics and other similar features, but no statistically significant differences were observed (Table 3).

DISCUSSION

This study was conducted as cross-sectional research with 403 pregnant women in Aydın, Turkey to determine the cost of prenatal care services. It was found that the women were followed up an average of approximately 11 times and mostly at the state hospital, that the cost of their prenatal care was covered by general health insurance or by the individuals themselves, that the average total cost of care was about $139 and that this was not influenced by some characteristics of the pregnant women. These findings are important in terms of providing comprehensive data on the cost of prenatal care services in Turkey, particularly in the Turkey's western regions and with high socio-economic status.

Table 2. Number of prenatal care visits and costs, by healthcare facility (n=403)

Variables	Mean±SD (min-max)
Number of follow-ups	
Family Health Center (n=138/403; 34.24%)	6.46±3.21 (1-10)
State hospital (n=391/403; 97.02%)	8.28±1.97 (1-11)
Private hospital/doctor's office (n=66/403; 16.38%)	4.39±3.42 (1-20)
Total number of follow-ups (n=403)	10.94±4.30 (2-30)
Amounts of average payment by site (USD)	
Payment to private facilities (n=66)	110.32±142.31 (8.49–1002.51)
State contribution (n=403)	96.12±46.38 (18.12–513.02)
Individual contribution (n=403)	25.05±10.43 (4.53-88.90)
Total cost (n=403)	138.77±93.44 (27.75–1184.60)

SD: standard deviation

Table 3. Distribution of prenatal care cost by some characteristics of pregnant women (n=403)

Variables	Mean Rank	Chi-square/Z values	p
Educational status (n=395)	5.684	0.224	
Elementary School	210.16		
Middle School	184.63		
High School	201.92		
University and Graduate School	209.83		
Spouse's Educational status (n=393)			
Literate/Elementary school	192.2	2.628	0.453
Middle School	197.44		
High School	211.24		
University and Graduate School	182.48		
Marital status, (n=397)			
Officially married	197.98	-0.406	0.685
Not officially married	208.89		
Working status (n=400)			
Income-earning	188.49	-1.242	0.214
Housewife	214.84		
Spouse's income-earning status (n=398)			
Yes	100.36	-0.852	0.394
No	92.86		
Health insurance (n=392)			
Yes	200.77	-0.147	0.883
No	197.88		
Income status (n=395)			
Income less than expenditure	181.87	-1.802	0.072
Income equal to expenditure	204.38		
Family type (n=395)			
Extended family	185.71	-1.132	0.258
Nuclear family	202.99		
History of chronic illness (n=395)			
Yes	152.04	-1.474	0.140
No	202.00		
Taking medicines (n=401)			
Yes	188.60	-0.343	0.732
No	201.32		
Planned pregnancy (n=403)			
Yes	197.80	-1.322	0.186
No	217.37		
Wanted pregnancy (n=403)			
Yes	201.89	-0.778	0.442
No	150.17		
Number of pregnancies			
Primipara	211.44	-1.517	0.129
Multipara	193.09		
Hospitalization during pregnancy			
Yes	88.60	-1.031	0.732
No	201.32		

It has been observed that the average number of follow-ups provided to pregnant women in this study (10.94±4.30; range: 2-30), is greater than the number (at least 4 follow-ups) recommended by the WHO (2016) or Turkey's Ministry of Health (Turkish Ministry of Health Turkish Public Health Institution Department of Women and Reproductive Health, 2014). But in Turkey, a pregnant woman generally receives about 10 times of prenatal care during her pregnancy, a check-up up every month until the first 28 weeks, then every two weeks until the 36th week, and later, every week until the 40th week or the delivery (Akadlı-Ergöçmen, et al., 2014). The average number of prenatal follow-ups (12.41±4.33) reported in another study conducted in Turkey (Izmir) is even greater than ours (Yücel, Çiçeklioğlu, Öcek, & Taner, 2015). Similar to our results, the same study also reported that the most pregnant women received prenatal services from state hospitals and family health centres (Yücel, et al., 2015). Increasing the number of follow-ups may increase the cost of prenatal care. Because of this, carefully identifying low-risk pregnancies and scheduling follow-up intervals according to the recommendations of WHO and national standards may make these services more cost-effective.

It was calculated in the present study that the total average cost of prenatal care services is approximately $139. No study was detected in the literature about the total cost of prenatal care services. There are, however, studies in which the costs per patient of screenings for trisomy 21 (Beulen, et al., 2014), cell-free fetal DNA (Evans, et al., 2015), congenital heart disease (Pinto, et al., 2014), diagnosing gestational diabetes mellitus (O'Dea, et al., 2014; Werner, et al., 2012) and congenital toxoplasmosis (Prusa, et al., 2017) are reported. Knowing the total cost of prenatal care per pregnant woman may make it easier for families as well as health insurance companies to plan ahead for the services that may be demanded. The findings point to the importance of conducting more studies in this context.

It was found in our study that the larger portion of prenatal care costs consists of the pregnant woman's health insurance (approximately $96) and that the lesser portion ($25) comprises the amount paid by the pregnant woman and her family. In their examination of costs and cost-effectiveness in the 22nd-24th weeks of pregnancy, Caughey and Burchfield (2014) have similarly stated that care costs are divided into what is paid out by insurance coverage and what is paid out by the individual. This indicates that besides having a health insurance policy, a family's level of income is also important in being able to obtain prenatal care.

We found in our study that some pregnant women (n=66/403; 16.38%) received prenatal care at private hospitals/doctor's offices and that they paid more (approximately $110) for the services provided in this way. The choice taken here may be related to the status of education and income of the pregnant woman and her family. Çınaroğlu (2017) reported that in addition to factors such as service quality and accessibility, individuals with higher levels of education and income preferred more private institutions in their study on the factors affecting the choice of public and private health services. It was found in this study however that these factors had no effect on the total cost of prenatal care.

It was observed in our study that the total cost of prenatal care was not influenced by the educational level or status of employment of the pregnant woman or her spouse, or by the presence of health insurance, civil status, and family type, perceived income level or obstetric characteristics. This may be related to the low share in prenatal care costs that preg-

nant women and their families are required to contribute in Turkey, also to the value families place on their expected children and the degree to which they attach importance to prenatal care.

CONCLUSION AND RECOMMENDATIONS

This study yielded the results that: pregnant women receive prenatal care for an approximate average of 11 times and mostly at state hospitals and family health centres; prenatal care amounts to a total average cost of approximately $139, which is met in the large part by general health insurance ($96) and for a lesser part ($25) by individuals themselves; pregnant women receiving prenatal care from private hospitals/doctor's offices individually pay more ($110) to receive this care; and, some characteristics of pregnant women do not influence the total cost of prenatal care.

On the basis of the results obtained, it can be recommended that: (1) healthcare providers refer pregnant women with personal financial difficulties to the public hospitals and the number and scope of prenatal monitoring visits be organized according to prenatal risk status; (2) pregnant women are informed about the cost of prenatal care so that they are given the opportunity to make informed decisions about the care they receive; (3) health care managers, pregnant women and their families determine the number of places and follow-up to receive prenatal health services in a cost-effective manner; (4) the study be repeated with pregnant women to include a more comprehensive assortment of prenatal care data that are based on the records of healthcare institutions.

Study Limitations

There are some limitations to this study. The first limitation is that the questionnaires for the study were based on self-reporting and therefore the reliability of the data is limited to the information provided by the participants. The second limitation is that the study was cross-sectional and based on convenience sampling. Consequently, the data obtained are only representative of the participating women and may vary with time. The third limitation is that the study was conducted with women in weeks 36-42 of pregnancy. The results obtained may differ from evaluations based on time of delivery.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Aydın Adnan Menderes University (Approval number: 2015/742).

Informed Consent: The women recruited into the research were informed about the study and their verbal and written consent was obtained.

Peer-review: Externally peer-reviewed.

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The Correlations Between Nursing and Medical Students' Values and Social Innovation Tendencies

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ABSTRACT

Aim: This study aimed to determine the correlation between values and social innovation tendencies of nursing and medical students and examine the effect of values on social innovation tendencies.

Method: This descriptive and correlational study consisted of 524 third-year students at nursing and medical faculties in a public university in Istanbul (response rate of 57.1%). The data of the study were collected using the information form, Portrait Values Questionnaire, and Social Innovation Scale. The data were collected between December 2015 and May 2016. The data were analyzed using descriptive and correlational analyses, and the factors affecting the score of social innovation were analyzed using linear regression analysis (backward).

Results: A positive significant correlation was determined between the total scores of Portrait Values Questionnaire and Social Innovation Scale (r=0.453). The subscale mean scores of Portrait Values Questionnaire had an effect of 26.6% in total score of Social Innovation Scale. In the regression model where significance was determined (F=37.566; p<0.01), the highest effect was observed in the subscale of universalism.

Conclusion: The value of universalism affected the social innovation for both groups at the most, which is an expected result by the nature of these occupations. The value of openness to innovation including self-direction and stimulation in medical students had a significant effect on the total score of social innovation, which is compatible with innovative behavior literature. These results are expected to guide educators and managers in developing socially innovative behaviors.

Keywords: Innovation, medical students, nursing students, social innovation, values

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INTRODUCTION

Innovation covers all kinds of beneficial economic and social incidents. Even though technology and product are still in the foreground in innovation, it can also be applied to the education, administration, and social level (Sönmez, 2014). In countries that target innovation as a national socioeconomic policy, it is required to establish the culture of innovation in society for individuals to turn their innovation tendencies into behaviors (Seçkin-Halaç, Eren, & Bulut, 2014).

Individuals play a key role in the process of innovation as the creators and bearers of knowledge (Goldenberg, 2004). Social innovators are the creators of change; they socially develop new ideas and try to solve social problems. They are expected to have enterprising features and act like the agent of change; they constantly conduct innovation activities to create a sustainable social value (Dees, 2007). Being one of the important factors for innovation, human capital is knowledge, abilities, and talents of individuals that could be developed with education. There is a great need for raising social entrepreneurs who generate innovative solutions to social problems (Eren, 2010). Environment and education determine the behavior patterns of social entrepreneurs who bear and conduct innovation (Seçkin-Halaç et al., 2014). In the literature, it is seen that individual factors and mostly organizational factors that affect innovative behaviors of individuals are examined (Sönmez, 2014). In their systematic review on innovation in the field of health, Greenhalgh, Robert, Macfarlane, Bate, and Kyriakidou (2004) stated that personality characteristics, intellectual talents, tolerance to uncertainty, motivations, values, and learning styles affect innovative behaviors of individuals. It is thought that determining the value types of individuals is important especially in terms of developing their socially innovative behaviors.

As the International Council of Nurses-ICN (2017) stated, nurses, and physicians who serve to preserve and improve the health of individuals, families, and societies are expected to take part in the social transformations that improve health. However, it is stated that their personal principles will guide their occupational practices and their relationships with individuals, families, and society (Kaya, Küçük-Yüceyurt, Şenyuva & Ulupınar, 2018). No study of nurse and medical student samples has examined the relationship between their values and social innovation (SI) tendencies. Accordingly, the theoretical framework of this study contains the relationship between values and SI tendencies.

Values are evaluated as phenomena that strain incidents in the environment and direct behaviors. Accordingly, it is stated that knowing the values of individuals will pave the way to estimate their behaviors in the face of incidents in their life (Çalışkur, Demirhan, & Bozkurt, 2012). Values guide in selecting behaviors or evaluating incidents and become distinct depending on their relative importance in individuals (Lan, Gowing, Mcmahon, Rieger, & King, 2008).

In his Theory of Values, Schwartz (2012) states that values are cognitive reflections of three universal needs that exist innately in every individual according to their content and structure. He defines these needs as basic needs of individuals (like stimulation) as biological organism, needs (like benevolence) required by successful interpersonal interaction, and needs (like adaptation) required by groups and communities to survive (Dirilen-Gumus & Buyuksahin-Sunal, 2012; Schwartz, 2012). Considering the three universal needs, Schwartz defines ten value types that contain values in similar or different motivational infrastructure and show an interrelated continuity

within a dynamic structure on a circular array (Schwartz, 2012) (Table 1). Studies conducted in different cultures support the circular array considerably (Demirutku & Sümer, 2010).

In the study comparing the value profiles of university students studying in nursing and business, the most important values of nursing students were "personal development" and "benevolence." Nursing students had higher "benevolence" and lower "life style, advancement, autonomy, authority, creativity, economic, and risk values" compared to business students (Thorpe & Loo, 2003). In a longitudinal study examining the value preferences of first-year nursing students, students preferred social values in the beginning and at the end of the academic year. It was indicated that the most distinctive features of an individual adopting social values were philanthropy, benevolence, and unselfishness (Kaya, Işık, Şenyuva, & Kaya, 2012a). In another study conducted with nursing students (Kaya, Kaya, Senyuva, & Isık, 2012b), while moral, social, financial/economic values were on the first three ranks; religious and scientific/theoretical values had the lowest scores.

In another study conducted with physiotherapists, physiotherapists showed the highest value tendency to the value of "benevolence" and the lowest tendency to the value of "power" (Nosse & Sagiv, 2005). In the study conducted by Çalışkur, Demirhan, and Bozkurt (2012), with different occupational groups using Rokeach Value Inventory, the values of honesty, family security, and inner peace were common values in all groups. The values on the first three ranks were honesty, family security, and inner peace for engineers; honesty, inner peace, and independence for psychologists; and inner peace, happiness, and honesty for physicians.

Max Weber addressed SI for the first time as social inventions in late nineteenth century. In the 1930s, Joseph Schumpeter emphasized the requirement of SI along with technology and innovation to provide an economic efficiency (Seçkin-Halaç et al., 2014). Considering the definition of innovation, "social innovation" may be defined as forming or applying new or reformed products, services, and processes to solve personal and social problems (Seçkin-Halaç et al,. 2014; Sönmez, 2014). In other words, SI is the generation of new ideas and solutions to meet social needs and increase the life standards of individuals (Mulgan, Tucker, Ali, & Sanders, 2007). Phills, Deiglmeier, and

Table 1. Values and definitions according to Schwartz's Theory of Values (Schwartz, 2012)

	Value	Definition
Self-enhancement	Power	Social status, dominance over people and resources
	achievement	Personal achievement tendency established by social standards
Openness to change	Hedonism	Quest for physical pleasure and sensual satisfaction
	Stimulation	Quest for excitement and innovation
	Self-direction	Tendency of independent thinking and behaving
Self-transcendence	Universalism	Sensibility and tolerance for everyone; protecting the welfare of people and the nature
	Benevolence	Protecting and strengthening the well-being of other people
Conservatism	Tradition	Respect for and commitment to cultural and religious applications and senses
	Conformity	Limitation of impulses and behaviors that may harm other people or contrast with social expectations
	Security	Quest for security and stability for self, society, and relations

Miller (2008) redefined SI as finding a more effective, efficient, and sustainable solution to a social problem or creating values primarily for society instead of private individuals based on present solutions to bring a higher sensitivity and understanding in this concept.

SI includes the development of new social products and services to provide a sustainable benefit to problems like working conditions, education, social development, health, environmental supervision, and climate change (Seçkin-Halaç et al., 2014). Mulgan et al. (2006) gave the following examples to SI, "telephone help lines, neighborhood nurseries and neighborhood wardens, Wikipedia and the Open University, complementary medicine, holistic health and hospices."

This study was conducted to determine the correlation between values and SI tendencies of nursing and medical students, and examine the effect of values on SI tendencies.

Research Questions

1. What are the values of nursing and medical students?
2. What are the SI tendencies of nursing and medical students?
3. Is there a correlation between the values and SI tendencies of nursing and medical students?
4. Do the values affect SI tendencies of nursing and medical students?

METHOD

Study Design

The study was conducted in a descriptive and correlational design.

Sample

This study consisted of third-year students (totally 917 students; 355 nursing, 562 medical students) at a medical and nursing faculty in a public university in Istanbul. In Turkey, medical students study for six years and nursing students study for four years. It was aimed to include students from similar ages and grades. As fourth-year nursing students were doing internship, the population consisted of third-year students instead of fourth-year students. It was aimed to reach the entire population without using sampling method. A total of 524 valid data collection tools were obtained with a total response rate of 57.1%.

Data Collection

The data were collected between December 2015 and May 2016. The data of the study were collected using the information form, Portrait Values Questionnaire (PVQ), and Social Innovation Scale. To use the scales, permissions were obtained from the researchers who developed them and adapted them into Turkish.

The Information Form: The form consisted of seven questions including sociodemographic characteristics of the students such as age, gender, number of siblings, the residence of the family, and income level of the family.

Portrait Values Questionnaire (PVQ): The PVQ was developed by Schwartz, Melech, Lehmann, Burgess, and Harris (2001) as 40 items to exceed the limitations of the Schwartz Value Survey and measure the value tendencies more efficiently. It was adapted into Turkish by Demirutku and Sümer (2004). In the scale, participants are asked to indicate how much they like the person being described. The scale consists of 40 items that are responded in the 6-point Likert scale (1-not like me at all, 6-very much like me) and 10 separate subscales respectively as power, achievement, conformity, hedonism, tradition, self-direction, security, universalism, stimulation, and benevolence. In their study, Schwartz et al. (2001) reported

reliability coefficients as follows: power, 0.84; security, 0.88; conformity, 0.86; tradition, 0.81; benevolence, 0.82; universalism, 0.83; self-direction, 0.66; stimulation, 0.74; hedonism, 0.84, and achievement, 0.83. Demirutku and Sümer (2004) calculated both Cronbach's alpha and test-retest reliability coefficients for reliability. Cronbach's alpha and test-retest values were follows: power, 0.77–0.81; security, 0.71–0.81; conformity, 0.77–0.75; tradition, 0.63–0.82; benevolence, 0.69–0.66; universalism, 0.79–0.72; self-direction, 0.65–0.65; stimulation, 0.61–0.70; hedonism, 0.81–0.77; and success, 0.84–0.81. In this study, the cronbach's alpha values were follows: self-direction, 0.65; stimulation, 0.64; hedonism, 0.71; power, 0.59; achievement, 0.74; universalism, 0.79; benevolence, 0.54; security, 0.62; conformity, 0.60; and tradition, 0.51.

Social Innovation Scale: Developed by Seçkin-Halaç et al. (2014) in Turkish to measure measuring SI tendency at individual level, the SI scale consists of a total of eight items that are responded as self-report in the 5-point Likert type (1-strongly disagree, 5-strongly agree). Cronbach's alpha value of the unidimensional scale was reported as 0.85. In this study, the cronbach's alpha value was 0.84 for the overall scale.

Data Analysis

The Number Cruncher Statistical System (NCSS) 2007 (Kaysville, Utah, USA) program was used for statistical analyses. The data of the study were evaluated using descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, maximum). While Student's t test was used in two-group comparison of variables that showed a normal distribution, Mann–Whitney U test was used in two-group comparison of variables that did not show a normal distribution. One-way ANOVA test was used in three-group (and more) comparison of variables that showed a normal distribution, and Tukey HSD test was used to determine the group that caused the difference. Kruskal–Wallis test was used in three-group (and more) comparison of variables that did not show a normal distribution, and Bonferroni corrected Mann–Whitney U test was used to determine the two groups that caused the difference. Spearman correlation analysis was used to evaluate the correlations between variables that did not show normal distribution. Factors affecting the total score of Social Innovation Scale were analyzed using linear regression analysis (backward).

Ethical Considerations

Ethics committee approval (Faculty Clinical Research Ethics Committee, Date: 12.02.2016, Decision No: 03) and permission of faculty management were obtained to conduct the study. Written informed consent was obtained from students who participated in this study, and they were ensured to participate in the study voluntarily.

RESULTS

Sociodemographic Characteristics of Participants

Among the students who participated in the study, 44.1% were nursing students and 55.9% were medical students. Of the students, 71.6% (n=375) were female, 28.4% (n=149) were male. The average age was 20.52±1.04 years (min 18, max 26). Only 17.2% of the students had no siblings; 69.1% of their families were living in the city; and 29.2% had a good income level, 54.4% had a middle income level, and 16.4% had a minimum and below income level.

Descriptive Results of the PVQ and SI

Total mean score obtained by the students from the SI was 3.99±0.59. Among the subscale mean scores of PVQ, the lowest mean

score was value of power (3.79±1.00), and the highest mean score was value of universalism (5.12±0.70) (Table 2).

There was no statistically significant difference between the total scores obtained by nursing and medical students from the SI (t=0.367, p=0.714). No significant relationships were found between the students' sociodemographic characteristics and their total SI scores (p>0.05). When comparing the mean scores of PVQ between the groups, the scores obtained by nursing students from the subscales of hedonism (p=0.002), universalism (p=0.046), and security (p=0.012) were higher than the scores of medical students in a statistically significant way (p<0.05).

There was a positive statistically significant correlation between the total scores obtained by the participating students from the SI and the total scores of PVQ at the rate of 45.3% (r=0.453; p=0.001; p<0.01) (Table 3). Positive but weak correlation between the total scores obtained by the students from the SI and their scores in the subscales of "hedonism, power, achievement and tradition" in the PVQ were statistically significant. There was also a positive statistically significant correlation between other subscales, mainly in the subscale of universalism at the rate of 44% (Table 3).

Regression Analysis of the Effect of the Subscale Scores of PVQ on Total Score of SI

The effect of the subscale scores of PVQ on total score of SI was tested by the help of linear regression analysis (backward stepwise); and as a result of the analysis, the regression model was significant (F=37.566; p<0.01) and R^2=0.266. According to the model, the effect of the subscale scores of PVQ on the SI was 26.6%.

As a result of the analysis, the subscales of self-direction (p=0.071), stimulation (p=0.031), power (p=0.031), universalism (p=0.001), and benevolence (p=0.073) of the PVQ were involved in the model. In the final step, the model also involved the subscales of self-direction and benevolence, which were not significant but were close to the significance level. The greatest effect in the model was shown by the value of universalism. The formula obtained as a result of the model was as follows (Table 4):

SI = 1.456 + 0.076(Self-Direction) + 0.061(Stimulation) + 0.052(Power) + 0.268
(Universalism) + 0.067(Benevolence)

Table 2. Mean scores and standard deviations of the SI and PVQ

			Item No	Mean	SD
Social Innovation Scale			8	3.99	0.59
Portrait Values Questionnaire	Openness to change	Self-Direction	4	4.87	0.76
		Stimulation	3	4.44	0.96
		Hedonism	3	4.55	0.99
	Self-enhancement	Power	3	3.79	1.00
		Achievement	4	4.26	0.95
	Self-transcendence	Universalism	6	5.12	0.70
		Benevolence	3	4.84	0.75
	Conservatism	Security	6	4.94	0.66
		Conformity	4	4.68	0.78
		Tradition	4	4.27	0.79

SD: standard deviation; PVQ: Portrait Values Questionnaire; SI: social innovation

Regression Analysis of the Effect of the Nursing and Medical Students' Subscale Scores on the PVQ on Their Total SI Scores

The effect of the subscale scores obtained by nursing and medical students from the PVQ on total score of SI was tested with the help of linear regression analysis (backward stepwise). As a result of the analysis, the regression model was significant in nursing students (F=25.161; p<0.01) and R^2=0.250. According to the model, the effect of the subscale scores of PVQ on SI was 25%.

Table 3. Correlations between the total and subscale scores of PVQ and the total scores of SI

	Total score of SI	
PVQ	r	p
Self-direction	0.395	0.001**
Stimulation	0.327	0.001**
Hedonism	0.209	0.001**
Power	0.160	0.001**
Achievement	0.206	0.001**
Universalism	0.440	0.001**
Benevolence	0.350	0.001**
Security	0.260	0.001**
Conformity	0.222	0.001**
Tradition	0.160	0.001**
Total score	0.453	0.001**

r: Spearman's Correlation Coefficient; **p<0.001. PVQ: Portrait Values Questionnaire; SI: social innovation

As a result of the analysis, power (p=0.014); universalism (p=0.001), and benevolence (p=0.007) subscales of the PVQ were involved in the model. The greatest effect in the model was depicted by the value of universalism. The formula obtained as a result of the model is as follows (Table 5):

$SI_{(Nursing\ students)}$=1.578+0.089(Power)+0.244(Universalism)+0.169(Benevolence)

As a result of the regression analysis applied in medical students, the model was significant (F=31.999; p<0.01) and R^2=0.308. According to the model, the effect of the subscale scores of PVQ on SI was 30.8%. Self-direction (p=0.011), stimulation (p=0.001), hedonism (p=0.001), and universalism (p=0.040) subscales of the PVQ were involved in the model. The greatest effect in the model was depicted by the value of universalism. The formula obtained as a result of the model is as follows (Table 5):

$SI_{(Medical\ students)}$=1.574+0.120(Self-Direction)+0.131(-Stimulation)–0.064(Hedonism)+0.301(Universalism)

DISCUSSION

This study was conducted in nursing and medical students to determine the values that would direct individuals, the most important component in the process of SI, and establishing its relationship with SI tendency. The students obtained high total mean score from the

Table 4. Regression analysis of the effect of the subscale scores of PVQ on total score of SI

	Unstandardized coefficients		95% Confidence interval for β	
	ß	p	Lower bound	Upper bound
Self-direction	0.076	0.071	–0.006	0.158
Stimulation	0.061	0.031	0.006	0.117
Power	0.052	0.031	0.005	0.099
Universalism	0.268	0.001	0.180	0.356
Benevolence	0.067	0.073	–0.006	0.140
(Constant)	1.456	0.001	1.083	1.829

*Dependent variable: Total score of SI; Independent variable: The subscales of PVQ; PVQ: Portrait Values Questionnaire; SI: social innovation

Table 5. Regression analysis of the effect of the subscale scores obtained by nursing and medical students from the PVQ on total scores of SI

		Unstandardized coefficients		95% Confidence interval for β	
		ß	p	Lower bound	Upper bound
Nursing students	Power	0.089	0.014	0.018	0.160
	Universalism	0.244	0.001	0.110	0.379
	Benevolence	0.169	0.007	0.047	0.291
	(Constant)	1.578	0.001	1.021	2.135
Medical students	Self-direction	0.120	0.011	0.028	0.211
	Stimulation	0.131	0.001	0.065	0.196
	Hedonism	–0.064	0.001	–0.126	–0.003
	Universalism	0.301	0.040	0.206	0.396
	(Constant)	1.574	0.001	1.127	2.021

*Dependent Variable: Total score of SI; Independent variable: The subscales of PVQ; PVQ: Portrait Values Questionnaire; SI: social innovation

Social Innovation Scale. In the study conducted by Eren (2010) to compare the social and technological innovation tendencies of university students, students had higher tendencies to SI compared to technological innovation. The author explains this result with the fact that individualistic communities have a tendency to seeking technological solutions to their problems rather than SI; and the Turkish society, which has a collectivist culture, was more inclined or eager to SI due to its cultural traits. In the literature, it is seen that the concepts of SI and social entrepreneurship are used together (Altman & Brinker, 2016). Accordingly, the results of our study were discussed with the literature on social entrepreneurship and innovative behavior. In their study comparing the business values of Turkish and American university students, Karakitapoğlu-Akgün, Arslan, and Güney (2008) determined that entrepreneurship value scores of Turkish students studying at Bilkent and Hacettepe universities in Ankara were significantly higher than the scores of American students. The authors stated that this result was associated with the increase of industrialization and developmental opportunities in Turkey after the 1980s. In addition, they explained that values like progression, independent decision-making, creativity, and helping one's organization ahead that were questioned as entrepreneurship values had emerged as a result of spreading of Western way of thinking obtained at American business schools. Nursing and medical students are trained to preserve and improve human health and to treat disorders. They have a tendency to be social innovators, which are to be expected. Being educated about social responsibilities regarding public health and the collectivist characteristics of the Turkish culture may be among the reasons for the number and size of the results.

When evaluating the mean scores obtained by the students from the subscales of PVQ, the highest mean score was observed in the subscale of universalism, the lowest mean score was observed in the subscale of power, and other values varied between these two mean scores. It was observed that nursing students had significantly higher scores of universalism, security, and hedonism than medical students. Karakitapoğlu-Aygün and İmamoğlu (2002) state that the value of self-transcendence, which includes the values of universalism

and benevolence that emphasize the welfare of others and the nature, is an important value for the Turks. This condition is reported to be associated especially with the increase of educational level (Dirilen-Gumus & Buyuksahin-Sunal, 2012; Karakitapoğlu-Aygün & İmamoglu, 2002). In the study conducted by Başaran (1992) with students from eight universities in Ankara using Rokeach Value Survey, students had the highest scores from the values of freedom, world peace, equality, self-esteem, and inner harmony. On the other hand, the lowest scores were obtained from the values of exciting life, pleasure, salvation, a world of beauty, and national security. In the study conducted by Demirutku (2007) to compare the values of high school and university students, university students had the highest mean scores from the values of self-direction, universalism (5.02±0.62), and benevolence (5.01±0.71) respectively; whereas, the lowest mean score was obtained from the values of power (4.06±1.07) and tradition (4.23±0.83).

In the study by Dirilen (2006), the values of Turkish students and students from Turkic Republics were compared. The highest mean scores of the Turkish students were observed respectively in the values of self-direction and universalism, whereas their lowest mean score was observed in the value of tradition. On the other hand, the highest mean score of the students from Turkic Republics were observed respectively in the values of self-direction and benevolence; whereas, their lowest mean scores were observed in the values of power and hedonism. In the intercultural comparison conducted by Gümüş (2009) in Turkish and American students, the highest mean scores were observed respectively in the values of benevolence and universalism Turkish students, whereas their lowest mean scores were observed in the values of tradition and power. On the other hand, the highest mean scores were observed respectively in the values of self-direction, benevolence, and universalism in American students; whereas, their lowest mean scores were observed in the values of power and tradition. In the study conducted by Karakitapoğlu-Aygün and İmamoğlu (2002) with university students and their families, they determined that the values of students mainly involved individualistic values like autonomy, achievement, self-improvement and relational values like benevolence. In accordance with these results, it was indicated that there have been not only collectivist values but also individualistic values in Turkey since the 1980s. In this study, it was observed that nursing and medical students had the highest mean scores in universalism values defining the act of understanding the people, dignification, protection of the people and the nature, equality and social justice, which is an expected result by the nature of health professions and is similar to other studies conducted with students. Along with universalism, the value of security defining commitment, and protection of family and social order was significantly higher in nursing students, which shows that the two health professions are different and nursing naturally focuses on, protects, and helps individuals rather than disease.

In the regression analysis that was carried out in our study, subscale scores of PVQ had an effect of 26.6% on total score of SI. In the regression model, the highest effect was observed in the subscale of universalism. In addition, stimulation, power, self-direction, and benevolence were involved in the model. Two separate regression analyses were performed for the nursing students and the medical students. The scores obtained by nursing students from the subscales of PVQ had an effect of 25% on SI; on the other hand, this rate was 30.8% in medical students. In the study of Eren (2010), the regression model established to de-

termine the effects of personal entrepreneurship characteristics (creativity, innovativeness, taking risk, proactiveness, skill of controlling, independence motive, need for achievement, and avoiding the ambiguity) on SI was statistically significant; and it was reported that all the independent variables in the model explained 38.9% of the change in SI. This result is similar and close to the regression model applied to medical students in our study. The regression models explained the SI tendency most for the medical students (30.8%), which indicates that variables other than those included in the model affected the results.

In our study, the value of universalism was involved in the model as the value with the highest effect in both groups. Additionally, other values in the model were benevolence and power in nursing students and stimulation, self-direction and (negative) hedonism in medical students. It was observed that values affecting SI changed between the groups, except for the value of universalism. Hofstede (1980) defines the Turkish culture as collectivist, hierarchical, and feminine. Values like serving the public and helping others are expressed as feminine values. In other studies conducted with nursing students, benevolence (Thorpe & Loo, 2003) and social value (Kaya et al., 2012a; 2012b) were the highest values. The value of power had the lowest mean score among all students; however, it was an effective value upon SI in nursing students. This result may be evaluated as a personal and professional outcome of the struggle of nursing to earn respect and status in the Turkish society. On the other hand, it should be taken into consideration that a professional training that is sustained on the basis of these results may also be efficient. Roles in advocacy and agents of change are related to preserving rights to life and health, which are significant in nursing education, improving individuals' general health status, enabling nurses to access health services and solve social inequality, which may raise their tendencies to SI. In addition, studies suggest that women participate in social responsibility activities because they are more compassionate and sensitive (Külekçi, 2015). The majority of nursing students in Turkey are females, which explains the effect of universality, benevolence, and power values on SI tendencies.

The value of self-direction defining independent thinking and acting in medical students was observed to be significant in the model. Another significant value was stimulation including quest for excitement and innovation. The value of stimulation defining innovation, an exciting life, and enterprise is evaluated as openness to change together with the value of self-direction (including hedonism) defining creativity, freedom, and curiosity. In this study, hedonism was significant in the model and had a negative effect. The values of universalism and openness to change in medical students had a significant effect on total score of SI, which is compatible with innovative behavior literature (Greenhalg et al., 2004). Innovator individuals took greater risks than other people (tolerance to uncertainty) and voluntary in trial and error (Parzefall, Seeck, & Leppänen, 2008). It was indicated that medical education received "training on uncertain conditions" for students to absolutely learn how to struggle with their information deficiency and limitations of medical sciences (Kasapoğlu, 1988). It may be asserted that the content of this training can be effective in developing the properties of quest for innovation.

Study Limitations

This study was conducted at two faculties of a public university. Its data were collected in a particular period. More than half of the population was contacted, and self-reporting

data collection tools were used. These are the limitations of this study. Thus, the sample and data collection tools were limited.

CONCLUSION AND RECOMMENDATIONS

In this study conducted in the third-year nursing and medical students, SI tendencies of students were high as expected from the candidates of the profession, which serves for people. In this study, it was also determined that universalism, self-direction, stimulation, benevolence, and power values of students affected their (social) innovative behaviors at the rate of 26.6%. It was observed that values being effective on SI were both individual and collectivist values as reflecting the Turkish society. The scores obtained by nursing students from the subscales of PVQ affected SI at the rate of 25%, and this rate was 30.8% in medical students. The greatest effect was observed in the value of universalism in both groups, and the value of openness to innovation (self-direction and stimulation) containing features like quest for innovation affecting innovative behaviors in the model in medical students increased the effect upon SI.

Education and investment in human are involved among the most important objectives of SI. Universities have significant roles such as creating cultures of SI, and realizing and supporting new ideas in countries where SI is extensive. It is thought that results acquired as a result of this study regarding personal values that affect innovative behavior will contribute to the relevant literature. It is recommended to consider the values that are effective upon activities to be conducted by educators and faculty managers to develop SI behaviors of students. Thus, this study's recommendations include determining educational methods that can improve the development of values in students' occupational courses, forming activity-based project groups to combine values with experiences and convert them into behaviors, and cooperating with healthcare experts. It is also recommended to compare senior students (fourth-year nursing and sixth-year medical students) and address SI and social determinants of health that affect individual and public health and access to healthcare services together in future studies.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Istanbul University, Istanbul Faculty of Medicine Clinical Research Ethics Committee (Date: 12.02.2016, Decision No: 03).

Informed Consent: Written informed consent was obtained from students who participated in this study.

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Understanding the Diffusion of Theoretical Knowledge in Nursing: A Citation Analysis of Meleis's Transition Theory

Kemal Yayla

ABSTRACT

Aim: The aim of this study is to examine the structure of the knowledge creation process in nursing science and to investigate the dissemination of theoretical knowledge in other disciplines by analyzing citations and social network data.

Method: This exploratory study evaluated Metadata to find academic publications. Meleis's Transition Theory was selected as a case study. A majority of the publications that represented the transition theory were assigned as the core of the theory. Forward and backward citations were used as agents of knowledge linkage to determine the dissemination of the theory in the field of science. Social network analysis and visualization were used to depict graphical and structural relations of the research front and the knowledge base.

Results: The knowledge base of the Transition Theory was built on 7 different information networks. The most effective and vast information network consisted of Meleis, AI as a researcher and the central information network, which is the journal of Nursing Research. Oncology, geriatrics, public health, and psychology in the areas of information propagation within the field of nursing were considered as research areas where the theoretical framework provided by the theory was rendered functional.

Conclusion: In recent years, the use of theoretical frameworks has become a necessity to assess the changing needs of the study of nursing science. The method used in the study can be effectively used to analyze the conceptual structures in the nursing education and professional application processes and to understand the origins of these theories. Further research can help to structure the use of informational science-based research designs to understand the connections between theory, clinical practice, and the development of educational contents in nursing faculties.

Keywords: Citation analysis, nursing science, social network analysis, scholarly communication, transition theory

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INTRODUCTION

The discipline of nursing has been accepted as a specialized vocation (Fawcett, & Desanto-Madeya, 2012; Fawcett, 2004; Rogers, 1992) and a valid academic research area (Karagözoğlu, 2005; Northrup, Tschanz, Olynyk, Makaroff, Szabo & Biasio, 2004; Parse, 1999) that is based on theoretical intellectual knowledge and practice. In this context, modern nursing creates a knowledge structure through theoretical studies and professional initiatives, which helps to establish a relationship between method-based and domain knowledge. While nursing leaders represent professional practices that concern expert knowledge, which includes care processes and health policies, nursing scholars tend to produce clinical practice, medical treatment, and field-specific theoretical knowledge (Barrett, 2002; Barrett, 2017). However, the changing care needs (McKenna, 1997) and the complexity of different types of knowledge in professional practices (Carper, 1999) have lead nursing researchers to develop various theories, concepts, and models related to the field of nursing (İnan-Şengün, Üstün, & Bademli, 2013; Meleis, 2011; Risjord, 2011; Roy, 2018; Theofanidis, & Fountouki, 2008). Historically, one of the primary expectations from people in the nursing profession is the creation of new processes and the development of theories and models of academic nursing knowledge to explain the actions of the professionals (Alligood, 2013; Meleis, 2011). However, it is not always possible to relate theory and research results to clinical situations where there are some difficulties in integrating theoretical knowledge into professional life (Risjord, 2011). Studies in the literature emphasize that the gap between nursing theories and professional practice is still an open-ended problem (Kellehear, 2014; Landers, 2000; Maben, Latter, & Clark, 2006; Özsoy, 2007; Üstün, & Gigliotti, 2009).

Forms of information gathering that are created or utilized in the academic disciplines are continually evolving. In recent years, some developments such as increasing access to digital databases and the spread of interdisciplinary working practices have significantly changed scholarly communication patterns (Ying, & Xiao, 2012). The change has enabled interdisciplinary knowledge transfer and facilitated the use of theories and research methods in different disciplines by other disciplines. Researchers in different disciplines provide new perspectives to area researchers through increased knowledge transfer (Antons, Joshi, & Salge, 2018; Yan, Ding, Cronin, & Leydesdorff, 2013). As in other disciplines, the change in scholarly communication patterns within the discipline of nursing has affected the structure of the studies quantitatively and qualitatively (Barutcu, & Mert, 2017; Çatal, & Dicle, 2014; de Brito et al., 2017; Ekim, Manav, & Ocakçı, 2012; Im, & Ju Chang, 2012; Kääriäinen et al., 2011; Koç, Keskin-Kızıltepe, Çınarlı, & Şener, 2017; Luna et al., 2015; Öztürk, & Karataş, 2008; Pehlivan, & Güner, 2016; Raimondo et al., 2012; Sitzman, & Eichelberger, 2010; Spear, 2007; Terzi, & Kaya, 2017; Zuhur, & Özpancar, 2017).

The expansion and dissemination of theoretical knowledge have drawn significant attention in the development processes of all scientific research disciplines. Library and information science (LIS) has an extensive literature, such as information sharing (Pilerot, 2012), information search behaviors (Leckie, Pettigrew, & Sylvain, 1996), and scholarly communication (Borgman, & Furner, 2002; Zhang, 1998) that explicitly examines the diffusion of information. Those studies built their dissemination models similar to the transac-

tion of commercial commodities (Cronin, & Pearson, 1990; Hessey, & Willett, 2013; Yan et al., 2013). Our study aims to investigate the diffusion dynamics of theoretical knowledge in the nursing discipline by using Citation Analysis and Social Network Analysis, which is similar to the LIS discipline approach. Transition Theory (Chick, & Meleis, 1986; Meleis, Sawyer, Im, Messias, & Schumacher, 2000; Schumacher, & Meleis, 1994) was selected as the case study. Nursing has distinct classifications of theories in terms of theoretical knowledge systems such as Grand Theories and Middle Range Theories (Im, & Ju Chang, 2012; Roy, 2018).

Research Questions

1) Is it possible to determine the dissemination of theoretical knowledge within the discipline of nursing using the information science approach?

2) How is theoretical knowledge disseminated within the discipline of nursing?

METHOD

Study Design

The study was designed and conducted as exploratory research based on scientific publications and metadata.

Sample

The research strategy of the study is the citation analysis of academic publications which are cited by or citing the transition theory. Scientific publications representing the transition theory include the book chapter, "Transitions: A nursing concern" (Chick, & Meleis, 1986) and published articles, such as "Transitions: a central concept in nursing" (Schumacher, & Meleis, 1994) and "Experiencing transitions: an emerging middle-range theory" (Meleis et al., 2000) (Meleis, Sawyer, Im, Messias, & Schumacher, 2010). The publications cited in the bibliography of core publications represent backward citations and the papers citing these publications serve as forward citations.

The sample of the study obtained from the bibliographies of the scientific core publication of transition theory, the articles that were indexed in the Web of Knowledge (WoK) database between the year 1987 and 2017, citing to core publications of transition theory. The WoK database is preferred because it performs better in terms of citation coherence and arranges them, and is more organized than other academic databases (De Groote, & Raszewski, 2012; Harzing, & Van der Wal, 2008).

Data Collection

In the process of scientific research, researchers use prior studies, experiments, and observations. Academic disciplines and commercial institutions use citations to construct the intellectual link between previous and current research (Leydesdorff, 1998; Snyder, Cronin, & Davenport, 1995; White, 2004). In scientific studies, the objective criterion of a measurable effect on a particular concept, theory, or method is established by referring to other research (Moed, 2006). Forward Citation and Backward Citation forms were used to determine the spread dynamics of theoretical knowledge (Jaffe, & De Rassenfosse, 2017). It is possible to decide on the citation dynamics of scientific works chronologically using these citation forms. The backward citation is aimed at examining the knowledge base of the relevant theory through the bibliographies of the publications constituting the transition theory. The forward citation form seeks to determine the span of theoretical knowledge. In our study, forward citations were obtained from the WoK database as structured data, while backward citations were compiled from the bibliography of the works constituting the transition theory.

Statistical Analysis

The social network analysis is preferred because it determines the knowledge upon which theoretical knowledge is established and maps the diffusion patterns of the generated theoretical knowledge in various research areas (Gallardo-Gallardo, Arroyo Moliner, & Gallo, 2017; Kadushin, 2012). In order to determine the knowledge base of the transition theory, backward citations in the references of the core publications were used, following which the author-publication media matrices were created using author name metadata. For the determination of diffusion areas, a two-mode network matrix was created (Borgatti, & Everett, 1997) using "author keyword" and "WoK research category". The obtained network graphs were visualized by Gephi (Bastian, Heymann, & Jacomy, 2009). Modularity (Newman, 2006) value was used as a performance indicator of clustering to determine the focal points of information dissemination areas.

Ethical Considerations

This study was carried out without the approval of the ethics committee. Since the study was carried out on scientific publications and metadata, no adverse effect on any human and living things in the data collection and analysis processes was observed.

RESULTS

The backward citations of the theory of transition were associated with 208 different publications, and the number of articles referring to these works was determined to be 530. The cognitive base of the Transition Theory, which forms seven various information networks, is indicated in Figure 1. The most effective and extensive information network was found to be the central information network, which includes *Meleis, IA* as a researcher and Nursing Research as its publication medium. As seen in Figure 1, *Dracup KA* and *Majewski J* form the network

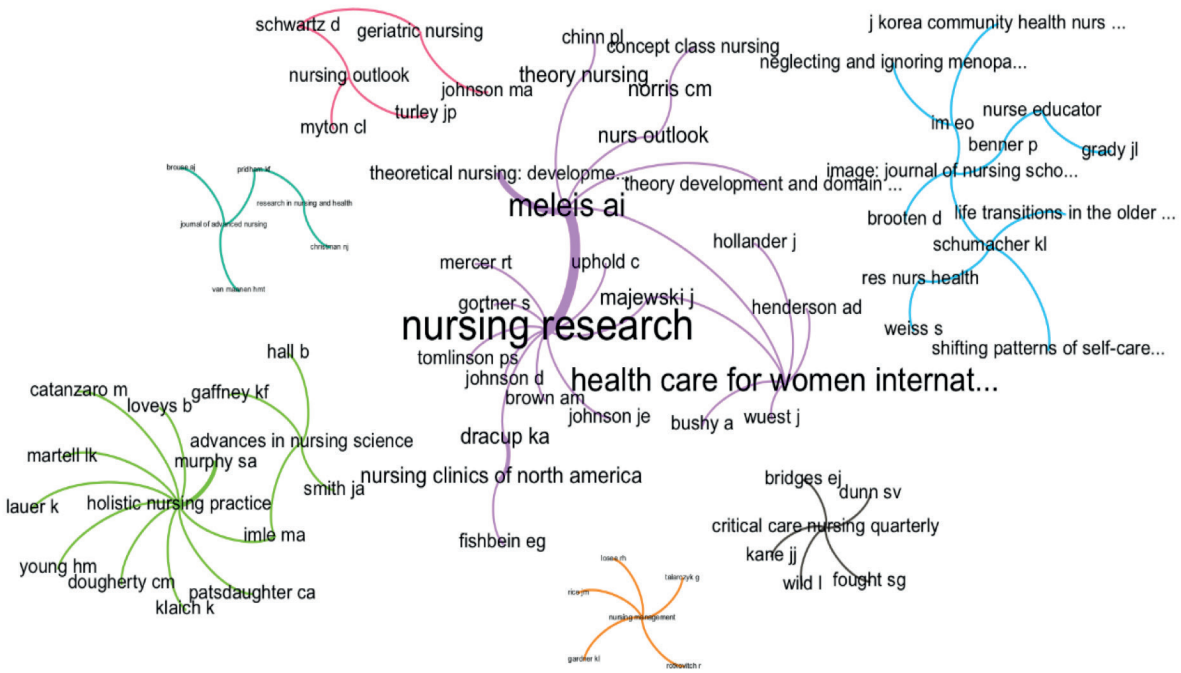

Figure 1. Cognitive Base Graph of Transition Theory

structures directly related to the theory by linking with the journal of Nursing Clinics of North America and Health Care for Woman International. In the formation of the knowledge base of transition theory, information networks outside the central information network contributed to the theory in different degrees.

The spread of transition theory is shown in Figure 2, according to the research fields and author keywords. In Figure 2, the nursing discipline is located at the center of the spillover area. The other 4 clusters are different research areas that share relevant author keywords related to the nursing discipline. When the scattering areas of the theory were examined, it was seen that each cluster was coexisting with the research fields that could be associated with itself. In the centralized nursing cluster, there are more author keywords than other clusters. The Closeness Centrality network criterion was

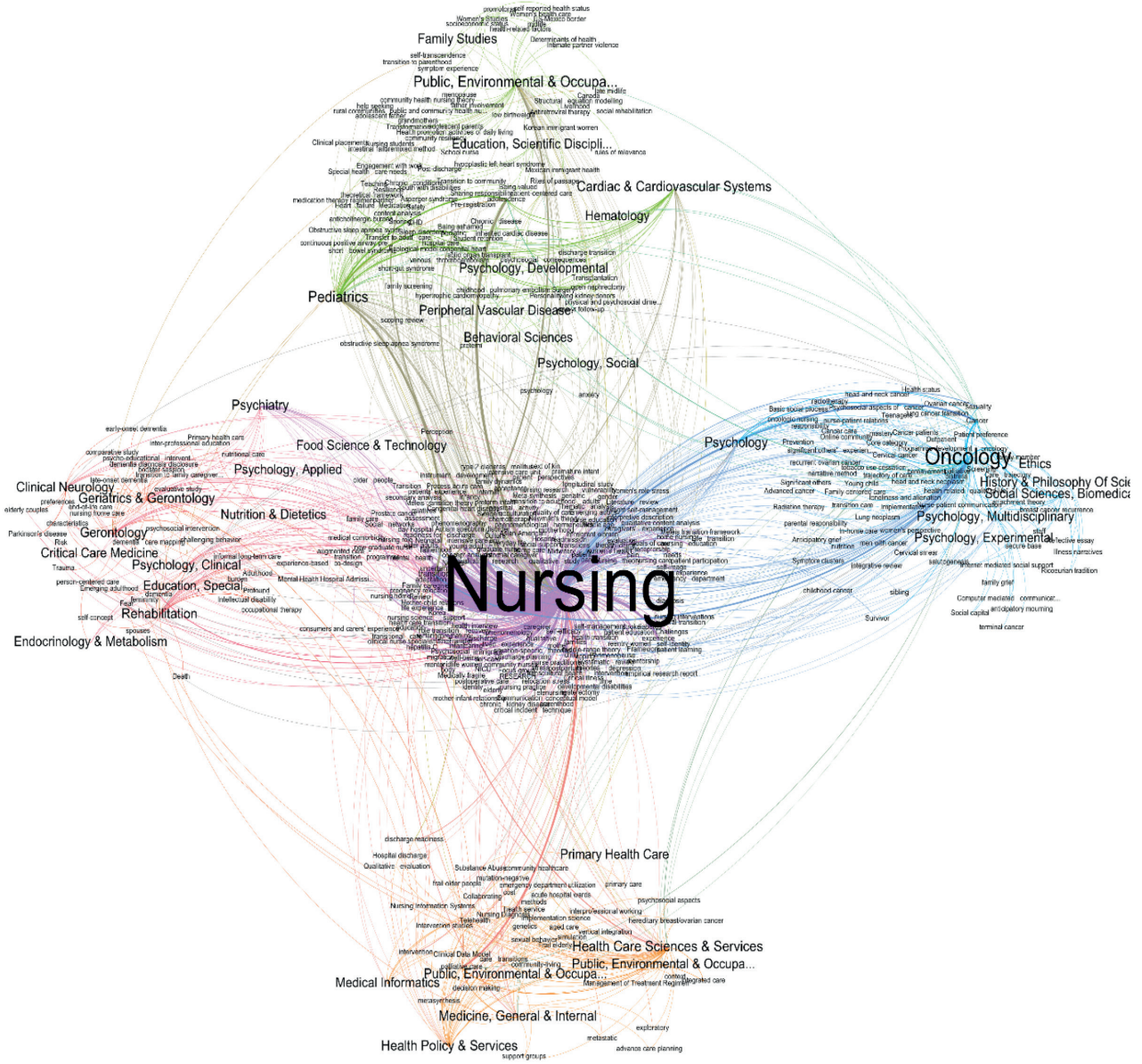

Figure 2. Diffusion Graph of Transition Theory

used to distinguish the importance of author keywords. In the nursing information network, which was centrally located, the words "nurse", "transition", and "caregiver" had the highest closeness centrality value. In the information network where the fields of oncology and psychology are valid, the words "cancer", "oncology", and "sense of loss" had the highest proximity center values. In the cluster defined by the fields of pediatric and developmental psychology, the concepts of "adolescents", "chronic diseases", and "transformation point to the first three authors" were assessed in terms of proximity centrality. In the other information network, including gerontology and geriatrics, the concepts of "dementia", "fear", and "femininity" have appeared. When the diffusion areas of the transition theory were examined, it was seen that the subjects such as "elder people", "pregnancy", and "cancer" terms were mainly handled. Oncology, geriatrics, public health, and psychology were considered as research areas in which the theoretical framework provided by the theory was made functional.

DISCUSSION

In recent years, the use of theoretical frameworks to satisfy different demands and create new knowledge in nursing research has become a necessity (Çatal, & Dicle, 2014; Ekim et al., 2012; İnan-Şengün et al., 2013). The conceptual framework of nursing practice and education programs is shaped through models and theories developed within nursing. Furthermore, those frameworks have been applied to new foundations that were initially used by nursing education, management, and research. There are national (Ekim et al., 2012; İnan-Şengün et al., 2013; Koç et al., 2017; Paşalak, Eroğlu, & Akyüz, 2018) and international publications dealing with nursing theories and models in the literature. They examine grand and mid-range theories and conceptual models in the nursing discipline in the context of field expertise with content analysis or meta-analysis methods in terms of research methodology (Im, & Ju Chang, 2012; Luna et al., 2015; Raimondo et al., 2012; Roy, 2018; Spear, 2007).

In our study, the findings are based on a model supported by concrete evidence such as forward citation and backward citation for the dissemination of theoretical knowledge according to the information diffusion model. The research model used within the scope of the study allows the data set to be repeated by compiling by different researchers. This model allows for the validation of the research designs by various researchers in terms of scientific consistency and ensures the structural validity of the obtained information.

Transition theory produces information for limited subject areas within the nursing discipline following the category of mid-level theories in which it is classified. The relationship it has established with other research disciplines with which it is associated arises from the fact that other disciplines deal with the situation or phenomena under different dimensions within their subjects.

Study Limitations

While this study provides reproducible results of the diffusion of theoretical knowledge of nursing science, it has some limitations. This study examines the dissemination of academic knowledge within the discipline of nursing only in the context of Meleis' transition theory. This does not allow the results obtained to be generalized as per diffusion dynamics of other nursing theories.

CONCLUSION AND RECOMMENDATIONS

Transition theory can be classified in the Middle Range Theory class, which is referred to as limited scope theories about a particular topic or concept (Kralik, Visentin, & Van Loon, 2006; Meleis, 2011; Meleis et al., 2000). The present study results indicate that the transition theory is in interaction with other research areas that examine the ideas that were dealt with mainly in the nursing discipline. Other findings obtained from citation and social network analysis show that the discipline-specific theoretical knowledge occupies an essential place in the production of new knowledge. In particular, the fact that all publication channels within the "backward citation" network are nursing journals reveals that theoretical knowledge is fed from its sources within the nursing discipline.

In light of these findings, the diffusion of research areas in the field of health and medicine related to the nursing discipline dramatically influences theoretical knowledge diffusion patterns. The method used in the study can be used effectively to analyze the conceptual structures in nursing education and professional practice processes and to understand the origins of these theories. It is also recommended that research designs specific to the discipline of information science be used to increase the possibility of interdisciplinary work with mixed research methods in the future.

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Systematic Review

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NOC/NIC Linkages to NANDA-I for Continence Care of Elderly People with Urinary Incontinence in Nursing Homes: A Systematic Review

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ABSTRACT

Aim: The aim of this study was to review interventional studies conducted by nurses about elderly people with urinary incontinence in nursing homes and to match the results to standardized nursing terminology using the Nursing Interventions Classification and the Nursing Outcomes Classification Linkages to the NANDA-I diagnoses guidelines.

Method: A systematic review of quantitative intervention studies was conducted using the PRISMA statement as a guide. The interventional research in English was scanned using the MEDLINE and CINAHL databases from January 2005 to May 2015. Fourteen studies that had at least one nurse researcher were conducted in nursing homes, excluding surgical and pharmacological interventions. The Nursing Outcome Classification and Nursing Intervention Classification Linkages to NANDA-I diagnoses and the Clinical Conditions Part II-U List were used as a guide to select North American Nursing Diagnosis Association International nursing diagnoses, Nursing Outcome Classification Scales, and Nursing Interventions from the data.

Results: We found the frequency of use of various NANDA-I diagnoses, Nursing Interventions, and Nursing Outcomes based on the Nursing Outcomes Classification and Nursing Interventions Classification Linkages to NANDA-I diagnoses and the Clinical Conditions List for incontinence.

Conclusion: Using the Nursing Outcomes Classification and Nursing Interventions Classification Linkages to NANDA-I diagnoses guide may provide new nursing perspectives on non-standardized research. In future studies, this may allow a comparison of data worldwide, enabling nurses to use the results in evidence-based practices.

Keywords: Intervention, NANDA, NIC, NOC, nursing, older people, systematic review, urinary incontinence

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INTRODUCTION

Urinary incontinence (UI) is one of the most common and distressing conditions affecting nursing home residents and their nursing staff. It is estimated that UI affects over 50% of the elderly persons living in nursing homes (NH). The NH staff report that UI care is difficult, time-consuming, and costly (Flanagan et al., 2015; Park, De Gagne, So, & Palmer, 2015; Resnick et al., 2006). They have to apply different interventions requiring different skill sets to handle alterations in urinary elimination. The NH staff not sufficiently specialized in this field should have support to diagnose and manage UI (De Moraes-Lopes, Siqueire-Ortega, Massad, & Marin, 2009; Vinsnes, 2012; Yu, Hailey, Fleming, & Traynor, 2014).

Urinary incontinence is defined as an "involuntary loss of urine, which is objectively demonstrable and a social or hygienic problem" (NANDA-I, 2014). Although different variants of UI have been described in prior studies, the five most common types are the stress, urge, mixed, overflow, and functional incontinence (Aslan, Komurcu, Beji, & Yalcin, 2008; Voith, 2000).

Urinary incontinence has a negative impact on an NH resident's life; moreover, it increases the risks of damaged skin, urinary tract infections, and falls (Rodriguez, Sackley, & Badger, 2007; Roe, Lisa Flanagan, & Maden, 2015). Treatment includes surgical, pharmacologic, and behavioral interventions (Bliss, Kay-Savik, Harms, Fan & Wyman, 2006). Nurses generally use behavioral interventions as the first management options (Palmer, 2008). These interventions include the pelvic floor muscle exercises with or without biofeedback (Aslan et al., 2008), electrical stimulation (Booth et al., 2013), bladder training and systematic voiding programs, individual care plans, exercise programs, and continence care (Schnelle et al., 2003; Palmer, 2008).

In the literature, there is much research available demonstrating the effectiveness of nursing care for elderly people with UI. However, it is unknown whether these research results are connected with nursing practice since current nursing research data are not based on any standardized nursing language. To provide nurses with information about the UI care globally, and to develop new nursing perspectives for elderly people with urinary incontinence living in NH, it is important to use standardized nursing language to understand the data. The NANDA International, the Nursing Interventions Classification (NIC), and the Nursing Outcomes Classification (NOC) are comprehensive, research-based, standardized classifications of nursing diagnoses, nursing interventions, and nursing-sensitive patient outcomes. They provide a set of terms to describe nursing judgments, treatments, and nursing-sensitive patient outcomes in every aspect of nursing care, including elderly patients with UI (De Moraes et al., 2009; Johnson et al., 2012; Noh & Lee, 2015).

The NOC and NIC Linkages to NANDA-I may provide more useful concepts to help deepen the description, explanation, prediction, and identification of interventions for patient care and the education of nurses (Johnson et al., 2012; Voith, 2000). Moreover, these linkages between nursing diagnoses and interventions can assist the nurses in making decisions about the optimal interventions and the desired outcome for this population (Johnson et al., 2012).

The aim of the study was to systematically review interventional research conducted by nurses on elderly patients with UI in NHs to match the standardized nursing language using the NOC and NIC Linkages to NANDA-I and Clinical Conditions Supporting Critical Reasoning and Quality Care.

METHOD

Study Design

We use the PRISMA statement as a guide in this study (Moher, Liberati, Tetzlaff, Altman, & the PRISMA Group, 2009). The study was designed as a systematic review of quantitative intervention studies and as a narrative synthesis.

Search Strategy

Electronic versions of interventional studies in English between January 2005 and May 2015 were searched for in MEDLINE and CINAHL via OVID. The search strategy was purposely kept broad to include relevant studies in which a nurse played an important role in the intervention but which excluded surgical and pharmacological interventions. It used keywords including "incontinence," "urinary incontinence," "nurse-led continence," "nursing home staff," "nursing care facility," "nursing home," "nursing classification," "NIC intervention," "NOC outcomes," "NANDA diagnosis," "self-care: toileting," "continence pads," "continence training impact," "elderly with UI," and "quality of life."

Inclusion and Exclusion Criteria

The systematic review consisted of studies including randomized controlled trials (RCT), quasi-RCT, quasi-experimental studies, and pretest/posttest studies or one-group intervention. These studies had to meet the following requirements: to have been published in English between 2005 and 2015, to have had either at least one nurse researcher on the research team or interventions that were carried out by a nurse, and to have been conducted in an NH setting (residential homes, long-term care). The research study samples had to comprise elderly patients aged 65 years and above living in NH care settings. All of the studies focused on the management of incontinence, and the promotion and maintenance of continence. Any studies conducted in settings other than NH, in different age groups other than ≥65 years, or on inpatient groups without any type of UI were excluded from the systematic review.

Search Outcome

As a result of the initial search, we identified 293 potential papers for inclusion, and a search by hand found five additional studies (n=298). Further to this process, duplicated studies (n=45) were deleted, meaning that 253 papers were left for examination. After reading the titles of all the papers, a further 106 were excluded because they did not meet the review criteria, leaving a total of 147. Following this, we read the abstracts of the studies and excluded studies that did not comply with the criteria. We located 56 studies, including seven systematic reviews. Forty-nine studies were original articles. The remaining papers were read in full, but only 14 studies were interventional studies that involved a nurse playing an important role or who was at the least a member of the research team (Figure 1).

Quality Appraisal

All studies were independently examined for inclusion/exclusion criteria by three reviewers using a standard form, and a consensus was reached. The "Quality Assessment of Controlled Intervention Studies" (14 item) and the "Quality Assessment Tool for Before-After (Pre-Post) Studies with no Control Group" (12 item) provided by the National Institutes of Health were used for quality assessment (NHBLI, 2014), which allowed a consistent approach for assessment. Three of the authors (HB, DA, and SO) independently evaluated each paper and then reached a consensus. The majority of studies were at a good level. No studies were excluded on the basis of the quality assessment.

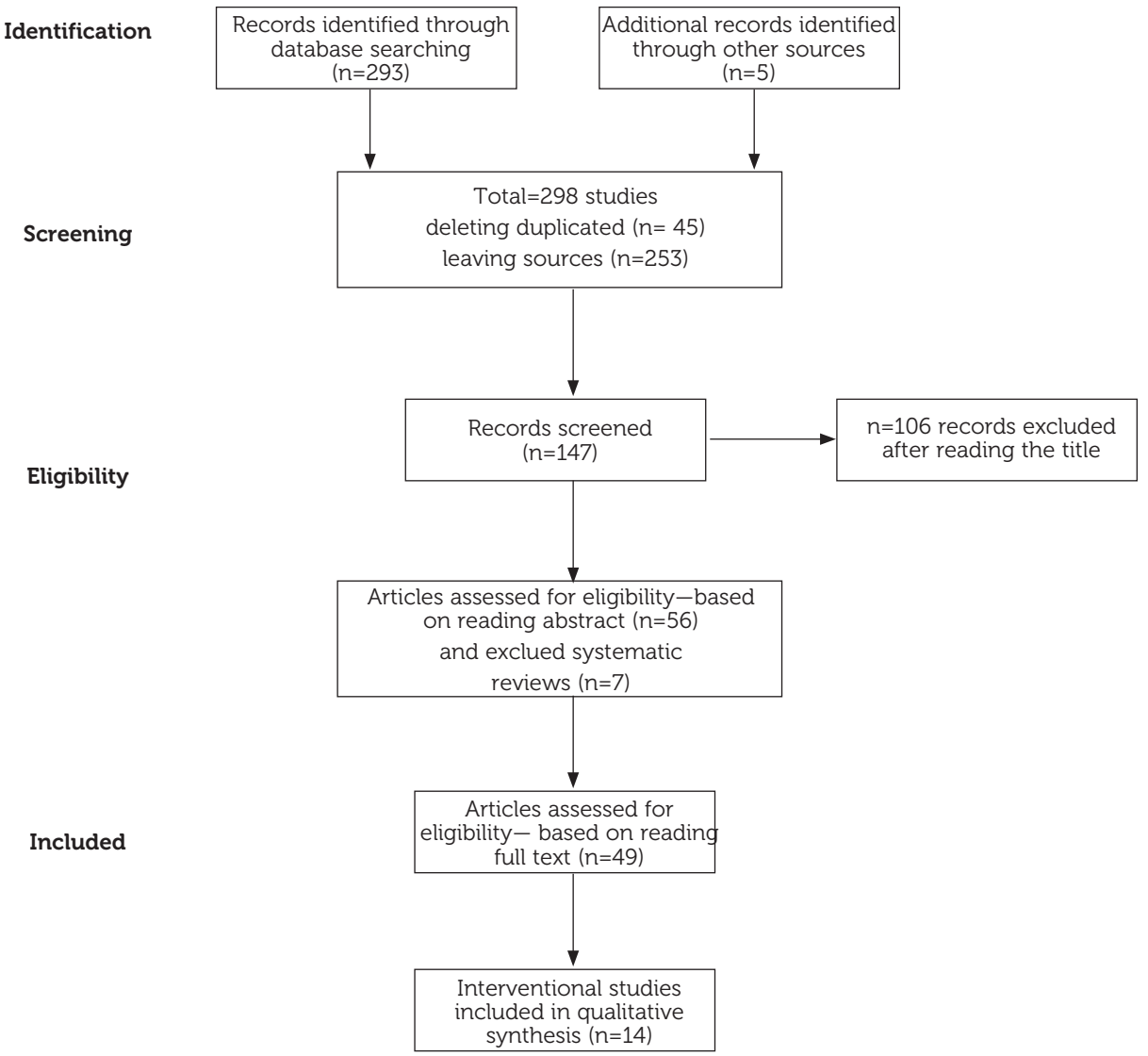

Figure 1. Study design

Data Extraction

A primary researcher developed a form to be used independently by the three researchers to extract standardized information from all studies. They reached an agreement on the accuracy of the data.

Data Synthesis

Although the main concern was with the elderly with UI in NHs, the studies included varied in terms of aims, methods, outcome measures, results, limitations, and implications for practice.

NOC and NIC Linkages to NANDA-I

In this review, we used the NOC and NIC Linkages to NANDA-I and the Clinical Conditions Supporting Critical Reasoning and Quality Care as guides (Johnson et al., 2012), and the studies were matched independently by three reviewers. The reviewers resolved any potential disagreements through discussion. A fourth reviewer who was an expert on NANDA/NIC and NOC Linkages then reviewed the results and decided if the NANDA-I diagnoses, NIC interventions, and NOC outcomes for UI care used in the study fitted.

This guide suggested eight NANDA-I diagnoses, five NOC outcomes, and 11 major and 35 suggested NIC interventions (Johnson et al., 2012). These NIC interventions were grouped together by the researchers under the headings "Training/Teaching," "Management/Monitoring," "Care," and "Documentation." In this step, each study was evaluated to find possible NANDA diagnoses, NOC outcomes and NIC interventions.

If the UI type had been determined by the research before the study, or the intervention was applied for a specific type of incontinence, this was selected as one possible specific NANDA diagnosis ("Overflow," "Reflex," etc.). If interventions were aimed at caring for symptoms of incontinence or continence management, the "Urinary Elimination, Readiness for Enhanced" was chosen as a possible NANDA diagnosis.

After the NANDA diagnosis was determined, we investigated the studies to match possible NIC/NOC Linkages to each of determined NANDA diagnoses. As we investigated possible NIC/NOC Linkages, we noted words commonly used in the studies. These were "observe," "physical mobility," "communicate," "documentation," "training," "teach," "impaired skin integrity," "self-care," "self-care toileting," "incontinence care," "exercise," "bladder training," "toileting schedule," "individual care plan," "consultant," "medication management," "fluid intake monitoring–management," and "perineal care." We used those words that were critical cues in selecting particular NIC interventions and NOC outcomes (Tables 1, Table 2).

RESULTS

This study reports on 14 nursing intervention studies from different countries. Thirty-six NANDA-I diagnoses were determined. For each study, at least two and at most four NANDA-I diagnoses were selected. A total of 37.1% of the diagnoses were "Urinary Elimination Impaired" (13 studies); 34.2% were "Urinary Elimination Readiness for Enhanced" (11 studies); 8.5% were "Urinary Incontinence: Urge" (three studies); 5.7% were "Urinary Retention" (two studies); 5.7% were "Urinary Incontinence: Functional" (two studies); and 2.8% were "Urinary Incontinence: Overflow" (one study) (Tables 1, Table 2).

There were 167 nursing interventions determined to have occurred in these studies. The studies examined eight training/teaching interventions, seven management/monitoring interventions, 10 care interventions, and two documentation interventions.

Forty-four possible NOC outcomes were determined in these studies. Each study had between two and five NOC outcomes. The most selected possible NOC outcome was "Urinary Elimination" (31.8%) (Tables 1, Table 2).

We separated the studies into two categories according to their primary aim. Some of these studies aimed to assess the effects of multi-intervention programs on incontinence-associated dermatitis (IAD) and skin integrity as a primary aim (Table 1). Other studies involved urinary decrease, continence promotion, or UI complication prevention, with an enhanced quality of life as the primary aim (Table 2).

Skin Integrity and Skin Care Studies

The primary aim of four studies was to promote skin integrity through preventing IAD and pressure ulcers and to provide treatment and healing. For these four studies, we matched possible NANDA diagnoses of "Urinary Elimination Impaired" and "Urinary Elimination Readiness for Enhanced." A diagnosis of "Urinary Incontinence: Urge" was added to one study because the researcher had determined this specific type of incontinence prior to the study (Palese et al., 2011). The interventions in these studies were

Table 1. NANDA diagnoses/NOC outcomes/NIC intervention for primary aim was skin integrity and skin care studies

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
1. Al-Samarrai N.R., et al. (2007)	United States of America (USA)	**Method:** The quasi-experimental/ controlled trial study. **Study Interventions:** 1. OSIS: Intervention group 2. BW: control group **Study outcomes:** 1. Resident location, thoroughness and duration of incontinence care, and materials used 2. CNAs' opinions of their preferred incontinence care materials and their experience using OSIS were obtained by self-administered survey.	**Study area:** Two NHs Participants: Data obtain 24 incontinent NH residents and 61 CNAs Intervention applied: 61 CNAs	1. The OSIS is effective for management of urinary, fecal, and combined (urinary plus fecal) incontinence. 2. CNAs used two wipes from OSIS to sanitize the perineal area 3. CNAs were more likely to report that they felt that OSIS facilitated skin cleansing compared to the BW.	**NANDA-I Diagnoses:** 1.Urinary Elimination Impaired 2.Urinary Eliminatıon Readiness for Enhanced **NOC Outcomes:** 1.Urinary Elimination 2.Tısue İntegrity: Skın and Mucous Membranes **NIC Intervention:** ***Management/Monitoring*** 1.Urinary Elimination Management 2.Infection Protection **Care** 1.Urinary Incontinence Care 2.Perineal Care
2. Thompson P., et al. (2005)	USA	**Method:** Quasi-experimental intervention study for a 3-month period. **Study Interventions:** 1. During the 3-month period, skin assessment data and information on PrU development, treatment, healing time, and incontinence were documented. 2. An educational session was conducted for all nursing staff. 3. Nursing staff were instructed to cleanse the skin with the body wash after each incontinent episode and to apply the skin protectant to the perineal/perianal area after each cleansing. **Study Outcomes:** 1. Braden Scale for Predicting Pressure Sore Risk used	**Study area:** Two rural long-term-care facilities **Participants:** A total of 136 residents (70% females and 30% males) **Intervention applied:** A total of 84% of licensed staff and 72% of unlicensed staff in both agencies.	1. A total of 63.3% of the residents in the study had urinary incontinence. 2. The prevalence of PrUs was 11.3% preintervention and 4.8% postintervention; the incidence was 32.7% preintervention and 8.9% postintervention. 3. Healing times significantly decreased for Stage I and Stage II PrUs, from a mean of nearly 23 days preintervention to 16 days postintervention, indication that chronic wounds in older adults heal with early treatment.	**NANDA-I Diagnoses:** 1.Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced **NOC Outcomes:** 1.Urinary Elimination 2.Tissue İntegrity: Skin and Mucous Membranes **NIC Intervention:** ***Management/Monitoring*** 1.Urinary Elimination Management 2.Infectıon Protection **Care** 1.Urnary incontinence care 2.Perineal care
3. Palese A., et al. (2011)	Italy	**Method:** Single-group, pre-/post intervention study. **Intervention:** 1. Initial assessment of incontinence care (phase 0, 14 days) 2. Use of new absorbent products and a structured skin care regimen in (phase 1, 14 days) 3. Follow-up 21 days. **Study Outcomes:** 1. Barthel Index 2. Norton Scale 3. medication, UI type,- pad changes per day and use of absorbent products, use of products for perineal skin care	**Study area:** In an 82-bed NH **Participants:** 63 residents (46 women and 17 men) **Intervention apply:** Three RNs and 30 nurses' aides (CNAs) provided round-the-clock care to residents. Nursing home staff had not received previous educational courses on UI care from the facility.	1. Barthel Index average score was 41.3. 2. A total of 55.6% were deemed at risk for pressure ulceration. 3. The types of absorbent; Phase 0=8, Phase 1=19, Phase 3=21 4. Clinical impact: - At baseline, IAD was 31.7%. After (Phase 2), IAD was 3.1%. - In baseline, the relative risk of IAD was 0.24, Phase I the relative risk of IAD was further diminished to 0.15. The final phase of the study reduced the relative risk of IAD to 0.03 (95% CI).	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced 3.Urinary incontinence: Urge **NOC Outcomes:** 1.Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced 3.Urinary incontinence: Urge **NIC Intervention:** ***Management/Monitoring*** 1. Urinary Elimination Management 2. Medication Management 3. Infection Protection **Care** 1. Urinary incontinence care 2. Perineal Care Documentation 1. Documentation

Table 1. NANDA diagnoses/NOC outcomes/NIC intervention for primary aim was skin integrity and skin care studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
4. Beeckman D., et al. (2011)	Belgium	**Method:** Randomized, controlled clinical trial Study Interventions: Experimental group was treated with a 3-in-1 perineal care washcloth impregnated with a 3% dimethicone skin protectant. - for daily routine perineal skin hygiene - after each diaper/underpad change 2. Control group received the standard of care (water and a pH-neutral soap). 3. No additional skin protectant was applied 4. If clinical signs of cutaneous bacterial or fungal infection occurred, the general practitioner of the resident was consulted and prescribed **Study Outcomes:** 1. IAD Skin Condition Assessment Tool. 2. Skin observation (use of a transparent disc/finger method to differ blanchable from nonblanchable erythema) and	**Study area:** Eleven NHs (six experimental, five control) N=464 nursing home residents were observed in this trial **Participants:** A total of 141 (32.9%) were described for study (experimental 73, control 68) **Intervention applied:** By six researchers (they trained all nurses and health care assistants in both groups using interactive, small-group educational sessions regarding) For the staff, posters and pocket cards were developed about the application of the perineal care washcloth and the skin care.	1. The mean age of the residents was 86.3 years. 2. In both groups, approximately 60% incontinent for urine, 30% for feces, 10% for urine/feces. 3. Baseline IAD prevalence experimental 22.3% control; 22.8%, (p>0.05) group (Day 1: 22.3%; Day 120: 8.1%, p=0.001). 4. In contrast, the prevalence of IAD significantly decreased in the experimental IAD prevalence increased in the control group (Day 1: 22.8%; Day 120: 27.1%, p=0. 003). - Characteristics and Formula of the Experimental Product may have reduced rubbing over the perineal skin to remove urine/feces, which may have caused a reduction in friction damage. 5. The baseline IAD severity was 6.9/10 in the experimental group and 7.3/10 in the control group. 7. A significant intervention effect on IAD prevalence was found in the experimental (8.1%) vs. the control group (27.1%) (p=0.003)	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced **NOC Outcomes:** 1. Urinary Elimination 2. Tissue Integrity: Skin and Mucous Membranes **NIC Intervention:** ***Management/Monitoring*** 1. Urinary Elimination 2. Management 3. Infection Protection 4. Pain Management **Care:** 1. Urinary incontinence care 2. Perineal Care ***Documentation:*** 1. Documentation

carried out by nurses/certificated nurse assistants (CNAs) (approximately n=100), who underwent training programs before the studies about skin observation, the differentiation between IAD and pressure ulcers, symptoms of incontinence symptoms, and treatment/care. Training programs were conducted using different approaches (interactive education activity, small-group discussion, etc.) in each study (Table 1).

In one study, the researcher observed the incontinence care practices of CNAs in an NH, including location and thoroughness of care, and amount and type of materials used (Al-Samarrai, Uman, Al-Samarrai T., & Alessi, 2007). In 23% of the observations, the CNAs interrupted IU care to leave the room to get more supplies. In the study by Thomson et al. (2005), the directors of nursing monitored and reinforced the NH staff's compliance to protocols on an ongoing basis. Healing times significantly decreased in this period. Palese et al. (2011) determined the prevalence of UI as 79.7%. This study measured a baseline IAD of 31.7%; after treatment, IAD was at 3.1%. We were able to identify three essential NIC interventions under the "Management/Monitoring" heading ("Urinary Elimination Management," "Infection Protection," "Medication Management," "Pain Management"), the "Care" heading ("Urinary Incontinence Care," "Perineal Care"), and the "Documentation" heading ("Documentation") (Table 1).

In all of the studies, residents were observed over different periods, skin assessments were

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
1. Booth J., et al. (2013)	United Kingdom (UK)	**Method:** Pilot randomized single-blind, placebo -controlled trial. **Study Interventions:** 1. A standardized history and physical examination, sensory testing, urinalysis, and postvoid residual urine volume measurement 2. A 12-session TPTNS treatment programmed (each treatment session 30 minutes, twice a week, over a continuous 6 week period) **Study Outcomes:** 1. The resident and staff were blinded to the group allocation 2. Postvoid residual urine volumes using portable bladder scanning 3.Acceptability of the TPTNS and adverse effects were assessed at each session by asking the resident	**Study area:** Seven residential care homes and three sheltered for 8 months (N=206). **Participants:** -30 care home residents (n=15 TPTN/ n=15placebo) - aged 65 and older with urinary or bowel symptoms and/or incontinence **Intervention applied:** Two staff (nurse)	1. The mean age was 84.2 years (80%, n=24) 2. UI was the predominant dysfunction in 50% (n=15) 3. Retention of participants throughout the 6-week intervention period was good. 4. Acceptability of the TPTNS was high throughout with no reports of any adverse effects, either by the participant or staff. 5. Urinary symptoms: Improved in 13 (87%) patients from the TPTNS group and worsened in two (13%)	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced 3. Urinary Incontinence: Urge 4. Urinary retention **NOC Outcomes:** 1. Urinary Elimination 2. Urinary Continence **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: Procedure/ Treatment ***Management/Monitoring*** 1. Urinary Elimination Management 2. Infection Protection 3. Pain Management ***Care*** 1. Urinary retention care 2. Urinary incontinence care
2. Aslan E., et al. (2008)	Turkey	**Method:** An experimental prospective research study **Study Interventions:** 1. Bladder training 2. Kegel exercises were given to the retreatment group for 6–8 weeks. **Study Outcomes:** 1.First evaluation: - Quality of Life Scale, Mini-mental Test, Ranking Scale - Daily urinary forms used - Pad tests - Pelvic floor muscle strength 2. The second evaluation was performed 8 weeks after treatment. 3. The last evaluation was carried out 6 months after treatment (major measurement was urinary incontinence with urgency, frequency, and nocturia complaints, and in the pad test results and pelvic flor strength evaluation) 1 NH care (female n=191)	**Study area:** **Participants:** Woman residents n=50 (25 from treatment group, 25 from the control group) **Intervention applied:** By researcher nurse (n=1)	1. The average age of residents was 78.8 years. 2. 52% in the treatment group had the mixed IU. 60% the control group had the urge IU. 3. the pelvic floor muscle - 1–2/5 weakness in 52% in the treatment group and 48% in the control group 4. After the study was found in urgency (52%), frequency (64%), and nocturia (32%) complaints in treatment group decreased 5. King Health Questionnaire results showed that urinary incontinence did not affect the women to a serious degree. 6. The pad tests of the treatment group, showed that the percentage of severe wetting (11–59 g) was 24%, while the percentage of wetting for the control group was 16% (p>0.005).	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced 3. Urinary Incontinence: Urge 4. Urinary Incontinence: Stress **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: Procedure/ Treatment 4. Teaching: Individual 5. Pelvic Muscle Exercise ***Management/Monitoring*** 1.Urinary Elimination Management ***Care*** 1. Urinary retention care 2. Urinary incontinence care 3. Perineal care 4. Self-care/assistance toileting 5. Prompted voiding
3. Tanaka Y., et al. (2009)	Japan	**Method:** An intervention study (pre-/post-) no control group.	**Study area:** In 17 NH, there were 1290 residents	1. The mean age of residents was 85.2 years. 2. Staff members were	**NANDA-I Diagnoses:** 1. Urinary Elimination Readiness for Enhanced

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
		Study Interventions: 1. Seventeen staff members including training chiefs of staff nurses, who in turn trained other staff and encouraging residents. 2. An individualized and comprehensive care strategy include - To encourage complete meal intake - To increase fluid intake up to 1500 ml/day - To encourage urination in a toilet - To encourage spending time out of bed for longer than 6 hours - To reduce time spent in wet diapers - To choose diapers with smaller pads to improve skin condition and lower costs **Study Outcomes:** 1. Three-day mean water intakes 2. Hours spent in wet diapers 3. Comparing the size of the diaper (24 combination patterns)	**Participants:** A total of 153 elderly subjects were selected, but complete data were obtained from n=122 residents. **Intervention applied:** Seventeen staff nurses and who in turn training staff, but each elderly for 1.5 staff.	seldom trained to accurately measure the volume of food intake (the volume was 800 ml before, and the mean volume was only 1146 ml) significantly increased after intervention ($p<0.001$). 3. In one-fourth of residents, there was an improvement such as changing from diapers to pants or from larger to smaller pads. 3. The mean time that residents spent before changing from wet diapers to clean ones decreased ($p<0.001$). 4. The method of urination during daytime did not significantly change before and after the intervention ($p>0.05$); but that method showed an improvement during nighttime ($p=0.007$).	2. Urinary Incontinence: Functional **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence 4. Tissue Integrity: Skin and Mucous Membranes **NIC Intervention:** ***Training/Teaching*** 1. Urinary bladder training 2. Urinary habit training 3. Teaching: Procedure/ treatment 4. Teaching: Individual 5. Pelvic Muscle Exercise 6. Exercise Therapy: Ambulation 7. Communication: Enhancement ***Management/Monitoring*** 1. Urinary Elimination Management 2. Fluid Management/ Monitoring 3. Infection Protection ***Care*** 1. Urinary incontinence care 2. Perineal Care 3. Self-Care: Assistance Toileting 4. Prompted Voiding Documentation 1. Surveillance: Safe 2. Documentation
4. Schnelle J.F., et al. (2010)	USA	**Method:** Randomized controlled trial **Intervention:** 1. Subjects were tended every 2 hours for 8 hours per day over 3 months. This nurses provided: - toileting assistance, - exercise, and - choice of food and fluid (snacks) 2. Trained research staff checked each participant every 2 hours (who were changed in the morning to ensure dry undergarments), and during each subsequent check, research staff thoroughly checked the participant's clothes for evidence of incontinence (e.g., wetness or fecal matter). 3. Research staff provided incontinence care (changing of soiled garments).	**Study area:** Six nursing homes (NHs). N=495 **Participants:** A total of 112 NH residents from the intervention (n=56) or control (n=56) groups completed the 12-week intervention. **Intervention applied:** Nurse research staff (n=2)	1. Two observers recorded the incontinence status (a total of 2,348 incontinence statuses) 2. Intervention subjects scored significantly higher than control subjects at baseline on the MMSE total score ($t=2.09$, $p=0.04$) and the number of sit-to-stands ($t=2.91$, $p=0.01$). 3. The intervention group showed a significant increase from the baseline on the following measures (per person, per day) compared to the control group: - Fluid intake ($p=0.001$) - Calories from snacks between meals ($p=0.001$) - Number of activities ($p=0.001$) - Number of minutes in	**NANDA-I Diagnoses:** 1. Urinary Elimination: Impaired 2. Urinary Elimination, Readiness for Enhanced 5. Tissue integrity: Skin and Mucous Membranes **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence 4. Medication Response **NIC Intervention:** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: Prescription Medication 4. Teaching: Procedure/ Treatment 5. Teaching: Individual 6. Pelvic Muscle Exercise 7. Exercise Therapy/ Ambulation 8. Communication Enhancement

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
		Study Outcomes: 1. Frequency of UI and FI 2. Rate of appropriate toileting 3. Anorectal assessments 4. Mini-mental State		activities (p=0.001) 4. The intervention had a significan t effect on frequency Examination (MMSE) assessments of UI, FI, and other variables (treatment coefficient): - UI (p=0.07); appropriate toileting percentage coefficient (p=0.000). - Higher fluid intake, MMSE score, laxative use, and baseline frequency of UI were associated with higher UI rates during intervention.	***Management/Monitoring*** 1. Urinary Elimination Management 2. Environmental Management 3. Medication Management/ Administration 4. Medication Reconciliation 5. Fluid Management/ Monitoring 6. Weight Management Infection Protection ***Care*** 1. Urinary incontinence care 2. Self-Care Assistance Toileting 3. Prompted Voiding Documentation 1. Surveillance: Safety 2. Documentation
5. Lin S-Y., et al. (2013)	Taiwan	**Method:** A quasi-experimental study with a pretest and posttest. Intervention: 1. The participants were assigned to the same fluid regimen chosen by their nursing administrator in 6 weeks. 2. In the maintained fluid group, residents were able to consume beverages based on their preference without any limitations on the amount and types. 3. Residents in the increasing fluid group were advised to increase their daily fluids over 1500 ml, and the type of beverage (e.g., water, juice, and tea) was not restricted. 4. Urine specimens were collected by nurses at baseline (T1) and at the end of fluid regimen (T2) for urine culture and urine specific gravity. **Study Outcomes:** 1. Barthel Index 2. The Short Portable Mental Status Questionnaire 3. Mini-nutritional Assessment 4. The intake and output checklist: - Voiding frequency - Voiding volume - Beverage types,	**Study area:** Six NH with 30–120 beds (N=240) **Participants:** Resident (n=74) **Intervention applied:** 294 staff (159 nurses, 36 head nurses, 99 CNAs)	1. No difference between the two groups (age, daily activities, cognitive function, nutrition status, number of medications, the degree of bladder control, incontinence, and UTI), and their mean age was 75.2 years. 2. At baseline, the prevalence of asymptomatic bacteriuria was 29.7%, and 17.6% at the 6-week follow-up, but the hypothesis was not supported 3. Prevalence of ASB in residents was 29.7% at T1 and 17.6% at T2, 4. The proportion of bacteriuria within subjects reached a significant difference between T2 and T1. Particularly, 22.7% of bacteriuric residents in the increasing fluid group converted to negative urine cultures. 5. Gram-negative species were more than Gram -positive species at T1 and T2. Enterobacteriacea was the most common species.	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence 4. Tissue Integrity: Skin and Mucous Membranes **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Communication Enhancement ***Management/Monitoring*** 1. Urinary Elimination Management 2. Fluid Management / Monitoring 3. Infection Protection 4. Specimen Management ***Care*** 1. Urinary incontinence care 2. Perineal Care 3. Urinary Tube Care 4. Urinary Catheterization 5. U.C. Intermittent 6. Self-Care Assistance Toileting 7. Prompted Voiding Documentation 1. documentation
6. Klay M., et al. (2005)	USA	**Method:** One-group intervention study **Intervention:** An advanced practice	**Study area:** One-center (long-term care facilities) (N=120 residents)	1. All 42 patients were female, the average age was 80, and 55% held a diagnosis of dementia.	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Incontinence:

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
		continence specialist (RN) 1. Incontinent episodes for each participant were recorded for a week. 2. An individualized plan of care for each patient was developed. 3. The plan of care (medications, diagnoses, and activities of daily living) was implemented for at least 1 year. **Study Outcomes:** Patient outcomes were obtained from the residents' medical records and documentation: 1. The total number of incontinent episodes 2. The ITU rate 3. The pressure sore rate, and falls rate 4. A cystometrogram (CMG) was performed, which confirmed an overactive bladder.	**Participants:** Forty-two female residents who were incontinent or had urgency related to overactive bladder **Intervention applied:** An advanced practice registered nurse continence specialist	2. The number of urinary incontinence episodes rose, which might be due to an advanced age. 3. Patients treated with biofeedback were also better able to notice the signal to void. - The UTI rates dropped rom 5% to 1%, - Pressure sore rates dropped from 80% to 45% - The falls decreased by more than 50%. - Overall, the 42 residents were 100 more time s drier per week.	Overflow 3. Urinary Incontinence: Urge **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence 4. Medication Response 5. Tissue Integrity: Skin/ Mucous Membranes **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching Prescription Medication 4. Teaching: Individual 5. Pelvic Muscle Exercise 6. Exercise/Therapy: Ambulation 7. Communication Enhancement ***Management/Monitoring*** 1. Urinary Elimination Management 2. Medication Management/ Administration 3. Medication Reconciliation 4. Fluid Management Monitoring 5. Infection Protection ***Care*** 1. Urinary Incontinence Care 2. Perineal Care 3. Tube Care: Urinary Catheterization 4. Self-Care Assistance 5. Toileting Prompted Voiding Documentation 1. Surveillance: Safety 2. Documentation
7. Yu P., et al. (2014)	Australia	**Method:** A quasi-experimental field design with pre-/postintervention Study Interventions: 1. The intervention was a new UC care plan and its implementation in care practice. - Due to resource restrictions, five to eight older people were assessed each week. It took 5 weeks to complete the T1 step. 2. The result of the telemonitoring UC assessment was used by a continence consultant to develop an individualized	**Study area:** A 120-bed NH during a 12-week trial **Participants:** Evaluate a total of 32 residents. Data collected 31 from residents **Intervention applied:** A total of 121 care staff who used the UC telemonitoring system. UC care was mainly provided by personal care workers (PCWs), who have a minimum qualification, such as a Certificate III in aged care awarded by the Technical and Further	1. The majority of the participants were female (78%). Their average age was 81 years 2. The mean ACFI score (Toileting and Continence) was both 3.94 (standard deviation [SD] 0.24) and (mobility score: mean 3.75, SD 0.56), indicating that participants required a high level of care and assistance toileting. 3. After the intervention, there were significant improvements in the UC performance of all the patients; but one outcome measure cannot reduce	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: Individual Ambulation 4. Communication Enhancement ***Management/Monitoring*** 1. Urinary Elimination 2. Management

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
		UC care plan for each older person 3. The outcomes of the intervention were evaluated 2 weeks later (T2). 4. The post implementation assessment was completed in 5 weeks for monitoring and assessing UC. **Study Outcomes:** 1. Pre-(T1) and post-(T2) implementation was conducted using data collected by the telemonitoring system for 72 hours at each data point. - Primary measure of weight of urine voided into the continence aid, number of prescribed toileting events, w actual toileting events; successful toileting events, voiding events into toilet;	Education (TAFE) college system.	the number of toilet visits prescribed in the UI care plans, and the success rate of toilet visits remained unchanged. 4. More people were assisted to use toilet around 4:30 p.m. and before going to bed. 5. Big improvement in UC care was the significant increase in the number of times a person was offered assistance to use a toilet, increasing from an average of two times to six times in 24 hours. 6. Assistance toileting was provided to older people to use the toilet over and above what was prescribed in the care plans p=0.033) after the intervention.	Environmental 3. Management Safety 4. Medication Management / Administration 5. Fluid Management/ Monitoring ***Care*** 1. Urinary retention care 2. Urinary incontinence care 3. Perineal Care 4. Bathing Self-Care Assistance 5. Self-Care Assistance Toileting 6. Prompted Voiding ***Documentation*** 1. Documentation
8. Vinsnes A.G., et al. (2012)	Norwegian	**Method:** Randomized controlled trial Study Interventions: 1. Training program included physical activity and ADL training. 2. Personal treatment goals were elicited for each subject: - Training in transfer, walking ability, balance, muscle strength, and endurance were offered to individuals and groups. - ADL training was performed when the resident needed help during meals, with personal care, or dressing. - Each subject was asked to participate in creative and/or entertaining activities. 3. All staff members on the wards were informed about each resident's treatment goals and offered personal supervision regarding how to provide "just the right challenge" to the residents. **Study Outcomes:** 1. The outcome measure of the 24 PWT was quantified prior to the intervention. 2. Then, it was quantified immediately after the intervention and 3 months after the intervention.	**Study area:** Four different NHs, N=115 residents **Participants:** n=98 residents group, n=48 and control group, n=50) **Intervention applied:** All nurses in the ward (n=unknown) and two physiotherapists and two occupational therapists provided the intervention services. Six researchers	1. The average age at enrollment was 85.7 years, and women were older than men (87.2 versus 81.1 years, p=0.001). 2. The mean leakage of urine at baseline 3-month postintervention adjusted mean difference between the groups according to the amount of leakage was 191 g (p=0.03). 3. The staff across the 24-hour time period had to understand why and how to complete the test and adhere to the process. 4. Altogether, 68 participants were included in the analysis (35 in the intervention group and 33 in the control group). 5. The average age was 84.3 years. The 3-month postintervention adjusted mean difference between the groups according to amount of leakage was 191 g (p=0.03). - This result was statistically significant after adjusting for the baseline level, age, sex, and functional status. - The leakage increased in residents not receiving the experimental intervention, while UI in the training	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired Urinary 2. Elimination Readiness for Enhanced **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: individual 4. Exercise Therapy: Ambulation 5. Communication Enhancement ***Management/Monitoring*** 1. Urinary Elimination Management 2. Environmental Management 3. Fluid Management /Monitoring 4. Weight Management ***Care*** 1. Urinary incontinence care 2. Bathing Self-Bare Assistance 3.Self-Care Assistance Toileting 4. Prompted Voiding ***Documentation*** 1. Documentation

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
				group showed improvement.	
9. Sackley C.M., et al. (2008)	UK	**Method:** Phase II pilot exploratory cluster randomized controlled trial **Study Interventions:** 1. Exercise training - It ran for 1 hour, twice weekly, for four weeks. - Participants were encouraged to walk or wheel to class - The task-related training of functional activities of daily living (standing up from a chair, and strength, balance, endurance, and flexibility exercises). - Music played during the class, and exercises were fun, making use of balloons and balls. 2. Staff education: **Study Outcomes:** - Formal urodynamic questionnaire investigation - Mobility was measured using the Rivermead Mobility Index -The short Orientation-Memory-Concentration Test - The Barthel Activity of Daily Living Index - Rivermead Mobility Index - Feasibility was assessed by uptake and compliance.	**Study area:** Six care homes (N=211) were selected purposefully. **Participants:** n=33 resident baseline (n=17 in the intervention group and n=16 in the control group) **Intervention applied:** 1. Staff training was available to all staff on a voluntary basis, by continence nurse completed questionnaires: (n=38) 2. The mobility training was delivered by three final -year student physiotherapists.	1. Twenty-nine residents (88%) were female and aged from 76 to 101 years (mean, 86 years). 2. Residents found the intervention acceptable and engaged well with the training. 3. In the intervention group incontinence decreased from 12/17 at baseline to 7/17 at 6 weeks 4. In the intervention group and increased from 9/16 at baseline to 9/15 at 6 weeks 5. The Rivermead Mobility Index scores were better in the intervention group (n=17; baseline, 6.1; 6 weeks, 6.2) compared with controls (n=16; baseline, 5.9, 6 weeks, 4.75). 6. The intervention was feasible, well received, and had good compliance. 7. Forty-one staff members attended continence training. - Thirty-eight completed questionnaires. The mean score was 5.5 (SD=2.5) out of a possible14 - They reported back positively, indicating felt need for additional continence training.	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced 3. Urinary Incontinence: Functional **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence **NIC Intervention:** ***Training/teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: Procedure/ treatment 4. Teaching: Individual 5. Pelvic Muscle Exercise 6. Exercise Therapy: Ambulation 7. Communication Enhancement ***Management/Monitoring*** 1. Urinary Elimination Management 2. Environmental Management/ 3. Fluid Management/ Monitoring 4. Weight Management ***Care*** 1.Urinary retention care 2.Urnary incontinence care 3.Self-Care Assistance: Toileting 4.Prompted Voiding ***Documentation*** 1. Documentation
10. Ouslander J.G., et al. (2005)	USA	**Method:** A randomized, controlled study cross-over trial **Study Interventions:** 1. Trained research staff provided the FIT intervention - Prompted voiding combined with individualized - Functionally oriented endurance - Strength-training exercises 2. This intervention was offered four times per day, five days per week, for 8 weeks. Group 1 received the intervention, while Group 2 served as a control group. **Study Outcomes:** - Endurance was measured using observations of walking (or wheeling a	**Study area:** Four nursing homes (N=528) **Participants:** 1. An immediate intervention (Group 1; n=52) 2. A delayed intervention group (Group 2; =55) **Intervention applied:** Six researchers: 1. On-site research staff were trained in the FIT intervention using a training video. 2. To ensure the quality and consistency of the intervention, on-site supervisors conducted periodic process observations and provided additional training and	1. The mean age was approximately 78, 90% were men, and approximately 75% were Caucasian. 2. Three-quarters of the subjects had at least one psychiatric diagnosis. 3. There was a significant difference between two groups in the changes for all measures of endurance except total time walked or wheeled. 4. Urinary incontinence rates as measured by wet checks declined from a median of 54% to 25% in the immediate intervention group and increased in the control group from 41% to 50%.	**NANDA-I Diagnoses:** 1. Urinary Elimination Impaired 2. Urinary Elimination Readiness for Enhanced 3. Urinary retention **NOC Outcomes:** 1. Urinary Elimination 2. Self-Care Toileting 3. Urinary Continence **NIC Intervention:** ***Training/Teaching*** 1. Urinary Bladder Training 2. Urinary Habit Training 3. Teaching: Procedure/ Treatment 4. Teaching: Individual 5. Exercise Therapy: Ambulation 6. Communication Enhancement ***Management/Monitoring*** 1. Urinary Elimination

Table 2. NANDA/NOC/NIC for primary aim was incontinence management studies (continued)

Author	Country	Method/Intervention	Participants	Results	NANDA/NOC/NIC
		wheelchair), transfers, and sit-to-stands - Timed measures of walking or wheeling a wheelchair (mobility), sit-to-stand exercises, independence in locomotion and toileting as assessed using the Functional Independence Measure (FIM), - One-repetition maximum weight for several measures of upper and lower body strength - Continence was assessed using physical checks if the participants were wet or dry.	enforcement on the protocol as needed	5. Out of 64 participants who completed the intervention, 43 (67%) were "responders" based on maintenance or improvement in at least one measure of endurance, strength, and urinary incontinence. 6. The older men in this trial responded well to the prompted voiding component of FIT despite a high risk of urinary retention.	Management ***Care*** 1. Urinary retention care 2. Urinary incontinence care 3. Self-Care Assistance Toileting 4. Prompted Voiding ***Documentation*** 1. Surveillance: Safety 2. Documentation

made, and information about the development of pressure ulcers, treatment, healing time, daily activities, risks of pressure ulcers, and incontinence were documented. We thus matched three possible NOC outcomes to these activities: "Urinary Elimination," "Tissue Integrity: Skin and Mucous Membranes," and "Urinary Continence."

Incontinence Management Studies

In this group of studies, researchers aimed to decrease episodes of incontinence and improve continence. They were conducted in 59 NH settings with n=669 residents. The mean ages of the residents ranged from approximately 78.0 to 86.0 years old (Table 2).

In the study Booth et al. (2013), 70 people had an overactive bladder. In the study by Aslan et al. (2008), the UI types were determined to be Stress, Urge, and Mixed Incontinence. The studies matched possible NANDA diagnoses of "Urinary Elimination Impaired," "Urinary Elimination Readiness for Enhanced," "Urinary incontinence: Urge," and "Urinary Retention."

In one study, NH staff gave a 12-session Transcutaneous Posterior Tibial Nerve Stimulation (TPTNS) treatment program and evaluated postvoid residual urine volume (Booth et al., 2013). In another study, bladder training and Kegel exercises were given to the retreatment group (Aslan et al., 2008). These possible NIC interventions selected for this study came under the "Training/Teaching" heading ("Urinary Bladder Training," "Urinary Habit Training," "Teaching: Procedure/Treatment," "Teaching: Individual," "Pelvic Muscle Exercise"), the "Management/Monitoring" heading ("Urinary Elimination Management," "Infection Protection," "Pain Management"), and the "Care" heading ("Urinary Retention Care," "Urinary Incontinence Care," "Perineal Care," "Self-Care Assistance Toileting," "Prompted Voiding").

The acceptability of the TPTNS was high throughout, with no reports of any adverse effects, either by the participant or staff. Urinary symptoms improved in 13 members (87%) of the TPTNS group. The intervention can be administered by a nurse, physician, or physiotherapist with only minimal training required (Booth et al., 2013). In another study, the pelvic floor muscle strength was 52% in the treatment group and 48% in the control group (Aslan et al., 2008). For these studies, we selected "Urinary Elimination" and "Self-Care Toileting Urinary Continence" as the possible NOC outcomes.

Three studies aimed to investigate whether it was effective to increase the intake of fluids

to encourage urination in a toilet (Lin, 2013; Schnelle et al., 2010; Tanaka et al., 2009). Possible NANDA-I diagnoses were "Urinary Elimination Impaired," "Urinary Elimination Readiness for Enhanced," "Urinary Incontinence: Urge," "Urinary Incontinence: Overflow," and "Urinary Incontinence: Functional."

In one study, the nursing interventions included increasing fluid intake, encouraging urination in a toilet, encouraging spending over 6 hours out of bed, reducing the time spent in wet diapers, and choosing diapers with smaller pads (Tanaka et al., 2009). In another study (Lin, 2013), the participants were assigned to a common fluid regimen chosen by their nursing administrator for a period of six weeks. The accuracy of the nurses' recording of the intake and output checklist was recorded (Lin 2013), and the same strategy was applied in a multicomponent intervention study (Schnelle et al., 2010). The possible NIC interventions under the "Training/Teaching" heading were determined to be "Urinary Bladder Training," "Urinary Habit Training," "Communication Enhancement;" under the "Management/Monitoring" heading "Urinary Elimination Management," "Fluid Management/Monitoring," "Infection Protection," "Specimen Management;" under the "Care" heading "Urinary Incontinence Care," "Perineal Care," "Tube Care: Urinary Catheterization," "UC. Intermittent," "Self-Care Assistance Toileting," "Prompted Voiding;" and under the "Documentation" heading, "Documentation."

In the baseline data, one study determined which NH staff members were not aware of the importance of monitoring fluid volume, even though they encouraged residents to drink often (Tanaka et al., 2009). In another study, the prevalence of symptomatic bacteria at baseline was 29.7%; after the intervention, it was 17.6% (Lin, 2013). In the multicomponent intervention study, the fluid intake, the number of calories from snacks between meals, the number of activities, and the number of minutes spent in activities of the intervention group increased significantly compared to the baseline and control group ($p<0.05$) (Schnelle et al., 2010). The possible NOC outcomes selected for these studies were "Urinary Elimination," "Self-Care Toileting," "Urinary Continence," "Tissue Integrity: Skin and Mucous Membranes," and "Medication Response, Tissue Integrity."

Two studies investigated individual care plans designed to help keep the elderly population drier and less prone to falls, urinary tract infections, and pressure sores (Klay & Marfyak, 2005; Yu et al., 2014). Possible NANDA-I diagnoses selected for these studies were "Urinary Elimination Impaired," "Urinary Elimination Readiness for Enhanced," "Urinary Incontinence: Overflow," "Urinary Incontinence: Urge."

In one of these studies, a continence nurse specialist (RN) recorded incontinent episodes for each participant for 1 week and then designed an individualized care plan (Klay & Marfyak, 2005). The other study aimed to explore the effects of a telemonitoring care planning system (Yu et al., 2014). Data included the time of any toilet event, whether it was successful or not, the time when a continence aid was changed, the weight of the pad, and the time and amount of fluid intake. Possible NIC interventions under the "Training/Teaching" heading were "Urinary Bladder Training," "Urinary Habit," "Training," "Teaching: Prescription Medication," "Teaching: Individual," "Pelvic Muscle Exercise," "Exercise/Therapy: Ambulation," and "Communication Enhancement;" under the "Management/Monitoring" heading were "Urinary Elimination Management," "Medication Management/Administration," "Medication Reconciliation," "Fluid Management/Monitoring," and "Infection Protection;" under the "Care" heading were "Urinary Incon-

tinence Carem," "Perineal Care," "Tube Care Urinary Catheterization," "Self-Care Assistance Toileting," and "Prompted Voiding;" and under the "Documentation" heading "Surveillance: Safety, Documentation."

In the first study, participants were treated with biofeedback. They were also better able to notice the signal to void. Urinary tract infection rates dropped from 5% to 1%, pressure sore rates dropped from 80% to 45%, and falls decreased by more than 50% (Klay & Marfyak, 2005). In the other study, there were significant improvements in the UC performance of all participants, and nurses became more person centered and responsive to toileting requests (Yu et al., 2014). The possible NOC outcomes selected were "Urinary Elimination," "Self-Care Toileting," "Urinary Continence," "Medication Response," and "Tissue Integrity: Skin and Mucous Membranes."

In three studies, the aim was to investigate individualized training programs designed to improve the activity of daily living (ADL) and physical capacity among residents in NHs (Ouslander et al., 2005; Sackley et al., 2008; Vinsnes et al., 2012). The functional status related to toilet habits was registered. Possible NANDA diagnoses were "Urinary Elimination Impaired," "Urinary Elimination Readiness for Enhanced," "Urinary Incontinence: Functional," and "Urinary Retention."

The training programs, included physical activity and ADL training (Vinsnes et al., 2012), activities in which the participants were encouraged to walk or wheel, or exercises to provide strength, balance, endurance, and flexibility (Sackley et al., 2008), or Functional Incidental Training (FIT) that included prompted voiding and functionally oriented endurance and strengthening exercises (Ouslander et al., 2005). Each subject was asked to participate in creative and/or entertaining activities (Vinsnes et al., 2012), and music was played during fun exercises, also making use of balloons and balls (Sackley et al., 2008). During the studies, all staff members on the wards were informed about each resident's treatment goals and offered personal supervision. Residents' progress was reviewed, and their views were gathered and documented (Ouslander et al., 2005; Sackley et al., 2008; Vinsnes et al., 2012). The possible NIC interventions in the three studies under the "Training/Teaching" heading were "Urinary Bladder Training," "Urinary Habit Training," "Teaching: Procedure/Treatment," "Teaching: Individual," "Pelvic Muscle Exercise," "Exercise Therapy: Ambulation," and "Communication Enhancement;" under the "Management/Monitoring" heading were "Urinary Elimination Management," "Environmental Management," "Fluid Management/Monitoring," and "Weight Management;" under the "Care" heading were "Urinary Retention Care," "Urinary Incontinence Care," "Self-Care Assistance: Toileting," and "Prompted Voiding;" and under the "Documentation" heading, "Documentation."

In all three studies, the interventions were feasible and well received. In one study, the researcher expected that the staff understand why and how to complete the intervention and that they would adhere to the process (Sackley et al., 2008). In another study, nurses gave verbal feedback, which indicated that residents valued the classes (Ouslander et al., 2005). The NOC outcomes selected included "Urinary Elimination," "Self-Care Toileting," and "Urinary Continence."

DISCUSSION

We reviewed these studies because incontinence is an important health and nursing issue in NHs, and there is a lack of intervention studies performed by nurses on factors associated with UI. The literature includes a number of different types of UI nursing studies, but even these studies do not provide for nursing diag-

noses, assessment, intervention, and evaluation for UI outcomes. They are not adequate to help nurses make logical and systematic decisions about diagnoses and do not allow for the development of databases to document nursing care (Ehlman et al., 2012; Felix, Thostenson, Bursac, & Bradway, 2013; Resnick et al., 2006; Roe et al., 2015). We reviewed studies from eight different countries, with five studies conducted the United States. As a result, the findings may not be transferable to other countries or cultures, but they do provide a common view for nurses about nursing activities related to UI (Table 1).

The majority of residents in the studies were aged >70 years, and they needed nursing aids to manage UI (Al-Samarrai et al., 2007; Beeckman, Verhaeghe & Defloor, 2011; Palese et al., 2011; Thompson, Langemo, Anderson, Hanson, & Hunter, 2005). Generally, it is known that elderly people receive NH care to meet their care needs, including those related to UI. Therefore, it is not surprising that the nursing interventions performed in the studies included activities such as assisted toileting, incontinence care, and being encouraged to walk or wheel (Felix et al., 2013; Resnick et al., 2006).

Different limitations were observed in different studies, such as having a smaller sample size or being based on a single center (Al-Samarrai et al., 2007; Booth et al., 2013; Lin, 2013; Klay & Marfyak, 2005; Yu et al., 2014), purposive sampling (Palese et al., 2011; Sackley et al., 2008), inadequate follow-up (Lin, 2013; Schnelle et al., 2010; Thompson et al., 2005); documentation problems (Tanaka et al., 2009; Thompson et al., 2005), and outcomes measurement (Beeckman, Verhaeghe, Defloor, Schoonhoven, & Vanderwee, 2011; Lin, 2013; Ouslander et al., 2005). Although some of the studies focused on a very specific area of UI nursing care (Aslan et al., 2008; Klay & Marfyak, 2005; Palese et al., 2011; Thompson et al., 2005), they cannot be standardized for UI care for the elderly.

Nursing diagnoses describe actual or potential problems resolved through intervention, and focus on wellness (Johnson et al., 2012; Moorhead, Johnson, Maas, & Swanson, 2014). In this systematic review, the most common NANDA diagnosis was "Urinary Elimination Readiness for Enhanced," and the least common was "Urinary Incontinence: Overflow" (Tables 1, Table 2). Nursing studies can help nurses who provide care to elderly people with incontinence in NHs to gather data to screen for etiologies and symptoms, and to focus and structure information about UI (Voith, 2000; Noh & Lee, 2015). Almost all the studies in this review were intended to improve continence and alleviate negative symptoms, but in some of them, the type of incontinence was overlooked in planning the nursing interventions (Al-Samarrai et al., 2007; Ouslander et al., 2005; Palese et al., 2011).

This study found 167 possible NIC interventions in the sources. In these 14 studies, nurses applied various nursing practices (Tables 1, Table 2). Determining which nursing interventions to use is influenced by a variety of factors. These factors affecting the nursing intervention selected include the desired patient outcomes, characteristics of the diagnosis, the research base associated with the intervention, the feasibility of implementing the intervention, the acceptability of the intervention to the patient, and the capability of the nurse (Bulechek, Butvher, Dochtermanj, & Wagner, 2013; Johnson et al., 2012).

Data obtained from nursing assessments and nurse's knowledge level about UI allows nurses make the correct nursing diagnosis in accordance with the type of UI experienced (Aslan et al., 2008; Ouslander et al., 2005; Vinsnes et al., 2012). It has been suggested that UI training programs should be mandatory for all nursing home staff (Ouslander et al., 2005). In the studies, nurse continence specialists gave UI training programs using different education techniques (Al-Samar-

rai et al., 2007; Beeckman et al., 2011; Palese et al., 2011; Thompson et al., 2005). The studies showed that educating health care professionals regarding UI may have a positive effect on staff and resident outcomes (Palmer, 2008; Park et al., 2015; Resnick et al., 2006; Roe et al., 2015).

In the current review, the most matched possible NOC outcomes were "Urinary Elimination Outcomes," and the least matched NOC outcomes were "Self Care: Toileting Outcomes" (Tables 1, Table 2). Although much nursing time, energy, and cost are invested in resolving urinary problems (Ersser, Getliffe, Voegeli, & Regan, 2005; Park et al., 2015), diagnosis and treatment are often shared between the nurse and another health professional, and these nursing efforts generally remain undocumented (Bardsley, 2014; De Moraes et al., 2009; Tanaka et al., 2009). The NOC outcomes allow for the quantification of the patient's state, behavior, and perception, and they outline what is expected to occur at different points in time during incontinence care (Johnson et al., 2012; Moorhead et al., 2014; Noh & Lee, 2015).

The four studies that were primarily aimed at skin integrity and skin care looked at implementing different skin care protocols and products (Al-Samarrai et al., 2007; Beeckman et al., 2011; Palese et al., 2011; Thompson et al., 2005). Inappropriate management can lead to breaks in the skin, incontinence dermatitis, and pressure ulcers, which can be very serious complications for the resident (Ersser et al., 2005; Rodriguez et al., 2007). A few studies focused on the cost-effectiveness (time, staff, equipment) and although the programs used were effective in reducing the care costs for episodes of incontinence, this was difficult to maintain throughout the follow-up period (Felix et al., 2013; Flanagan et al., 2015). In the study by Thomson et al. (2005), the PrUs prevalence (4.8%) and incidence (8.9%) decreased. The healing time significantly decreased from 23 days to 16 days. Chronic wounds in older adults took approximately 26–42 days to heal (Esser et al., 2005). It was thought that educating and monitoring nurses and encouraging them to study guidelines had an important effect on the result (Bliss et al., 2006; Ersser et al., 2005; Flanagan et al., 2011; Park et al., 2015).

In this review, two of the studies included intervention on bladder function using TPNE (Booth et al., 2013) and Kegel exercises (Aslan et al., 2008). These studies demonstrated a significant decrease in UI frequencies, and both interventions could be successfully administered by nurses. Nursing interventions were supported by research evidence to improve patient outcomes and the quality of clinical practice. Nurses seek continually the answer if the intervention being given is the best possible practice (Bulechek et al., 2013; Resnick et al., 2006).

Multicomponent intervention studies aimed to determine the effect of interventions that combined toileting assistance, exercise, and improved food and fluid intake on UI (Lin, 2013; Schnelle et al., 2010; Tanaka et al., 2009; Yu et al., 2014). In the literature, most of the studies offered at least 2000 ml fluid to prevent the risk of the dehydration and symptoms of bacteria (Bardsley et al., 2014; Heardman & Kamitsuru, 2014; Schnelle et al., 2010; Lin, 2013). These studies found that resident did not take in enough fluid, thus nursing staff were not aware of this situation. Using the NIC/NOC intervention for fluid intake activity may help nurses to manage and monitor to fluid intake in patients (Bulechek et al., 2013; Johnson et al., 2012; Moorhead et al., 2014).

Several studies suggested that individualized incontinence nursing care plans were able to reduce the rate of UI among NH residents (Klay & Marfyak, 2005; Palmer, 2008; Yu et al., 2014). After the nurses' interventions, there were significant improvements in UC, but the number of toilet visits cannot be prescribed in the UI care plans, and the success rate of toilet visits remained un-

changed (Klay & Marfyak, 2005; Yu et al., 2014). A big improvement in UC care came about through a significant increase in the awareness among care staff about UI. This awareness led care staff to be more person centered and responsive to toilet requests (Flanagan et al., 2015; Moorhead et al., 2014; Schnelle et al., 2003).

Studies included physical activity, ADL training, and FIT programs, and nurses observed residents' progress, gave verbal feedback, and documented each resident individually (Ouslander et al., 2005; Sackley et al., 2008; Vinsnes et al., 2012). These studies show that if nursing practices and the nursing care provided to patients are documented, it possible to capture all of the contextual elements of the nursing care process (Ouslander et al., 2005; Sackley et al., 2008; Vinsnes et al., 2012). Responses to questionnaire forms indicated that nurses needed to develop their basic knowledge in this area, and they reported back positively, indicating that they felt the need for additional continence training (Ouslander et al., 2005).

CONCLUSION AND RECOMMENDATIONS

Many questions of interest related to elderly with UI cannot yet be answered, and it is not yet possible to systematically evaluate the effectiveness of nursing care. Most of the research data related to UI are not included in national/international databases of nursing practice. There is a pressing need to identify and systematically collect more data in formats that can be compared and incorporated in databases. Using NOC/NIC Linkages to NANDA-I may provide new nursing perspectives on nonstandardized research. Future studies may allow for the comparison of data across different locations worldwide, enabling nurses to use the results of these studies in evidence-based practices.

Informed Consent: This review was written with searching on databases and the articles found by articles was reviewed. So we did not work with patients or parents. There is no need informed consent.

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Review

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Example of a Simulation Design in Nursing Education: Safe Chemotherapy Administration

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ABSTRACT

Chemotherapy is one of the treatment methods increasingly used in cancer. In this article, we aimed to share our simulation experiences within the scope of the elective course of Cancer Nursing in the Nursing Internship (4th year) program in the process of teaching safe chemotherapy administration methods. Simulation-based experience should be designed to attain specified educational goals and expected results as best as possible. Scenario implementation is based on the criteria of the International Nursing Association for Clinical Simulation and Learning standards. A biologically safe drug preparation cabin in the drug preparation room of a simulation center was used, and a medium-fidelity mannequin-based simulator evaluating the vital signs was utilized as the simulator during the simulation implementation. In the patient history prepared within the scope of the scenario, the students were expected to achieve goals. An analysis was performed by a trainer who followed attentively the implementation during the scenario. In the analysis stage, sessions including 8–10 students were held using the Promoting Excellence and Reflective Learning in Simulation. A checklist was used to evaluate the skill steps of the students objectively. It is thought that this simulation scenario maintained in accordance with the standards of best practice of the International Nursing Association for Clinical Simulation and Learning would guide the readers. The simulation is considered to be an effective method for safe medications, and it is recommended to plan different scenarios according to the levels of students.

Keywords: Nursing education, safe medication, simulation, simulation-based experience, simulation design

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INTRODUCTION

According to GLOBOCAN (The Global Cancer Observatory) data, the increasing number of cancer cases increases further the importance of oncology nurses providing care service to this patient group. Chemotherapeutic (CT) drugs administered to patients have negative effects on cancerous cells, as well as normal cells. When considering the side effects of CT drugs, they negatively affect the health of the nurses preparing and administering the treatment, as well as their patients (Tuna, 2014). It is stated that a long-term exposure to CT drugs may have negative effects such as nausea, vomiting, diarrhea, irritant and allergic contact dermatitis, hair loss, and corneal ulcers if they come into contact with the eye (Olgun, & Şimşek, 2010).

For reducing the exposure to CT drugs, it is recommended to use biological safety cabinets, disposable gloves made of protective materials, an apron, mask to prevent inhalation, and goggles to prevent eye splashing (Connor, & McDiarmid, 2006; Ministry of Health Safe Working Guide with Antineoplastic Drugs, 2004; Oncology Nursing Association, 2014; Power, & Coyne, 2018). The studies conducted on CT drug administrations of the nurses reported that the preventive measures taken by nurses in preparing and administering CT drug were insufficient and recommended that training be given for the safe use of CT drugs (Olgun, & Şimşek, 2010; Önal, & İntepeler-Seren, 2017). It has been stated that health care professionals do not take adequate precautions to protect themselves from CT drugs since they have not adopted protective behaviors enough (McGovern, Vesley, Kochevar, Gershon, Rhame, & Anderson, 2000).

Along with the problems the nurses encounter with the CT drug exposure, the lack of possible knowledge and skills regarding safe CT drug administration poses significant risks for patients. The most common drug errors encountered by nurses about CT drugs are related to the wrong physician requests, improper administration of the drug, correct dose, and time (Büyük, Güdek, Güney, Yıldırım, & Akkoca, 2014). Therefore, integrating the administration of CT drugs into the undergraduate education curriculum is important for patient safety. However, the training of CT drug administration in the real patient is a difficult situation. Therefore, mistakes that may be made during the drug administration can be prevented by conducting simulation implementations in an environment that is the closest to the real one.

Simulation is a method that allows participants to develop cognitive, affective, and psychomotor skills by imitating real-life situations in a realistic and reliable environment (Committee, 2016f).

In simulation-based experience, the best practice standards developed by the International Nursing Association for Clinical Simulation and Learning (INACSL) are recommended to be used INACSL Standards of Best Practice (Barbara et al., 2015). These eight standards that define the whole process include the simulation design, results and objectives, facilitation, analysis, evaluation of the participants, professional behavior (professional integrity), extended inter-professional training, and operation.

The aim of this study is to share the simulation method that was prepared based on the INACSL standards for nursing students (n=16), who took and applied the elective course of cancer nursing in the intern program (4th year) of a university, during safe CT administrations. According to the simulation design standard, it is thought that this simulation scenario applied using the design template would guide the readers.

SIMULATION DESIGN

Simulation-based experience should be designed to ensure that the specified learning objectives and expected outcomes are reached at the most appropriate level. The criteria examined within the scope of the design standard are as follows and form the parts of a design template:

- Perform a needs assessment to provide the foundational evidence of the need for simulation ,
- Determine the measurable objectives,
- Decide the simulator type and modality,
- Design a clinical scenario or situation in accordance with the training content,
- Use fidelity methods to create the required perception of realism,
- Provide a facilitative approach that is participant centered,
- Begin simulation-based experiences with a prebriefing,
- Debrief and/or have a feedback session by using appropriate techniques after the implementation,
- Evaluate the participant(s), facilitator(s), and the simulation-based experience,
- Ensure the preparation of the participants,
- Pilot test simulation-based experiences before full implementation (Committee, 2016e).

It is recommended to use a design template to achieve standardization in the simulation process. This ensures the consistency of the simulation and also guides the development, implementation and evaluation of the simulation (Bartlett, 2015; Lamontagne, McColgan, Fugiel, Woshinsky, & Hanrahan, 2008). The use of template during the scenario design provides the trainers with a roadmap for monitoring the desired steps. The details of a "safe chemotherapy administration" scenario in accordance with design standard criteria are as follows:

Perform the Needs Assessment

To determine the needs, comprehensive targets or objectives specific to the participants should be determined. Different methods can be used in determining the needs. These can be listed as the analysis of underlying causes (root cause analysis), SWOT (strengths, weaknesses, opportunities, and threats) analysis, evaluation of the participants (clinicians, trainers, participants), and outputs (pilot studies, health needs of the country, previous simulation experiences) (Committee, 2016e). The reasons for the implementation of this scenario are the following:

- Wide use of CT today due to an increased incidence of cancer,
- A risky CT administration during clinical practices cannot be experienced by every student in a safe learning environment, and they are expected to do such practices in case of graduation.

Measurable Objectives

In simulation-based experience, the specified objectives must be accessible, realistic, and appropriate to the knowledge level and experiences of the participants. The results expected from the training should be determined (Committee, 2016c). In this context, the implementation objectives of the scenario are given in Table 1.

Table 1. Objectives of the scenario

Before chemotherapy drug preparation
• The student/user can take protective measures for safe chemotherapeutic drug administration
• Safe drug administration
• Evaluation of drug responses

While the main purpose of the simulation scenario is to make the students perform CT practices in oncology clinics in line with patient safety principles, the main purpose of the program/curriculum is to have students perform drug administration in line with the patient safety principles.

The main question of the scenario: Can the student administer the drug properly in oncology clinics in accordance with the patient safety principles?

Main question of the program/curriculum: Can the student administer the drug in accordance with the patient and employee safety using the acquired knowledge and skills?

Modality

While deciding on the simulator type, the main objective and existing sources should be taken into account (Committee, 2016e). In this simulation implementation, a biologically safe drug preparation cabinet found in a drug preparation room of the simulation center was used, and a medium-fidelity mannequin-based simulator in which vital signs could be evaluated was used as a simulator.

Design a Clinical Scenario or Situation

Scenario is a planned situation developed by the trainer to help participants in achieving their learning goals (Alinier, 2011). It is defined as models based on real-life situations involving problem solving, critical thinking, clinical decision making, and other complex mental skills (Nadolski et al., 2008).

Table 2 shows demographic characteristics of the patient in the scenario. In the patient history prepared within the scope of the scenario, the student was expected to achieve the objectives. The scenario flow prepared by the trainer toward the goals was used in this scenario implementation (Table 3). The scenario started with the nurse's encounter with the patient and evaluation of the patient's blood tests, ending with the initiation of drug administration.

Table 2. Patient demographic information

Simulation date: 10/27/2017	**Patient name and surname:** K. Ş.
Gender: Male	**Age:** 58
Body mass index: 25.7	**Race/Religion:** Turk, Islam
Caregiver: Wife	**Allergies:** Pollen, strawberries
Primary medical diagnosis: Colon (Rectum) Cancer	
Surgical procedures/interventions & date: Mitral valve replacement 2012	
Medical history: The patient who had hypertension for 10 years underwent the cardiac surgery 5 years before due to a mitral valve failure. He regularly uses Norvasc 5 mg 1x1 tablet, Aldactone 1x1 tablet, and Coumadin 5 mg 1x1 tablet.	
Current disease history: The patient who presented with indigestion and constipation symptoms for 4 months had lost 10 kg in the past 1 year. He was diagnosed with stage III rectum cancer. The patient's treatment plan included eight cycles of neoadjuvant chemotherapy. Surgery is planned for the patient.	
Social history: The patient who is married and retired meets his own self-care needs.	
Information given to the student before simulation: You work as a nurse in the oncology inpatient service, and your shift started at 08:00 o'clock. There are six patients in the service, and you are responsible for their care. One of the patients will receive a chemotherapy drug today. The patient diagnosed with stage III rectum cancer will receive the third cure of neoadjuvant. A performance assessment and toxicity assessment of the patients were made by the physician before. After evaluating the laboratory findings, consent will be obtained, and the drugs will be prepared and started. The facilitator (instructor) will take part in the scenario when necessary.	

Table 3. Scenario flow

Scenario flow				
Time	**Mannequin actions**	**Environmental factors**	**Expected interventions**	**Clues**
1–3 minutes	The patient's condition remains stable.	Making necessary arrangements in the drug preparation unit (setting up lights and sound system of the device)	Interpreting laboratory results and informing the patient	**Doctor (Facilitator):** If the laboratory findings are not evaluated, he or she makes a phone call and requests the student's interpretation by asking, "How are the laboratory findings?" and "When will chemotherapy approval be obtained?"
	Pulse: 88/min	- Preparing the cabinet	Obtaining the chemotherapy protocol approval by informing the physician	**Patient:** If the patient is not informed, he or she asks, "Will drug be given to us today? Nobody gave us any information!"
	Breath: 14/min	- Preparation of medicines		
	SpO_2: 97%	- Placement of necessary materials		
	Blood Pressure: 118/72 mmHg			
	The patient is in a semi-sitting position on the bed.			
3–12 minutes	The patient's condition remains stable. The patient lies in the bed	Making necessary arrangements in a drug preparation unit	To be dressed according to chemotherapy drug preparation standards,	**Doctor (Facilitator):** Requests to repeat the dose calculation.
			Complying with the principles of chemotherapy drug withdrawal from ampoules and vials	
			Preparing the drugs specified in the chemotherapy protocol in appropriate doses	
12–15 minutes	The patient's condition remains stable. The patient lies in the bed	There is an infusion pump in the patient room	Informing the patient	**Patient:** If the patient is not informed, he or she asks, "What are you going to put on me now?" and wants to get information.
			Initiating premedication by following the patient safety principles	

Testing the Design

Once the design is completed, it should be tested with a pilot study. The parts that are forgotten, missing, or are not understood should be determined in the pilot study, and the design should be edited (Committee, 2016e). In this implementation, the environment and checklists were tested with other nursing students (a different group similar to the target group) who were not involved in this simulation implementation.

Figure 1. Physical, psychological, and conceptual fidelity implementation*
**The images are from the authors' archive. Consent was obtained from the students for their use*

Fidelity

Fidelity can be defined as the possibility of the case to be seen in real life, its reasoning, and the simulation ability of the cases in the simulation environment (Committee, 2016f). Physical fidelity is associated with the patient, simulator, standardized patient, environment, equipment, embedded participants, and support systems. It reflects the case of the implementation or situation to be seen in real life. Conceptual fidelity is the logic and reality of each case in the scenario or situation (e.g., diagnosis and vital signs compliance). Psychological fidelity is defined as the simulation ability of the cases in the simulation environment (e.g., active voice of the patient, noise, family members, other team members, time pressure, competition) (Committee, 2016e).

In practice, preparations were made for physical, psychological, and conceptual fidelities to increase the fidelity level of the scenario (Figure 1).

Within the context of physical fidelity, necessary materials for security measures were obtained according to the number of students, and the drug preparation cabinet was used.

Within the scope of psychological fidelity, the medium-fidelity simulator was dressed in a patient outfit and laid in a semi-sitting position. Moulage was applied to the simulator according to its age, and glasses and a wristband were put on it. The model was made speak by the moderator with the help of a walkie-talkie. By providing lighting and sound effect in the drug preparation cabinet, the cabinet became operational. Labels were prepared in a word file suitable for the visual images of the requested drugs and adhered onto the empty drug bottles, and the water put into the empty drug bottles according to the drug properties was colored with moulage paints. Within the context of conceptual fidelity, the breast, lung, and colon cancer cases having the highest possibility to be encountered by the students during clinical practice

were prepared. Chemotherapeutic drug protocols similar to the ones used in the hospital were adapted to the patient, and a physician request form was prepared. By obtaining hospital laboratory results, laboratory results were prepared in the same image. The patient file was prepared, and attachments were placed in it. To prevent information transmission during the scenario implementation, different case histories and drug protocols were given to each group.

Facilitator Approach

There are many facilitator methods, and the method to be used for the determined goals should be decided. The facilitator is the person who takes responsibility for managing the entire simulation-based experience. Facilitation enables the simulation to progress. Facilitation actually begins by reconciling participants' goals with the course or learning goals before orienting the participants to the simulators and simulation environment. It also continues during the simulation implementation. Facilitators in the simulation implementation can manage this process with various clues (Committee, 2016b).

The trainers in this simulation implementation took a different professional role to ensure the progress of the scenario and the facilitator role as the analysis session moderator. The students experienced the scenario in groups of two. A total of three people including one facilitator participated in the scenario. Each scenario took about 15 minutes. One of the trainers played a doctor role as a facilitator and ensured to give clues facilitating the scenario flow in case that the scenario does not continue/block (Table 3). The roles expected from the students were as follows:

Nurse 1: Meets the patient and interprets the laboratory findings, obtains approval from the physician about its suitability, and requests support from a teammate (Nurse 2) for the preparation of drugs; ensures the preparation of drugs.

Nurse 2: Prepares the drugs in line with safe drug administration steps after approval his/her teammate obtains the approval; starts premedication treatment.

Doctor (facilitator): Receives information from the nurse interpreting laboratory findings and approves drug administration.

Prebriefing

Prebriefing includes informing the participants and adaptation activities to build trust about the environment prior to the scenario implementation. It contains the activities such as meeting the participants, sharing information about the simulator, and introducing the environment, understanding the expectations/goals, defining the roles of the participants, obtaining ethical approvals, and setting a time schedule (Chmil, 2016; Committee, 2016f).

In this implementation, the prebriefing stage was applied to all students who would participate in the implementation prior to the scenario, and it took about 20 minutes. Table 4 shows the information given to the students within the scope of prebriefing.

Table 4. Prebriefing

- Sharing information about the simulator
- Expectations about the scenario/understanding the goals
- Fulfillment of requirements before the simulation
- Obtaining video/photo shooting permissions
- Ensuring privacy and a safe learning environment
- Reminding of safety issues
- Understanding the defined role by all participants
- Giving the expected timetable
- Giving information about the debriefing

Participant Preparation

The preparation stage is important for the participants to achieve simulation goals successfully. During the preparation stage, the preparation for the implementation (reading assignments, courses, didactic sessions, questions/answers specific to the simulation, video, pretest, etc.) and for administrative (confidentiality/privacy and informing about expectations) processes must be completed (Committee, 2016e).

The theoretical course content prepared for course objectives within the scope of the Cancer Nursing course was transferred to students using the classical learning method. One week before the simulation scenario implementation, lecture notes, books, and guidelines about the preparation of CT drugs were given to the students as printed materials. Prior to the implementation, the students were reminded about the rules to be followed in the simulation center (no cell phones, course notes, books or any course materials, food and drink in the implementation area, removing the jewelry, wearing a lab coat, etc.).

Ethical Issues: It was informed that all education practices were for learning purposes and that the privacy of the training should be considered. Images of the students were recorded during the implementation. The students were informed that the personal information would be kept confidential, and their consent was obtained. In addition, consent was obtained from the students for the use of their photos.

Debriefing and/or Feedback

After the implementation of all simulations, a debriefing session should be held to help participants gain permanent skills (Committee, 2016a). The planned session consisting of collaborative and reflective process led by a competent person after simulation-based experience and in which the participants' experiences are discussed is defined as analysis (Committee, 2016f). In this study, debriefing was performed by a trainer who carefully observed the implementation during the scenario implementation. The debriefing environment was planned in a way that supported learning, was safe, protected privacy, maintained open communication, and enabled the self-assessment of the individual. Attention was paid to ensure that the debriefing is compatible with the expected results. During the debriefing phase, sessions involving 8–10 students were held and the Promoting Excellence and Reflective Learning in Simulation (PEARLS) method was used (Eppich & Cheng, 2015). The PEARLS method consists of four stages: reaction, identification, analysis, and summarizing. Sample questions by stages are listed in Table 5.

Evaluation

In nursing education, an evaluation of the simulation technique is as important as its use. The evaluation of the implementation is multidimensional, and many parameters such as participants, facilitators, team members, training results, and simulation process can be evaluated. In all simulation implementation, the assessment methods of scenario participants should

Table 5. Steps of the debriefing by using the PEARLS method

Reaction	Definition	Analysis	Summarizing
How did you feel?	What did you do for your patient?	What do you think you're doing well?	In summary, what are your inferences?
How do you feel now?	What were the objectives of the scenario?	What would you like to change if you had a second chance?	What are the key points we learned from this scenario?

be determined and clearly indicated to the participants. Valid and reliable tools should be used to evaluate the results (Committee, 2016d).

To objectively assess the skill steps of the students during the simulation implementation, a checklist consisting of 26 items, including the steps of preparing CT drugs and being developed by the trainers in line with the literature, was used. The method of assessing the skill defined as a competence-based assessment strategy through direct observation was used (Boztepe, & Terzioğlu, 2013). While the students fulfilled the skills expected in the simulation environment, the clinical trainer monitored how those skills were performed and evaluated through a pre-structured and staged checklists. The clinical trainer observed whether the students followed the determined drug preparation steps and chose the appropriate material during drug preparation, and the students used the material correctly during drug preparation steps. For each skill step, "sufficient," "partially sufficient," and "insufficient" options were marked. The checklists were shared with the students in the analysis session, and the reflective questions were discussed over the implementation steps.

CONCLUSION AND RECOMMENDATIONS

In this study, the steps followed during the use of a simulation method in teaching safe CT drug administration were shared. During the realization of the method, simulation design stages and a design template from the best practice standards of INACSL were used. A well-designed scenario implementation is important in terms of minimizing the problems that may arise during the flow and ensuring the quality of education. Therefore, a scenario design should be systematically addressed and planned according to the INACSL best practice standards. The use of a simulation method in teaching the drug administrations is an effective method enabling students to work in a comfortable and safe learning environment without being exposed to risky CT drugs. It is thought that the students indirectly meet the patient and employee safety measures with the simulation method. Planning of different scenarios according to student's levels and using them in education are recommended.

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Committee, I. S. (2016d). INACSL standards of best practice: Simulation SM participant evaluation. *Clinical Simulation in Nursing, 12*, 26-29. [CrossRef]

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Mucchielli, A. (1991). *Zihniyetler* [Mindsets] (A. Kotil, Trans.). İstanbul, Turkey: İletişim Yayınları.

c) Edited Book
Ören, T., Üney, T., & Çölkesen, R. (Eds.). (2006). *Türkiye bilişim ansiklopedisi* [Turkish Encyclopedia of Informatics]. İstanbul, Turkey: Papatya Yayıncılık.

d) Turkish Book with Multiple Authors
Tonta, Y., Bitirim, Y., & Sever, H. (2002). T*ürkçe arama motorlarında performans değerlendirme* [Performance evaluation in Turkish search engines]. Ankara, Turkey: Total Bilişim.

e) Book in English
Kamien R., & Kamien A. (2014). *Music: An appreciation.* New York, NY: McGraw-Hill Education.

f) Chapter in an Edited Book
Bassett, C. (2006). Cultural studies and new media. In G. Hall & C. Birchall (Eds.), *New cultural studies: Adventures in theory* (pp. 220–237). Edinburgh, UK: Edinburgh University Press.

g) Chapter in an Edited Book in Turkish
Erkmen, T. (2012). Örgüt kültürü: Fonksiyonları, öğeleri, işletme yönetimi ve liderlikteki önemi [Organization culture: Its functions, elements and importance in leadership and business management]. In M. Zencirkıran (Ed.), *Örgüt sosyolojisi* [Organization sociology] (pp. 233–263). Bursa, Turkey: Dora Basım Yayın.

h) Book with the same organization as author and publisher
American Psychological Association. (2009). *Publication manual of the American psychological association* (6th ed.). Washington, DC: Author.

Article

a) Turkish Article
Mutlu, B., & Savaşer, S. (2007). Çocuğu ameliyat sonrası yoğun bakımda olan ebeveynlerde stres nedenleri ve azaltma girişimleri [Source and intervention reduction of stress for parents whose children are in intensive care unit after surgery]. *Istanbul University Florence Nightingale Journal of Nursing, 15*(60), 179–182.

b) English Article
de Cillia, R., Reisigl, M., & Wodak, R. (1999). The discursive construction of national identity. *Discourse and Society, 10*(2), 149–173. http://dx.doi.org/10.1177/0957926599010002002

c) Journal Article with DOI and More Than Six Authors
Lal, H., Cunningham, A. L., Godeaux, O., Chlibek, R., Diez-Domingo, J., Hwang, S.-J. et al. (2015). Efficacy of an

adjuvanted herpes zoster subunit vaccine in older adults. *New England Journal of Medicine, 372,* 2087–2096. http://dx.doi.org/10.1056/NEJMoa1501184

d) Journal Article from Web, without DOI

Sidani, S. (2003). Enhancing the evaluation of nursing care effectiveness. *Canadian Journal of Nursing Research, 35*(3), 26-38. Retrieved from http://cjnr.mcgill.ca

e) Journal Article wih DOI

Turner, S. J. (2010). Website statistics 2.0: Using Google Analytics to measure library website effectiveness. *Technical Services Quarterly, 27,* 261–278. http://dx.doi.org/10.1080/07317131003765910

f) Advance Online Publication

Smith, J. A. (2010). Citing advance online publication: A review. *Journal of Psychology.* Advance online publication. http://dx.doi.org/ 10.1037/a45d7867

g) Article in a Magazine

Henry, W. A., III. (1990, April 9). Making the grade in today's schools. *Time, 135,* 28–31.

Doctoral Dissertation, Master's Thesis, Presentation, Proceeding

a) Dissertation/Thesis from a Commercial Database

Van Brunt, D. (1997). *Networked consumer health information systems* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 9943436)

b) Dissertation/Thesis from an Institutional Database

Yaylalı-Yıldız, B. (2014). *University campuses as places of potential publicness: Exploring the politicals, social and cultural practices in Ege University* (Doctoral dissertation). Retrieved from Retrieved from: http://library.iyte.edu.tr/tr/hizli-erisim/iyte-tez-portali

c) Dissertation/Thesis from Web

Tonta, Y. A. (1992). *An analysis of search failures in online library catalogs* (Doctoral dissertation, University of California, Berkeley). Retrieved from http://yunus.hacettepe.edu.tr/~tonta/yayinlar /phd/ickapak.html

d) Dissertation/Thesis abstracted in Dissertations Abstracts International

Appelbaum, L. G. (2005). Three studies of human information processing: Texture amplification, motion representation, and figure-ground segregation. *Dissertation Abstracts International: Section B. Sciences and Engineering, 65*(10), 5428.

e) Symposium Contribution

Krinsky-McHale, S. J., Zigman, W. B., & Silverman, W. (2012, August). Are neuropsychiatric symptoms markers of prodromal Alzheimer's disease in adults with Down syndrome? In W. B. Zigman (Chair), *Predictors of mild cognitive impairment, dementia, and mortality in adults with Down syndrome.* Symposium conducted at the meeting of the American Psychological Association, Orlando, FL.

f) Conference Paper Abstract Retrieved Online

Liu, S. (2005, May). *Defending against business crises with the help of intelligent agent based early warning solutions.* Paper presented at the Seventh International Conference on Enterprise Information Systems, Miami, FL. Abstract retrieved from http://www.iceis.org/iceis2005/abstracts_2005.htm

g) Conference Paper - In Regularly Published Proceedings and Retrieved Online

Herculano-Houzel, S., Collins, C. E., Wong, P., Kaas, J. H., & Lent, R. (2008). The basic nonuniformity of the cerebral cortex. *Proceedings of the National Academy of Sciences, 105,* 12593–12598. http://dx.doi.org/10.1073/pnas.0805417105

h) Proceeding in Book Form

Parsons, O. A., Pryzwansky, W. B., Weinstein, D. J., & Wiens, A. N. (1995). Taxonomy for psychology. In J. N. Reich, H. Sands, & A. N. Wiens (Eds.), *Education and training beyond the doctoral degree: Proceedings of the American Psychological Association National Conference on Postdoctoral Education and Training in Psychology* (pp. 45–50). Washington, DC: American Psychological Association.

i) Paper Presentation

Nguyen, C. A. (2012, August). *Humor and deception in advertising: When laughter may not be the best medicine.* Paper presented at the meeting of the American Psychological Association, Orlando, FL.

Other Sources

a) Newspaper Article

Browne, R. (2010, March 21). This brainless patient is no dummy. *Sydney Morning Herald, 45.*

b) Newspaper Article with no Author

New drug appears to sharply cut risk of death from heart failure. (1993, July 15). *The Washington Post,* p. A12.

c) Web Page/Blog Post

Bordwell, D. (2013, June 18). David Koepp: Making the world movie-sized [Web log post]. Retrieved from http://www.davidbordwell.net/blog/page/27/

d) Online Encyclopedia/Dictionary

Ignition. (1989). In *Oxford English online dictionary* (2nd ed.). Retrieved from http://dictionary.oed.com

Marcoux, A. (2008). Business ethics. In E. N. Zalta (Ed.). *The Stanford encyclopedia of philosophy.* Retrieved from http://plato.stanford.edu/entries/ethics-business/

e) Podcast

Dunning, B. (Producer). (2011, January 12). *inFact: Conspiracy theories* [Video podcast]. Retrieved from http://itunes.apple.com/

f) Single Episode in a Television Series

Egan, D. (Writer), & Alexander, J. (Director). (2005). Failure to communicate. [Television series episode]. In D. Shore (Executive producer), *House;* New York, NY: Fox Broadcasting.

g) Music

Fuchs, G. (2004). Light the menorah. On *Eight nights of Hanukkah* [CD]. Brick, NJ: Kid Kosher.

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