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ORIGINAL RESEARCH

Determination of Individual Innovative Characteristics of Surgical Nurses of Different Generations: Descriptive Study

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Abstract

Background: The leadership characteristics of nurses working in operating rooms and surgical clinics where technology is used intensively come to the forefront, and therefore, their innovative behaviors are expected to be more developed.

Aim: The study aims to determine the individual innovative characteristics of surgical nurses of different generations.

Methods: The data of the descriptive study was collected between April and June 2023. The sample of the study consisted of 216 surgical nurses. Data were collected online using the data collection form, Individual Innovativeness Scale and Multidimensional Nursing Generations Scale.

Results: The total score obtained from the Individual Innovativeness Scale was 59.97 ± 8.00, and the total score obtained from the Multidimensional Nursing Generations Scale was 73.93 ± 15.68. It was determined that this difference resulted from the statistical significance between Generations X and Z in the individual innovation scale (p = 0.038), and between Generations X and Generation Y in the Multidimensional Nursing Generations Scale.

Conclusion: As a result of the study, it was seen that the nurses' individual innovation scales core averages were not low and surgical nurses were skeptical according to the classification of individual innovation behaviors.

Keywords

Surgery, Nurse, Intergenerational relations, Individual innovation

Introduction

In parallel with scientific and technological developments, nursing has entered a rapid innovation process. The International Council of Nurses defines innovation as transforming a new or significantly changed product, process, or method into outputs that respond to community needs [1]. Nurses are responsible for providing care within the health system, reviewing the interventions made, questioning whether they are appropriate and effective, and researching to provide quality service. Ensuring change and progress in the nursing profession depends on the progress and effective implementation of the concept of "care" in a way open to scientific and technological developments. It is essential in nursing care to include an innovative approach based on scientific knowledge instead of traditional practices. Innovation in care is ensured by nurses assuming essential roles in innovation in the units and positions where they work [2].

Operating rooms, surgical intensive care units, and surgical wards with highly developed equipment are highly specialized units where patients are vulnerable; employees should have special knowledge, skills, and equipment, require constant attention, are risky in terms of medical errors, require interdisciplinary practices, and team work. Nurses spend more time with patients and their families than other health professionals, take appropriate interventions in this process, and evaluate

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the results of the process. Surgical nurses have a crucial role in continuing patient care, providing care for surgical patients from the moment they are hospitalized until discharge, and coordinating among health professionals in the preoperative, intraoperative, and postoperative periods. Surgical nurses need to update their professional knowledge and skills and improve themselves to fulfill these roles [3].

Differences in the perception of nurses who grow up in different periodic characteristics and are in different age groups may affect their innovativeness. Changes in the evolving world affect individuals and societies. Economic, technological, sociological, and developmental factors in different periods cause the formation of different generations that are affected by values, attitudes, beliefs, and behaviors. Generation is defined by the Turkish Language Association (TDK) as "a group of people who were born in approximately the same years, shared the conditions and destinies of the same age, and was obliged to similar duties" or "a group of individuals who make up the age clusters of approximately twenty-five to thirty years" [4]. Today, the prolongation of life expectancy has resulted in individuals staying in business life for a long time and continuing to work after retirement. This situation causes individuals belonging to different generations to work together in organizations. The thoughts of each generation in working life differ in their attitudes towards work and the organization. New technologies are used in many areas, from diagnosis to disease treatment. The leadership characteristics of nurses working in operating rooms and surgical clinics where technology is used intensively come to the forefront, and therefore, their innovative behaviors are expected to be more developed [5].

When the literature is examined, it is seen that studies have been conducted on generational differences among nurses. However, studies have yet to be found to determine the individual innovative characteristics of surgical nurses of different generations. Accordingly, this study aims to determine the individual innovative characteristics of surgical nurses of different generations.

Research questions

- ✓ What are the individual innovativeness levels of surgical nurses of different generations?
- ✓ What are theme an scores of surgical nurses on the multi dimensional nursing generations scale?
- ✓ Is there a difference between the individual innovativeness levels of surgical nurses of different generations?

Methods

Design

This descriptive study was conducted to determine the individual innovative characteristics of surgical nurses of different generations. The writing of this study report adhered to the STROBE guidelines.

Sample and participant

The research was conducted online between April and June 2023. The study population consisted of nurses working in surgical clinics, and the sample consisted of nurses working in surgical clinics all over Turkey on the study dates who voluntarily agreed to participate in the study and could use the Internet. Online links were shared from there searchers' social media accounts. In addition, the link address of the online form was shared by obtaining permission from the administrators of closed nursing groups on Facebook. The power analysis determined the sample size (90% power ratio, 95% confidence limit, and 0.2 effect size). The sample size was 216, and the study was completed with 216 surgical nurses. The data collection form of nurses who did not complete the form did not appear on the administrator screen. Therefore, the sample size was reached precisely.

Data collection tools

Nurse information form: The form consisted of 13 questions determining the individual (age, education level, marital status, etc.) and professional (type of hospital, unit, etc.) characteristics of the nurses [5,6].

Individual innovativeness scale: The scale developed by Hurt, et al. (1977) consists of 18 items. The Turkish validity and reliability of the scale, which has three sub-dimensions as "idea leadership, resistance to change, risk-taking," was conducted by Sarıoglu Kemer and Altuntaş, (2017). The Cronbach alpha reliability coefficient of the scale was 0.82. In this study, Cronbach's alpha value was found to be 0.84. Individuals are considered "Traditionalist" if their score is below 57 points, "Skeptical" if their score is between 58-65, "Questioning" if their score is between 66-74, "Pioneering" if their score is between 75-81, and "Innovative" if their score is above 82.2 [2].

Multidimensional nursing generations scale (MDNGS): The scale was developed by Stevanin, et al. [7], and its Turkish validity and reliability were conducted by Türedi [8]. The scale consists of 36 items and four sub-dimensions, "Presentation and working tendency" dimension consists of 13 items (33, 34, 35, 36, 37, 38, 38, 39, 40, 41, 42, 43, 44, 47), "Intergenerational conflict" consists of 9 items (1, 2, 3, 4, 5, 6, 7, 8, 9), "Perspective on patient safety" dimension consists of 9 items (12, 13, 14, 15, 16, 18, 19, 20, 48), and "Collaboration with others in their generation" dimension consists of 5 items (21, 22, 24, 26, 28). It is scored on a five-point Likert scale (from strongly disagree-1 to strongly agree-5). The sub-dimensional Cronbach's alpha values of the original scale range between 0.73 and 0.88 [8]. In this study, Cronbach's alpha was found to be 0.91.

Data collection

Research data were collected online between April and June 2023 from the surgical nurses who constituted the sample. An online invitation letter containing the purpose and link of the study was sent to nurses working in surgical units in nursing groups on social networking sites. It was explained to the nurses participating in the study that they could share the online invitation letter containing the purpose and link of the study with their friends or forward this invitation letter by directing it to the principal or co-investigator. Data collection forms completed online was backed up daily by their searchers by providing IP supervision to ensure that a participant completed a single questionnaire.

Statistical analysis

The study data were evaluated using SPSS 22.0 (IBM Statistical Packages for the Social Sciences-Corp.; Armonk, NY, USA) package program. The data was analyzed by number, percentage distribution, mean, and standard deviation. A one-way analysis of variance (ANOVA) was used in groups with normal distribution, and a further analysis of the Turkey test was used to determine the difference between groups. Significance was evaluated as $p < 0.05$.

Ethical considerations

Ethics committee approval was obtained from the ethics committee for scientific research (Date: 21.03.2023, Number: 240089). A text explaining the purpose of the study was written to the nurses who would participate, and the researchers who accepted the study proceeded by pressing the continue button. For the scales used in the study, the authors who performed the Turkish validity and reliability were given permission. The study was conducted in accordance with the Helsinki principles.

Results

Descriptive characteristics of nurses

The mean age of the nurses was 31.10 ± 8.67 years, and Generation Z (50.5%) participated in the study the most. 56.5% (n = 122) of the nurses participating in the study had a bachelor's degree, and 59.3% worked in the wards (Table 1).

Individual innovative characteristics of nurses

43.1% of the nurses answered "sometimes" to "Do you feel free about innovations in the organization?" While 43.5% of the nurses defined themselves as questioning, 30.6% defined themselves as innovative (Table 2).

Scores obtained from the scales and sub-dimensions of the scales

The total score obtained from the IIS was 59.97 ± 8.00, and the total score obtained from the MDNGS was (73.93 ± 15.68). When we look at the sub-dimensions of IIS, theme an scores of risk-taking, thought leadership and resistance to change were (16.72 ± 2.05); (27.49 ± 4.05); (19.59 ± 5.78), respectively, and when we look at the sub-dimensions of MDNGS, the sub-dimension score of Collaboration with those of their generation was (12.73 ± 4.28); intergenerational conflict sub-dimension score (21.96 ± 6.29); patient safety perspective sub-dimension score (18.60 ± 4.55); presentation and working tendency sub-dimension score (23.14 ± 6.80) (Table 3).

Table 1: Descriptive characteristics of nurses (N = 216).

Descriptive Characteristics		Number (n)	Percentage (%)
Age Group	Generation X	25	11.6
	Generation Y	82	38.0
	Generation Z	109	50.5
Gender	Female	197	91.2
	Male	19	8.8
Education status	High School	27	12.5
	Associate degree	26	12.0
	Bachelor's degree	122	56.5
	Postgraduate	41	19.0
Type of Hospital you work in	University	41	19.0
	State	15	6.9
	City	42	19.4
	Education research	38	17.6
	Private	80	37.0
The clinic you work at	Operating Room	67	31.0
	Service	128	59.3
	Intensive care	21	9.7

Table 2: Individual innovative characteristics of nurses (N = 216).

		Number (n)	Percentage (%)
Do you feel free about innovations in the organization?	Yes	47	21.8
	No	76	35.2
	Sometimes	93	43.1
What is your innovation strategy?	I bring it	32	14.8
	I make small changes	146	67.6
	I do the same	34	15.7
	I wait for others	4	1.9
How do you evaluate yourself?	Innovative	66	30.6
	Pioneer	25	11.6
	Questioner	94	43.5
	Skeptic	14	6.5
	Traditionalist	17	7.9

Table 3: Scores obtained from the scales and sub-dimensions of the scales.

	Minimum	Maximum	Mean	SD	Min-max score available
Individual inovativeness scale	**26.00**	**85.00**	**59.97**	**8.00**	**18-90**
Risk-taking sub-dimension	5.00	20.00	16.72	2.05	4-20
Thought leadership sub-dimension	9.00	35.00	27.49	4.05	7-35
Resistance to change sub-dimension	8.00	35.00	19.59	5.78	7-35
Multidimensional Nursing Generations Scale (MDNGS)	**35.00**	**148.00**	**73.93**	**15.68**	**36-180**
Collaboration with those of their generation	5.00	24.00	12.73	4.28	5-25
Inter-generational conflict	9.00	44.00	21.96	6.29	9-45
Patient safety perspective sub-dimension	9.00	42.00	18.60	4.55	9-45
Tendency to present and work	13.00	46.00	23.14	6.80	13-65

Abbreviation: SD: Standard Deviation; $p < 0.05$

Correlation between scales

When the inter-scale correlation calculation was performed, it was determined that there was a negative "low" level relationship between the total scores of the IIS and the MDNGS scale; there was a negative "medium" level relationship between the IIS and the MDNGS patient safety perspective, intergenerational conflict and presentation and working tendency sub-dimensions.

It was found that there was a negative "medium" relationship between the risk-taking sub-dimension of the IIS and the patient safety perspective and a negative "high" relationship between the intergenerational conflict and presentation and work tendency sub-dimension of the MDNGS. There was a negative "moderate" relationship between the thought leadership sub-dimension of the IIS and the intergenerational conflict and presentation and working tendency sub-dimension of the MDNGS and a negative "high" relationship between the patient safety perspectives (Table 4).

Comparative analysis of scales and descriptive characteristics

When the nurses' generations and scales were compared, a statistically significant difference was found between the two scales. This difference is due to the statistical significance between Generation X and Generation Z ($p = 0.038$) in the IIS and between Generation X and Generation Y in the MDNGS (Table 5).

When the place of work of the nurses and the scales were compared, a statistically significant difference was found with both scales. In the advanced level (Turkey) analyses performed between the IIS and the hospital where the nurses worked, it was determined that there was a significant difference between nurses working in private hospitals and nurses working in education and research hospitals ($p = 0.010$) and city hospitals ($p = 0.07$). In the advanced level (Turkey) analyses conducted between the MDNGS and the hospital of employment, it was seen that there was a significant difference between the nurses working at the university hospital and the nurses working at the education and research hospital (0.044) (Table 5).

Table 4: Correlation between scales.

		MDNGS	Patient safety perspective sub-dimension	Collaboration with those of their generation	Intergenerational conflict	Tendency to present and work
IIS	Pearson correlation	-0.239**	-0.467**	-0.346**	-0.507**	-0.443**
	p	0.000	0.000	0.000	0.000	0.000
Risk-taking sub-dimension	Pearson correlation	-0.235**	-0.569**	-0.246**	-0.606**	-0.675**
	p	0.000	0.000	0.000	0.000	0.000
Resistance to change sub-dimension	Pearson correlation	-0.099	-0.085	-0.269**	-0.153*	-0.038
	p	0.149	0.211	0.000	0.025	0.575
Thought leadership sub-dimension	Pearson correlation	-0.242**	-0.619**	-0.218**	-0.564**	-0.558**
	P	0.000	0.000	0.001	0.000	0.000

Table 5: Comparative analysis of scales and descriptive characteristics.

Characteristics		n	IIS	Test	MDNGS	Test
			Mean ± SD		Mean ± SD	
Generations	Generation X	25	81.08 ± 17.52	F = 3.12	56.60 ± 4.53	F = 3.10
	Generation Y	82	72.32 ± 14.78	**p = 0.046**	59.71 ± 7.73	**p = 0.047**
	Generation Z	109	73.50 ± 15.61		60.93 ± 8.63	
Gender	Female	197	59.66 ± 7.61	t = -1.826	74.12 ± 15.32	t = 0.562
	Male	19	63.15 ± 11.07	p = 0.194	72.00 ± 19.39	p = 0.575
Education status	HealthVocational High School	27	62.55 ± 9.98	F = 2.448	72.92 ± 21.19	F = 0.132
	AssociateDegree (Health-related)	26	61.38 ± 11.52	p = 0.065	72.80 ± 16.57	p = 0.941
	Bachelor's degree	122	59.89 ± 7.07		74.47 ± 1.68	
	Postgraduate	41	57.60 ± 5.80		73.70 ± 14.29	
The hospital where he Works	University Hospital	41	60.80 ± 7.43	F = 4.860	69.70 ± 13.11	F = 3.067
	State Hospital	15	57.06 ± 10.08	**p = 0.001**	71.66 ± 20.79	**p = 0.017**
	City Hospital	42	57.69 ± 5.89		77.78 ± 14.74	
	Training and research hospital	38	57.34 ± 6.94		79.42 ± 13.96	
	Private hospital	80	62.53 ± 8.55		71.90 ± 16.28	
Marital Status	Married	93	58.66 ± 7.44	t = -2.100	74.81 ± 15.86	t = 0.718
	Single	123	60.95 ± 8.30	**p = 0.037**	73.26 ± 15.58	p = 0.474
Status of being free in terms of innovations	Yes	47	63.44 ± 9.41	F = 8.115	71.21 ± 19.06	F = 1.270
	No.	76	57.65 ± 8.12	**p = 0.000**	75.82 ± 16.46	p = 0.283
	Sometimes	93	60.10 ± 6.40		73.76 ± 12.86	

t = independent samples t-test; F = analysis of variance test; p < 0.05

When the status of being free in terms of innovations was compared with the CBRS, there was a statistical difference between the group answering "Yes" and the groups answering "No" (p = 0.000) and "Sometimes" (p = 0.045). There was no statistically significant difference between being free regarding innovations and the MDNGS (Table 5).

Discussion

The development of innovative behaviors of nurses has brought the concepts of efficiency, patient safety, and quality to the forefront of healthcare. It is stated that improving the innovative behaviors of nurses will increase the effectiveness of medical treatment and work efficiency along with the quality of nursing care [9]. In the study of Basoglu [10], the mean score of the nurses' IIS was 66.06 ± 10.3; in the study of Ertug [11], it was 60.67 ± 7.14; in the study of Utli [12] it was 59.11 ± 8.29, in the study of Ayhan [9] the mean score of the IIS total scale was 58.62 ± 5.61, and in the study of Bilik, et

al. [5] it was 57.52 ± 5.14. This study observed that the mean score of the surgical nurses was 59.97 ± 8.00, and the study result was similar to the literature.

According to the individual innovativeness scale, individuals are evaluated as skeptical, traditionalist, innovative, pioneering, and questioning. A study conducted by Baksi, et al. [13] found that nurses were in the "pioneer" category according to the IIS; Basoglu [10] found that generation Y nurses were in the "pioneer" category against innovation. Porto [14] found that the majority of participants with robotic surgery experience were in the "questioners" and "skeptics" category, while the majority of participants without robotic surgery experience were in the "skeptics" and "traditionalists" category. Yanmış [15] found that the innovative characteristics of the nurses working in the internal medicine clinic were "questioners"; Ayhan [9] found that nurses were in the category of "skeptics" in their study, and in this study, it is seen that the majority of the nurses are in generation z. Almost half of the nurses define themselves as questioners. However, nurses are in the category of "skeptics" according to the individual innovativeness scale. This result may be because although Generation Z has a high desire to access information and learn, they are not sufficiently reflecting it to practice, and they approach innovations skeptically in line with the institutional policy and the principle of not harming the patient.

The characteristics and differences between generations of nurses are important factors for healthcare professionals. They should be considered and managed in the best way to create socially and psychologically healthy work places. Using the multidimensional nursing generations scale helps to identify and understand the strengths and minimizes the weaknesses of each generation. It will also support managers in encouraging nurses' willingness to work with colleagues who may differ in various respects but are focused on achieving the best health care outcomes for their patients [16]. In the study, the multidimensional nursing generations scale was used to determine nurses' perceptions of generational differences in the work place, and the mean scale scores were low. When the literature is examined, it is seen that the studies using the intergenerational multidimensional nursing generations scale are limited in the international literature [17] and not in the national literature. In this context, comparing the scale results with the literature was impossible. According to the scale, it was determined that nurses in Generation Z, which constituted the majority of the study's sample group, were prone to cooperation with nurses in their generation and wanted to work with nurses in their generation. This situation emerged with the idea that Generation Z seeks a flexible structure away from sharp boundaries in business life and, therefore, can adapt more easily with colleagues of their generation.

Since different generation shave different values, judgments, beliefs, and expectations, conflicts may occur when they work together. Since different generation shave different working styles, the working environment may become more complex when they work together. Kemer [2] found that the difference between the mean total scores of the nurses in Generation X and Generation Y and being in Generation X and Generation Y was statistically significant, and the nurses in Generation Y had higher scores. Arpag [18] found that the total IIS score of operating room nurses and gender, maritals tatus, educational level, surgical department, institutional characteristics, and years of experience in the operating room affected individual innovativeness characteristics. In the study, it was seen that generations, marital status, institution of employment, and being free about innovations affected individual innovativeness characteristics, and generation sand institution of employmental so affected the multidimensional nursing generations scale scores. The fact that the IIS score was higher in Generation Z compared to Generation X is an expected result because Generation Z is more open to innovations. The study also observed that the institution where surgical nurses worked influenced the IIS and MDNGS scores. The fact that the nurses working in private hospitals have high scores on the IIS can be explained by the fact that the nurses working in private hospitals are younger, private hospitals are new and technologically better, and especially the presence of technologically advanced operating rooms can turn into an opportunity for surgical nurses in Generation Z to improve themselves.

Limitations

The generalizability of the results of the present study is limited to the responses and viewpoints of surgical nurses who took part in the research.

Implication for nursing practice

This study contributes to the literature on raising awareness of issues such as preventing disadvantages that may arise due to different generations of nurses working together, especially in surgical clinics where technological developments are reflected and intense working conditions, maintaining healthy and effective communication between different generations and designing the working environment according to the needs of different generations.

Conclusion

As a result of the study, it was seen that the mean scores of nurses on the individual innovativeness scale were not low, and surgical nurses were skeptical according to the classification of individual innovativeness behaviors. It was seen that the generation, gender, the institution where the nurses work, and the state of being free about innovations affect the individual

innovativeness characteristics of the nurses, and the generation and the institution where the nurses work also affect the scores of the multidimensional nursing generations scale. In order to prevent the disadvantages that may arise due to nurses of different generations working together, especially in surgical clinics where technological developments are reflected and intensive working conditions, there may be solutions such as healthy and effective communication between different generations, maintaining the awareness of employees from different generations, and designing the working environment by the needs of different generations.

Author Contributions

Pınar ONGUN: Conceptualization; Methodology; Validation; Formal analysis; Data curation; Writing - Original draft. Ezgi SEYHAN AK: Conceptualization; Methodology; Data curation; Validation; Writing - Original draft; Writing - Review and editing.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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Ethical Approach

Ethics committee approval was obtained from the ethics committee for scientific research (Date: 21.03.2023, Number: 240089). A text explaining the purpose of the study was written to the nurses who would participate, and the researchers who accepted the study proceeded by pressing the continue button.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Scales Use Permission

Written consent was obtained from the author via e-mail to use the scales.

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