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ORIGINAL ARTICLE

Nursing students' innovation and creativity approaches: A descriptive study

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Abstract

The aim of this study is to reveal the creativity and innovativeness attitudes of nursing students who receive vocational education, to determine the influencing factors and to increase their awareness of innovation and creativity in nursing. The research was conducted as a descriptive study. The sample consisted of 399 nursing students. To collect data "Personal Information Form", "Individual Innovativeness Scale Adapted for Nursing", "Individual Creativity Scale" were used. Descriptive values, Shapiro-Wilk, Chi-square, Student's-t, ANOVA, Tukey, Pearson Correlation test were used in the evaluation of the data. Ethics committee and institutional permission were obtained for the study. The average age of the participants is 20.82 ±1.69. The total score average of the participants is 59.19 for the Individual Innovativeness Scale and 55.58 for the Individual Creativity Scale. A significant relationship was found between genders, the place lived in the longest, the need for innovative thinking and individual innovativeness total score average. Also, a significant relationship was found between gender, place lived in the longest, participation in scientific activities related to creativity and innovativeness and innovative thinking status and creativity scale average score. The participants were skeptical about individual innovativeness and their creativity score average was at a medium level. The creativity and innovation scale scores of the participants were affected by some sociodemographic characteristics. It is recommended to plan trainings to raise awareness about innovation and creativity.

Keywords: Innovation, creativity, nursing, student

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Introduction

Developments in technology and medicine have led to an increase in expectations and possibilities in health services. In this context, nurses are expected to be more open to innovations and develop their creativity in the care and treatment process.

Innovative practices are important in reducing costs, improving the quality of care and evidence-based nursing practices, and increasing scientific knowledge [1,2]. The main factor in spreading innovation is nurses thinking with an innovative point of view and putting those ideas into practice [1].

Therefore, an innovation culture must be established in order to increase and develop innovative practices in nursing. Despite the unit they work in, nurses should take on important roles in innovation and be a pioneer in developing new technologies, procedures and policies [3]. In their study, Zhong et al. (2018) emphasized that supporting nursing students in developing innovative awareness and skills is very important for the quality of patient care [4].

Creativity is essential in the advancement of nursing practices and assessing the quality and outcomes of care. The creativity of nurses plays an important role in the development of the health institutions, increasing productivity and ensuring sustainability. Being creative in nursing practices includes being open to change, being able to evaluate opportunities and accepting flexibility in perspective [5,6]. Liu et al. (2020) defined creative teaching behaviors as actions that improve student creativity [7]. Four elements to improve student creativity are; (1) autonomous learning promoting independence; (2) creative thinking that encourages creative approaches to problem solving, decision making, and flexibility; (3) traits / motivation that encourage students to learn basic needs and to approach conflict in a positive manner; and (4) to create environments / opportunities that encourage student collaboration and interpersonal interaction.

The reflection of the developments in science and technology on medicine, the increase in competition in the health system and the increase in the quality of care have made innovation in the field of nursing necessary [4,8,9]. In the International Council of Nurses (ICN) 2014-2015 Biennial report, "innovativeness" is explained with the concepts of transformation, progressiveness, being evidence and solution-oriented [10]. According to the ICN 2020 nursing practice guideline, in order to improve health care, the specialist clinical nurse should lead innovations and changes in practices and produce innovative alternative solutions with a multidisciplinary approach to the problems experienced in the care process [11]. Therefore, in the modern nursing profession, it is important to follow and apply innovations and be creative in limited resources to give the best care. Yang et al. (2018) emphasized the importance of creating open environments that encourage learning and teaching creative thinking skills by discovering new teaching methods in nursing education, and preparing nursing students with problem-solving skills who can think creatively and innovatively [12].

Nursing students are the professionals of the future. It is important to increase sensitivity and awareness about innovation and creativity in clinics during vocational training. The aim of this study is to reveal the creativity and innovativeness attitudes of nursing students who receive vocational education, to determine the influencing factors.

Research Question

What are the factors affecting nursing students' approaches to individual innovativeness and creativity?

Does the nursing students' individual innovativeness approach affect their creativity attitude?

Materials and Methods

Study Design

The research was conducted as a descriptive study.

Place and characteristics of the study

This study was conducted with nursing students of a university located in southern Türkiyeduring the spring semester of the 2018-2019 academic year.

Study sample

The population consists of 815 nursing students of a university. No sampling method was used; after the information session, the students who accepted to participate in the study were included in the sample. All of the volunteer nursing students who accepted to participate in the study and filled the questionnaire completely were included in the study. 49% of the universe has been reached.

Instruments

Data collection form consists of three parts: "Personal Information Form" created by researchers after scanning the literature, "Individual Innovativeness Scale Adapted for Nursing" and "Individual Creativity Scale". Personal Information Form: This form consists of 17 questions about innovativeness, creativity and demographic characteristics of the participants [13-16]. Individual Innovativeness Scale (IIS) Adapted for Nursing: The scale was developed in 1977 by H. Thomas Hurt, Katherine Joseph and Chester D. Cook. The validity and reliability of the adaptation of the scale for nursing was conducted by Sarıoğlu Kemer and Altuntaş in 2017 [13] .This Likert-type scale (strongly disagree: 1, strongly agree: 5) includes 18 items and 3 sub-scales (opinion leadership, resistance to change, risk taking). 82 and above are classified as innovators, 75-81 pioneers, 66-74 interrogators, 58-65 skeptics, 57 and less traditionalists [15]. Cronbach's alpha reliability coefficient is 0.82. [13].

Individual Creativity Scale (ICS): This scale was developed by Balay in 2010. It consists of one dimension and 16 questions. The lowest score that can be obtained is 16 and the highest score is 80. There are no reverse questions. Scoring was done according to a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) [17]. As a result of the reliability analysis, the coefficient of alpha internal consistency of the individual sub-division has been found as 92, that of the administrative sub-division found as 93, and of the social sub-division as 95 [17].

Application of data collection form

After being informed about the study, students who met the inclusion criteria and agreed to participate in the study completed the data collection forms. It took approximately 10-15 minutes to complete the form. The data collection form was distributed face to face by the researchers during the students' recess and the data were collected.

Data analysis

STATISTICA 13.3 program was used for data entry and analysis. Descriptive statistics of categorical data were given as numbers and percentages, and descriptive statistics of continuous variables were given with mean, standard deviation and minimum-maximum values. Chi-square test was used to determine the relationship between categorical data. Student's-t test was used to control the difference between the two group averages, while the ANOVA test was used for the difference between the means of more than two groups. Pearson Correlation test was used to control the relationship between two continuous variables.

Ethical considerations

Permission was obtained from the non-invasive clinical research ethics committee of the university (No: 05, Date: 23.05.2019). Also, written permission from the nursing department dean and written consent from the participants were obtained. Before data was collected, verbal consent was obtained from the participants after the purpose of the research in accordance with the Helsinki Declaration was explained. Also, participants were informed about the fact that their participation is voluntary, and their answers will be kept confidential and evaluated only as scientific data.

Results

Characteristics of the participants

The average age of the participants is 20.82 ± 1.69 (18-29) and academic grade point average is 73.11 ± 8.64 (50-100). 64.9% of the participants were female; 36.1% first, 26.8% second, 17.3% third, 19.8% were fourth year students. Half the participants' income, 52.4%, is equal to expenses, 39.4% income less than expenses and 8.1% income more than expenses. 74.1% are anatolian/science high school, 14.4% medical vocational/

vocational high school and 11.6% are regular high school graduates.

Half of the participants' mothers, 50.6%, are primary school graduates and 24.2% are illiterate. Half of the participants' fathers, 50.9%, are primary school and 22.2% are high school graduates. 48.3% of the participants lived in the province, 36% in the city, 15.6% in the village / town the longest. When asked about internet use, 55.4% stated 1-3 hours, 19.4% 4-7 hours, 15.1% 10 hours and morre, 10.1% 7-10 hours weekly. Reason for the use of the Internet were; 11.1% access to information sources, 10.5% watching TV / music / videos,9.5% doing homework, 8.6% social networking and 7% Internet surfing. 61.9% of the participants did not attend conferences / courses / training on innovation and creativity. 33.7% of the participants defined innovation as innovation, 35.5% as creativity and 24.7% did not know, 5.6% as entrepreneurship, 0.5% gave other statements. 74.6% stated that nurses should think innovatively.

Comparison of participants' demographic characteristics and individual creativity scale Scores and individual innovativeness scale mean scores

A statistically significant difference was found between the Individual Creativity Scale and Individual Innovativeness Scale scores ($p < 0.001$). There is a statistically significant, linear, moderate positive correlation ($p < 0.001$; $r = 0.679$) between the ICS total score and the opinion leadership sub-scale. Also, a statistically significant, linear, moderate positive relationship was found between the ICS total score and the risk taking sub-scale. ($p < 0.001$; $r = 0.585$). In addition, a statistically significant, linear, moderate positive correlation was found between ICS total score and IIS total score ($p < 0.001$; $r = 0.555$) (Table 1).

IIS total score average is 59.19 and median is 59. For this study, Cronbach's α reliability coefficient was determined as 0.82. ICS total score average is 55.58 and median is 56. Cronbach's α reliability coefficient for this study was determined as 0.94. A statistically significant, linear, and positive low correlation was found between the ICS total score and the IIS total score ($p < 0.001$; $r = 0.555$) (Table 1).

There was a statistically significant relationship between gender and the IIS total score ($p = 0.001$) and the IIS total score average and the need for innovative thinking ($p = 0.013$). This difference is due to the difference between the group which stated that innovative thinking is not necessary and the groups that states "yes" and "I don't know" ($p = 0.018$; 0.009). A statistically significant difference was found between the IIS total score and the place lived the longest. This difference is due to the fact that those living in the province are different from those living in the city and in villages / towns ($p = 0.024$; $p = 0.017$). When looking at the relationship between IIS sub-scales and individual demographic characteristics, a statistically significant difference was found between the resistance to change sub-scale and gender ($p < 0.001$). The average of resistance to change score of the male participants was higher (Table 2). No significant difference was found in the comparison of the participants' other demographic characteristics and the IIS sub-scales ($p > 0.05$).

Table 1. Individual innovativeness scale sub-subscales versus individual creativity scale total score comparison

	Individual Innovativeness Scale							
	Opinion Leadership Sub-scale		Risk Taking Sub-scale		Resistance to Change Sub-scale		Individual Innovativeness Scale Total Score	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Individual Creativity Scale Total Score	0.679	**<0.001**	0.585	**<0.001**	-0.018	0.723	0.555	**<0.001**

r:Pearson Correlation

A statistically significant difference was found between the risk taking sub-scale and the year of study (p = 0.031). This was due to the difference between the second year, first year and the fourth year students (p = 0.011; 0.014). A statistically significant difference was found between the year of study and resistance to change sub-scale scores (p = 0.003). This was due to the difference between the scores of the second year and the first year students (p = 0.001) (Table 2).

A statistically significant difference was found between the resilience to change sub-scale and the type of high school graduated (p = 0.026). The average score of medical vocational high school graduates is lower than those graduated from other high schools (p = 0.013; p = 0.041). A statistically significant difference was found between the opinion leadership sub-scale and the status of participation in conferences / courses / training related to innovation (p = 0.004).The sub-scale mean score of those who attended an activity on innovation was found to be higher. A statistically significant difference was found between the opinion leadership sub-scale average and the status of participation in conferences / courses / training related to creativity (p = 0.008). A statistically significant difference was found between the resilience to change sub-scale mean score and the definition of innovation (p = 0.009).

Table 2. Comparison of participants' demographic characteristics and individual innovativeness scale mean scores

		INDIVIDUAL INNOVATIVENESS SCALE			
		Opinion Leadership Sub-scale	**Risk Taking Sub-scale**	**Resistance to Change Sub-scale**	**Individual Innovativeness Total Scale**
		M±SD	M±SD	M±SD	M±SD
Gender	Female	24.95±4.01	15.90±2.30	17.41±4.39	58.27±6.64
	Male	25.46±4.01	15.82±2.56	19.61±5.21	60.96±8.07
	Student's t Test: *p*	0.230	0.772	**<0.001**	**0.001**
Year of Study	1st Year	25.13±3.81	16.15±2.39	17.21±4.13	58.51±6.30
	2nd Year	24.51±4.43	15.37±2.51	19.53±5.30	59.41±8.91
	3rd Year	24.94±4.07	15.68±2.48	18.23±4.78	58.95±7.66
	4th Year	26.14±3.58	16.24±1.99	17.93±4.86	60.32±5.85
	ANOVA Test: *p*	0.058	**0.031**	**0.003**	0.358
Type of High School	Regular High School	25.17±4.00	15.47±2.23	19.34±4.59	60.00±6.89
	Anatolia/Science High School	25.12±4.00	15.88±2.45	18.16±4.79	59.19±7.09
	Medical Vocational High School	24.90±4.19	16.11±2.22	16.94±4.80	57.96±8.29
	Vocational High School	29.50±3.53	17.00±2.82	24.00±4.24	70.50±2.12
	ANOVA Test: *p*	0.472	0.529	**0.026**	0.074
Place lived the longest	Province	24.70±3.83	15.70±2.46	17.74±4.25	58.14±6.61
	City	25.65±4.16	16,09±2.24	18.20±5.46	59.99±7.76
	Town/village	25.28±4.09	16.08±2.16	19.32±4.72	60.71±7.59
	ANOVA Test: *p*	0.105	0.282	0.083	**0.017**
Attended conference/course/training on innovation	Yes	25.87±3.58	16.15±2.08	17.86±5.10	59.86±6.45
	No	24.65±4.21	15.73±2.56	18.30±4.6	58.75±7.7
	Student's t Test: *p*	**0.004**	0.088	0.388	0.149
Attended conference/course/training on creativity	Yes	25.83±3.70	16.06±2.04	17.70±4.9	59.62±6.47
	No	24.69±4.16	15.78±2.59	18.37±4.7	58.88±7.7
	Student's t Test: *p*	**0.008**	0.258	0.194	0.341
Definition of innovation	I don't know	24.43±4.26	15.38±2.6	18.70±4.7	58.55±7.6
	Innovation	25.32±3.6	16.14±2.36	17.37±4.5	58.83±6.49
	Creativity	25.08±4.10	15.94±2.19	18.37±4.8	59.39±7.5
	Entrepreneurship	26.00±3.71	15.63±2.38	21.00±4.9	62.95±8.5
	Other	30.00±4.24	19.00±1.41	14.50±7.7	63.50±2.12
	ANOVA Test: *p*	0.131	0.055	**0.009**	0.118
Need for innovative thinking	Yes	25.46±3.9	16.12±2.25	17.57±4.7	59.18±7.09
	No	26.83±4.06	15.41±2.10	22.83±3.8	65.08±6.81
	Undecided	23.83±4.10	15.09±2.7	19.51±4.6	58.46±7.67
	ANOVA Test: *p*	**0.001**	**0.002**	**<0.001**	**0.013**

This is due to the difference between the group that defines innovation as entrepreneurship and the group that doesn't know the definition of innovation. Also there was a differene between the group that defines innovation as innovation and the group that defines innovation as creativity. (p = 0.045; p = 0.001; p = 0.018; p = 0.037) (Table 2).

A statistically significant difference was found between the opinion leadership sub-scale of the IIS and the need for innovative thinking (p = 0.001). This was due to the differences between the groups that stated "Undecided about the necessity of innovative thinking", "Innovative thinking is necessary" and "Innovative thinking is not necessary" (p = 0.003; p = 0.044). A statistically significant difference was found between the risk taking sub-scale score and the group who declared that "Innovative thinking is necessary" (p = 0.002). The group that stated "Innovative thinking was necessary" had a higher mean score than the other groups (p = 0.001). Also, a statistically significant difference was found between the resistance to change sub-scale and the need for innovative thinking (p <0.001). This difference was caused by the difference between the group saying "Yes" to the necessity of innovative thinking and the groups saying "No" and "I don't know" (p <0.001; p = 0.002) (Table 2).

A statistically significant difference was found between gender and Individual Creativity Scale (p = 0.043). Also, a statistically significant difference was found between the place lived longest and ICS (p = 0.005). This difference is due to the difference between the groups that live in the province and city (p = 0.005). In terms of the ICS, a statistically significant difference was found between the participants' participation in a course / training related to innovation (p = 0.012) and the status of participating in a course / training about creativity (p = 0.003). Also, a statistically significant difference was found between the groups that think nurses need to think innovatively (p = 0.011). This difference arises between those that answered "Yes" and "I do not know" (p = 0.010) (Table 3).

Discussion

The participants with high ICS total score also had high IIS total score. The participants were skeptical about individual innovativeness. The creativity score average was at a medium level. Studies have found that the level of individual innovativeness of nursing students is low [18,19]. In this study, the participants with high individual creativity scores had higher opinion leadership and risk-taking sub-scale mean scores. Also the participants of our study were not directly open to innovative approaches, attitudes and practices in the field of nursing; they evaluated these innovations with suspicion. Although the participants' creativity scale scores were high, it can be said that they had difficulty in transferring their creativity to their innovative approach.

Table 3. Comparison of participants' demographic characteristics and individual creativity scale scores

		Individual Creativity Scale	
		M±SD	*p*
Gender	Female	54.83±10.26	**0.043***
	Male	57.05±10.12	
Place lived the longest	Province	53.8±9.6	**0.005****
	City	57.50±11.17	
	Town/Village	56.7±9.26	
Attended conference/course/training on innovation	Yes	57.26±9.38	**0.012***
	No	54.5±10.68	
Attended conference/course/training on creativity	Yes	57.26±9.38	**0.012***
	No	54.5±10.6	
The need for innovative thinking	Yes	56.35±10.02	**0.011****
	No	57.6±7.8	
	Undecided	52.6±10.9	

M±SD: The mean and standard deviation,*: *Student's t Test*, **: ANOVA Test.

A significant relationship was found between gender and the IIS total score. Both genders showed a skeptical approach to innovativeness. Male students had higher IIS total scores than females. Similar results were found in a study conducted with nurses working in intensive care units [20]. In studies found a statistically significant difference between gender and IIS and ICS score where female's scores were higher [21,22]. These differences may arise from personal characteristics. These differences may originate from the patriarchal culture in Türkiyeand male gender receiving more support.

In this study, a significant relationship was found between the longest place of residence and the IIS total score. The IIS scores of those living in villages / towns was found to be higher than others. In other studies, no significant difference was found between the IIS scores and where students live [19, 23]. In the literature, different results were shared about effects of the environment on the innovative approach. We can conclude that the environment the participants in this study live in supports innovative approach. The participants that live in villages and towns interact with their environments more and different stimuli leads young individuals to think innovatively.

A significant relationship was found between the place of residence and the ICS score where the creativity approach of the people living in the district was higher. In a study conducted with nursing students, a significant relationship was found between the place of residence and the average score of creativity ($p < 0.005$), while the scale scores of the people living in the province were high [18]. The environments where creativity is supported are an important source of inspiration and support for the creativity of the individual.

A significant relationship was found between year of study and IIS risk taking and resistance to change sub-scales. The mean scores of the second year students in the risk-taking sub-scale and the first-year students' in the resistance to change sub-scale were found to be lower. In one study were found to be at a good level, and the innovative behavioral attitudes were more positive in graduate students than undergraduate students [4]. Literature review and results of this study reveal that the education level is a factor in the individual innovativeness approach.

In this study, a significant relationship was found between the high school graduated from and the IIS resistance sub-scale. The average score of medical vocational high school graduates is lower than others, while the average score of other vocational high school graduates is the highest. The knowledge and skills acquired during vocational education have a positive effect on the tendency to be innovative and creative. In studies conducted with nursing students [24] and medical students [22], the average of innovation and creativity scores of students with higher education levels were found to be higher. These differences may be due to the students' having different personal characteristics and experiences.

In this study, a significant relationship was found between participating in an activity related to innovativeness and creativity and the opinion leadership sub-scale of the IIS and the ICS score. The mean scores of those that participated in an activity related to innovation and creativity were higher. According to Saeed et al., education about creativity affected nurses' attitudes towards creativity positively and that there were insufficiencies in developing creativity in nursing education [5]. Studies concluded that education contributes to the development of nursing students' creativity and innovativeness [15,25,26]. In line with this, it can be concluded that planning curriculum to develop innovative approach and creative thinking in the nursing education can increase awareness on this issue.

In this study the group that defines innovation as entrepreneurship has the highest score. In a study, 45.7% define innovation as "innovation", and they are aware of the necessity of innovation in the field of nursing [19]. Liu et al. (2020) defines the creative capacity for health research as the ability to produce something new and useful that could be a concrete product, an abstract idea, or a theory [7]. Noles et al. (2019) stated that innovative lead nurses have an important role in obtaining better patient care, being cost effective and coping with chronic conditions

[27]. While entrepreneurship means building a business by taking risks, innovation is the introduction of new methods in social, cultural and administrative environments in order to adapt to changing conditions.

In this study, a significant relationship was found between the necessity of innovative thinking and the total IIS score. The average score of the group who thinks innovative thinking is not necessary is higher than the indecisive group. Nurses need the support of entrepreneurial leaders to exhibit Innovation Work Behavior in the process of discovering, producing, and implementing a new idea [28]. Studies have emphasized the importance of encouraging lead nurses and nurses to use new technologies in their workplaces, and innovation ability being a part of the profession [3,29,30]. Researchers concluded that adopting innovative thinking is an element that will contribute to being open to creative and innovative in the areas served.

In this study, a significant relationship was found between the necessity of innovative thinking and the ICS score. The average score of the group who thinks innovative thinking is not necessary is higher. In a study evaluating the effectiveness of creativity courses in nursing students, the importance of developing creative thinking skills and integrating creative teaching techniques into nursing education was emphasized [31]. While creativity requires an idea, interpretation or solution that solves a problem, innovations involve the application of that idea [32,33]. It is possible to say that creativity and innovativeness will have positive effects on people's daily lives and professional development, as well as providing new perspectives. Innovative thinking will also contribute to an increasing in the quality of health care services.

Conclusion

The participants were skeptical in terms of individual innovativeness. The creativity score average was at a medium level. The IIS and ICS scores were affected by some socio-demographic characteristics. Participating in various scientific activities related to innovation and creativity positively affected the creativity and innovativeness approach. Creating course content and seminars and encouraging students to participate in activities aimed at developing creativity and innovativeness skills are recommended during nursing education.

In order for nurses to be open to innovations in clinics, their knowledge on the subject should be developed during their education. Innovative and creative nurses will provide better quality service in patient care. Being open to the innovation contributes to improving care and increasing patient satisfaction.

Limitations: The location and sample of this study is a limitation. The study was conducted with nursing students of a university in southern Türkiye.

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Conflict of interest

No potential conflict of interest was reported by the authors.

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