



# Determination of Individual Innovation Characteristics of Operating Room Nurses

## Ameliyathane Hemşirelerinin Bireysel İnovasyon Özelliklerinin Belirlenmesi

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### ABSTRACT

**Objective:** This study was conducted to determine the individual innovativeness of the operating room nurses and the individual factors affecting them. Operating room nurses, who work in operating rooms where many biomedical devices and sensitive instruments are used and are constantly changing with the developments in technology, need to lead in terms of individual innovative features and adapt quickly to change.

**Methods:** A descriptive and cross-sectional study was conducted between 15 November and 31 December 2021 with the participation of 153 operating room nurses in the province of İstanbul. "Individual Innovation scale (IIS)" and "Descriptive Information Form" were used as data collection tools. Data analysis was done with the SPSS 25.0 program.

**Results:** The operating room nurses' total IIS score was  $68.7 \pm 7.7$ , while their opinion leadership, resistance to change, and risk-taking subscale scores were  $28.4 \pm 3.4$ ,  $23.2 \pm 5.5$ ,  $17.1 \pm 1.8$  respectively. It was determined that gender, marital status, education level, years of experience in the operating room, surgical department, and institution characteristics affected individual innovativeness characteristics ( $p < 0.05$ ;  $p < 0.01$ ).

**Conclusion:** It was determined that the innovative behavior characteristics of the operating room nurses are mostly interrogators and the need to support and develop their innovativeness characteristics.

**Keywords:** Individual innovativeness, nurse, operating room nurse

### ÖZ

**Amaç:** Ameliyathane hemşirelerinin bireysel yenilikçilik özelliklerini ve etkileyen bireysel faktörleri belirlemek amacıyla yapıldı. Birçok biyomedikal cihazın ve hassas aletlerin kullanıldığı ameliyathanelerde çalışan ve teknolojideki gelişmelerle sürekli değişen ameliyathane hemşirelerinin bireysel yenilikçilik özellikleri açısından öncülük etmesi ve değişime hızlı uyum sağlaması gerekmektedir.

**Gereç ve Yöntem:** İstanbul ilinde 153 ameliyathane hemşiresinin katılımıyla 15 Kasım-31 Aralık 2021 tarihleri arasında tanımlayıcı ve kesitsel bir çalışma olarak yapıldı. Veri toplama aracı olarak "Bireysel Yenilik ölçeği (BYÖ)" ve "Tanımlayıcı Bilgi Formu" kullanıldı. Veri analizi SPSS 25.0 programı ile yapıldı.

**Bulgular:** Ameliyathane hemşirelerinin toplam BYÖ puanı  $68,7 \pm 7,7$ , fikir liderliği, değişime direnç ve risk alma alt ölçek puanları sırasıyla  $28,4 \pm 3,4$ ,  $23,2 \pm 5,5$ ,  $17,1 \pm 1,8$  idi. Cinsiyet, medeni durum, eğitim düzeyi, ameliyathanedeki deneyim yılı, cerrahi bölüm ve kurum özelliklerinin bireysel yenilikçilik özelliklerini etkilediği belirlendi ( $p < 0,05$ ;  $p < 0,01$ ).

**Sonuç:** Ameliyathane hemşirelerinin yenilikçi davranış özelliklerinin daha çok sorgulayıcı olduğu ve yenilikçilik özelliklerini destekleme ve geliştirme ihtiyacı olduğu belirlendi.

**Anahtar Kelimeler:** Bireysel yenilikçilik, hemşirelik, ameliyathane hemşiresi

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## INTRODUCTION

Innovativeness can be defined in different ways, such as adopting innovation faster than others, acting outside what was known before, and creating an absolute change. On the other hand, individual innovativeness is expressed as an individual's willingness to innovate, adopting a positive attitude, and adopting it as a behavior (1-3).

In line with the developments in diagnosis, treatment, and care services, change management is stated as the most important organizational vision for health institutions. Organizational change in the field of health services requires a vision understanding of "the basic functions of the system and those that support these functions". With this understanding, there is a need for a highly qualified workforce that performs regulations and functions professionally (4). Operating rooms appear as service areas where innovative approaches are most needed with the effect of rapidly developing technology (5).

There are studies in the literature on the innovativeness of nursing students and nurses working in internal medicine and surgery clinics (1-5). However, only two studies were found that included operating room nurses, who were most affected by the developments in science and technology and therefore had to adapt to a constant change and development.

Therefore, with the view that more research is needed on operating room nurses; in order to determine the distribution of innovative behavior level categories of operating room nurses, the relationship between innovative behavior level and sociodemographic and descriptive characteristics (age, gender, marital status, education level, operating room experience years, surgical department and institution characteristics).

This research was carried out to determine the individual innovativeness of the operating room nurses, who are most affected by the developments in science and technology and therefore have to adapt to a constant change and development, and the individual factors that affect them. Studies examining the innovative characteristics of operating room nurses could not be found. For this reason, it is aimed to make suggestions to institutions and leaders in determining, supporting, and developing the innovative characteristics of operating room nurses and to contribute to the literature.

### **The research questions were determined:**

1) In which category are the individual innovativeness characteristics of the operating room nurses?

2) What are the individual factors affecting the individual innovativeness of the operating room nurses?

## METHODS

### **Study Design**

It was planned as a descriptive and cross-sectional study.

### **Sample and Setting**

The study population consisted of nurses working as operating room nurses in Istanbul. The sample of the study was carried out with 153 operating room nurses who were actively working in any health institution in Istanbul between November 15 and December 31, 2021 who agreed to participate in the research and met the inclusion criteria of the study.

The snowball sampling technique, one of the nonprobability sampling methods, was used. The suggested analysis for relational studies, which is used to determine the factors decisive in calculating the sample size, was used. Considering the number of independent variables, the study was planned to be completed with the participation of 149 operating room nurses according to the 0.05 significance value, 95% power, and 0.15 effect size parameters (<https://www.danielsoper.com/statcalc/calculator.aspx?id=1>). The study was completed with the participation of 153 operating room nurses.

### **Inclusion Criteria**

Operating room nurses working as operating room nurses in any institution in the province of İstanbul who reached and voluntarily agreed to participate in the research were included in the study.

### **Data Collecting Tools**

The data were collected in the study using the online data collection tools "Descriptive Information Form" and "Individual Innovation scale (IIS)", which were prepared by the researchers in line with the literature (5).

### **Descriptive Information Form**

It consists of 7 items that include the sociodemographic characteristics of the operating room nurses (age, gender, marital status, educational status, operating room working years, surgical department and institution information).

### **Individual Innovation Scale**

It was developed by Hurt, Joseph, and Cook in 1977 to measure the innovativeness level of individuals, and its Turkish validity and reliability study was carried out by Sarioğlu Kemer and Yıldız in 2014 (6). A total of 20 items in

the original scale were arranged as 18 items in the Turkish validity and the reliability study. The answers in the scale are 5-point Likert type; it is scored between “strongly disagree: 1 point and strongly agree: 5 points”. In IIS there are 11 directs (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 14<sup>th</sup>, 16<sup>th</sup> and 17<sup>th</sup> items) and 7 reverses (18<sup>th</sup>, 15<sup>th</sup>, 13<sup>th</sup>, 12<sup>th</sup>, 9<sup>th</sup>, 6<sup>th</sup>, 5<sup>th</sup> items) items. The scale has three subscale scores. 7 items (1<sup>st</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup> items) reflecting the “Opinion Leadership subscales score” and 7 items that reflect the “Resistance to Change subscales score” (5<sup>th</sup>, 6<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 18<sup>th</sup> items) and 4 items (2<sup>nd</sup>, 14<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup> items) reflecting the “Risk Taking subscales score” are evaluated. The lowest score that can be obtained from the scale is 18 and the highest is 90 points. The evaluation of the scale is based on the total score. In the evaluation, 82 points and above are accepted as “Innovators”, between 75 and 82 points as “Pioneers”, between 66 and 74 points as “Interrogators”, between 58 and 65 points as “Skeptical”, 57 points and below as “Traditionalists”. The “Opinion Leadership subscales score” refers to the characteristics that make the individual ahead of the others according to the group characteristics; “Resistance to Change subscales score” refers to individuals’ concerns about change and innovation; and the “Risk Taking subscales score” reflects the characteristics of coping with uncertainties. The related feature increases linearly with the increase in scores in all dimensions. The Cronbach’s alpha coefficient of IIS 0.82 is reported as 0.80 in the Opinion Leadership subscale score, 0.78 in the Resistance to Change subscale score, and 0.72 in the Risk-Taking subscale score (1-3,6-8). In the research, the Cronbach’s alpha coefficient of IIS 0.82 was 0.80 in the Opinion Leadership subscales score, 0.85 in the Resistance to Change subscales score, and 0.71 in the Risk-taking subscales score. When Cronbach’s alpha reliability coefficients were examined on the basis of the total and subscale scores of the IIS, it was determined that it varied between 0.851 and 0.715, and the internal consistency of the scale was reliable according to the coefficients.

### Data Collection

The data collection form was sent online to the nurses who would participate in the study. In the data collection form, information was given about the purpose of the study and the essentiality of voluntary participation, and their consent was obtained. Filling out the data collection form takes approximately 5-10 minutes.

### Statistical Analysis

Data analysis was performed using SPSS 25.0 (Statistical Packages for the Social Sciences, Armonk, NY: IBM Corp. 2017) program. Within the scope of the research,

the participants’ sociodemographic information and IIS responses were evaluated. Since the expressions of the scale’s Resistance to Change dimension consisted of opposite expressions, the expressions were reversed before the evaluations were made. In the evaluation of the data; the standard deviation, median, frequency, percentage, lowest value, and highest value were used from descriptive statistics. Scores related to the total and subscale scores of the scale were obtained from the total scores of the responses given to the statements under the dimension. Before examining the differences according to demographic variables, their conformity to the normal distribution was examined with the Kolmogorov-Smirnov test. Among the tests, Mann-Whitney U test and Kruskal-Wallis test were applied. After the Kruskal-Wallis test, the Dunn-Bonferroni test was applied as the post hoc test. In the analysis of the data,  $p < 0.05$  values were considered statistically significant.

### Ethical Permissions

Ethical permission (no: 2021/11-733, date: 01.11.2021) for the study was obtained from the İstanbul Yeni Yüzyıl University Science, Social and Non-Interventional Health Sciences Research Ethics Committee. Permission to use the scale and written informed consent from the nurses participating in the study were obtained from the authors who conducted the validity and reliability study for the use of the scale.

## RESULTS

According to the total IIS scores of the operating room nurses, individual innovativeness levels were determined to be mostly questioning (45.75%), skeptic (28.75%), pioneering (16.99%), innovative (4.57%), and least traditional (3.92%). The sociodemographic and working life characteristics of the participants are shown in (Table 1).

According to age groups, the 26-33 age group was perceived as more opinion leaders than the 18-25 age group ( $p < 0.05$ ). According to gender, men are perceived as more opinion leaders than women, while women are less anxious about change and innovation than men ( $p < 0.05$ ;  $p < 0.01$ ). In compliance with marital status, married people show a more innovative attitude and opinion leadership and are more open to change than singles ( $p < 0.05$ ;  $p < 0.01$ ). As per educational status, undergraduate and graduate graduates are more competent in terms of individual innovation and less resistant to change than associate degree graduates. Health vocational high school graduates report the ability to cope with uncertainties and take risks compared to both associate degree and undergraduate and higher graduates ( $p < 0.05$ ;  $p < 0.001$ ). According to the years of operating room experience, individual innovativeness and opinion

leadership were higher in participants with 10 or more years of experience ( $p < 0.05$ ;  $p < 0.001$ ). In accordance with the characteristics of the institution, employees working in private institutions show the ability to cope with uncertainties and opinion leadership compared with those working in public institutions ( $p < 0.05$ ). As reported by the Surgical Intervention List to be Applied in the Surgical Intervention Units of the Ministry of Health, Annex 1 group (Ministry of Health 2009/42), operating room nurses working in the surgical departments where major surgeries are performed show less resistance to change ( $p < 0.05$ ). The total scores of the operating room nurses' IIS/subscales score and items are given in (Table 2).

## DISCUSSION

Due to the limited number of studies describing the individual innovative characteristics of operating room nurses, studies conducted with sample groups including nurses working in other units (medical/surgical/intensive

care) were included in the discussion. Innovation in the delivery of health services and patient care is expressed as the process of transferring a new idea to the development of patient care and improving outcomes (9). It is emphasized that operating room workers, who are most affected by the rapid technological developments in recent years, should support their innovative features in order to adapt quickly to changes and developments (10). In the results of a study conducted in 2021 to determine the factors affecting the individual innovativeness of operating room staff, including operating room nurses, it has been reported that individual innovativeness levels are affected by gender, marital status, type of occupation (physician, nurse, operating room technician), age, and working year (5). In line with the results of the research, it was determined that among the operating room nurses, men are perceived as more opinion leaders than women, and women show less resistance to change than men. Married people are more competent in terms of individual innovation, more opinion leaders, and less resistant to change than singles. Although not as a professional group, in terms of the level of education that may correspond to this, it was determined that undergraduate and higher graduates were more competent in terms of individual innovativeness and less resistant to change than associate degree graduates. It was found that the graduates of health vocational high schools had higher scores in terms of risk taking compared to both associate degree and university and higher graduates, and they were more inclined to take risks. In a study, it was reported that the X generation was more innovative than the Y generation, but this result may be related to the sample characteristics in which the physicians are majority (11). In another study conducted with nurses and nursing students, it was found that the Y generation is more innovative than the X generation (7). In some studies, there is no relationship between age and innovativeness characteristics (8,12). According to the research findings, opinion leadership behavior was observed more in the 26-33 age group than in the 18-25 age group. There was no difference in the age groups of 34 years and above, indicating that the level of individual innovativeness was positively and weakly correlated with age increase. According to the different results reported in the literature, it is thought that these results can be explained by the fact that the sample group in the study consisted of operating room nurses, age ranges were determined, and comparisons of the subscales scores in the scale were made, and there is no possibility of comparison. It can be said that this result supports the view that there is a need for more research with operating room nurses, including comparisons of scale subscales scores, as

**Table 1. Sociodemographic and professional experience characteristics of the participants (n=153)**

Characteristics	n	%	
Gender	Male	26	17.0
	Female	127	<b>83.0</b>
Age (range)	18-25 years old	66	<b>43.1</b>
	26-33 years old	34	22.2
	34-41 years old	38	24.8
	42 years and older	15	9.8
Education	Health vocational high school	30	19.6
	Associate degree	56	36.6
	Bachelor's and above	67	<b>43.8</b>
Marital status	Single	88	<b>57.5</b>
	Married	65	42.5
Operating room experience	0-1 year	38	24.8
	2-4 years	32	20.9
	5-10 years	30	19.6
	10 years and above	53	<b>34.6</b>
Institution of employment	Private hospital	101	<b>66.0</b>
	*Public hospitals	52	34.0
**Surgical group	Minor surgeries surgical group	34	22.2
	Middle surgeries surgical group	75	<b>49.0</b>
	Major surgeries surgical group	44	28.8

\*Public hospitals: State Hospital (8), Education and Research Hospital (16), City Hospital (8), University Hospital (20); \*\*Surgical group: List of Surgical Interventions to Be Applied in Surgical Intervention Units of the Ministry of Health according to Annex. 1 group (Ministry of Health 2009/42)

**Table 2.** Comparison of individual innovativeness levels of operating room nurses according to sociodemographic and descriptive characteristics (n=153)

Characteristics	Mean ± SD Median (lower-upper)				Test			
	18-25 years (a) (n=66)	26-33 years (b) (n=34)	34-41 years (c) (n=38)	42 years and above (d) (n=15)	H value	Df	p-value	Differences
IIS total score	66.67±7.71 67 (51-87)	69.76±5.87 69 (62-80)	70.26±8.37 71 (58-86)	71.07±7.59 69 (60-86)	7.205	3	0.066	
Opinion Leadership Subscales score	27.7±3.51 28 (17-34)	29.59±2.79 30 (22-34)	28.79±3.44 28 (23-35)	28.2±3.28 28 (22-33)	8.717	3	<b>0.033*</b>	b>a (p=0.024)
Risk-Taking Subscales score	16.73±2.12 17 (13-20)	17.41±1.26 17 (16-20)	17.16±1.75 17 (14-20)	17.33±1.54 16 (16-20)	3.256	3	0.354	
Resistance Change Subscales score	22.24±5.64 24 (9-33)	22.76±5.77 23 (13-34)	24.32±5.29 26 (14-33)	25.53±3.62 25 (22-33)	5.347	3	0.148	
Gender	Male (n=26)		Female (n=127)		U	z	p-value	
IIS total score	67±5.73 68 (58-76)		69.02±7.96 69 (51-87)		1426	-1.094	0.274	
Opinion Leadership Subscales score	29.69±1.76 29 (27-32)		28.18±3.57 28 (17-35)		1180	-2.306	<b>0.021*</b>	
Risk-Taking Subscales score	17.08±2.24 17 (13-20)		17.04±1.73 17 (13-20)		1527	-0.615	0.539	
Resistance Change Subscales score	20.23±4.42 20 (14-28)		23.8±5.5 24 (9-34)		994	-3.199	<b>0.001**</b>	
Marital status	Single (n=88)		Married (n=65)		U	z	p	
IIS total score	67.18±6.91 67 (51-87)		70.71±8.17 72 (51-86)		2048	-3.001	<b>0.003**</b>	
Opinion Leadership Subscales score	28.02±3.1 28 (21-34)		29±3.67 29 (17-35)		2292	-2.113	<b>0.035*</b>	
Risk-Taking Subscales score	16.84±1.87 17 (13-20)		17.32±1.73 17 (14-20)		2538	-1.213	0.225	
Resistance Change Subscales score	22.32±5.27 23.5 (9-33)		24.38±5.59 26 (13-34)		2249	-2.260	<b>0.024*</b>	
Education	Health vocational high school (a) (n=30)	Associate degree (b) (n=56)	Bachelor's and above (c) (n=67)		H value	Df	p-value	Differences
IIS total score	69.87±6.4 71 (58-80)	66.46±7.69 66 (51-87)	70±7.8 70 (58-86)		8.278	2	<b>0.016*</b>	c>b (p=0.037)
Opinion Leadership Subscales score	29.53±2.62 29 (23-34)	28±3.64 27 (17-34)	28.31±3.39 28 (21-35)		5.852	2	0.054	
Risk-Taking Subscales score	18.2±1.19 18 (16-20)	16.46±1.95 16.5 (13-20)	17.01±1.72 17 (13-20)		18.979	2	<b>0.0001***</b>	a>b (p=0.000) a>c (p=0.002)
Resistance Change Subscales score	22.13±5.05 23 (13-29)	22±6.04 22 (9-34)	24.67±4.88 25 (14-33)		8.181	2	<b>0.017*</b>	c>b (p=0.029)
Operating room experience	0-1 year (a) (n=38)	2-4 years (b) (n=32)	5-10 years (c) (n=30)	10 years and above (d) (n=53)	H value	Df	p-value	Differences

**Table 2. Continued**

IIS total score	65.95±6.6 68 (51-78)	66.88±8.13 66.5 (51-87)	69.27±6.63 69 (59-80)	71.4±7.79 73 (58-86)	12.657	3	<b>0.005**</b>	d>a (p=0.01) d>b (p=0.04)
Opinion Leadership Subscales score	27.32±2.59 28 (21-32)	27.94±4.09 27.5 (17-34)	28.93±2.86 29 (22-33)	29.26±3.48 29 (22-35)	10.288	3	<b>0.016*</b>	d>a (p=0.03)
Risk-Taking Subscales score	16.58±1.84 16 (13-20)	16.63±2.18 17 (13-20)	17.2±1.06 17 (16-19)	17.55±1.81 18 (14-20)	7.039	3	0.071	
Resistance Change Subscales score	22.05±5.9 24 (9-30)	22.31±5.09 23 (15-33)	23.13±6.02 24 (14-34)	24.58±4.92 26 (13-33)	5.240	3	0.155	
<b>Instution</b>	<b>Public (n=52)</b>			<b>Private (n=101)</b>		<b>U</b>	<b>z</b>	<b>p</b>
IIS total score	67.73±7.77 67.5 (51-86)			69.17±7.57 69 (51-87)		2367	-0.999	0.318
Opinion Leadership Subscales score	27.77±3.21 28 (21-34)			28.78±3.43 29 (17-35)		2115	-1.984	<b>0.047*</b>
Risk-Taking Subscales score	16.62±1.73 16 (13-20)			17.27±1.84 17 (13-20)		2020	-2.382	<b>0.017*</b>
Resistance Change Subscales score	23.35±6.22 24.5 (9-34)			23.12±5.1 24 (13-33)		2499	-0.490	0.624
<b>Department of employment/surgical group</b>	<b>Minor surgeries surgical group (a) (n=34)</b>	<b>Middle surgeries surgical group (b) (n=75)</b>	<b>Major surgeries surgical group (c) (n=44)</b>		<b>H value</b>	<b>Df</b>	<b>p-value</b>	<b>Differences</b>
IIS total score	67.65±8.13 68 (51-86)	68.16±6.71 67 (51-86)	70.36±8.62 72 (57-87)		3.178	2	0.204	
Opinion Leadership Subscales score	28.88±3.19 29 (21-34)	28.28±3.62 28 (17-35)	28.36±3.13 28 (22-34)		1.490	2	0.475	
Risk-Taking Subscales score	17.06±1.98 17 (13-20)	17.09±1.85 17 (13-20)	16.95±1.68 16 (14-20)		1.219	2	0.544	
Resistance Change Subscales score	21.71±6.47 24 (9-33)	22.79±4.68 23 (13-33)	25.05±5.57 26.5 (14-34)		8.655	2	<b>0.013*</b>	c>a (p=0.031) c>b (p=0.03)

Mean ± SD: Mean ± standard deviation; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001; U: Mann-Whitney U test, p: The value of signiability, Df ; Degree of freedom, H value: Kruskal-Wallis test

a: Eye surgery (8), Ear Nose Throat surgery (2), Pediatric Surgery (2), Other surgeries (26).

b: General surgery (14), Other surgeries (61).

c: Neurosurgery (6), Cardiovascular surgery (22), Orthopedics and Traumatology surgery (8), Obstetric surgery (8)

stated in the research purpose. In a qualitative study conducted with nurses (13) and in another study conducted with operating room workers (physicians, nurses, surgery technicians) (11), it has been reported that there is a linear relationship between years of experience and innovation level. In some studies, it has been reported that the year of professional experience is not related to the level of innovation (8,12,14). Individuals with 10 or more years of experience in the operating room have higher individual innovativeness levels than those with 0-1 years or 2-4 years of experience, and there is no difference between them and

those with 5-10 years of experience. In terms of the Opinion Leadership subscale score, those with 10 years or more of experience state that they are perceived as more opinion leaders than those with 0-1 years of experience. Consistent with the literature, it was claimed that after the first working year, which included the inexperience and learning process, the innovativeness level of the operating room nurses increased as the years of experience increased. It is thought that this result can be explained by the development of the professionalism of operating room nurses in determining the requirements for surgical intervention and patient safety,

being aware of and eliminating inadequacies, in line with their experience in surgical intervention procedures. Among the factors hindering innovation are institutional barriers and inadequacy of resources, as well as the attitudes of members of the profession. In addition, workload and employees' feeling of pressure are also expressed as negative factors affecting the level of innovation (2). In the research conducted by Bilik et al. (5), the participants reported the attitudes of managers and institutional approaches as barriers to innovation. It was claimed in the research that the employees in private institutions showed more ability to cope with uncertainties and opinion leadership than those working in public institutions. It is thought that operating room nurses do not prefer to take risks with innovative ideas and initiatives due to the corporate culture brought by the legal regulations in public institutions, the management approach, and the approaches of the members of the profession, and prefer to continue their defined duties in the current order. For the implementation of innovations, the support of nurse leaders and the establishment of an institutional culture that adopts and values evidence-based practice standards are extremely important (15-17). As emphasized in the literature (18,19), it is recommended to know the factors that negatively affect the level of innovation, to accept and make the necessary arrangements, to increase the awareness of the leading decision-makers, and to ensure cooperation in supporting innovation and change. Those working in Major Surgeries Surgery Group departments showed less resistance to change than those working in Minor and Middle Surgeries Surgery Group departments. This result can be interpreted as the change and development observed in surgical departments that use special tools, equipment, methods, and technology that positively affect and support individual innovative features. In addition to the limited number of studies in the scientific literature that included operating room nurses in the sample group, an analysis related to the total score and subscales scores of the operating room nurses and the surgical departments they were working with could not be reached. In two studies conducted with operating room workers, in which the operating room nurses were also in the sample group, it was reported that the individual innovativeness level of the health workers in the operating room was mostly in the "traditional" category (5,14). The data obtained from another study conducted with internal medicine, surgical and intensive care nurses apart from operating room nurses was evaluated as the result that 40.7% of the nurses and in another study 42.1% of the nurses were "skeptical" (6,14). This result, which is inconsistent with the literature, is related to the fact that

most participants in the sample group have a bachelor's degree or higher, have 10 years or more experience working in private institutions, and are thought to be limited to group characteristics. In a study conducted to define the individual innovativeness characteristics of intensive care, internal and surgical nurses, the total score of the nurses' IIS was  $70.71 \pm 9.79$ , the total score of the opinion leadership subscales was  $25.85 \pm 4.77$ , and the total score of the resistance to change subscales was  $18.57 \pm 5.81$ , and the Risk-Taking Subscales score total score was  $15.93 \pm 3.18$ . In the study, although the total score of the operating room nurses' IIS ( $68.7 \pm 7.7$ ) was lower than the values reported in the literature, and the total score of the Risk-Taking Subscales score ( $17.1 \pm 1.8$ ) was similar, the total score of the Resistance to Change subscales score ( $23.2 \pm 5.5$ ) was found to be significantly higher. Accordingly, it can be said that operating room nurses show less resistance to change and are more open to change compared with intensive care, medical, and surgical nurses. When the expressions in which the operating room nurses have an average of 4 and above among the expressions in the subscales scores, it can be concluded that they are sensitive to the problems encountered, support innovative ideas and initiatives to find solutions, and enjoy using new things and leading the use of innovations. Since no analysis was found in the literature regarding the statements containing the answers to the subscales scores, no evaluation could be made. It is predicted that because of supporting the innovativeness of the operating room nurses, who are mostly in the questioning category with their individual innovativeness, they will contribute positively to the development of intraoperative nursing care with innovative and evidence-based practices and to increase the quality of care.

### Study Limitations

This research reveals the need for research on defining, supporting, and developing the innovativeness of operating room nurses by accepting that the innovativeness of operating room nurses may show different characteristics with different factors in different geographies and cultures. There are limitations to this research that should be acknowledged. The results obtained may vary according to other countries and cities in terms of geography, city, cultural structure, nursing education system, and structuring of health services. For this reason, it can be stated that the research results are limited to the sample and cannot be generalized.

### CONCLUSION

It has been determined that the individual innovativeness of the operating room nurses is mostly in the inquiring category,

women are more open to change than men, men and those with more than ten years of experience are perceived as more opinion leaders, and married people are perceived as both more open to change and opinion leaders. It was found that as the level of education and years of experience increased, the innovativeness level was positively affected, while the risk-taking feature decreased. While those working in private institutions report that they are perceived as more opinion leaders than those working in public institutions, operating room nurses working in departments where major surgical operations are performed, regardless of institution, state that they are less resistant to change. Operating room nurses state that they research and develop new solution methods to the problems they encounter and that they like to lead innovations with an attitude that supports innovative ideas and initiatives. The fact that very few operating room nurses who undertake important responsibilities during surgical intervention in operating rooms where different and rapidly developing technologies are used are in the "innovative" category shows the need to develop their innovative features. Innovative behaviors in operating room nurses are thought to be one of the most important factors in the development of evidence-based patient care and safety practices in the surgical intervention process. In line with the results obtained, the institutions and leaders working together should encourage their participation in in-service training or similar programs, where they will be informed about scientific and technological developments that will support the innovative features of operating room nurses and enable them to be an opinion leader, review institutional policies, and make arrangements according to the needs. Conducting this research with including different geography and cultures; It can obtain important information about identifying and supporting the innovative characteristics of operating room nurses.

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### ETHICS

**Ethics Committee Approval:** Ethical permission (no: 2021/11-733, date: 01.11.2021) for the study was obtained from the İstanbul Yeni Yüzyıl University Science, Social and Non-Interventional Health Sciences Research Ethics Committee.

**Informed Consent:** Permission to use the scale and written informed consent from the nurses participating in the study were obtained from the authors who conducted the validity and reliability study for the use of the scale.

### Authorship Contributions

Concept: N.A., S.G., H.B.K., Design: N.A., S.G., H.B.K., Data Collection or Processing: N.A., S.G., H.B.K., Analysis or Interpretation: N.A., S.G., H.B.K., Literature Search: N.A., S.G., H.B.K., Writing: N.A., S.G., H.B.K.

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