



## Sex Discrimination in Clinics: Do Female Undergraduate Gender Feel in Health Services Less Secure?

### Kliniklerde Cinsiyet Ayrımcılığı: Kadın Sağlık Öğrencileri Kendilerini Daha Az mı Güvende Hissediyor?

<sup>1</sup> Gülden AYNACI

<sup>2</sup> Zuhale GUKSU

 ORCID: 0000-0002-2112-8631

 ORCID: 0000-0003-0150-3227

<sup>1</sup>Trakya Üniversitesi Sağlık Yüksekokulu, Edirne, Türkiye

<sup>2</sup>Trakya Üniversitesi Tıp Fakültesi, Edirne, Türkiye

#### ÖZ

**Amaç:** Çalışmamızın amacı, Sağlık Bilimindeki lisans öğrencilerinin hasta güvenliği açısından bilgi ve özgüven düzeylerini belirlemektir.

**Gereç ve Yöntemler:** Bu çalışma Aralık 2018 ve Haziran 2019 tarihleri arasında Trakya Üniversitesinden 583 sağlık bilimi öğrencisiyle yapıldı. 245 hemşirelik öğrencisi, 134 hemşire beslenme ve diyetetik öğrencisi, 141 fizik tedavi ve rehabilitasyon öğrencisi, 14 odyoloji öğrencisi, 49 sağlık yönetimi öğrencisi idi. Sağlık Mesleki Eğitiminde Hasta Güvenliği ölçeğinden aldıkları puanlar değerlendirildi. Öğrencilerin, hasta güvenliği konusundaki bilgi ve deneyimi 3 tema üzerinden değerlendirildi. Kliniklerde hasta güvenliği alanlarını öğrenmede kendilerine duydukları güven, hasta güvenliğinin daha geniş yönleri hakkında bilgileri ve etkileyen parametreler incelendi.

**Bulgular:** Erkek üniversite öğrencilerin ekip çalışmasına, güvenlik risklerini yönetmeye ve beklenmedik durumları tanımadaki güven kızlara göre daha yüksekti. Kız öğrenciler, çalışma ortamındaki güvenlik ekipmanlarını anlama konusunda kendilerine güvenleri daha yüksekti. Erkekler, öğrenci olsalar da olumsuz olayları şikayet edebildiklerini belirttiler. Katılımcıların klinik ortamlarda güvensiz bakım uygulamasında yer aldığını gördüğü birine yaklaşma konusundaki güvenleri düşüktü.

**Sonuç:** Kız öğrenciler etkili iletişim yoluyla hasta güvenliğini artırabileceklerini düşünüyorlardı ve çevresel faktörlerin kliniklerde kendilerini etkilediğini belirtti. Kızlar duygular, beceriler ve bellekte daha iyiydi. Algılamaya düzeyleri değerlendirildiğinde erkekler daha yüksek puan aldı. Bu çalışma öğrencilerin olumsuz olayları bildirmekte rahat olmadıklarını göstermektedir. Sağlık bilimi profesyonellerinin hasta güvenliği sağlama ve risklere çözüm bulma yeteneklerini artırmak için lisans eğitimlerine hasta güvenliği bilinci kazandırıcak eğitimleri arttırmak gereklidir.

**Anahtar Kelimeler:** cinsiyet ayrımcılığı; hasta bakımı; lisans sağlık bilimi eğitimi; sağlık bilimi; üniversite öğrencileri

#### ABSTRACT

**Aim:** To determine the knowledge and self-confidence levels of undergraduate health science students in terms of patient safety.

**Material and Methods:** This study was performed with 583 health science students of Trakya University between December 2018 and June 2019. Two hundred forty-five were student nurses, 134 were nutrition and dietetics students, 141 were physical therapy and rehabilitation students, 14 (2.40%) were audiology students, and 49 (8.40%) were healthcare management students. They answered the Health Professional Education in Patient Safety Survey (H-PEPSS). The H-PEPSS evaluated knowledge and experience on patient safety through 3 themes; confidence in learning certain patient safety areas, information about the broader aspects of patient safety, and comfort in speaking up about safety.

**Results:** The confidence of males in studying in teams, managing safety risks, and recognizing unexpected situations was higher than in females. Females were more confident in understanding the safety equipment in the working environment. Males also stated that they could report adverse events even if they were students. The students' confidence to approach someone they saw engaging in unsafe care practice in clinical settings was low.

**Conclusion:** The females thought that through effective communication, they could improve patient safety. The females had a better understanding of the role of environmental factors. Females were better in emotions, skills, and memory. When the perception levels were evaluated, males scored higher. This study has shown that students are not comfortable in reporting adverse events. The quality of continuous undergraduate education should be increased in order to increase the ability of health science professionals to provide patient safety and to find solutions to risks.

**Keywords:** sex discrimination; patient care; undergraduate health science education; health science; university students

#### INTRODUCTION

Patient safety is an important determinant of the quality of health care. The importance of providing patient safety and having a level of knowledge and skills are understood more as time passes. The undergraduate

education process in health sciences is an important building block toward increasing the adequacy of patient safety and educating future healthcare professionals as competent specialists. In addition, it should ensure performance of good clinical practice in unexpected situations in clinics.

#### Sorumlu Yazar/ Corresponding Author:

Gülden Aynacı

Trakya Üniversitesi Sağlık Yüksekokulu, Edirne, Türkiye

Email: guldenaynaci@hotmail.com

Başvuru tarihi: 12.07.2018

Kabul tarihi: 31.10.2018

Health science professionals have a critical role in managing patient care and safety in clinics that provide health care. Moreover, females may be under more pressure than males due to increased workload, efforts to provide high quality care, emotional responses in the care of patients, responses to occupational stress, and women's unique physiologic structure. As scientific progression continues restructuring to advance health sciences, education to higher levels also continues. Patient safety can be brought to optimal levels through education of students on their way to becoming health professionals, as well as refreshing knowledge of health professionals. A number of studies demonstrated the importance of education of medical students and other health professionals in equipping them with the knowledge, attitude, and skills necessary to prepare them for professional life, and the importance of restructuring education (1-4). Universities offering health science undergraduate education have begun to take global concerns for healthcare safety issues into account. To increase the level of proficiency in patient safety, the necessity of including the content of patient safety in health vocational education programs is often considered as a priority. Studies, however, show that this does not happen quickly in healthcare services. Emphasis should also be given to socio-cultural aspects of patient safety programs (5).

Security competencies in health centers are shaped by the diversity of health disciplines. The World Health Organization and international professional organizations also develop patient safety competence and training frameworks. Six sociocultural fundamentals, which constitute the building blocks of patient safety, are emphasized; making contributions to patient safety, working as a team for patient safety, establishing high quality communication with patients and staff, risk and safety assessment in clinics, regulation of human and environmental factors in order to ensure security, and timely recognition of and response to negative events or adverse effects including appropriate interventions (6,7).

Objective tools are used to measure the knowledge, skills, and attitudes of students receiving vocational education in health, especially in health science undergraduate programs about patient safety. In order to examine the impact of specific patient safety interventions and to improve the quality of health care services, an effort should be made to maintain continuous renewal and to increase experience.

The assessment of confidence levels of female students is necessary in order to increase their competence in patient safety and to determine the place of patient safety in health education. It is important that young healthcare workers, who will enter professional life, create their own patient safety skills and reinforce them with their observations. The Health Professional Education in Patient Safety Survey (H-PEPSS) was designed specifically for this purpose. The scale questions a wide range of patient safety competence areas and has strong psychometric characteristics (7). It is used to evaluate healthcare professionals in various disciplines and undergraduate health education programs in universities. The results reflect the participants' learning experiences and their satisfaction with a program. It also shows whether young people who are about to enter a profession in healthcare understand the content of the patient safety program. The H-PEPSS may also be used to evaluate attitudes and knowledge (self-report) included in quality and safety training of health sciences (8). The H-PEPSS focuses on the more complex sociocultural aspects of this subject and it is suitable for those who continue education. However, with its wide variability, it may also be used while assessing healthcare professionals.

Patient safety is an important determinant in providing high quality healthcare. Health sciences are critical to patient safety (18). Health sciences are

in constant communication with patients, patient relatives, health personnel, and physicians. In addition, health sciences are at the center of patient safety due to their contribution to all stages of patient care. In order to achieve higher levels of attention to patient safety, training should begin in undergraduate health science programs and education should continue in throughout professional life.

The aim of this study was to determine the knowledge, awareness, and self-confidence levels of undergraduate health science students in terms of patient safety. Thus, patient safety training in undergraduate health science programs can be evaluated and guidance may be provided for attempts to protect or improve quality.

## MATERIAL AND METHODS

### Study design

This study was performed through face-to-face interviews with undergraduate health science students of Trakya University. Voluntary students were asked to evaluate their competencies and confidence levels in learning about patient safety issues, both in class and in the clinical field. The study started in December 2018 and was completed in June 2019. Written informed consents were obtained from the participants of this study.

### Participants

Five hundred eighty-three volunteers from the undergraduate health science students of Trakya University in Turkey participated in our study. Participants were 18-29 years old. 245 (42.02%) were student nurses, 134 (22.98%) were nutrition and dietetics undergraduate students, 141 (24.18%) were physical therapy and rehabilitation undergraduate students, 14 (2.40%) were audiology undergraduate students, and 49 (8.40%) were healthcare management undergraduate students (Table 1).

**Table 1.** The Sexes of the Participants and their Percentages

Un-dergra-du-ate Pro-grams	Student Nurses	Nutrition and Di-etetics	Physical Therapy and Rehabilita-tion	Audiol-ogy	Health-care man-agement	Total
Female Students	192 (32.93%)	75 (12.86%)	72 (12.73%)	7 (1.20%)	22 (3.77%)	368 (63.1%)
Male Students	53 (9.09%)	59 (10.12%)	69 (11.83%)	7 (1.20%)	27 (4.63%)	215 (36.9%)
Total	245 (42.02%)	134 (22.98%)	141(24.18%)	14 (2.40%)	49 (8.40%)	583 (100%)

### Systematic review protocol and data sources

The participants were evaluated using prepared forms. After the sociodemographic features were questioned, the students completed the H-PEPSS. It was developed by Ginsburg et al. and its safety and reliability have been determined (9-10).

The H-PEPSS was designed to measure knowledge and confidence of healthcare providers and students about the six main topics of patient safety. The H-PEPSS measures the self-confidence of individuals about clinical skill dimensions. In addition, it measures different aspects of patient safety and also includes the ability to critically look at this topic. It is a 5-point Likert-type questionnaire. The answers range from 1 (strongly disagree) to 5 points (strongly agree). The H-PEPSS can be used with health professionals in a wide range of areas. It is also suitable for undergraduate health science students who have just graduated from university, are approaching graduation, or continuing their education (8,9).

The H-PEPPS evaluates knowledge and experience on patient safety through 3 themes. It examines the level of knowledge about specific patient safety areas. This mainly evaluates clinical safety, the culture of safety, communicating effectively, working in teams with other health professionals, managing safety risks, understanding human and environmental factors, and recognizing, responding to and disclosing adverse events and close calls.

**Search strategy**

The H-PEPSS assesses patient safety and parameters affecting safety in health vocational education. It investigates skills and concerns about patient safety, which are self-evaluated by students taking health professional education. This scale mainly focuses on the sociocultural aspects of patient safety, including communication with patients and health workers, identifying risks, and understanding management and systemic factors. The H-PEPPS was summarized by Kirkpatrick and evaluated by Barr. It is an evaluation tool that measures the improvement of patient safety and the level of competence of participants with education. It has also been used to assess knowledge and behaviors that define the quality of the safety training of health science and other undergraduate health educations (11). The scale explores the perspectives of students in various fields of health services on various aspects of patient safety. It questions the self-confidence of the participants regarding the most commonly encountered issues in clinics (e.g. hand hygiene, patient transplantation, and drug safety), as well as systemic problems that interact with patient safety (e.g. management, organization, work environment resources, human factors, communication, and discipline practices). The H-PEPPS evaluates the experience and awareness of participants on the main aspects of patient safety. The study assesses agreement only, it does not ask them to say whether statements are true or false?

**Ethical consideration**

Ethics committee approval for this study was obtained from Trakya University Scientific Research Ethics Committee.

**Data analysis**

All statistical analyses were evaluated using the IBM SPSS 21.0 package program. The non-parametric Mann-Whitney U test was used for group comparisons. The data were evaluated using appropriate descriptive statistics. Median, minimum, and maximum were calculated as descriptive statistics. Mean and standard deviation are used for descriptive statistics of quantitative variables and percentage and frequency are used for qualitative variables. Significance value (P) for all statistical analyses was defined as 0.05.

**RESULTS**

**Participant selection and characteristics**

Between December 2018 and June 2019, 583 volunteers from the undergraduate health science students of Trakya University participated in our study. Three hundred sixty-eight (63.1%) participants were female and 215 (36.9%) were male. The sociodemographic features, age, high school they graduated from, undergraduate education program that they had been taking, and their experience in the healthcare sector were asked of the participating students. H-PEPSS questions were asked in face-to-face interviews to each participant. Students aged below 22 years formed 60.2% of the population. The number of students aged between 22 and 24 years was 214 (36.7%). Eighteen (3.1%) students were aged 24 years or over. One hundred ten (18.9%) students graduated from health vocational high school, 473 (81.1%) students graduated from other high schools. One hundred seventeen (20%) students were in the 4th year, 148 (20.1%) were in the 3rd year, 128 (22%) were in 2nd year, and 190 (32.6%) were in the 1st year. The first and second year students have more lessons in the classroom; therefore, it was easier for us to reach them to complete the study questionnaire form. There were more 3rd and 4th students than 1st and 2nd year. Thus, there was heterogeneity in the participants.

The place of residence of the participants during university education was questioned; 137 (23.5%) students were staying at a house they rented with their friends, 34 (5.8%) were staying with their families, and 412 (70.7%) were staying at a state or private dormitory.

**Synthesized findings**

In our study, 46 (7.9%) students had another university license other than the healthcare branch from which they had previously graduated. The number of students who worked as professionals in healthcare before they started their current universities was 55 (9.4%).

The H-PEPPS was mainly evaluated in 3 areas. We wanted to evaluate the differences of sex discrimination in undergraduate students. The first one was "perceived confidence in patient safety areas." Perceived confidence in safety areas was evaluated separately in females and males. Results of in-classroom and in-clinic subscales were assessed (Table 2).

**Table 2.** Self-reported Patient Safety Scores in the Classroom and Clinic

Patient safety dimensions	Classroom				p	Clinical				p
	Women (n=368)		Men (n=215)			Women (n=368)		Men (n=215)		
	Median	Mean	Median	Mean		Median	Mean	Median	Mean	
<b>Section1. Patient safety areas</b>										
Clinical safety skills	4.00	3.92	4.00	3.79	.146	4.25	4.06	3.96	4.25	.361
Culture of patient safety	3.00	2.89	3.00	2.88	.256	3.00	2.96	2.96	3.00	.889
Studying in teams with another health professionals	4.00	3.79	4.00	3.83	.551	4.00	4.01	3.87	4.00	.484
Communicating efficiently	4.16	4.01	4.00	3.94	.552	4.33	4.14	4.00	4.00	.046*
Managing safety risks in areas	4.00	3.78	3.66	3.65	.201	4.00	3.88	3.73	4.00	.087
Understanding environmental and human agents	4.16	4.03	4.00	4.01	.789	4.33	4.16	4.06	4.33	.26
Recognize and prevent unexpected situations	4.00	3.89	3.75	3.72	.084	4.00	3.99	3.81	4.00	.050

\*Statistically significant

The areas in which the students were confident about females or males (score  $\geq 4$ ) were examined. "Understanding environmental and human agents" (4.03=classroom; 4.16=clinic), and "communicating efficiently" (4.01=classroom; 4.14=clinic) were high in female students. "Understanding environmental and human agents" was high in male students (4.01=classroom; 4.33=clinic). The confidence of male health science students in some areas in clinics was higher than in female health science students (mean scores 4 or above). These were "clinical safety skills," "studying in teams with other health professionals," "communicating efficiently," "managing safety risks in areas," and "recognizing and preventing unexpected situations." However, the difference between male and female students was not statistically significant.

The only difference between the female and male students in the first part of the study was found in communication in the clinics ( $P = .046$ ). Female health science students were more confident in communication skills with patients and other health professionals.

The confidence of females in clinical practices (e.g. hand hygiene, safe drug administration), managing professional conflicts while studying with health professionals, decision-making and adaptation to team dynamics was at a good level (mean  $>4$ ).

The percentage of participants who felt confident (score  $\geq 4$ ; meaning confidence is high) about what they had learnt in training programs about patient safety and confidence level both in classroom and in clinics were assessed (Table 3). More than 70% (73.7% in-clinic) of females who participated in this study felt confident about communicating effectively with patients and others in the environment. The percentage of female participants who felt confident about clinical safety skills to benefit to the patient was also high (66% in-clinic). Among the male health science students, 72.6% felt confident about understanding human and environmental factors. They stated that they could provide safe administration of health technologies, and felt confident when they managed workflow, ergonomics, and resources.

**Table 3.** Broader Aspects of Patient Safety and Confidence in Speaking Up About Patient Safety

Patient safety dimensions	Classroom				<i>p</i>	Clinical				<i>P</i>
	Women (n=368)		Men (n=215)			Women (n=368)		Men (n=215)		
	Median	Mean	Median	Mean		Median	Mean	Median	Mean	
<b>Section 2.</b>										
<b>Broader aspects of patient safety</b>	3.92	3.80	3.85	3.76	.737	4	3.83	3.85	3.82	.968
As a student, my scope of practice was clear to me	4	4.08	4	3.93	.150	4	4.14	4	4.03	.390
There is consistency in how patient safety issues were dealt with by different preceptors in the clinical/simulation setting	4	3.85	4	3.78	.652	4	3.94	4	3.80	.377
I had sufficient opportunity to learn and interact with members of interdisciplinary teams	4	3.57	4	3.47	.529	4	3.69	4	3.64	.822
I gained a solid understanding that reporting adverse events and close calls can lead to change and reduce reoccurrence of events	4	3.91	4	3.76	.212	4	4.03	4	3.88	.143
Patient safety was well integrated into the overall program	4	3.73	4	3.30	.361	4	3.73	4	3.70	.944
Clinical aspects of patient safety were well covered in our program	4	3.94	4	3.84	.440	4	3.86	4	3.90	.633
'System' aspects of patient safety were well covered in our program	4	3.79	4	3.71	.912	4	3.78	4	3.75	.816
<b>Section 3.</b>										
<b>Confidence in speaking up about patient safety</b>	3.33	3.45	3.33	3.42	.788	3.66	3.51	3.66	3.54	.712
In clinical settings, discussion of adverse events focuses mainly on system-related issues, rather than focusing on the individual(s) most responsible for the events	4	3.45	4	3.60	.265	4	3.75	4	3.69	.759
It is difficult to question the decisions or actions of those with more authority	3	3.27	3	3.34	.582	4	3.42	4	3.47	.595
If I see someone engaging in unsafe care practice in the clinical setting, I feel safe to approach them	3	3.34	3.5	3.37	.688	4	3.45	4	3.35	.445
If I make a serious error I worry that I will face disciplinary event	3		3.5			4		4		

Having information about the broader aspects of patient safety in sex discrimination was considered. Under this topic, the scale evaluated how broader patient safety issues are addressed in health professional education and the confidence about reporting these issues comfortably.



Female health science students stated that they were confident in understanding the safety equipment in the working environment. Their confidence was good in classrooms (mean: 4.08) and in clinical areas (mean: 4.14). The responses of female students about consistency in how patient safety issues were dealt with by different preceptors in clinical settings during their study in health practice centers were relatively good (in-classroom 3.85; in-clinic 3.94). Male students also stated that they could report adverse events even if they were students (in-clinic: 4.03; in-classroom: 3.93). The confidence levels of both female students (76.6%) and male students (72.1%) were high on this topic.

Most of the students (69.3% of the females and 70.7% of the males) stated that wider systemic aspects of patient safety (e.g. use of resources, safety organization of patients, safe use of working environments) had been addressed well during their entire training process. The majority of the female and male students (69.6% and 71.4%, respectively) reported that reporting adverse events and close calls could lead to a positive change and decrease the probability of recurrence.

No statistically significant difference was detected between the female and male students in terms of their responses to section 2.

The confidence of both the female and male students in talking about situations that might threaten patient safety were evaluated. No sex discrimination was clearly identified.

There were topics in which students had low levels of confidence in speaking about patient safety. Their confidence to approaching someone they saw engaging in unsafe care practice in clinical setting was low (51.9% females, 56.3% males).

They stated that they believed changing someone's beliefs who had more authority than themselves was difficult (mean score of females: 3.37 and males: 3.35).

Most students stated that in clinical settings, discussion around adverse events focused mainly on system-related issues rather than focusing on the individual(s) most responsible for the event (females 63.3%, males 63.8%). The opinions of the students suggested that they were comfortable with this topic (mean score of females: 3.75 and males: 3.69).

## DISCUSSION

Patient safety is generally defined as follows: 'The absence of preventable damage to patients during the healthcare process indicates the quality of patient safety. The discipline of patient safety is the coordinated effort to prevent damage caused by the health process itself.' Studies indicate that the main aim of the patient safety discipline is to minimize negative events and to eliminate preventable damage in health services (11,12).

From the patient's view, security is, believing that they will not be harmed by the care provided to them. In terms of health science, patient security is provided through the ability to respond to this need in health centers by being aware of the need to feel safe. The awareness of new healthcare workers about their patient safety competencies should be determined and developed until the beginning of their professional life.

In our study, the scores of the students in clinical safety skills (basic occupational skills, infection control, safe treatment applications) were good. Other studies have also shown that students know better the clinical safety aspects of patient safety, as opposed to the socio-cultural aspects of patient safety (12,13).

Both males and females reported that they would have little hesitation in recognizing adverse effects and adverse events in clinics, intervening, and informing patients about adverse events. In other studies, it was seen that students were relying on what they learned in order to manage security risks, to understand

human and environmental impacts, and to produce solutions for them (14).

When the results of our study were examined, there was a difference in communication issues between male and female health science students. The female students thought that through effective communication, they could improve patient safety both by communicating clearly and consistently with patients, and by effective communication with other health professionals. The scores in clinics in our study (mean 4.14 for females and 4.00 for males) were at good levels. Thus, they stated that they felt confident in the effective communication dimension to prevent adverse events and understood the importance of patient safety. Other studies have also shown that health science students are confident in the effective communication dimension of patient safety (25). In other studies that evaluated patient safety in health vocational education, scores from effective communication were also high. Ginsburg et al. found 4.15 in clinical settings; van den Kerkhof et al. found 4.43; and Usher et al. found 4.2 (9,14-16).

Female students stated that factors such as fatigue and intensity of working conditions affected them more. It was seen that female students had a better understanding of the role of environmental factors such as workflow, resources used, and ergonomics affecting patient safety. They stated efforts to ensure the safe implementation of health technology. At the same time, with the high score they received from the security culture, they stated that they would question security culture problems and they would try to provide an environment that would encourage patients and staff to report issues when there was a security weakness.

In our study, 76.6% of females and 72.1% of males were found to be able to understand the safety medical equipment as a student in health centers. Lukewich et al. found this score as 67-70% and van den Kerkhof found it as 82%. In some other studies, this value was 48% in medical students, 66% in postgraduate students, and 67% in health science students (3,17,18).

In our study, 51.9% of the female students and 56.3% of the male students stated that if they saw someone who performed unsafe patient care practices they felt comfortable in warning them, even if these people had more authority than themselves. One of the conclusions is that it is necessary to educate teachers in practice environments in order to improve students' skills and self-confidence. Opportunities should be provided to students in terms of education and training. Both the female and male students in the study were not willing to report serious adversities that could cause patient safety problems. Other studies have shown that less than 60% of students in health vocational education indicate that they can confidently approach someone who is performing an unsafe practice. More than 75% of undergraduate students in the field of healthcare stated that it was difficult to challenge someone who is the clinic authority (18). The present study's findings are similar to studies showing low self-confidence in reports about malpractice or misbehavior in clinics. In addition, it is in line with previous literature showing that patient safety risks are not sufficiently exposed (19). Healthcare providers should be appreciated when they give feedback and notice problems, requirements or concerns. Our study is consistent with previous literature which indicated that it is hard for health science students to gain confidence to speak about patient safety due to valid business life culture (9,20).

In our study, 63.3% of the females and 63.8% of the males stated that discussion around adverse events in clinical settings focuses mainly on system-related issues, rather than focusing on the individual(s) most responsible for the event. In clinical practices that accompany health vocational training environments, equipment and resources are questioned more than individuals. Other studies also demonstrated that there were hesitations to question those who had authority in clinical practice areas and the reactions were concentrated on people rather than events (14).

It is thought that providing good patient safety is one of the factors that increases the quality of the service in the health center. In addition, patient safety and patient care quality are sine qua non of the centers and systems responsible for providing healthcare services. Health sciences are at the forefront in providing patient safety with their experience and observations. In addition, health sciences are the largest group of healthcare providers. Health science are more likely to recognize, intervene, and correct life-threatening events in clinics because they spend more time with patients and take part in more important tasks in the clinics compared with other healthcare professionals (21).

Similar to the literature, almost half of the students reported that they could not raise their concerns regarding unsafe practices due to a lack of authority. Health sciences are an important part of the team that provides optimal conditions for safety issues. They also take on tasks to complete deficiencies in healthcare needs, professional behaviors, and concerns about delays that occur frequently. Training and practices that support reporting and participation help to develop patient safety strategies. Despite concerns about patient safety, unresponsiveness and silence are more likely, which endangers safety in clinics that do not support reporting. The main reasons of treatment errors and unsafe practices in the first years of the profession are the pressure of other health workers in the working environment and not being able to take a critical approach (22-25).

It is important to provide health science students with a supportive environment instead of pressure and criticism during their clinical experience. System-based approaches are required to ensure patient safety (26). Developing solutions with systematic approaches to the requirements in clinics improves the students' experience and develops their ability to realize their deficiencies. Studies show that student healthcare providers can stay in the practices they think are wrong, with the fear of being abandoned by the team in clinics (27). However, this may pose a risk to patient safety.

The quality of continuous health science undergraduate education should be increased in order to increase the ability of health science professionals to provide patient safety and to find solutions to risks. In addition to the education received by health professionals during their education period, it is important to continue their education in order to maintain their personal development in their professional life. Continuous skills and care acquisition efforts should be supported for patient care and safety.

Health education programs show some similarities to technical training programs such as engineering undergraduate programs prepared by functionally oriented experts. Undergraduate health science programs, in which patient safety education has a part, should focus mainly on the technical aspects of patient care. In order to optimize patient safety, the health science undergraduate program should be prepared in an education program that is standardized, includes certain rules and instructions, and enables the provision of a high-quality service.

Previous studies demonstrated that participants were more confident about some of the issues they had learned in the classroom about patient safety issues. Learning "working in teams," "culture of safety," "understanding human and environmental factors," and "risk management" in classroom environment produces more confidence in students (3,21). The role and quality of the relationship between students and educators in both the classroom and the clinical setting is important. The problem of trust in clinics can be caused by various parameters. The intensity of the working environment, lack of time, and personal conflicts between health workers may interrupt patient safety education.

There is a general lack of perception in the field of patient safety in all levels of health science undergraduate education. However, this deficiency was observed to decrease after obstetrics and gynecology courses and practices. This may be

due to the increase in their experience and knowledge because they were 3rd year students who took well level scores.

Similar to our study, several studies have been conducted to examine patient safety adequacy in classroom and clinical settings. These studies showed that self-reliance on patient safety had a strong impact on both the quality and safety of clinics (21,26). Health science students reported that they perceived the positive effects of patient safety on patient outcomes in clinical learning environments.

Various areas of work are anticipated in the health science profession. Patient safety training should be given in health science undergraduate programs from the first year in order to train skilled healthcare professionals to ensure patient safety (3,27). Health vocational training to ensure optimal patient safety should be maintained throughout university education. Health science students need high-quality knowledge and skills to keep patients safe in an ever-changing healthcare environment. In health science undergraduate programs, patient safety education is an important milestone in the path towards patient safety and quality in clinical practice. Education and training to ensure patient safety will enable health science students to think more critically in clinics and increase their awareness. Training and education have important roles in patient safety. By helping students to gain knowledge, attitude, experience, and skills, it helps students to improve themselves. It also creates awareness about patient safety events, causes, and prevention (27-30).

With their communication skills, health professionals play important roles in the patient's healing process and in optimizing patient safety. Student health sciences should be confident that they can communicate effectively with health professionals and patients such that they can learn to provide maximum patient safety. Both female and male students should gain the ability to solve the deficiencies they see in clinics with effective communication. During the undergraduate education, it is very important for students to have critical perspectives in the field of practice, to improve patient safety, to recognize adverse events, to produce solutions to unexpected situations, and to be confident in communicating with employees at every stage of healthcare service.

There are some patient safety principles that should be present in the academic and clinical education of health sciences who will provide professional service in the field of health. These are required to support the implementation of high quality safety practices. It is important for health science students to understand how they handle patient safety according to their sex and academic year, and to evaluate their perspective on patient safety (13).

Studies evaluating male and female students also identified significant differences in some subjects. Female health science students were better than males in emotions, skills, and memory. When the perception levels were evaluated, male students scored higher. Female students were found to approach their profession with a deeper perspective (14). Training needs to be deepened in the appropriate levels of patient safety for both male and female students.

The lack of a decrease in unexpected events in healthcare facilities warrants increased importance to be given to patient safety. The importance given to patient safety issues is increasing throughout the world. Patient safety issues and training are frequently included in undergraduate programs in many universities and their role in clinical practice has been increasing. Strategies to ensure patient safety standards and protection are continually designed, tested, and implemented in order to improve patient safety standards (3-31).

The combination of academic learning and clinical practice supports mastering patient safety skills. This study has shown that students are not comfortable enough to report adverse events or close calls, which is consistent with the previous literature reporting patient safety risks (29, 47). Based on the findings of our study,

the sensitivity of both male and female undergraduate health science students on patient safety should be increased. No difference was detected between the sexes. This requires training staff in the practice clinics needed to provide support to students.

There are some limitations in the study. No difference was detected between the sexes. In our study, we would have preferred to have more male students to identify sex discrimination better; however, there were too few male health science students. Future studies will require larger sample sizes to evaluate this issue.

Since the number of students in different undergraduate programs in the study was low, we did not separate the males and females in the undergraduate programs into separate groups. Our suggestion is to make studies with larger sample groups in order to investigate sex discrimination and the affecting parameters.

## CONCLUSION

In order to achieve significant improvements in the way that patient safety is improved to optimal conditions, effective training and working strategies are necessary, including the steps that will enable health science students to make their criticisms fearlessly. Health professionals have a critical role to play in the forefront of increasing patient safety. In order to reduce the safety risks that patients may face in the clinics to low levels, both female and male students in the training process should continue to improve their adequacy in the safety of the patient and to communicate with other health workers in unexpected situations. Security skills should be supported in training programs, but also these programs should be checked to understand whether they have the required quality. There is no need to gender discrimination to both male and female students for giving more chances them in the patient care.

### There is no conflict of interest.

We want to thank Ass. Prof. Dr. Selçuk Korkmaz for his help with statistical evaluations.

## REFERENCES

- Bath J, Dombrovskiy VY, Vogel TR. Impact of Patient Safety Indicators on readmission after abdominal aortic surgery. *Journal of Vascular Health science*. 2018;36(4):189-95. <https://doi.org/10.1016/j.jvn.2018.08.002>
- Sun N, Lv DM, Man J, Wang Xy, Cheng Q, Fang Hl, et al. The correlation between quality of life and social support in female health sciences. *Journal of clinical health science*. 2017;26(7-8):1005-10. <https://doi.org/10.1111/jocn.13393>.
- Lukewich J, Edge DS, Tranmer J, Raymond J, Miron J, Ginsburg L, et al. Undergraduate baccalaureate health science students' self-reported confidence in learning about patient safety in the classroom and clinical settings: An annual cross-sectional study (2010–2013). *International Journal of Health science Studies*. 2015;52(5):930-38. <https://doi.org/10.1016/j.ijnurstu.2015.01.010>
- Wong BM, Etschells EE, Kuper A, Levinson W, Shojania KG. Teaching quality improvement and patient safety to trainees: a systematic review. *Academic Medicine*. 2010;85(9):1425-39. doi: 10.1097/ACM.0b013e3181e2d0c6
- Kane JM. Patient safety education: overreported and still lacking. *Academic Medicine*. 2010;85(9):1397-98. doi: 10.1097/ACM.0b013e3181eb4c7f
- Fagan A, Parker V, Jackson D. A concept analysis of undergraduate health science students speaking up for patient safety in the patient care environment. *Journal of advanced health science*. 2016;72(10):2346-57. <https://doi.org/10.1111/jan.13028>
- Bressan V, Stevanin S, Bulfone G, Zanini A, Dante A, Palese A. Measuring patient safety knowledge and competences as perceived by health science students: An Italian validation study. *Health science education in practice*. 2016;16(1):209-16. <https://doi.org/10.1016/j.nepr.2015.08.006>
- Stevanin S, Bressan V, Bulfone G, Zanini A, Dante A, Palese A. Knowledge and competence with patient safety as perceived by health science students: The findings of a cross-sectional study. *Health science education today*. 2015;35(8):926-34. <https://doi.org/10.1016/j.nedt.2015.04.002>
- Ginsburg L, Castel E, Tregunno D, Norton PG. The H-PEPSS: an instrument to measure health professionals' perceptions of patient safety competence at entry into practice. *BMJ Qual Saf*. 2012;21(8):676-84. <http://dx.doi.org/10.1136/bmjqs-2011-000601>
- Jacob S, Thomas S. Effect of Educational Intervention on Knowledge Regarding Patient Safety among Undergraduate Health science Students of Navi Mumbai. *International Journal of Health science Education and Research*. 2018;6(1):61-65. <http://dx.doi.org/10.5958/2454-2660.2018.00015.7>
- Montoya ID, Kimball OM. Gauging patient safety programs. *Journal of allied health*. 2013;42(3):182-86. <https://www.ingentaconnect.com/content/asahp/jah/2013/00000042/00000003/art00012#expand/collapse>
- Kim L, Lyder CH, McNeese Smith D, Leach LS, Needleman J. Defining attributes of patient safety through a concept analysis. *Journal of advanced health science*. 2015;71(11):2490-503. <https://doi.org/10.1111/jan.12715>
- Duhn L, Karp S, Oni O, Edge D, Ginsburg L, VanDenKerkhof E. Perspectives on patient safety among undergraduate health science students. *Journal of Health science Education*. 2012;51(9):526-31. <https://doi.org/10.3928/01484834-20120706-04>
- VanDenKerkhof E, Sears N, Edge DS, Tregunno D, Ginsburg L. Patient safety in practical health sciences' education: A cross-sectional survey of newly registered practical health sciences in Canada. *Health science education today*. 2017;51:48-56. <https://doi.org/10.1016/j.nedt.2017.01.003>
- Usher K, Woods C, Parmenter G, Hutchinson M, Mannix J, Power T, et al. Self-reported confidence in patient safety knowledge among Australian undergraduate health science students: A multi-site cross-sectional survey study. *International journal of health science studies*. 2017;71:89-96. <https://doi.org/10.1016/j.ijnurstu.2017.03.006>
- Berta W, Laporte A, Perreira T, Ginsburg L, Dass AR, Deber R, et al. Relationships between work outcomes, work attitudes and work environments of health support workers in Ontario long-term care and home and community care settings. *Human resources for health*. 2018;16(1):15. <https://doi.org/10.1186/s12960-018-0277-9>
- Doyle P, VanDenKerkhof EG, Edge DS, Ginsburg L, Goldstein DH. Self-reported patient safety competence among Canadian medical students and postgraduate trainees: a cross-sectional survey. *BMJ Qual Saf*. 2015;24(2):135-41. <http://dx.doi.org/10.1136/bmjqs-2014-003142>
- Lukewich J, Edge DS, VanDenKerkhof E, Williamson T, Tranmer J. Association between registered health science staffing and management outcomes of patients with type 2 diabetes within primary care: a cross-sectional linkage study. *CMAJ open*. 2016;4(2):E264. <https://dx.doi.org/10.9778%2Fcmajo.20150113>
- Castel ES, Ginsburg LR, Zaheer S, Tamim H. Understanding health sciences' and physicians' fear of repercussions for reporting errors: clinician characteristics, organization demographics, or leadership factors? *BMC health services research*. 2015;15(1):326. <https://doi.org/10.1186/s12913-015-0987-9>

20. Ginsburg LR, Tregunno D, Norton PG. Self-reported patient safety competence among new graduates in medicine, health science and pharmacy. *BMJ Qual Saf.* 2012;bmjqs-2012-001308. <http://dx.doi.org/10.1136/bmjqs-2012-001308>
21. Colet PC, Cruz JP, Cruz CP, Al-Otaibi J, Qubeilat H, Alquwez N. Patient safety competence of health science students in Saudi Arabia: a self-reported survey. *International journal of health sciences.* 2015;9(4):418. <https://www.ncbi.nlm.nih.gov/pubmed/26715921>
22. Dekker SW, Breakey H. 'Just culture': improving safety by achieving substantive, procedural and restorative justice. *Safety science.* 2016;85:187-93. <https://doi.org/10.1016/j.ssci.2016.01.018>
23. Dankoski ME, Bickel J, Gusic ME. Discussing the undiscussable with the powerful: why and how faculty must learn to counteract organizational silence. *Academic Medicine.* 2014;89(12):1610-13. doi: 10.1097/ACM.0000000000000428
24. Hutchinson M, Jackson D. Troubling fragments and small stories: an analysis of public commentary on health science through a web blog. *Collegian.* 2014;21(2):81-88. <https://doi.org/10.1016/j.colegn.2013.12.002>
25. Sahay A, Hutchinson M, East L. Exploring the influence of workplace supports and relationships on safe medication practice: A pilot study of Australian graduate health sciences. *Health science education today.* 2015;35(5):e21-e26. <https://doi.org/10.1016/j.nedt.2015.01.012>
26. Tella S, Smith NJ, Partanen P, Turunen H. Learning patient safety in academic settings: A comparative study of Finnish and British health science students' perceptions. *Worldviews on Evidence-Based Health science.* 2015;12(3):154-64. <https://doi.org/10.1111/wvn.12088>
27. Lee NJ, Jang H, Park SY. Patient safety education and baccalaureate health science students' patient safety competency: A cross-sectional study. *Health science & health sciences.* 2016;18(2):163-71. <https://doi.org/10.1111/nhs.12237>
28. Weatherford BH, Viveiros JA. senior Health science students' Perspectives on safety competencies: An end-of-Program outcome evaluation. *Health science Education Perspectives.* 2015;36(3):182-84. DOI: 10.5480/13-1182
29. Tregunno D, Ginsburg L, Clarke B, Norton P. Integrating patient safety into health professionals' curricula: a qualitative study of medical, health science and pharmacy faculty perspectives. *BMJ Qual Saf.* 2014;23(3):257-64. <http://dx.doi.org/10.1136/bmjqs-2013-001900>
30. Mansour M. Examining patient safety education in pre-registration health science curriculum: Qualitative study. *Journal of Health science Education and Practice.* 2013;3(12):157. <https://doi.org/10.5430/jnep.v3n12p157>
31. Steven A, Magnusson C, Smith P, Pearson PH. Patient safety in health science education: contexts, tensions and feeling safe to learn. *Health science education today.* 2014;34(2):277-84. <https://doi.org/10.1016/j.nedt.2013.04.025>