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Editorial

THE DISASTER OF THE CENTURY: EARTHQUAKES IN TURKIYE

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On February 6th, 2023, Turkey experienced two severe earthquakes, just nine hours apart from each other, centered in Kahramanmaraş. The first earthquake hit at 04:17 am, measuring 7.8 on the Richter scale, and the second at 1:24 pm on the same day with a magnitude of 7.6. These earthquakes, described as the disaster of the century, affected 11 provinces in the Eastern Anatolia and Southeastern Anatolia Regions; Kahramanmaraş, Adıyaman, Hatay, Osmaniye, Diyarbakır, Adana, Gaziantep, Malatya, Elazığ and Şanlıurfa. Approximately 15.8 million people living in the earthquake zones were directly affected. Subsequently, many aftershocks occurred in cold winter conditions, preventing people from entering their homes for a long time and having to survive outside. The Minister of Interior Disaster and Emergency Management Presidency stated that 57,029 buildings were destroyed in the earthquakes, more than 50,000 people lost their lives in which more than 7000 were refugees, 107,000 were injured and approximately 850 of them were amputated [1]. About a month after the earthquakes, the earthquake area was affected by heavy rains and floods. In the UNICEF report, it was stated that 4 million children had difficulty in accessing education due to the disasters [2]. The Ministry of Health announced that one out of four hospitals in the disaster area was severely damaged [3]. Approximately 2.7 million people left their homes in the disaster area.

In addition to the academic and other staff working in the universities in the disaster area, the students lost their lives, their homes, as well as those who lost their families and friends, as well as the number of those affected by the earthquakes. Although two months have passed since the earthquakes, some of the victims whose houses were destroyed stay in dormitories and similar shelters, while others try to survive in tents and containers. Psychological problems such as post-traumatic stress disorder, anxiety and depression have emerged, as well as problems related to nutrition and hygiene, as well as the risk of epidemics.

In response to the suffering caused by the earthquakes and the problems encountered, the effort to help people deeply affect and share the pain has also been noteworthy. Search and rescue teams from many countries of the world, support messages sent from different geographies of the world and aid materials have been a hopeful and proud moment for humanity.

In these difficult days, we tried to publish the first issue of International Journal of Health Services Research and Policy for 2023. The reviewers, authors and editors of our journal tried their best, but due to the adverse work conditions caused by the earthquakes, the review process of the articles was delayed. Despite all the negativities though, we managed to publish the first issue of the 8th volume of our journal with a limited number of studies.

We are grateful to all editors, reviewers and authors for their contributions, collaborations and devotion. Hope to meet again in happier days away from all disasters...

Regards.

Editor-in-Chief
Assoc. Prof. Dr. Rojan Gümüş

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Research Article

THE VIEWS OF NURSES WORKING IN SURGICAL CLINICS AND SURGICAL INTENSIVE CARE UNITS ON MEDICATION ADMINISTRATION ERRORS AND ERROR REPORTING

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Abstract *This study aims to identify the causes of medication administration errors and the reasons stated by nurses working in surgical clinics and surgical intensive care units for not reporting these errors, and to compare the number of errors witnessed by nurses and errors actually reported. The research sample of this descriptive cross-sectional study consists of 125 nurses working in surgical clinics and surgical intensive care units. Data were collected using the face-to-face survey method. The Nurse Personal Information Form and the Medication Administration Error Scale were used to collect data. The perceived medication administration error rate was found to be 59 %; however, 61.6 % of the nurses reported that only 0-20 % of medication administration errors were actually reported. The main reasons for not reporting medication errors are administrative response (4.10 ± 1.18) and fear (3.28 ± 0.99). The most important reason for not reporting errors due to the administrative response is that no positive feedback is given after correct medication administration (4.18 ± 1.53). The perceived cause of medication administration error is pharmacy-related and system-related, which explains 26% of the reason for not reporting the error due to fear. The fact that the reason for medication administration error originates from the physician, pharmacy, and system explains 51 % of the reason for not reporting the error due to disagreement over the error. There is a major difference between the medication administration errors nurses witness and the errors they actually report. The errors are not reported due to administrative response and fear.*

Keywords: *Error reporting, Medical Errors, Medication Errors, Nursing, Surgical Nursing.*

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1. Introduction

Medical error is defined as the unexpected or undesirable results patients are exposed to either intentionally or as a result of negligence during the treatment and care process in health institutions. As a result of medical errors, undesirable situations that involve the risk of death, serious physical or psychological injuries and damage may occur [1]. Medical error includes medication errors, surgical errors, errors in diagnosis, errors due to system deficiencies, and other errors. Preventing these errors in health institutions is the basis of quality improvement and ensuring patient safety. Security reporting systems have been established in order to prevent the reoccurrence of errors that cause harm to the patient or that were noticed before they did harm and to create an educational material based on the reported events [2].

One of the most common medical errors in health institutions is medication administration (MA) errors [1;3]. Medication administration is a process that includes the procurement of the correct

medication given at the request of the doctor, administration of the medication to the correct person at the correct dose, time, and method, correct patient training, correct recording, the confirmation of the patient's rejection, correct medication preparation, and correct response follow-up [4]. Any negativity or disruption to be experienced in this process causes medication administration errors.

MA errors occur due to a multidisciplinary process. Pharmacies, the pharmaceutical industry, the health system, physicians and nurses are included in this process. Pieces of evidence is that nurses' working environments threaten patient safety, heavy workloads and low job satisfaction reduce the quality of care and services provided by nurses [4;5]. However, nurses work at the stages where the probability of error is the highest in the medication administration process [1;4]. Nurses generally experience MA errors during interventions such as medication selection, medication administration, medication dose calculation, the selection of the administration method, and medication form preparation. The most important characteristic of MA errors is that they are preventable [3]. Studies show that 56.7-100% of medication errors witnessed by nurses are preventable [3;5;6]. For this reason, nurses who are responsible for the management of the treatment and care plan of the patients have a key role in preventing MA errors.

The general opinion is that medical errors occur mostly in clinics and intensive care units where patients who have undergone surgical intervention are hospitalized [4;5]. Kırşan et al. (2019) reported that nurses frequently make mistakes in the best-known practices during medication administration [1]. Aygin et al. (2020) determined that nurses who did not make any medication errors and witnessed medication errors 56.7% of them [5]. Around a quarter of the nurses reported errors, such as medication errors and patient falls, which threatened patient safety in the emergency units. According to the study, the case report forms were not filled when these errors occurred [7]. Nurses working in clinics where surgical patients are hospitalized may reduce the occurrence of MA errors if they fulfill their treatment responsibilities in the most accurate way [8]. Thus, safer care and treatment may be provided to patients and quality service may be ensured.

The most important threat after the occurrence of MA errors is not reporting these errors and covering them up. Reporting all errors without fear of punishment is the most important quality improvement work in health institutions. The information obtained as a result of error reporting may ensure that necessary arrangements are made, measures are taken, and the awareness level of employees is increased with in-service training. Thus, it is important that healthcare institutions understand the attitudes and behaviors toward patient safety so they can determine the weak points, errors, and other factors affecting them [7]. However, errors in health institutions are not reported for reasons such as fear of the response of the administrator, fear of being blamed, being punished, and disagreement over the error. Therefore, this study aimed to reveal the perceptions of the nurses working in surgical clinics and surgical intensive care units about the causes of MA errors and not reporting errors and to compare the MA errors witnessed by nurses and the actual reported MA error rates.

2. Materials and Methods

This descriptive cross-sectional study includes the nurses working in the surgical clinics and surgical intensive care units of Yozgat Bozok University Research and Application Hospital. The research was carried out with the survey method in order to reveal the perceptions of nurses regarding the causes of MA errors and not reporting errors, and to compare the MA errors witnessed MA errors and the actual reported MA error rates.

The total number of nurses working in the surgical clinics and surgical intensive care units of the hospital was 132. The research sample included 125 (94.7 %) nurses who actively provided patient care in the hospital between 01.11.2021 and 20.11.2021 and who agreed to participate in the study. Seven (5.3 %) nurses who were on leave for various reasons (marriage, birth, death, annual leave, illness, etc.)

during the date of the research could not participate in the research. The researchers provided them with information about the study and obtained their verbal informed consent. The participants were informed that they could decide not to participate in the study, that no identifying information would feature on the survey forms, and that the data would be used only for the study.

2.1. Data collection tool

The Nurse Information Form and the Medication Administration Error Scale (MAES) were used to collect data. The Nurse Information Form aimed to gather data on the socio-demographic characteristics of the nurses (age, gender, etc.).

Medication Administration Error Survey-MAES: The scale consists of four parts. The first part includes 29 items scored on a six-point Likert type scale, where responses range from 1 = strongly disagree to 6 = strongly agree (Items from 1 to 29). These items measure nurses' perceptions of factors that may cause MA errors. The total score that can be obtained from this part of the scale ranges from 29 to 174. As the score obtained from each item increases, the probability of the factor stated in the item to cause medication error also increases. The items in this part were grouped under six subscales, which are physician (4,5,6,7), lack of knowledge (17,18,19,23), pharmacy (9,10,11), the pharmaceutical industry (1,2,3), the system (12,20,21,24,25,26,27,28,29) and susceptibility to error (13,14,15,16) [2].

The second part includes 16 items (Items from 30 to 45) scored on a six-point Likert scale, where responses range from 1 = strongly disagree to 6 = strongly agree. These items aim to reveal the reasons why nurses do not report errors. The total score that can be obtained from this part of the scale ranges from 16 to 96. As the score obtained from each item increases, the probability of the cause of not reporting an error stated in the item also increases. The items in this part are grouped under three sub-factors, which are fear (31,36,37,39,40), disagreement over the error (30,32,33,34,35,38,41), and administrative response (42,43,45) [2].

The third part consists of 21 items (Items 46-66) on a 10-point scale. The total score that can be obtained from this part of the scale varies between 21 and 210. As the score scale approaches 210, it is predicted that the error rates in the clinic and the error rates actually reported are equal [2].

The items in the fourth part of the scale aim to introduce the participants and are not scored [2].

The Turkish validity and reliability study of the scale was performed by Arat in 2016. The Cronbach's alpha values for the parts of the scale were reported as 0.89 for the first part, 0.83 for the second part, and 0.98 for the third part [2]. In the current study the total Cronbach alpha value for the scale was 0.93.

2.2. Ethical considerations

Prior to the study, Ethics Committee approval was obtained from Yozgat Bozok University (numbered E-28571837-600-38544 and dated 20.10.2021). The nurses participating in the research provided their verbal informed consent.

3. Statistical Analysis

The data were analyzed using the Statistical Package for Social Science (SPSS) 20. Since the variables of gender, marital status, the unit where the nurse works, and use of the medication dose guideline showed normal distribution, t-test was performed to reveal the relationship between the groups. Since the variable of working model did not show normal distribution, the Mann Whitney U test was performed to reveal the relationship between the groups. Since the variables of age, level of education, years of experience, frequency of non-intravenous medication administration, and frequency of monthly rotation showed normal distribution, (One-Way) ANOVA test was performed to determine

the relationship between the groups. The Kruskal-Wallis test was used to determine the relationship between the groups as to the variable of the frequency of intravenous medication administration, which did not show normal distribution. The effect between dependent and independent variables was tested with multiple regression analysis. The findings were evaluated at 95% confidence interval and 5% significance level.

4. Results and Discussion

4.1. Results

It was found that 58.4 % of the nurses working in the surgical clinic and the surgical intensive care unit were female; 68 % had a bachelor's degree; 52% were married; and their mean age was 29.38 ± 5.72 years. 65.6% of the nurses worked in surgical clinics; their working experience was 6.97 ± 5.58 years; 72% of them did not use the medication dose guideline while providing care; 72 % were patient-centered; and 64% used non-intravenous medications frequently. It was revealed that 80 % of the nurses administered intravenous medications frequently and 50.4 % of them did not have rotations over a month (Table 1).

Table 1. Distribution of the socio-demographic and working characteristics of the nurses (n=125)

Variables	Characteristics	n	%
Gender	Female	73	58,4
	Male	52	41,6
Age	20-28	71	56,8
	29-37	42	33,6
	38+	12	9,6
Level of Education	High school	40	32
	Bachelor’s degree	85	68
Marital status	Married	65	52
	Single	60	48
Unit	Surgical ICU	43	34,4
	Surgical clinic	82	65,6
Years of experience	1-5	66	52,8
	6-11	37	29,6
	12+	22	17,6
Use of the medication dose guideline	Yes	35	28
	No	90	72
Working Model	Job-centered	35	28
	Patient-centered	90	72
Frequency of non-IV medication administration	Rarely	22	17,6
	Sometimes	23	18,4
	Often	80	64
Frequency of IV medication administration	Rarely	12	9,6
	Sometimes	13	10,4
	Often	100	80
Frequency of monthly rotation	None	63	50,4
	1-5	48	38,4
	6+	14	11,2

ICU: Intensive Care Unit

The mean score of the nurses on Part I of the MAES, in which perceptions regarding the causes of MA errors are evaluated, was found to be 95.15 ± 19.57, and the most common cause of MA errors was revealed as the pharmaceutical industry (4.70 ± 0.94), followed by susceptibility to error (4.24 ± 0.82). The mean score of the nurses on Part II of the MAES, in which the reasons for not reporting the MA errors are evaluated, was 52.02 ± 12.48. The main reason for not reporting an error was found to be administrative response (4.10 ± 1.18), followed by fear (3.28 ± 0.99). The mean score on Part III of the

MAES, which evaluates whether error reporting is at the same rate as clinical reporting, was 59.28 ± 57.21. It was reported that the highest amount of error reporting was due to MA errors experienced as a result of intravenous administrations (34.20 ± 34.02) (Table 2).

Table 2. Distribution of MAES scores (n = 125)

Parts	Factors	Min-max	Mean±SD
Part I	Physician	1,50-3,00	2,63 ± 0,26
(43-144)	Lack of Knowledge	1,00-5,00	2,69 ± 1,03
95,15±19,57	Pharmacy	1,00-6,00	2,24 ± 1,09
	Industry	1,00-6,00	4,70 ± 0,94
	System	1,00-5,33	2,84 ± 0,82
	Susceptibility to error	1,75-6,00	4,24 ± 0,82
Part II	Fear	1,00-6,00	3,28 ± 0,99
(19-84)	Disagreement over the definition	1,00-5,71	2,77 ± 0,84
52,02±12,48	Administrative response	1,00-6,00	4,10 ± 1,18
Part III	Non-intravenous MA	10,00-100,00	27,88 ± 26,24
(21-210)	Intravenous MA	12,00-120,00	34,20 ± 34,02
59,28±57,21			

MA: Medication administration

Among the factors causing medication errors, the “pharmaceutical industry” has the highest mean score with 4.70 ± 0.94, and the most important reason for the error in this dimension is that the names of some medications are similar (4.77 ± 1.13). As another factor causing medication errors, “susceptibility to errors” has a mean score of 4.24 ± 0.82, and the most important reason for making mistakes in this dimension is the frequent use of equivalent medications (5.09 ± 1.10). The mean score for the "system" dimension, which is another factor causing MA error, was 2.84 ± 0.82, and it was revealed that the most important factor under this dimension was nurses’ not being aware of the known allergy of a patient (3.14 ± 1.53). The mean score for the "lack of knowledge" dimension was 2.69 ± 1.03, and the most important factor under this dimension was found to be the lack of an easy way to find information about medications in the unit (2.84 ± 1.47). The mean score of the "physician" dimension was found to be 2.63 ± 0.26, and the most important factor under this dimension was the frequent change of orders by physicians (4.04 ± 1.38). The mean score for the "pharmacy" dimension was found to be 2.24 ± 1.09, and the most important factor under this dimension is that the pharmacy does not label medications correctly (2.29 ± 1.30) (Table 3).

Table 3. Distribution of the mean scores of the nurses on the factors causing medication errors (n=125)

Part I. Subscales of the MAES		Mean±SD
Physician	Physician's medication orders are not legible.	3,29±1,65
	Physician's medication orders are not clear/understandable.	3,31±1,65
	Physicians change orders frequently.	4,04±1,38
	Physicians use abbreviations instead of writing the orders completely.	3,36±1,47
	Total (1,50-3,00)	2,63±0,26
Lack of Knowledge	There is no easy way to find information about medications in the unit.	2,84±1,47
	Nurses in this unit have limited knowledge of medications	2,66±1,34
	Nurses are pulled between their own teams and the teams of other units regarding medication administration.	2,52±1,29
	The level of knowledge of the unit personnel about medication administration is insufficient.	2,75±1,29
	Total (1,00-5,00)	2,69±1,03
Pharmacy	Pharmacy delivers incorrect dose of medication to the unit.	2,25±1,21
	Pharmacy does not prepare the medicine correctly.	2,17±1,12
	Pharmacy does not label the medicine correctly.	2,29±1,30
	Total (1,00-6,00)	2,24±1,09

Table 3. Continued

Part I. Subscales of the MAES		Mean±SD
Industry	Some medications have similar names.	4,77±1.13
	Different medications look similar	4.69±1.17
	Some medications have similar packaging/packaging.	4.65±1.04
	Total (1.00-6.00)	4.70±0.94
System	It is not possible to reach pharmacists 24 hours a day.	4.04±1.38
	When the prescribed dose of medication is delayed, nurses cannot communicate with the physician to set the duration for the next dose	2.81±1.43
	Nurses in this unit do not follow approved medication administration procedure.	1.95±0.96
	For a group of patients, all their medications may not be given at the agreed time.	2.85±1.49
	Medication orders are not recorded correctly on medication cards.	2.72±1.20
	Errors can be made on medication cards.	2.60±1.27
	Tools are not working properly or not set correctly.	2.95±1.63
	Nurses may not be aware of patients' known allergies.	3.14±1.53
	Patients are in a different area than the nurse's working area because of their other care processes.	2.99±1.41
	Total (1.00-5.33)	2.84±0.82
Susceptibility to error	The equivalent of the medications is often used (example: using the cheaper equivalent).	5.09±1.10
	Communication between physicians and nurses is poor.	3.57±1.50
	Many patients have the same or similar medications.	4.24±1.21
	Unit personnel do not receive adequate in-service training on new medications.	4.04±1.33
	Total (1.75-6.00)	4.24±0.82

Table 4 shows the distribution of the mean scores on the subscales of Part I in MAES, which evaluates the reasons for not reporting MA errors. The mean score for the "administrative response" dimension was found to be 4.10 ± 1.18, and the most important reason under this dimension for not reporting errors is that no positive feedback is given after correct medication administration (4.18 ± 1.53). The mean score for the "fear" dimension was found to be 3.28 ± 0.99, and the most important reason under this dimension is that if medication errors are reported, the patient or family may have a negative attitude towards the nurse or sue the nurse (3.86 ± 1.44). The mean score for the "disagreement over the error" dimension was found to be 2.77 ± 0.84, and the primary reason under this dimension for not reporting errors is when medication error occurs, it takes too much time to fill out the incident report form (3.07 ± 1.30) (Table 4).

Table 4. Distribution of the mean scores of the nurses regarding the reasons for not reporting errors (n= 125)

Part II. Subscales of the MAES (min-max)		Mean±SD
Fear	After medication administration, nurses do not realize that there is an error.	2.82±1.24
	Nurses believe that if they make a medication error, they will be perceived as incompetent by other nurses.	3.44±1.40
	If a medication error is reported, the patient or family may have a negative attitude towards the nurse or sue the nurse.	3.86±1.44
	Nurses are afraid that doctors will reprimand them for a medication error.	2.95±1.42
	Nurses fear negative consequences of reporting medication errors.	3.31±1.47
	Total (1.00-6.00)	3.28±0.99

Table 4. Continued

Part II. Subscales of the MAES (min-max)		Mean±SD
Disagreement over the error	Nurses disagree with the hospital's definition of medication error.	2.74±1.24
	When a medication error occurs, it takes too much time to fill out the incident report form.	3.07±1.30
	It takes too much time to contact the doctor about medication errors.	2.88±1.50
	There is no clear definition of medication error.	2.38±1.12
	Nurses may believe that the error is not significant enough to be reported.	2.66±1.36
	The expectation that medications will be delivered exactly as ordered is unrealistic.	2.59±1.41
	Total (1.00-5.71)	2.77±0.84
Administrative response	The nurse can be blamed if something happens to the patient as a result of the medication error.	3.04±1.41
	No positive feedback is given after correct medication administration.	4.11±1.26
	When there are medication errors, nursing management focuses on the individual rather than the system as the possible cause of error.	4.18±1.53
	Responses to medication error by nursing administration do not match the severity of the error.	4.00±1.57
	Total (1.00-6.00)	4.10±1.18

The nurses reported that regarding non-intravenous medication administration, they experienced MA errors most frequently in giving non-prescribed medication (3.03 ± 2.91), administering discontinued medication (3.03 ± 2.96), and giving medication to a patient with a known allergy (3.07 ± 3.34). Regarding intravenous medication administration, the nurses reported that they experienced errors most frequently in giving medication to a patient with a known allergy (3.03 ± 3.31), administering the wrong fluid (3.01 ± 3.12), and administering the given dose incorrectly (3.00 ± 3.08) (Table 5).

Table 5. Distribution of opinions on what percentage of medication administration error type is actually reported in the unit (n = 125)

Error Type	Non-intravenous MA Mean±SD	Intravenous MA Mean±SD
Wrong method of administration	2.33±2.63	2.68±2.86
Wrong time of administration	2.60±2.73	2.76±2.84
Wrong patient	2.74±2.97	2.84±3.12
Wrong dose	2.60±2.74	2.83±3.03
Wrong medication	2.78±2.95	2.80±3.06
Skipping medication	2.86±2.81	2.80±2.80
Giving non-prescribed medicine	3.03±2.91	2.79±2.96
Administration of discontinued medication	3.03±2.96	2.80±2.98
Giving medication to a patient with known allergy	3.07±3.34	3.03±3.31
Wrong liquid	-	3.01±3.12
Wrong administration of the correct dose	-	3.00±3.08

MA: Medication administration

When the nurses working in the surgical clinic and the surgical intensive care unit were asked about the percentage of actually reporting all types of MA errors including intravenous or non-intravenous medication administration, 61.6 % of them stated that this rate was 0-20 % (Table 6).

Table 6. Distribution of opinions regarding the actual reporting of MA errors in the unit

	Actual reporting rate of MA errors in surgical clinics and surgical intensive care units									
%	0–20	21–30	31-40	41–50	51-60	61–70	71-80	81-90	91-99	100
n (%)	77 (61.6)	10 (8)	3 (2.4)	4 (3.2)	11 (8.8)	0 (0.0)	4 (3.2)	5 (4)	4 (3.2)	7 (5.6)

Multivariate linear regression analysis was conducted in order to predict the factor of not reporting error due to "fear", using the independent variables of "physician", "lack of knowledge", "pharmacy", "industry", "system" and "susceptibility to error" in Part I of the MAES. The analysis revealed a

significant regression model (F(6.118) = 31.09, p<0.001) and showed that 26 % of the variance in the dependent variable ($R^2_{adjusted}$ = 0.26) was explained by the independent variables. According to the model, in the "pharmacy" dimension, the causes of MA errors predicted not reporting errors due to fear negatively and significantly (*ß* = -0.25, *t*(118) = -2.46, *p*<0.05, pr^2 = 0.04). Thus, it can be said that the increase in the perception that a pharmacy-related MA error was made reduces the perception of not reporting errors due to fear. In addition, in the "system" dimension, the causes of MA errors predicted not reporting errors due to fear positively and significantly (*ß* = 0.04, *t*(118) = 5.95, *p*<0.001, pr^2 = 0.23). Thus, it can be stated that the increase in the perception that the error is caused by the system increases the perception of not reporting error due to fear. It was found that the dimensions of "physician", "lack of knowledge", "industry" and "susceptibility to error" did not predict fear-related error reporting (Table 7).

Multivariate linear regression analysis was conducted in order to predict the dependent variable of not reporting error due to “disagreement over the error”, using the independent variables of "physician", "lack of knowledge", "pharmacy", "industry", "system" and "susceptibility to error" in Part I of the MAES. The analysis revealed a significant regression model (*F*(6.118) = 22.70, p<0.001) and that 51 % ($R^2_{adjusted}$ = 0,51) of the variance in the dependent variable was explained by the independent variables. According to the model, in the "physician" dimension, the causes of MA errors negatively and significantly predict failure to report errors due to disagreement over the error (*ß* = -0.17, *t*(118) = -2.18, *p*<0.05, pr^2 = 0.03). It was found that in the "pharmacy" dimension, the causes of MA errors predicted failure to report errors negatively due to the disagreement over the error (*ß* = -0.24, *t*(118) = -2.91, *p*<0.05, pr^2 = 0.06). Thus, it can be said that the increase in the perception that there is a physician and pharmacy-induced MA error reduces the perception of not reporting errors due to the disagreement over the error. In addition, in the "system" dimension, the causes of MA errors predicted not reporting errors due to disagreement over the error positively and significantly (*ß* = 0.91, *t*(118) = 10.06, *p*<0.001, pr^2 = 0.46). Thus, it can be said that the increase in the perception that the MA error is caused by the system increases the perception of not reporting the error due to the disagreement over the error. It was found that the error factors in the dimensions of "lack of knowledge", "industry" and "susceptibility to error" did not predict failure to report errors due to disagreement over the error (Table 7).

Table 7. Multiple regression analysis results

Variables							95% confidence interval for B	
Dependent	**Independent**	**B**	**SD**	***ß***	**t**	**p**	**Min**	**Max**
Not reporting MA error due to fear	Constant	14.50	2.49		5.82	0.000	9.57	19.43
	Physician	-0.13	0.09	-0.13	-1.40	0.16	-0.32	0.05
	Lack of knowledge	-0.06	0.11	-0.05	-0.57	0.56	-0.30	0.16
	Pharmacy	-0.38	0.15	-0.25	-2.46	0.01	-0.70	-0.07
	Industry	-0.21	0.15	-0.12	-1.40	0.16	-0.52	0.09
	System	0.44	0.07	0.66	5.95	0.000	0.30	0.59
	Susceptibility to error	-0.07	0.14	-0.04	-0.49	0.62	-0.36	0.22
Not reporting MA error due to disagreement over the error	Constant	12.75	2.39		5.33	0.000	8.01	17.48
	Physician	-0.19	0.09	-0.17	-2.18	0.03	-0.37	-0.01
	Lack of knowledge	-0.08	0.11	-0.06	-0.76	0.44	-0.31	0.13
	Pharmacy	-0.44	0.15	-0.24	-2.91	0.004	-0.74	-0.14
	Industry	-0.12	0.15	-0.06	-0.86	0.39	-0.42	0.16
	System	0.72	0.07	0.91	10.06	0.000	0.58	0.86
	Susceptibility to error	-0.20	0.14	-0.11	-1.41	0.16	-0.48	0.08

MA: Medication administration

4.2. Discussion

Prevention of MA errors is the basis of quality improvement and patient safety studies in health institutions. MA is predominantly the responsibility of nurses and is an important component of patient treatment. The perceptions of nurses regarding the causes of MA errors are important in terms of preventing MA errors. In this study, the perceptions of nurses working in the surgical clinic and the surgical intensive care unit of a hospital regarding the causes of MA errors, the reasons for not reporting errors, and the MA errors they witness and the actual reported error rates were evaluated.

Perceptions of nurses working in surgical clinics and surgical intensive care units about the factors causing MA errors

The mean score of the nurses on the first part of the MAES, which evaluates the perceptions regarding the factors causing MA errors, is 95.15 ± 19.57. The highest score that can be obtained from this section is 174, and the mean score obtained by the nurses is slightly above the highest mean score that can be obtained from the scale. Therefore, it can be stated that the perceptions of the nurses regarding the causes of MA errors are at a moderate level.

It was found that the nurses perceived "Industry" (4.70 ± 0.94) as the main reason behind MA errors, followed by "Susceptibility to Error" (4.24 ± 0.82). Contrary to this, Vural et al. (2014) stated that medical errors are system-related [9]. Our study revealed that the nurses reported system as the third reason for MA errors. It is believed that the difference between the findings is due to the fact that the nurses in the institution where the research was conducted perform their practices in line with the standards, reducing the number of system-related MA errors.

You et al. (2015) found that according to nurses, the causes of industry-related MA errors are similar packaging of some medications and similar appearance of different medications [10]. Similarly, in our study, the nurses listed the causes of industry-related MA errors as the similar names of some medications (4.77 ± 1.13), similar appearance of different medications (4.69 ± 1.17), and similar packaging of some medications (4.65 ± 1.04). In addition, the nurses in our study reported that the major cause that increases susceptibility to error is the frequent use of equivalent medications (5.09 ± 1.10). Although the content is the same, it is understood that nurses make mistakes more often due to the fact that they use the equivalent of the medication they are used to and that some of the characteristics of the medications are similar. It is thought that this is due to the fact that the representatives of pharmaceutical companies do not include nurses in the information meetings regarding the promotion and use of medications in the clinic.

Perceptions of nurses working in surgical clinics and surgical intensive care units about the reasons for not reporting MA errors

The total mean score the nurses obtained from Part II of the MAES, which evaluates nurses' perceptions of the reasons for not reporting MA errors, was 52.02 ± 12.48. The highest score that can be obtained from this section is 96, and the mean score of the nurses is slightly above the highest mean score that can be obtained from the scale. Therefore, it can be said that the perceptions of the nurses regarding the reasons for not reporting MA errors are at a moderate level.

In this study, the first reason why nurses do not report errors was "administrative response" (4.10 ± 1.18) and the second reason was "fear" (3.28 ± 0.99). Similarly, the study of Ala'a et al. (2016) conducted in Saudi Arabia revealed that the primary reason for not reporting MA errors was "administrative response" (3.48) and the second reason was "fear" (3.32) [11]. One study conducted in Ethiopia by Bifftu et al. (2016) revealed that the nurses who thought that administrative response did not constitute an obstacle to reporting MA errors were 35 times more likely to report errors [12]. Studies conducted in Taiwan and South Korea reported that 50 % of health professionals did not report their MA errors due to administrative response [13;14]. Nourian et al. (2020) showed that the most important barriers to reporting errors for nurses are fear and administrative response [15]. Similarly, the results of

some studies conducted in Turkey show that nurses do not report errors due to concerns such as punishment, exclusion by their colleagues, and administration's focusing on the individual rather than the cause of the error [5;9;16]. This similarity in the literature indicates that nurses have the same perceptions of MA error reporting barriers although they work in different locations and cultures.

Özlü et al. (2015) reported that according to 63.8 % of the nurses in their study, there was no positive feedback about the correct administration of medications, which is a major reason for not reporting errors [5]. Nourian et al. (2020) also found that the most common reason for not reporting MA errors is the lack of positive feedback given to nurses after correct medication administration [15]. Our study also revealed that the most important reason for not reporting MA errors under the "administrative response" dimension is the lack of positive feedback after correct medication administration (4.18 ± 1.53). Although the studies have been carried out in different geographies and cultures, they point to a universal truth: being appreciated not only provides spiritual satisfaction but also encourages the right behavior and motivates people to do the right thing. As stated in the literature, the common problem that prevents nurses from reporting errors is that administrators do not motivate employees by appreciating correct practices.

As for the fear dimension, You et al (2015) reported that the reason why nurses did not report the MA errors was the anxiety of being blamed if something happened to the patient [10]. In the studies of Özlü et al. (2015) and Nourian et al. (2020), nurses stated that if a medication error is reported, the patient or family may develop a negative attitude toward them or may accuse and sue them [5;15]. Karagözoğlu et al. (2019) found that nurses tend not to report their MA errors because administrators focus on the individual when a medical error occurs [17]. In our study, the most important reason for not reporting MA errors related to the fear factor is the anxiety that the patient or family may develop a negative attitude towards the nurse or sue the nurse (3.86 ± 1.44) when medication errors are reported. In addition, we found that the pharmacy and system-related causes of MA errors explained 26 % of not reporting MA errors due to fear. This shows that as nurses believe that MA errors occur due to pharmacy-related reasons, their perception of not reporting errors due to fear decreases. Contrary to this finding, when nurses believe that MA errors are system-related, their perception of not reporting errors due to fear increases. Therefore, it can be said that nurses are afraid of criticizing the system and reporting system-related errors, whereas they have courage to report pharmacy-related errors. This finding shows that nurses report their MA errors when they do not have a fear of being accused.

El-Bialy and Hashish (2013) found that the most important obstacle to reporting MA errors is disagreement over the definition of error [18]. Kim et al. (2011) revealed that health professionals are not afraid of error reporting; however, about half of the participants did not know the definition of error clearly [19]. Similarly, there are other studies emphasizing that the tendency of not reporting MA errors has increased because there are uncertainties about the definition of MA errors in the literature [12;20]. In our study, the final reason for not reporting MA errors was the disagreement of nurses over the error (2.77 ± 0.84). In addition, the reasons for MA errors under the dimensions of "physician", "pharmacy", and "system" explain 51 % of not reporting MA errors due to "disagreement over the error". The increase in the perception that MA errors have physician and pharmacy-related reasons reduces the perception of not reporting errors due to disagreement over the error. On the other hand, the increase in the perception that MA errors have a system-related cause increases the perception of not reporting errors due to disagreement over the error. These results indicate that when nurses are afraid of the reaction of the administration, they cannot agree on the system-related errors and therefore do not report any errors. However, it is understood that nurses have more courage about error reporting and agree on the definition of error as far as pharmacy and physician-related errors are concerned.

The difference between the rate of MA errors in surgical clinics and surgical intensive care units and the actual clinical error reporting rate

The mean score obtained from Part III of the MAES, which investigates whether the rate of errors made and the rate of errors reported are the same, is 59.28 ± 57.21. The highest score that can be obtained from this section is 210, and the closeness of the score to the highest score means that errors experienced in clinical settings and the rate of reported errors are similar [2]. The very low score obtained from the research data indicates that there is an inconsistency between the errors that nurses witnessed and the rate of errors actually reported. Similarly, Karagözoğlu et al. (2019) found that 80.4 % of the nurses did not report medication errors [17]. Özlük (2020) also revealed that nurses' awareness of medical errors and error reporting was low [21].

In our study, the majority of the nurses (61.6 %) reported that 0-20 % of actual error reporting was made for all medication administrations. Similarly, many studies in the literature revealed that healthcare professionals report MA errors at a rate of 22-29.1 % [12;13;17;22]. However, some studies emphasize that MA errors are reported at a rate varying between 35 % and 86 % [13;23;24]. This difference in findings may be attributed to the differences in institutional procedures, sanctions applied as a result of errors, and the perception of patient safety culture within a specific institution.

In our study, the nurses reported that they mostly reported errors during intravenous medication administration (34.20 ± 34.02), which is similar to the findings of You et al. (2015) [10]. You et al. (2015) found that the most common MA errors in intravenous medication administration were the administration of the medication at a wrong rate, to the wrong patient, and at wrong dose. The studies of Härkänen et al. (2016), Lan et al. (2014), and Hossain-Gholipour et al. (2014) reported that the most common MA error by nurses is the administration of the wrong dose of the medication [25;26;27]. Kırşan et al. (2019) found in their meta-analysis study on MA error types that the most critical MA error performed by nurses is dose error [1]. Bişkin and Cebeci (2017) reported the most common type of MA error experienced by nurses as medication misuse [28]. In our study, the most common intravenous MA errors were found to be medication administration to a patient with known allergy (3.03 ± 3.31), wrong fluid (3.01 ± 3.12), and wrong dose (3.00 ± 3.08). The nurses in our study were found to make mistakes on the most familiar truths, which is similar to the literature. However, it is noteworthy that they reported the most common MA error as medication administration to a patient with known allergy. It is thought that this is caused by lack of communication, not paying attention to the armbands of the patients with allergies, and the busy working environment.

It has been reported in the literature that the most common errors in non-intravenous medication administration are wrong patient, wrong dose, and wrong medication selection [5;10]. Our study revealed that the most common errors of nurses in non-intravenous medication administration are the administration of non-prescribed medication (3.03 ± 2.91), the administration of discontinued medication (3.03 ± 2.96), and the administration of medication to a patient with a known allergy (3.07 ± 3.34). This result indicates that nurses do not comply with institutional standards regarding the use of intravenous medications. In addition, only 28 % of the nurses reported that they use medication administration guidelines during a procedure, which is an indication of non-compliance with clinical standards. The thought that non-intravenous medication administration is less dangerous for the patient than intravenous medication administration may cause nurses to be more susceptible to errors.

5. Conclusion

Nurses experience more MA errors than they report. Our study revealed that MA errors mainly occur due to the pharmaceutical industry and factors that increase susceptibility to error. Administrative response and fear are the main reasons why nurses do not report their MA errors. A number of technological innovations are implemented in health institutions to reduce the number of MA errors, such as pharmacy automation systems, online preparation of prescriptions, and barcode system. However, errors continue to occur despite the use of these technologies. Thus, the importance of creating

an institutional culture based on technology as well as patient safety is clearly understood. The biggest step in this regard is for administrators to develop a strategy that appreciates the correct practices and does not focus on the individual in the face of errors. In this way, nurses may be motivated to detect and report medical errors without fear of punishment.

It is not a simple task to administer medications to hospitalized patients. It is important that health professionals have knowledge and experience in this respect. Novice nurses with insufficient experience should have quick access to information in clinics. To this end, medication administration guidelines should be developed and the use of these guidelines should be encouraged. Errors are usually caused by the similarity between medications, which requires some arrangements in clinics for medications with similar names, pronunciation, and appearance. Finally, it is recommended that nurses receive periodic in-service training to increase the level of patient safety and safe reporting.

Limitations of the study:

The major limitation of our study is that it includes nurses working in the surgical clinic and the surgical intensive care unit of a hospital in Yozgat. The results obtained from a small sample may not be generalized to other parts of the country.

Ethical considerations:

Prior to the study, Ethics Committee approval was obtained from Yozgat Bozok University (numbered E-28571837-600-38544 and dated 20.10.2021). The nurses participating in the research provided their verbal informed consent.

Declaration of Competing Interest:

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Research Article

FAMILY PLANNING ATTITUDE IN TURKISH CULTURE: RELATIONSHIP BETWEEN EXPERIENCING UNINTENDED PREGNANCY, RECEIVING COUNSELING, AND ACCESSING METHODS

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Abstract: *In this study, it was aimed to determine the frequency of married women using methods related to family planning and the factors associated with method use. 400 women of childbearing age participated in the study, which was carried out as a descriptive and relationship-seeking study. The Family Planning Attitude Scale and a personal information form were utilized in the data collection phase of the study, and data were analyzed using the IBM SPSS 25 program. Ethics committee permission and written consent from the participants were obtained for the habituation to take place. T-test, one-way analysis of variance, and multiple regression analyzes were used in the analysis of the data. It was determined that the total mean score of the family planning attitude scale of the women was 133.49 ± 18.78, 67% of them used a modern family planning method, and 32.5% of them received counseling for family planning. It has been found that women's family planning attitudes are affected by age, income level, availability of family planning products and method selection reasons. It has been determined that the family planning attitude scale sub-dimensions of women who have experienced abortion/abortion have lower attitudes towards family planning and family planning method attitudes than women who have not experienced abortion/abortion. According to the research, women have positive attitudes regarding family planning, but not at the level that is ideal. More effectively delivering training and consulting services is crucial to fostering a good attitude toward family planning.*

Keywords*: Family planning, Methods, Unwanted Pregnancy*

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1. Introduction

One of the factors affecting a woman's health is her fertility. By resulting in unintended and high-risk pregnancies, high fertility rates have an impact on maternal and newborn mortality and morbidity [1]. In today's world, family planning services are being offered in order to foster healthy societies, prevent unintended pregnancies and improve maternal and fetal health [2]. Family planning services provided in the world and in Turkey enable preventing of unintended pregnancies, regulate interpregnancy intervals, and support maternal and child health [3, 4]. In face of its favorable effects on health indicators of countries and on maternal and child health, family planning methods and attitudes are still not implemented to the fullest extent in many countries, and in Turkey as well.

Family planning and attitude take an important place among the basic health practices potentially influencing women's status in society in parallel with public health [5]. There are factors that influence individuals' family planning attitudes in the world and in Turkey. Many factors such as social status,

educational background, and standard of living are important determinants of using contraception methods and family planning attitudes among people from different regions and cultures [6, 7]. Literature indicates that lack of awareness regarding family planning and low-level use of modern contraception has led rise of the rate of unintended pregnancies [8, 9]. It is reported that the increase in unintended pregnancies can have a negative impact on maternal and family health in the short term and lead to a number of negative conditions in the long term, such as challenges in the labor market, more abortions, and higher crime rates, etc. [10]. According to the 2018 report of the Turkish Population Health Research Institute, 49% of women of childbearing age in Turkey use modern methods and 20% use traditional methods. In addition, the withdrawal method is the most frequently used method (20%) in married women, followed by male condom (19%) and IUD (14%) [11]. Inadequate attitudes of couples toward family planning and failures in the use of contraceptive methods are among the main reasons for unintended pregnancies [8]. The use of modern contraceptive methods available today and the reduction of individuals' false beliefs and practices in using modern methods are influenced by the quality of family planning counseling provided to couples [12]. Dehigia et al. (2019) argue that high-quality family planning counseling has a very important effect on the continued use of modern contraceptive methods and on ensuring continuity [13].

To ensure the continuity of a modern family planning contraception method and improve the coverage of family planning, it is essential to provide people with family planning products and effective counseling [14, 15]. It was concluded that the acceptance of these approaches is linked to the growing accessibility of people to utilize the current family planning method they prefer [14, 15]. However, in the studies conducted in our country, there is no study finding in which the effect of receiving modern family planning counseling and being able to supply the product on the occurrence of unintended pregnancy is clear. Identifying people's attitudes toward family planning and the situations that influence those attitudes, as well as understanding the relationship between those attitudes and the ability to receive counseling and supply products, will guide the services to be provided at the primary level. The aim of this study was to determine the relationship between married women's attitudes toward family planning and unintended pregnancy, receiving counseling, and supplying products.

2. Material and Method

2.1. Research Type

This was a descriptive correlational study.

2.2. Sample

The sample group consists of women of reproductive age. In Turkey, 70% of married women use a contraceptive method. 49% of women benefit from modern methods [11]. Using the SampSize tool for sample size, it was calculated that 384 individuals should be taken, considering a 95% confidence interval and a margin of error of α=0.05 (http://sampsize.sourceforge.net/). 400 women who met the inclusion criteria were enrolled in the study. The inclusion criteria for our study were as follows: aged 15-49 years, those who were sexually active, those who use primary health care services, and those who participate voluntarily in the study. Those with a psychiatric story (self-report) were excluded.

2.3. Data Collection Tools

The Participant Information Sheet and the Family Planning Attitude Scale were used to collect data.

Participant Information Sheet: Consists of 15 items that examine sociodemographic characteristics (age, educational background, employment, income level, area of residence, marriage age, use of family planning, low standard of living, abortion status, number of living children, etc)[2,7,8].

Family Planning Attitude Scale (FPAS): Developed by Örsal and Kubilay (2006) to assess family planning attitude [16]. This 5-point Likert-type scale consists of 34 items and three subscales. It has no reversed item. The higher score indicates more positive FP attitude. The score varies between 34 and 170. The scale has three subscales: attitudes of the society toward family planning (items 1-15); attitudes toward contraceptive methods (items 16-26); and attitudes toward pregnancy (items 27-34). The Cronbach alpha value of the scale was reported as 0.90 [16]. Cronbach alpha value for this study was found as 0.91.

2.4. Data Collection

The questionnaire form was prepared by the researchers and filled out by the participants themselves via WhatsApp and Instagram groups with the help of the online survey system, which allows them to answer via the Internet. The data of the study were collected between April 2022 and June 2022 and the participants' responses were transferred to the SPSS 25 program.

2.5. Data Analysis

In the statistical analysis of the data; Kolmogorov Simirnov (K-S) and Shapiro-Wilks (W) tests were used to assess normality. Independent samples t-test and one-way analysis of variance (ANOVA) were used to compare mean in normally distributed parametric data, and multiple regression analysis, Mann Whitney U Test and correlation were used to determine the factors affecting family planning. Statistical significance level was accepted as $p<0.05$.

2.6. Ethical approval

Ethics committee approval (dated September 10, 2020 and numbered 2020/018) was obtained. The purpose of the study was explained to the participants and they were informed that they were free to participate in the study on a voluntary basis. Prior to data collection, participants were informed about the study and informed consent was obtained. Participants were told that they could leave the study at any time and that their responses would be kept confidential.

3. Results

Table 1 shows the sociodemographic characteristics of the women who participated in the study. Their mean age was 35.19±8.61; mean marriage age was 22.09±3.97; and mean first-time pregnancy age was 23.91±4.39. Of the participants, 68.8% had two or fewer living children, 97.3% had no unintended pregnancy, and 55.5% had no history of miscarriage/abortion. 67.5% of women did not receive FP counseling. 76.3% of the participants did not have access to FP products, while 78.5% previously used and 67% currently use modern FP contraceptive methods. 94.3% of participants said that they preferred the method they were using because of its safety and easiness.

Table 1. Comparison of FPAS Mean Scores by Sociodemographic Characteristics (N: 400)

Sociodemographic Characteristics	N (%)	$\bar{X}$±SD	Test/p
Age			
18-34	205 (%51.3)	135.60±19.69	t: 2.307
35 and above	195 (%48.8)	131.28±17.57	**p: 0.02**
Education			
Primary[1]	99 (%24,8)	124.84±16.11	F: 13.670
Secondary[2]	53 (%13,3)	132.05±15.00	**p: 0.00**
High school[3]	108 (%27.0)	133.87±16.90	**1-3/1-4**
University and above[4]	140 (%35.0)	139.87±20.76	**2-4/3-4**

Table 1. Continued.

Sociodemographic Characteristics	N (%)	X̄±SD	Test/p
Employment status			
Employed	108 (%27.0)	139.81±19.65	t: 4.173
Unemployed	292 (%73,0)	131.16±17.93	**p: 0.00**
Income level			
Good	125 (%31,3)	136.40±19.80	F: 3.1170
Average	245 (%61,2)	132.72±18.10	**p: 0.04**
Bad	30 (%7,5)	127.70±18.65	
Experience of unintended pregnancy			
Yes	11 (%2,8)	133.32±18.80	t: -1.099
No	389 (%97,3)	139.69±18.04	p: 0.27
Receiving FP counseling			
Yes	130 (%32.5)	132.73±17.61	t: -0.560
No	270 (%67.5)	133.86±19.34	p: 0.57
Accessing FP products			
Yes	95 (%23,9)	130.32±17.39	t: -1.890
No	305 (%76,3)	134.48±19.12	p: 0.05

FP: Family Planning; N: Sample (%); X̄: Mean; SD: Standart Deviation.

Using data from 400 individuals, we examined whether the FPAS mean scores differed significantly according to the sociodemographic characteristics of the women.

Given the FPAS scores of women by their age, a significant difference was found between the groups ($p<0.05$). FPAS mean scores of those aged 18-34 (135.60±19.69) were found to be significantly higher than those aged 35 and above (131.28±17.57) ($p<.05$). Given the FPAS scores by their educational background, it was determined that there was a very significant difference between the groups ($p<0.001$). FPAS mean scores of women who have graduated from university and above (139.87±20.76) were found to be significantly higher than those who graduated from high schools (133.87±16.90), secondary schools (132.05±15.00), and primary schools (124.84±16.11) ($p<.05$). It was observed that the FPAS mean scores of women who graduated from primary school were significantly lower than the FPAS mean scores of women who graduated from high school. Given the FPAS scores of women by their employment status, FPAS mean scores of employed women were found to be very significantly higher than those who were unemployed ($p<.001$). Given the FPAS scores of women by the number of children, FPAS mean scores of women who had two or fewer children were found to be very significantly higher than those who had three or more children ($p<.001$).

Given the society's attitude towards family planning subscale scores by accessing FP products, the mean scores of women who accessed FP products were found to be significantly lower than those who did not access FP products ($p<0.05$, Table 2).

Tablo 2. Comparison of FPAS Subscales' Mean Scores by Sociodemographic Characteristics

Sociodemographic Characteristics	X̄±SD	Test/p	X̄±SD	Test/p	X̄±SD	Test/p
Experience of unintended pregnancy						
Yes	60.78±8.58	U: -1.485	42.26±8.11	U:-0.704	30.28±5.56	t:-0.421
No	64.54±7.04	p:0.138	44.09±8.43	p:0.481	31.00±6.52	p:0.674
Receiving FP counseling	59.95±8.29	U:-1.522	42.40±8.37	U:-0.059	30.37±5.06	t:0.191
Yes	61.33±8.66	p:0.128	42.26±8.00	p:0.953	30.26±5.82	p:0.849
No						
Accessing to FP products						
Yes	59.04±8.13	U:-2.458	41.29±8.68	U:-1.842	29.98±5.38	t:-0.620
No	61.45±8.61	**p:0.014**	42.62±7.91	p:0.065	30.39±5.64	p:0.535

U: Mann Whitney-U; X̄: Mean SD: Standart Deviation; FP: Family Planning.

Multiple regression analysis results were significant ($F_{(11,388)}$ =5.580; p<.01, p<.05). Adjusted R^2 value was 0.11. This result shows that the 11% variance in FP Attitude is explained by sociodemographic variables. However, given the beta coefficients in Table 3, when all independent variables are included in the regression model, it is seen that only the variables of age, income level, accessing FP products and the reason for choosing the method have a significant contribution in explaining the FP attitude (p<0.05). Other independent variables were found to have no significant contribution (Table 3).

Table 3. Multiple Regression Results

Variables	B	SE	ß	p
Age	4.553	.912	.287	**.000****
Educational background	-1.452	1.628	-.045	.373
Employment status	-2.193	2.245	-.054	.329
Income level	4.240	1.816	.112	**.020***
Marriage age	9.082	5.658	.079	.109
First-time pregnancy age	.500	.852	.029	.557
Number of living children	-1.258	2.025	-.031	.535
Experience of unintended pregnancy	4.334	2.201	.098	.050
Miscarriage/abortion	1.778	2.091	.041	.396
Receiving FP counseling	2.211	1.622	.065	.174
Purpose of FP service	-8.964	3.954	-.111	.024
Access to FP products	4.553	.912	.287	**.000****
Previous FP methods	-1.452	1.628	-.045	.373
Current FP methods	-2.193	2.245	-.054	.329
Reason for method	4.240	1.816	.112	.020*
Constant	10.050	12.000	.079	.109

R^2: Adjusted R Square; SH: Standart Error; B: Non-standardized coefficient; ß: Standardized coefficient Remarks: R^2=.13; Adjusted R^2 =.11; $F_{(11,388)}$=5.580; **p<.01, *p<.05

Of participants, FPAS overall mean scores were 133.49±18.78, "Society's Attitude Towards Family Planning" subscale mean score was 60.88±8.55, "Attitude Towards Family Planning Methods" subscale mean score was 42.31± 8.11 and "Attitude Towards Pregnancy" subscale mean score was 30.30±5.58 (Table 4).

In the correlation analysis, it was found that there is a significant relationship between the status of FP counseling and accessing FP products (p<.001).

Table 4. Participants' FPAS overall and subscales mean scores (n=400)

	Min-Max Score	X̄±SD
FPAS Overall Score	34-170	133.49±18.78
Society's Attitude Towards Family Planning	15-75	60.88±8.55
Attitude Towards Family Planning Methods	11-55	42.31±8.11
Attitude Towards Pregnancy	8-40	30.30±5.58

X̄: Mean SD: Standart Deviation

4. Discussion

This study discussed the factors affecting the use of family planning methods, the selection of methods, and the FPAS by women's sociodemographic and obstetric characteristics in light of literature. In this study, we found that FPAS mean scores of women aged 18-34 who had two or fewer children were higher than those of women aged 35 years and older who had three or more children. Gözükara et al. (2015) reported that there was a significant difference between FPAS scores of women aged 17-34 and aged 35 and older, that family planning attitudes were at an undesirable level in women older than 34 years of age [17]. In their study on the prevalence of family planning by sociodemographic characteristics, Çalikoğlu et al. (2018) identified that women aged 15-24 chose modern family planning methods, while women aged 35 and older rather traditional methods [18]. Bekele et al. (2020) determined that the family planning attitude of women aged 25-34 was significantly better than other age groups [6]. In similar studies of family planning conducted in Turkey and abroad, age and the number of children were found to be significant variables in views on and attitudes toward the use of family planning methods [19, 18]. Maternal age and the number of living children were considered to be important determinants of the use of family planning methods and the development of attitudes toward family planning.

In this study, we found that the FPAS mean scores of women with a university degree or higher, who were employed and who had a high income were significantly high. These results are consistent with findings in the literature [6, 20]. Nikolic et al. determined that there was a positive relationship between educational background and the use of family planning method [21]. Semachew et al. (2018) concluded that the increase in the education level of women in Ethiopia had a positive effect on family planning method [19]. In a similar study on the use of family planning method, Guracho et al. (2022) reported that the increase in the education level of women affects their decision-making ability about family planning [22]. On the other hand, in their study on Roma women, Avcı et al. (2018) concluded that FPAS scores of Roma women who had lower educational level and unemployed were higher than those who had a higher educational level and unemployed [23]. In the literature, similarly, it was concluded that FPAS scores of employed women were higher than unemployed women [24]. Yusoff et al. examined women's awareness of attitudes towards family planning and concluded that annual income, education level and employment status were significantly related to use of and attitude towards family planning contraceptive methods [25]. In a cross-sectional study conducted in Serdang with 349 women, it was found that the women's level of knowledge about the use of contraceptive methods was effective [26]. Abdelwahab et al. (2017) found that there was a strong positive relationship between the awareness of working women and family planning attitudes and practices [27]. It is thought that higher educational levels were more effective on using safer contraceptive methods and gaining personal control over reproductive health, while income level and employment status were more effective on access to the contraceptive method.

In this study, we found that experience of unintended pregnancy did not affect FPAS mean scores. Abortion, which is considered the most important indicator of unintended pregnancies in the literature, is an important indicator for assessing individuals' attitudes toward family planning services and method

use [28, 29]. Unintended pregnancies and induced abortions are referred to as major women's health problems in the modern world [24]. Apay et al. found that as the number of unintended pregnancies and miscarriages increased, family planning attitudes scores decreased [30]. One study found that women who had not experienced abortion and miscarriage had statistically higher FPAS mean scores than women who had [17]. In their descriptive study, Tezel et al. (2015) found that the number of miscarriages and abortions of women did not have a significant relationship with the FPAS mean scores [31]. Bilgin and Keskin (2020) reported that induced abortion did not affect the family planning attitude [32]. Although the rate of unintended pregnancies in the world has decreased, it is still high. Unintended pregnancies are influenced by women's attitudes toward childbirth and failure to use modern family planning contraceptive methods [33]. In the studies conducted, it was found that people who do not have the desired attitude towards fertility for reproductive health usually do not use family planning methods at all or use a traditional method [34, 35]. In this study, it is hypothesized that the fact that the FPAS mean scores did not change by experiencing an unintended pregnancy and receiving counseling may be due to the fact that a small proportion of the people we interviewed experienced an unintended pregnancy because they did not receive counseling.

The study found that receiving family planning counseling did not affect women's FPAS mean scores. In the randomized-controlled trial of Skogsdal et al. (2019), the control group received routine contraceptive counseling, while the intervention group received reproductive life plan counseling (RLPC) in addition to routine counseling [12]. As a result of the study, it was found that the awareness of women in the intervention group about attitudes toward family planning and fertility increased. It is believed that routine counseling may not provide good information about women's attitudes toward family planning and cannot be considered a positive predictor of contraceptive use. The fact that men may not be involved in family planning education at the desired level, especially in the world and in our country, also affects women's fertility awareness and attitudes toward family planning [35]. Raj et al. (2016) determined that married couples' use of family planning methods improved after a three-session intervention study conducted with the joint participation of couples in family planning counseling [36]. Family planning counseling is found to influence the use of and attitudes toward family planning methods in several intervention studies where the content, quantity, and quality of education are expanded compared with standard counseling [37, 38]. It is hypothesized that the reason the FPAS mean scores did not change as a function of the counseling received may be that the women did not have sufficient awareness as a result of the counseling they received.

It turns out that women's access to contraceptive products and the reason for choosing the method (the fact that they find the method safe-effective-ease) increase their attitudes toward family planning. For contraceptive methods to be widely used, it is desirable that the methods be used at an optimal level. Couples' acceptance of contraception is closely related to their having access to a contraceptive method at all times [39]. Wang and Mallick (2019) found that the use of a modern method was significantly lower in regions where contraceptive availability was low than among women living in the area where access to contraceptive methods was not a problem [15]. It is shown that the risk of leaving the family planning method decreases in the regions where women who use a safe and effective contraceptive method have access to this service, and this situation affects the attitude toward family planning [11]. Even though modern methods are cost effective in the long run, it is not always possible to offer the method that individuals will use [40]. Although contraceptive methods can be provided free of charge in facilities that offer family planning services, some reasons such as the lack of supplies of the distribution methods and the restriction of free access to the service may be a barrier to the use and recruitment of family planning methods [41]. It is important to provide quality family planning services so that the public use modern family planning methods that they find safe-effective-ease, and so that their attitudes toward family planning are improved.

5. Conclusion and Recommendations

Consequently, it was found that women's characteristics such as age, education level, income level, employment status, number of children, and low abortion rates influence their attitudes toward family planning. It can be seen that the fact that women can obtain family planning products and perceive the method as safe-effective-ease increases their attitude toward family planning. Accordingly, it is important that women's attitudes toward family planning are supported by education and counseling, and that the role of midwives working in public health, especially in using existing resources and being effective counselors, addresses individual differences in counseling.

Ethical statement:

Ethics committee approval (dated September 10, 2020 and numbered 2020/018) was obtained. The purpose of the study was explained to the participants and they were informed that they were free to participate in the study on a voluntary basis. This is an evaluation as a matter of quality management, it was performed in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Ethics Committee of the KTO Karatay University and conducted according to the principles of the Declaration of Helsinki.

Conflict of interest:

The authors must notify of any conflicts of interest.

Authors' Contributions:

BD, HDT, ŞİD, conceptualised the study.

BD, HDT, ŞİD, collected the data.

HDT, analyzed the data.

BD, HDT, ŞİD, drafted the initial manuscript.

BD, HDT, ŞİD, reviewed the manuscript, approved the final manuscript and agree to be accountable for all aspects of the work.

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Research Article

THE EFFECT OF OCCUPATIONAL STRESS EXPERIENCED BY NURSES ON MENSTRUATION: A CROSS-SECTIONAL STUDY

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Abstract: *This study was carried out to determine the irregularity of menstruation that may occur due to the work stress of nurses.The study universe was composed of female nurses aged 18-49. By taking the research sample as an example of studies related to the menstrual irregularity of nurses in the literature, it was determined that 196 nurses should be reached with a 5% error margin and 95% confidence interval, and 264 nurses were reached. The data were collected face-to-face and online using the Introductory Information Form, the Menstrual Symptom Scale (MSS), and the Work Stress Scale (WSS) as data collection tools. The data were evaluated by number, average percentage, Pearson or Spearman correlation, Student's t-test, and One-way analysis of variance in a statistical program.The mean age of the nurses participating in the study is 33.31±7.73. 57.6% of nurses are married, 60.6% are undergraduate graduates, 42.8% are working in a university hospital, 32.3% have been working for 11-20 years, 53.8% are working ≤40 hours weekly, and 56.8% of them work in a shift system. The mean duration of menstruation of the participants was 6.13±1.91 days. 65.6% of them thought that their menstruation was regular, 54.9% had their first menstruation between the ages of 9-13, and 79.2% had a menstruation interval of 21-35 days. A moderately significant relationship was found between the WSS total and all sub-factors and the MSS total score averages. Furthermore, a low-level positive and significant correlation was found between the MSS score, the WSS total score, and the WSS Job Role Mismatch sub-factor score.As a result, it was determined that there is a positive significant relationship between work stress and menstruation status. The implementation of practices that will reduce work stress by health managers will also be able to reduce the complaints of nurses about menstruation.*

Keywords*: Menstruation, Nurse, Work Stress.*

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1. Introduction

Nursing has a heavy workload due to many factors arising from the work environment. The reasons such as increased workload, lack of staff, emotional stress experienced due to patients' problems, long working hours, and working in a shift system make working conditions difficult in the nursing profession [1, 2]. It is stated that stressful and shift work causes reproductive health problems such as irregular menstrual cycle, dysmenorrhea, subfertility, hormonal disorder, spontaneous abortion, the threat of premature birth, and low birth weight babies [3].

The intense and stressful workplace has been associated with negative effects in terms of reproductive health. The menstrual cycle is provided by the cyclical secretion of hormones such as luteinizing hormone, follicle-stimulating hormone, estrogen, and progesterone regulated by the hypothalamus-pituitary-ovary [4]. Menstrual cycle characteristics have been associated with factors

such as age, endocrine problems, age at menarche, parity, body mass index, physical activity, and stress [5]. Stress caused by work can disrupt the hormonal balance and cause menstrual complaints [6]. It is known that menstrual problems such as dysmenorrhea are affected by work-related stress [7]. Nursing Health Studies have reported that irregular menstrual cycle varies between 11% and 19% among nurses [8, 9]. A study in Korea determined that the rate of nurses with menstrual irregularity was 21%, and these nurses reported more complaints such as distress, depression, stress, fatigue, anxiety, and sleep problems (10). A study with Taiwanese nurses revealed that 72.3% of nurses experienced work stress associated with irregular and prolonged menstrual bleeding [11].

Although there is a relationship between the type and severity of stress and women who experience menstruation problems, it is difficult to determine a threshold at which stress interferes with the normal cycle. The individual response to an abnormality in body function increases due to psycho-biological characteristics. On the other hand, shift work can often change the menstrual pattern, disrupting the circadian rhythm. Specifically, it has been suggested that night work negatively affects menstruation, which can affect fertility. A cross-sectional study conducted with 71,077 nurses in the USA showed a relationship between shift work and a short or prolonged menstrual cycle [8]. A study conducted with Taiwanese nurses showed that nurses who work night shifts have shorter menstrual cycles than nurses who do not work at night [12]. For all these reasons, our study was conducted to determine the irregularity of menstruation nurses may experience due to work stress.

2. Materials and Methods

2.1. Purpose and Type of Research

This study was carried out in a descriptive and cross-sectional type to determine the irregularity of menstruation that may develop due to the work stress experienced by nurses.

2.2. Universe and Sample of the Research

The universe of the research was composed of female nurses living in Turkey. The study was conducted between 30 May - 30 September 2022.

While creating the research sample, the menstrual irregularity of the nurses in the literature was taken as an example[8]. The formula ($n= N\ t^2\ p\ q\ /\ d^2\ (N-1) + t^2\ p\ q$) was used, and it was determined that 196 nurses should be reached with a 5% margin of error and 95% confidence interval. In this study, data were collected face-to-face and online, as the maximum level of diversity was aimed at.

2.3. Sampling inclusion criteria

- Being between the ages of 18 and 49
- Being a female nurse
- Working as a nurse
- Not being in the menopausal period

2.4. Data Collection Tools

The Introductory Information Form examines demographic data, and the Menstrual Symptom Scale (MSS) and Work Stress Scale (WSS) were used as data collection tools. The data of the study were collected face-to-face and online with the nurses working in the hospital environment.The answering time for research questionnaires was an average of 5 to 10 minutes.

2.4.1 The introductory information form

The introductory information form consists of 15 questions developed by researchers to determine the socio-demographic status of young people [2,8,9].

2.4.2 Work Stress Scale

In order to determine the work stress level of oncology nurses, the scale developed by Rizzo et al. in 1981 and adapted to Turkish by Güngör (1997) was used [13, 14]. The scale consists of 17 items with a five-point Likert-type scoring**.** The Job Stress Scale consists of 3 sub-dimensions as 'job role uncertainty' (Cronbach alpha=0.87), 'job role mismatch' (Cronbach alpha=0.81), and 'job role burden' (Cronbach alpha=0.61). In this study, the 'job role uncertainty is designated as (Cronbach alpha=0.82), 'job role mismatch'(Cronbach alpha=0.83), and 'job role burden' (Cronbach alpha=0.60). The total Cronbach value for the study is 0.77 .This study shows that the scale with Cronbach's Alpha value is moderately reliable.

2.4.3 The Menstruation Symptom Scale (MSS)

The Menstruation Symptom Scale (MSS) was developed by Chesney and Tasto 1975 to assess menstrual pain and symptoms [15]. The validity of the study in Turkish was made by Güvenç et al. in 2014. MSS is a five-point Likert-type scale consisting of 24 items. The MSS score is calculated by the total score average of the items in the scale. An increase in the average score indicates an increase in the severity of menstrual symptoms. The original scale has three sub-dimensions 'Negative Effects/Somatic Complaints,' 'Menstrual Pain,' and 'Abdominal Pain.'An increase in the average score for the sub-dimensions indicates an increase in the severity of menstrual symptoms related to that sub-dimension. Cronbach's Alpha value of the scale is 0.86 [16]. In this study, the Cronbach Alpha value of the scale was found to be 0.90.

2.5. Analysis of the Data

The data were evaluated by entering the Statistical Package for the Social Sciences(SPSS 21.0) package program. The data were evaluated by number, average percentage, Pearson or spearman correlation, student's t-test, and one-way analysis of variance.

In our study, the variables were normally distributed, and the normality of the distribution was examined by the Skewness-Kurtosis test. Levene's test evaluated that the variances were homogeneous.

2.6. Ethical Aspect of the Study

The ethics committee approved the study with the number 240 on 09.06.2022. After the explanation was made to the participants, their consent was taken on the written and online questionnaires.

2.7. Limitations of the Study

- Inability to perform the study face-to-face,
- Lack of motivation of the nurses to fill out work forms,
- Extension of the data collection period in order to provide access to nurses working in different regions of our country,

2.8. Strengths of the Study

- Accessing the number of samples representing the universe,
- Access to nurses from different regions of the country,
- Access to nurses working in both private and public health institutions.

3. Findings

A total of 264 nurses, with a mean age of 33.3 years, completed the research.It was determined that the difference between the education status of the nurses and the total mean score of the MSS and the age, duration of working in the profession, weekly working hours, and working style, and the total score of the WSS were found to be statistically significant (p<.05) (Table 1).

Table 1. Work Stress Scale and The Menstruation Symptom Scale score averages according to some descriptive characteristics of nurses (n=264)

Features	Number / Percentage		WSS		MSS	
	n	%	$\bar{X} \pm SD$	Test/p	$\bar{X} \pm SD$	Test/p
Age						
20-25	59	22.3	49.20±8.06[a]		3.64±0.66	
26-30	60	22.7	49.37±8.47 [a]	F=2.364	3.59±0.72	F=.801
31-35	46	17.4	48.11±10.23	p=**.049***	3.58±0.83	p=.526
36-40	32	12.2	46.06±9.61		3.48±0.81	
41 and over	67	25.4	45.57±7.32 [b]		3.42±0.74	
Marital Status						
Married	152	57.6	47.60±8.82	t= -.323	3.49±0.77	t=-1.257
Single	112	42.4	47.95±8.52	p=.747	3.61±0.69	p= .210
Education Status						
High School or Associate D.	79	29.9	47.60±8.24	F=.806	3.68±0.77	F=3.765
Bachelor's Degree	160	60.6	47.50±9.01	p=.448	3.45±0.70 [b]	p= **.024***
Graduate	25	9.5	49.84±7.81		3.74±0.84[a]	
Having Children						
Yes	135	51.1	48.31±0.59	t=1.082	3.61±0.69	t=1.427
No	129	48.9	47.16±8.77	p= .28	3.48±0.79	p= .16
Institution Where She Works						
University Hospital	113	42.8	46.88±8.71		3.51±0.80	
The Ministry of Health	102	38.6	49.25±7.92	F=1.714	3.49±0.68	F=2.355
Private Hospitals	10	3.8	45.80±7.53	p=.165	4.09±0.40	p=.072
TSH	39	14.8	46.85±10.38		3.64±0.74	
Unit Where She Works						
Internal Medicine Services	99	37.5	48.64±8.82		3.52±0.75	
Surgical Services	29	11.0	47.69±7.60	F=1.336	3.34±0.70	F= .973
Intensive Care	87	33.0	47.94±8.09	p=.263	3.60±0.73	p=.406
Administrative/Polyclinic	49	18.6	45.63±9.82		3.60±0.75	
Duration of Work in the Profession (years)						
1-5	70	26.5	49.59±7.36 [a]		3.56±0.66	
6-10	59	22.3	49.66±9.56 [a]	F=4.095	3.56±0.77	F=1.021
11-20	85	32.3	46.14±9.25 [b]	p=**.007***	3.61±0.79	p=.384
21 and over	50	18.9	45.64±7.42 [b]		3.39±0.73	
Weekly Working Hours						
40 and under	142	53.8	46.08±8.42	t=-3.439	3.50±0.74	t=-.983
45 and over	122	46.2	49.69±8.60	p=**.001***	3.59±0.74	p=.326
Mode Of Study						
Non-Shift	114	43.2	46.17±9.03	F=-2.606	3.57±0.79	t= .544
Shift	150	56.8	48.95±8.24	p=**.010***	3.52±0.70	p=.587

X: Mean, SD: Standard Deviation, F: One Way Anova, t: Student T, *p<0.05, **p<0.01.
[a-b]: Groups where the difference isindicated

It was determined that the difference between the nurses' menstrual pattern and the total mean scores of MSS and WSS was statistically significant (p<.05) (Table 2).

Table 2. Total Work Stress Scale and The Menstruation Symptom Scalemean scores of the nurses according to the characteristics of menstruation (n=264)

Features	Number / Percentage		WSS		MSS	
	n	%	$\bar{X} \pm SD$	Test/p	$\bar{X} \pm SD$	Test/p
Menstrual Pattern						
Regular	173	65.6	46.67±8.67 [a]	F=4.733 p= **.010***	3.47±0.72[a]	F=3.567 p= **.030***
Irregular	55	20.8	51.17±8.19 [b]		3.54±0.95	
Undecided	36	13.6	48.89±8.43		3.77±0.61[b]	
The Age of the First Menstruation						
age of 9-13	145	54.9	48.30±9.05	t=1.152	3.50±0.77	t= -.869
age 14 and over	119	45.1	47.07±8.19	p=.250	3.59±0.59	p=.386
Menstrual Pattern Range						
every 21-35 days	209	79.2	47.48±8.91	F=.461	3.52±0.73	F=.759
shorter than 21 days	29	11.0	48.83±7.77	p=.631	3.70±0.82	p=.469
longer than 35 days	26	9.8	48.65±7.83		3.53±0.78	

X: Mean, SD: Standard Deviation, F: One Way Anova, t: Student T, *p<0.05 **p<0.01.
[a-b]: Groups where the difference is indicated

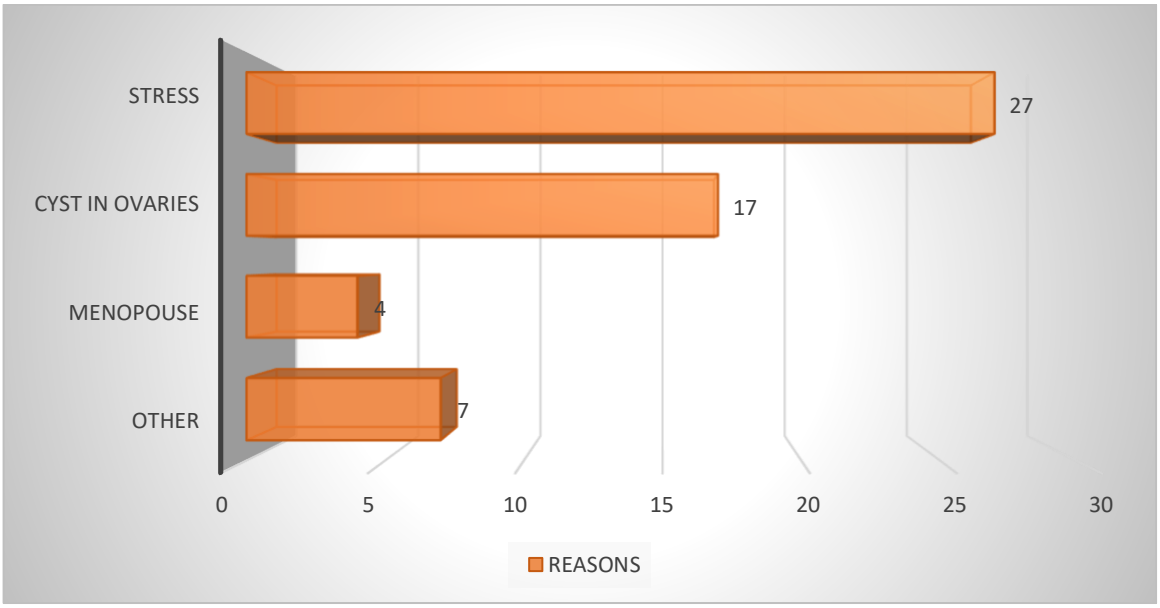

Figure 1. Reasons for Menstrual Irregularity Considered by Nurses (n: 55)

It was determined that the nurses' WSS scored 47.75±8.68, and MSS scored a total of 3.54±0.74.A weak positive significant relationship was found between the total WSS and MSS score and the participants' WSS Job Role Mismatch sub-factor score (p<0.05, Table 3).

Table 3. The Relationship between the Work Stress Scale Total and Sub-Factors Score and the TheMenstruation Symptom ScaleTotal Scores

	$\bar{X} \pm SD$	Test/p	WSS Total Score	WSS Job Role Uncertainty	WSS Job Role Mismatch	WSS Job Role Burden	MSS Total Points
WSS Total Score	47.75±8.68		___				
IS Job Role Uncertainty	13.93±5.16	r	.684**	___			
		p	**.000**				
WSS Job Role Mismatch	26.47±7.19	r	.789**	.175**			
		p	**.000**	**.004**	___		
WSS Job Role Burden	7.35±2.64	r	-.195**	-.183**	-.471**		
		p	**.001**	**.003**	**.000**	___	
MSS Total Score	3.54±0.74	r	.169**	.110	.155*	-.082	
		p	**.006**	.074	**.011**	.184	___

r=Pearson correlation coefficient, *p< 0.05. **p< 0.01

4. Discussion

According to the results of our study, it has been determined that the work stress experienced by nurses affects menstrual symptoms at a low level. It has been determined that the excess weekly working hours and shift work increase job stress. The relationship between intense work pace and shift work with menstrual function is supported by studies [17,18]. The essence of the nursing profession and workload can lead to problems associated with menstrual symptoms in female nurses and decrease work performance. Work stress seen in nurses is reported to be associated with hyperprolactinemia, which can cause fertility disruption and infertility [19].

It has been determined that 65.6% of the nurses participating in our study have regular menstrual cycles. A similar study determined that 66.7% of nurses have regular menstrual cycles [18]. On the other hand, a significant part of the participating nurses had menstrual problems. Although menstrual problems negatively affect the daily life of women, they cause a decrease in the ability to perform professional tasks and their quality of life [7]. One systematic review study reported that the annual cost of treating menstrual symptoms is 12-36 billion dollar's[20]. When it is considered a health expenditure, it is clear that there is an economic burden that cannot be underestimated. For this reason, it will be more economical to provide counseling services to nurses to determine the causes of menstrual problems and ways to solve them.

It was determined that the scores of the nurses who experienced menstrual irregularity were significantly higher than the WSS and MSS scores. It is known that menstrual symptoms are work-related and stress-related. Nursing care is among the professions that require strength due to both its physical and emotional effects. Night shifts and physically challenging work schedules increase emotional stress and cause menstrual irregularity. The general pressure on nurses results in a change in menstrual symptoms. Sharing menstrual symptoms is also still considered a social taboo. Women's fear of appearing weak causes them to hesitate to express their menstrual disorders or ask for help [21, 22]. In the study by Yu et al., nurses reported that they could not see sufficient support from their colleagues regarding the menstrual symptoms they experienced and therefore did not share the problems [7].

It was determined that among the nurses participating in the study, those with ten or fewer working years experienced higher levels of job stress. Nurses working in intensive care and outpatient clinics reported higher work stress and menstrual problems. A study conducted on American nurses stated that units that cause high-stress increase work stress and pose a risk for longer cycles [23]. It is known that prolonged and shift work causes many problems. Similarly, to the literature, it has been revealed that intensive-paced work areas increase stress more in the nurses participating in our study.

It has been determined that almost half of the nurses participating in the study work more than 40 hours a week, which increases work stress but does not affect menstruation. A weak positive relationship was found between weekly working hours and shift work and work stress. Long working hours were associated with menstrual irregularity and short cycles in the study by Lawson et al. [9]. Taiwanese nurses have reported that working hours cause menstrual irregularity, amenorrhea, and long cycles [12]. Another study reported that variability in weekly working hours has effects such as menstrual irregularity, amenorrhea, and long cycle [24]. Shift work is reported to have effects that alter menstrual patterns. In our study, there was no significant difference between shift workers and non-shift workers regarding menstrual symptoms. However, it has been found that shift workers experience more work stress. It has been determined that the shift work model in Italian nurses is associated with short cycle rates compared to nurses working fixed shifts [23].

In this study, it was determined that nurses experienced moderate stress on the Work Stress Scale. In a study conducted by Tuna and Baykal with oncology nurses, it was reported that they experienced a similar moderate level of work stress [25]. In the studies of Özen Bekar and Gökoğlan, it was determined that the mean WSS scores of new nurses were at a moderate level [26]. It is observed that the work stress of nurses is similar in different studies. Although similar and particular problems affect work stress, it can be said that nurses experience work stress under all circumstances. Solutions should be developed by determining the causes of nurses' stress.

The study determined that the nurses scored a total of 3.54±0.74 points on the menstrual symptom scale, with average scores. In the studies of Solt Kırca and Özgün with working and student women, it was reported that the total MSS score was 3.37± 0.45 [27]. The study conducted by Güvenç et al. with nursing students determined that they scored a total of 2.65 ± 0.79 points [16]. It was determined that the total MSS score of immigrant university students was 1,28 ± 0,364[28]. It has been determined that the nurses participating in our study have higher scores compared to student nurses and working or young immigrant women. It can be said that the nursing profession causes menstrual problems more in women.

5. Conclusions and recommendations

In this study, it was determined that the stress experienced by nurses affects menstrual symptoms at a low level, and it was found that weekly working hours and shift work are among the factors that increase stress. In light of this information, it can be recommended to take the necessary precautions in the unit where they work, make remedial arrangements regarding fair wages, patient/nurse ratios, and working hours, and organize stress management training to minimize the work stress of nurses and the menstrual symptoms experienced accordingly. There is a need for different studies to make the work stress experienced by nurses, their results, and menstrual effects visible and provide guidance for a solution.

Ethical statement:

For conducting the study, ethical approval was obtained from the Clinical Research Ethics Committee of Dicle University on June 09, 2022 (Number: 240), written institutional permission from the university hospital, Where the study was conducted and written and verbal consents from nurses who agreed to participate in the study. The research was carried out in accordance with the principles of the Helsinki Declaration.

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Concept – M.A.Ş., E.Y.A.;
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Research Article

THE RELATIONSHIP BETWEEN UNIVERSITY STUDENTS' E-HEALTH LITERACY AND HEALTHY LIFESTYLE BEHAVIORS

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Abstract: *This study aimed to analyze the relationship between university students' e-health literacy and healthy lifestyle behaviors. This is a descriptive study. It was conducted with 1,714 students in a university in the east of Turkey during the 2018-2019 academic year. The data were collected using Lifestyle Behaviors Scale II in face-to-face interviews. Of the participants, 64% were female, 45.9% were studying at the Faculty of Education. Of the participants, 54.6% said that internet was helpful for making decisions about their health, and 57% said that it was important for them to access health resources on the internet. The participants' mean age was 21.03±2.27 years. The participants' mean e-Health Literacy Scale score was 27.80±6.12, and their mean Healthy Lifestyle Behaviors Scale II score was 125,74±19,09. These scores did not vary significantly by age, gender, or residence. They did vary significantly by year of study and faculty. A positive significant relationship was found between the participants' total e-Health Literacy Scale and Healthy Lifestyle Behaviors Scale II scores. The participants' mean e-Health Literacy Scale score was above the moderate level, and their mean Healthy Lifestyle Behaviors Scale II score was at a moderate level. Higher mean e-health literacy correlated with higher mean healthy lifestyle behaviors. Training programs should be developed considering the factors that affect university students' healthy lifestyle behaviors and e-health literacy, and students should be encouraged to adopt these behaviors.*

Keywords: *e-health literacy, healthy lifestyle behaviors, university students*

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1. Introduction

Health is a universal concept, but its meaning differs from person to person and culture to culture, which makes it a relative concept. The World Health Organization (WHO) describes health not only as suffering from no diseases or disabilities but also as having complete physical, mental and social well-being [1]. Health is a necessary right for a person to maintain a socially and economically productive life. Health is directly or indirectly affected by a number of interrelated factors such as environmental conditions, lifestyles, genetic characteristics and the structure of healthcare services [2].

A healthy lifestyle is an important factor in the quality and level of health. Healthy lifestyle behaviors (HLBs) are positive behaviors that affect health, abandoning negative behaviors and rearranging daily activities by choosing behaviors to stay healthy and avoid diseases [3]. Individuals can keep healthy and improve their health if they adopt healthy lifestyle behaviors such as a balanced diet,

exercising regularly, coping with stress effectively, and taking responsibility to maintain and improve their health [4].

Health literacy has a key role in protecting and promoting health and enabling individuals to make decisions about their own health. Health literacy serves as an intermediator between individuals, health systems, educational systems and health issues. Therefore, it is an important concept that involves information, motivation, and competence in terms of maintaining and improving health, preventing diseases, and accessing, understanding, evaluating and using health information [5]–[7]. Adequate health literacy is considered a crucial factor for individuals to access the health care services they need, to make decisions about treatments, to support their health effectively and to actualize positive health [8].

Today, the internet has become a source of online health information thanks to developing technology. It helps people to access any kind of health-related information easily and quickly. Fast-growing information and internet technologies and their increasing use have led to the emergence of the term, e-health literacy [9]. Norman and Skinner defined e-health literacy as, "the ability to search, find, understand and evaluate health information from electronic sources and to use this information to address or resolve health problems" [10].

E-health literacy is a novel concept that refers to the use of information and communication technologies (ICT) to learn about health care. It is described as the ability to search and collect health information from digital resources and to use this information to resolve health problems [11].

Studies have shown that individuals with lower levels of health literacy: have poor health conditions, have higher health care costs, use health care services more frequently, delay seeking health care when they have symptoms, cannot understand their medical condition and to adhere to medical advice, and are unable to develop healthy lifestyle behaviors and to practice self-care activities [5], [11]–[13].

University education is the transition period for young people from adolescence to adulthood. The university period is a critical period in which students experience individual, social, and health changes. It is very important for young people, who are the cornerstone of a healthy society, to be aware of their own health and adopt healthy lifestyle behaviors. Therefore, this study aimed to analyze the relationship between university students' e-health literacy and healthy lifestyle behaviors and answers to the following research questions were sought.

1. What are the healthy lifestyle behaviors and e-health literacy levels of university students?
2. What are the factors affecting the healthy lifestyle behaviors and e-health literacy levels of university students?
3. What is the relationship between university students' healthy lifestyle behaviors and e-health literacy levels?

2. Material and Methods

2.1. Study Design

This study is a descriptive study.

2.2. Setting and Sample

The population of the research consists of 10,877 undergraduate students studying in six faculties (Faculty of Education, Art and Science, Law, Economics and Administrative Sciences, Engineering and Theology) of a university in the east of Turkey in the 2018-2019 academic year. No sampling method was used in the research, and the research sample consisted of a total of 1,714 students studying at the specified faculties between March and May 2019. Health Sciences, Faculty of Medicine, Faculty of

Pharmacy and Dentistry Faculties of this university were not included in the sample group because it would affect the results of the research.

2.3. Data Collection Instruments

The data were collected in face-to-face interviews using a demographic information form, " The e-Health Literacy Scale " and "The Healthy Lifestyle Behaviors Scale II''. No sampling method used. All the students who agreed to participate were included in this study.

2.3.1 The Demographic Information Form

This form was prepared by researchers. It has eight questions about education, age, gender, place of residence, year of study and health-related internet usage.

2.3.2 The e-Health Literacy Scale (e-HEALS)

The scale was developed by Cameron D. Norman and Harvey A. Skinner in Canada in 2006. Its validity and reliability tests were performed. It was adapted into Turkish by Gencer (2017). The scale assesses how, why, when and to what extent people benefit from using the internet lo learn about health. The scale items, consisting of a total of 8 items, are in a 5-point Likert type as "1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree". The lowest 8 and the highest 40 points are taken from the scale. A high score from the scale indicates a high level of e-health literacy. The coefficient of reliability for the Turkish version of this scale is 0.86. [10], [14]. In this study, the reliability coefficient of the scale was found 0.89.

2.3.3 The Healthy Lifestyle Behaviors Scale II (HLBS II)

The scale was developed in 1987 by Walker et al., based on Pender's health promotion model. This 48-question scale is used to assess health-promoting behaviors related to a healthy lifestyle [15]. It was then revised by Walker, Sechrist, and Pender as the HLBS II with 52 questions [16]. Bahar et al. did a validity and reliability study of its Turkish version in 2008. The reliability coefficient was 0.92 for the Turkish version of the scale, indicating a high level of reliability. The scale consists of six sub-dimensions: health responsibility (α =0.77), physical activity (α =0.79), nutrition (α =0.68), mental development (α =0.79), interpersonal relations (α =0.80), and stress management (α =0.64). The scale consists of 52 items and a 4-point Likert scale (never: 1, sometimes: 2, often :3, regularly:4). The scores that can be obtained from the scale range from 52 to 208. Higher scores indicate high levels of healthy behaviors [17]. The reliability coefficient of this scale was 0.90 in this study. The reliability coefficient of its subscales was: 0.75 for health responsibility, 0.80 for physical activity, 0.58 for nutrition, 0.72 for mental development, 0.73 for interpersonal relationships, and 0.59 for stress management.

2.4. Data Collection

After the researchers were informed by the researchers about the purpose and process of the research, the data collection tools, and the volunteering of the research, the data collection tools were distributed and the students were asked to fill in all the questions completely. It took approximately 10-15 minutes for each participant to fill out the data collection forms.

2.5. Ethical Considerations

Before starting the research, ethics committee approval from the Human Research Ethics Committee of the Erzincan University (Date:02/07/2019, Number: 02) and written permission from the faculties where the research would be conducted were obtained. While conducting this study, we adhered to the principles of informed consent, autonomy, and respect for privacy during data collection.

2.6. Data Analysis

The data were analyzed using SPSS 23.0 (Statistical Package for the Social Sciences 23.0) software based on a 95% confidence interval. The threshold for statistical significance was $p \leq 0.05$, $p < 0.001$. Using the Kolmogorov-Smirnov test, it was determined that the data showed a homogeneous distribution. The statistical methods used in the analysis of the data; are numbers, percentages, minimum and maximum values, means, and standard deviations. The independent samples t-test was used to compare two normally distributed groups, and variance analysis and Pearson's correlation were used to compare multiple groups.

3. Results

It was determined that the mean age of the students included in the study was 21.03±2.27, 64% of them were women and 66.3% of them were currently living in the dormitory. Another result of the study is that 32.9% of the students were in 1st grade, 22.5% in 2nd grade, 23.9% in 3rd grade, and 20.8% in 4th-grade students. 45.9% of the students were educated in Education, 15.8% in FEAS, 9.5% in Law, 7.2% in Engineering, 11% in Theology, and 10.6% in Science and Literature Faculty (Table 1).

According to the results of the study, the participants' age did not have a statistically significant relationship with their mean e-HEALS and HLBS II scores. Additionally, these scores did not vary significantly by gender or residence.

It was determined that there was a statistically significant difference between the class variable of the students and the total mean score of the e-health literacy and healthy lifestyle behaviors scale. In further analysis, it was determined that this significance was due to the 3rd-grade group for e-health literacy and the 4th-grade group for healthy lifestyle behaviors, and the average score was higher than the other groups (Table 1).

It has been determined that there is a statistically significant difference between the variable of the faculty being studied by the students and the total score average of the e-health literacy and healthy lifestyle behaviors scale. In further analysis, it was determined that this significance was due to the FEAS student group and the average score was higher than the other groups (Table 1).

When the question "What are your thoughts about the internet helping your health?" was asked of participants 54.6% of them stated that it was useful, 16.9% of them had no idea about this issue and 15.8% of them stated that it was not useful. It was determined that there was a significant difference between the students' thinking that the internet is useful in helping them make decisions about their health and the total score average of the e-health literacy and healthy lifestyle behaviors scale. In further analysis, it was determined that this significance stemmed from the group that answered as very useful, and the mean score was higher than the other groups.

Another question "What is the importance of having access to health resources on the Internet for yourself?" was asked to students. It was determined that 57% of the respondents stated that it is important, 15.7% is very important, 13.5% have no idea and 10.4% is not important. It was determined that the difference between the students' state of stating that it is important for them to access health resources on the internet and the total score average of the e-health literacy and healthy lifestyle behaviors scale was found to be significant. In further analysis, it was determined that this significance stemmed from the group that answered as very important and the mean score was higher than the other groups.

The Participants' Mean e-HEALS and HLBS II Scores and relationships with their demographic characteristics were calculated by statistical programs and presented in Table 1.

Table 1. Comparison of the Participants' Mean e-HEALS and HLBS II Scores and Their Demographic Characteristics (n=1,714)

Characteristics	n	%	The e-Health Literacy Scale	Total HLBS II Score
Age	Mean±SD		r=0.021	r=0.039
	21.03±2.27		p=0.378	p=0.108
Gender				
Female	1097	64.0	27.82±5.88	125.58±18.30
Male	617	36.0	27.76±6.51	126.38±20.67
Test and p			t=-0.212	t=0.835
			p=0.832	p=0.406
Residence				
Family	343	20.1	28.53±5.84	127.75±20.00
Dormitory	1137	66.3	27.70±6.14	125.51±18.80
With friends	184	10.7	27.17±6.32	124.74±19.25
Alone	50	2.9	27.28±6.39	125.38±21.48
Test and p			F=2.520	F=1.459
			p=0.056	p=0.224
Class				
Freshman	564	32.9	27.48±6.41	123.59±19.23
Sophomore	385	22.5	27.56±5.87	126.58±19.63
Junior	409	23.9	28.55±5.85	126.66±17.48
Senior	356	20.8	27.70±6.12	127.81±20.20
Test and p			F=2.802	F=4.289
			p=0.039	p=0.005
Faculty of				
Education	786	45.9	28.19±5.72	126.93±18.63
FEAS*	270	15.8	28.37±6.48	127.67±18.97
Law	163	9.5	26.67±6.56	122.63±16.61
Engineering	124	7.2	28.19±6.18	126.33±20.46
Theology	189	11.0	26.47±6.21	124.83±21.34
Arts and	182	10.6	27.34±6.37	122.34±20.15
Sciences			F=4.366	F=3.259
Test and p			p=0.001	p=0.006

p<0.05, *FEAS: Faculty of Economics and Administrative Science, r= Pearson's correlation, t= The independent samples t-test, F= variance analysis.

Table 2 shows that the participants' mean e-HEALS score was 27.80±6.12. Their mean subscale scores on the HLBS II were 19,58±4,52 for health responsibility, 16.21±4.71 for physical activity, 19,74±3,91 for nutrition, 26,07±4,67 for mental development, 25,16±4,46 for interpersonal relationships, and 18,98±3,73 for stress management. Their mean scale score was 125,74±19,09.

Table 2. Distribution of the Participants' Mean e-HEALS and HLBS II Scores (n=1,714)

Scales	Min.	Max.	Mean±SD
The e-Health Literacy Scale	8	40	27.80±6.12
The Healthy Lifestyle Behaviors Scale II and its Subscales			
Health Responsibility	9	36	19,58±4,52
Physical Activity	8	32	16.21±4.71
Nutrition	9	36	19,74±3,91
Mental Development	9	36	26,07±4,67
Interpersonal Relationships	10	36	25,16±4,46
Stress Management	8	32	18,98±3,73
Total Score	68	208	125,74±19,09

Table 3 shows the correlation analysis between the participants' mean e-HEALS and HLBS II scores. The participants' total e e-HEALS score had a positive significant relationship with their mean

HLBS II scores and its subscale scores ($p<0.001$). Higher mean e-HEALS scores correlated with higher mean HLBS II scores.

Table 3. The Relationship between the Participants' Mean e-HEALS and HLBS II Scores

Scales	The Healthy Lifestyle Behaviors Scale II						
	Health Responsibility	**Physical Activity**	**Nutrition**	**Mental Development**	**Interpersonal Relationships**	**Stress Management**	**Total HLBS II Score**
The e-Health Literacy Scale	r=0.772** **p=0.000**	r=0.708** **p=0.000**	r=0.712** **p=0.000**	r=0.721** **p=0.000**	r=0.697** **p=0.000**	r=0.743** **p=0.000**	r=0.289** **p=0.000**

**p<0.001, r= Pearson's correlation

4. Discussion

Today, the internet is a priceless resource that provides information about health and is an important tool for socializing. Rapid advances in technology bring the concept of e-health literacy to the agenda as an important issue as it enables people to access information that allows them to take responsibility for their own health, manage their health, and make decisions about their own health. [11], [18].

The participants' healthy lifestyle behaviors were at a moderate level. Their highest mean scores were in mental development and the lowest mean scores were in the physical activity subscale. There are studies that support this study's results in the literature, which have found that students' HLBs were at a moderate level, that their highest mean score was on the mental development subscale, and that their lowest mean score was on the physical activity subscale [19]–[21]. Ceylantekin and Öcalan conducted a similar study and found that students' healthy lifestyle behaviors were at a moderate level, their highest mean score was on the interpersonal relationships subscale, and their lowest mean score was on the physical activity subscale [22]. This study found that most of the students had low levels of physical activity. Physical activity is one of the factors that positively affect students' psychological and physical health. Therefore, it is important to encourage students to do physical activities and to improve infrastructural opportunities for physical activities.

E-health literacy is expressed as the ability to search and collect health-related resources from digital sources and use this information to solve health problems. [11]. This study found that the participants had an e-Health Literacy Scale average score above the moderate level. Arli found that university students' mean e-health literacy score was above the moderate level [23]. Other studies in the literature have found that university students' e-health literacy was at a moderate level [24]–[26].

The participant's age, gender, and residence did not affect their e-health literacy levels. A number of studies have also found that university students' age, gender, and residence did not affect their e-health literacy levels [24]–[28]. On the other hand, there are studies indicating that students who were living in a separate residence from their family had higher levels of e-health literacy [27]. One study conducted with people over 18 years old found that age affected their level of e-health literacy [28]. The literature suggests that young people may have higher levels of e-health literacy because they have better knowledge of and ability to use technology [29].

It has been found that the idea of finding the use of the internet very useful and important in making decisions about their own health and accessing health-related resources affects the e-health literacy level of the students. Similar studies have also revealed that thinking that internet use is very useful and important in terms of accessing relevant resources affects students' e-health literacy levels [23], [26], [30].

The participant's age, gender, and residence did not affect their healthy lifestyle behaviors. Some studies in the literature support this study's result by finding that gender did not affect healthy lifestyle behaviors [21], [31]. Unlike this study, another study found that gender and residence affected healthy lifestyle behaviors, and that male [22] students who were living alone or with their friends had higher levels of healthy lifestyle behaviors [20], [22].

In this study, it was found that the grade level and faculty variables studied affect students' e-health literacy and healthy lifestyle behaviors. The literature includes studies indicating that students' years of study both affected [22] and did not affect [20] their healthy lifestyle behaviors. One study found that students' healthy lifestyle behaviors varied by faculty and that students who were studying at departments related to health and physical activity were more likely to have healthy lifestyle behaviors [20].

In this study, it was found that the thought of finding internet use very useful and important when making decisions about their individual health and accessing health-related resources affects the level of healthy lifestyle behavior of students. It has become a source of health-related information [32]. For this reason, the Internet continues to be an important source of access to health-related information.

E-health literacy refers to searching for and collecting health information from digital resources on the internet and related technologies to resolve health-related problems [11]. The literature shows that people with higher levels of health literacy are more likely to have more health-related knowledge, visit health institutions less frequently, develop positive attitudes towards their health, and develop higher levels of healthy lifestyle behaviors as a result of their self-efficacy and motivation [5]. The participants' mean Healthy Lifestyle Behaviors II Scale scores increased as their mean e-Health Literacy Scale scores increased. This study's results support those in the literature, indicating that students with higher levels of e-health literacy were more likely to have knowledge and awareness about protecting and improving their own health.

5. Conclusions and recommendations

In this study, it was found that university students' e-Health Literacy Scale score averages were above the medium level, and their healthy lifestyle behaviors were at a moderate level. Age, gender and residence did not affect the participants' levels of e-health literacy and healthy lifestyle behaviors. The participants' mean HLBS II scores increased as their mean e-HEALS scores increased. These results suggest that:

Training programs should be developed considering the factors that affect university students' healthy lifestyle behaviors and e-health literacy, and students should be encouraged to adopt these behaviors. Students should be encouraged to engage in activities that positively affect their healthy lifestyle behaviors and necessary infrastructure should be provided to them. Students should be informed about how to obtain accurate and reliable information about health on the internet and how they can analyze and use this information starting in the first years of their education. Courses about protecting and improving health should be included in the curricula, and further studies should be conducted with larger samples because this study was limited to six faculties of a state university in the east of Turkey.

Limitations of the Research:

This study is limited to first, second, third, and fourth-year students studying at the faculties of education, science and literature, law, economics and administrative sciences, engineering, and theology at a university in the east of Turkey. In addition, since the Cronbach alpha values of the Healthy Lifestyle Behaviors Scale sub-dimensions used in the study were low, discussing the study over the total score constitutes the limitation of the study.

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NK. led the research. All the authors undertook the intervention field works. NK. and SAB. collected the data. PK conducted the analysis and drafted the manuscript. All the authors read and approved the final manuscript.

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Case Study

STRATEGIES FOR IMPROVING THE IMPLEMENTATION OF ELECTRONIC HEALTH RECORDS- A SINGLE CASE STUDY

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Abstract: *Electronic health records are a healthcare quality improvement strategy. Healthcare organizations in middle-income countries face significant challenges in adopting and implementing electronic health records. In Jordan, implementation challenges delayed achieving the objective of a national initiative titled Hakeem. The initiative aimed to implement the Hakeem electronic health record system in all healthcare sectors by 2020. This delay may be attributed to inadequate implementation guidelines. The King Hussein Cancer Center successfully pioneered the Hakeem system in Jordan and fully used it in all departments. This study used a single case study design to explore and codify the center's strategies for system implementation. Data sources included a review of organizational documents related to the Hakeem system implementation and individual interviews with six healthcare leaders involved in the implementation process. Thematic data analysis included manual analysis and verification using NVivo 12, QRS International software. The emerging themes included (1) a phased approach and continuous planning, (2) stakeholders' active involvement, (3) collaboration with the facilitating agency/vendor, (4) training and continuous support, (5) managing resistance, and (6) recommendations for other organizations. The findings of this study may lay the foundation to lead healthcare organizations into successful implementation and effective use of electronic health records.*

Keywords*: Case Study Design, Electronic Health Records, Electronic Health Solutions, Hakeem System, King Hussein Cancer Center.*

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1. Introduction

Electronic Health Record Solutions (EHRs) have gained worldwide momentum as a strategy to improve healthcare quality. EHRs are "digital forms of patient records that include patient information such as personal contact information, patient's medical history, allergies, test results, and treatment plan" [1]. EHR systems are an effective quality improvement strategy in healthcare organizations because they have the potential to improve care quality, process efficiency, and patient safety and outcomes [2, 3]. There was a steady growth in global ERHs adoption over the past fifteen years, but their level of adoption and implementation varies among world countries [4]. Developed and high-income countries were more successful in EHR implementation than developing and low to medium-income countries [5].

Healthcare organizations face several challenges as they adopt and implement EHRs. These challenges include healthcare providers' perceptions and resistance to EHRs' use, training and technical support issues, financial constraints, EHRs' systems' limitations, and concerns over patient safety and privacy [2,6-8]. These barriers are unique to organizations and countries' healthcare systems. Developed countries are more likely to face healthcare providers' resistance to new technology, while developing

countries are prone to organizational challenges like insufficient senior management and weak coordination among team members, besides resistance to new technology [5, 8, 9].

Jordan is a developing medium-income country that began a nationwide EHRs initiative called Hakeem in 2010. The objective of the Hakeem initiative was to achieve nationwide implementation by 2020 [10]. Through the Ministry of Health, the Jordanian government designated a nonprofit agency called Electronic Health Solutions (EHS) as the national body for facilitating and supervising Hakeem's nationwide implementation [11]. Three years before the target date, a nationwide survey showed that only ten percent of hospitals in Jordan had a comprehensive implementation of EHRs in all units, suggesting unresolved challenges [12]. Common challenges facing Jordanian healthcare organizations include providers' resistance to new technology, inadequate financial resources, technology infrastructure, and human resources concerns [6, 10, 13]. How healthcare organizations respond and overcome these challenges in Jordan is not clear.

One notable example of comprehensive EHRs implementation in Jordan is the King Hussein Cancer Center (KHCC). KHCC is a leading cancer care center in the Middle East. Hakeem's implementation at KHCC began in 2014 and was completed in 2019 with comprehensive use in all departments [14, 15]. The successful implementation and use of EHRs at KHCC suggest implementing strategies to overcome challenges. While several studies from Jordan addressed the challenges of EHRs implementation in Jordan, to the best of my knowledge, no studies focused on implementation strategies for facilitating successful execution and use.

The purpose of this qualitative single case study is to explore KHCC's strategies for overcoming the Hakeem system implementation challenges. Other healthcare organizations can use these strategies to capitalize on the system's benefits. Study results helped build a guideline model that healthcare organizations in Jordan can use to achieve the EHR implementation objective.

This study's research question is:

What strategies did KHCC use to achieve full implementation of the Hakeem EHR program?

2. Materials and Methods

2.1. Study Design

This qualitative research study employed a single case study design to focus the lens on KHCC's experience with EHRs implementation. Qualitative research allows for a detailed understanding by talking to people in their natural settings and empowering them to reveal their perspectives [16]. The Case study approach requires triangulation to achieve rigor and depth in the research. Triangulation entails using a range of empirical data collection tools to answer the research question, increase the credibility and validity of the results, add richness and extensiveness to the study, and build an in-depth understanding [17- 19].

This study's primary data sources included a review of organizational documents related to implementing the Hakeem EHR system and individual open-ended interviews with six KHCC healthcare leaders involved in the implementation process. Approval by KHCC's Institutional Review Board (IRB) was obtained and allowed access to the organizational documents, recruiting and interviewing study participants, and publishing results.

2.2. Document Reviews

The first data collection phase for this study was the organizational document review. KHCC provided several documents related to the early planning stages, system assessment, and software configuration. After a thorough review, two primary documents provided substantial information. The

first document was titled *Transformational State Workflow*, and the second was *Design and Configuration Specifications.*

2.3. Interviews

The following phase was the open-ended interviews with KHCC healthcare leaders. The study sample included a purposive sample of six healthcare leaders from KHCC who agreed to participate. Recruitment for the study was done through email and informed consent. Criteria for inclusion included being a healthcare leader who participated in the Hakeem system implementation and was willing to consent to an audio recording of the interviews.

All interviews were virtual using Zoom. The primary tools for data collection during the virtual interviews included one-on-one semi-structured open-ended interview questions, audiotapes, and interview notes.

The one-on-one, semi-structured, open-ended interview technique facilitates an open discussion with the participant. It allows the researcher to engage in a flexible conversation with the study participant to attain subjective responses to the questions instead of receiving yes or no answers [16-18]. It also allows the researcher to probe participants for clarification to facilitate a deeper understanding of the phenomenon [17].

During the interview, I asked questions, listened carefully to responses, asked follow up questions, recorded responses, and audio-recorded the entire interview. Data collcetion continued until data saturation was reached and no newer information emerged. Data saturation means that the researcher reaches "the ultimate point of data collection" where no further information can be introduced and when the researcher begins to see a pattern of repetitive responses or no new responses [22, 23]. Data saturation is essential in qualitative case study design because it enhances the research quality and validity. I stopped data collection when new information generation ceased.

2.4. Thematic Data Analysis

Preparing the data for thematic analysis included transcribing the audio recordings into typed Word documents and member checking. Study participants received their transcribed interview script by email for member checking. Most participants replied with approvals and some with minor requests for modification.

The data was manually analyzed following the Braun and Clarke thematic analysis method [24]. The method involves "identifying, analyzing, and reporting patterns within data" [24]. A thorough analysis of the codes and potential themes revealed six primary emerging themes. They included (1) a phased approach and continuous planning, (2) stakeholders' active involvement, (3) collaboration with EHS, (4) training, and continuous support, (5) managing resistance, and (6) recommendations for other organizations.

The following step was data analysis verification using the NVivo 12, QRS International software. The process included organizing the interview scripts into NVivo files labeled with the themes' names generated from the manual data analysis and running two verification tests. The first test was a word frequency query from the interview data. This test lists the most frequently occurring words or concepts in specific files and helps identify possible themes [25]. The second test was a review of references in the data set. This test calculates the number of references and their percentage coverage in each code [26].

3. Results and discussion

3.1. Document Review Results

The review of the primary assessment reports revealed three main observations. First, the documents' developers were EHS and KHCC, indicating collaboration between the two organizations during the planning and assessment phases. Second, the reports addressed operational gaps in technology infrastructure and potential solutions before inception. They highlighted needed system improvements for Hakeem to meet KHCC's needs and enhance the providers' experience. Third, reviewing the reports instigated several questions that I inquired about later in the interviews.

The first report, The Transformational State Workflow, summarized the workflow procedures in the Outpatient clinics. This document indicated close collaboration between KHCC and EHS at a highly detailed level. The report highlighted needed system improvements for Hakeem to meet KHCC's needs and enhance the providers' experience. The second report, titled The Design and Configuration Specifications, described the method that EHS used to configure the Hakeem solution in coordination with KHCC. Later in the interviews, I learned that KHCC had used two homegrown electronic systems to manage some operations. One study participant explained that the system configuration required integrating the data from the existing systems into the new Hakeem solution. Both reports were developed by KHCC and EHS in 2012. Table 1 below summarizes the two primary reports reviewed for this study.

Table 1: Reviewed KHCC organizational documents related to the Hakeem System Implementation.

Title	Description
Transformational State Workflow	• Summarizes departments' workflow procedures. • Describes the patient's journey from appointments and scheduling until case closing. • Includes a process diagram depicting the patient's journey from start to finish.
Design and Configuration Specifications	• Describes EHS's method to design the Hakeem solution in coordination with KHCC. • EHS's design was customized upon KHCC's request. • EHS designed added services and treating specialties.

Note. This table briefly describes the two primary reviewed documents.

3.2. Interviews Results

The thematic data analysis revealed six emerging themes. They included

1. Phased approach and continuous planning,
2. Stakeholders' active involvement,
3. Collaboration with ehs,
4. Training and continuous support,
5. Managing resistance, and
6. Recommendations for other organizations.

The results generated from the NVivo 12, QRS International software Word Frequency test showed the most occurring words and concepts in the data files. Figure 1. represents the generated visual word cloud. It depicts the most frequent fifty words in the interview scripts. The word cloud exercise helped verify the emerging themes. It reflected five major word counts that pertained to the first five identified themes from the manual analysis. The recommendations for other organizations' theme did not appear with the same strength as the other five in the word cloud.

Figure 1. Word cloud indicating the word frequency of the interview data. Created from NVivo 12, QRS International.

The results from the *Review of References* verification test showed the codes' number of references and percentage coverage. The purpose of this test was to check the manual data accuracy. The results are presented in Table 2. and Figure 2. below.

Table 2: Number of Occurrences per the theme

Theme Name	References Coded	% Coverage
Phased approach and continuous planning	43	8.66
Stakeholders' active involvement	40	8.06
Collaboration with EHS	33	6.65
Training and continuous support	28	5.64
Managing resistance	30	6.04
Recommendations	18	3.29

Note. References coded indicate the number of data references coded to the identified theme and the % coverage indicates the percentage of the data file that the coding represents. Created from NVivo 12, QRS International.

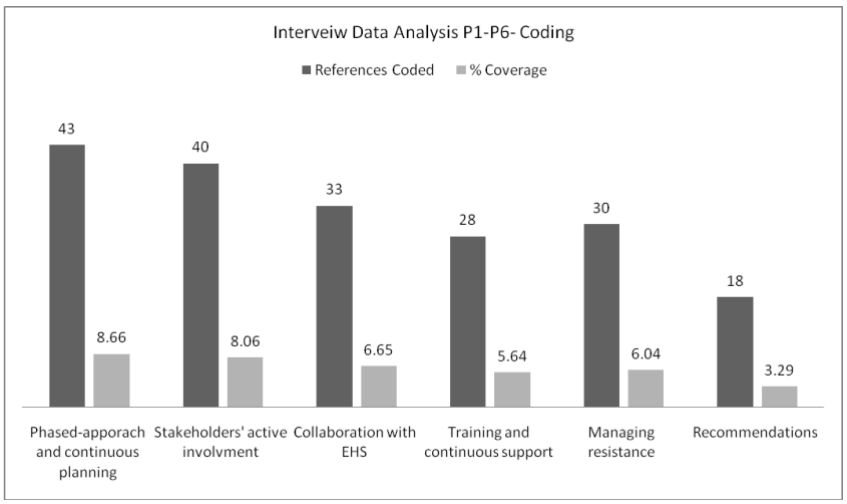

Figure 2. Graph indicating the coding references and percentage coverage of the interview data. The chart reflects the themes identified in the data analysis.

These tests helped verify that the themes identified in the manual analysis method pertain to the NVivo results method. They illustrate that the first five themes had similar strength while the last,

recommendations to other organizations, appeared with lesser strength. Although it is an important theme for this study, it does not qualify as an implementation strategy.

3.2.1 Phased Approach and Continuous Planning

The phased approach was a critical strategy that studies participants unanimously noted. According to the study participants, the process began with establishing a steering committee and a project management office to carry out the project planning and execution. The planning phase comprised intense assessment exercises of technology infrastructure, human resources capacities, and training and system needs. The following steps included system configuration, piloting in one department, gradual implementation in the outpatient clinics, and the final step of going live in the inpatients' words. Time and human resources were allocated for each phase of the process.

3.2.2 Stakeholders' active involvement

Study participants emphasized that stakeholders' active involvement was an effective implementation strategy. Stakeholders are all individuals involved in the Hakeem system implementation, including KHCC leaders, health care providers from all departments, IT and support staff, patients, and the EHS team. Study participants assured that actively involving representatives from each department throughout the project lifecycle was crucial. One study participant echoed, "*Never force people to do things. Involve them instead and take their input, concerns, and recommendations seriously*". Study participants appeared to attribute this strategy to top management's support. They thought highly of the project leadership and viewed leadership buy-in, involvement, and support as significant success factors.

3.2.3 Collaboration with EHS

The third emerging theme is related directly to the level of coordination between KHCC and EHS. Study participants unanimously agreed that coordination was high on all levels. One study participant emphasized, "*Top management from each organization was actively involved in process planning, project aspects, and execution details''*. Study participants unanimously agreed that EHS's and KHCC's roles were well-defined since the project inception with minimal duty overlap. EHS was responsible for system configuration, while KHCC was responsible for all internal processes. They attributed this understanding to the project's leadership vision and their strategic collaboration with EHS.

3.2.4 Training and continuous support

The participants recognized training and continuous support as critical strategies. They unanimously agreed that training was a considerable and challenging undertaking. The training was tailored to needs and capacities. KHCC used a training-of-trainers approach, where each department allocated and comprehensively trained *Super Users*, and Super Users then trained end-users in each department with ongoing support. One study participant echoed, "*There were different levels of training to prepare end-users, and there was also intense training for Super Users*". Trainees received hands-on preparation for their departments' interfaces.

3.2.5 Managing Resistance

The fifth identified theme was managing resistance to the Hakeem system implementation. Study participants had varied impressions about end users' resistance to implementation. For example, a study participant thought resistance was not significant and preferred to call it "*hesitation or skepticism*". On the other hand, another study participant asserted that resistance was a considerable hurdle, especially in the early implementation phases. He elaborated, "*We had whole departments that refused to use the system and came up with a million excuses of why not and how it interfered with their work*". Overall, study participants agreed there was some degree of resistance to system implementation. KHCC used

various mitigation strategies corresponding to resistance causes, not a one-fit-all approach. These strategies included tailored training, using shadows and personal assistants, simplifying data entry and documentation, capitalizing on early adopters' experiences, and mandating organizational policies.

3.2.6 Recommendations for other organizations

The last question to the study participant was about their recommendations for other organizations that strive to implement an EHR system. A primary recommendation was that every organization approach system implementation from their perspective and understand their capacities before implementing. Study participants emphasized that every organization is unique and has no one-fit all solution, and what worked for KHCC only sometimes work for others. One study participant elaborated that an organization should thoroughly analyze its business processes and recognize the importance of implementing an EHR system. According to one study participant, identifying clear objectives for the organization is a "prerequisite" to successful implementation.

4. Discussion

EHR system implementation is challenging and complex, and employing effective implementation strategies is crucial to capitalize on the system benefits. Primary benefits of EHR use include provider integration and health care quality, improved medical diagnosis, improved medical outcomes, and potential financial savings [2, 3, 7, 27, 28, 30]. EHR systems support care system integration and communication between providers. They allow healthcare providers instant access to patient records and patient history, clinical results, and clinical reports and allow instant communication with other clinicians on the team [7, 9, 30]. The advanced access and communication features in EHR systems have been shown to improve clinical diagnosis and enhance the decision-making process [2]. Implementing EHR systems can yield significant long-term potential cost savings, especially with nationwide implementation [7, 9, 30]. EHRs' potential benefits can outweigh challenges when healthcare organizations make an effort to mitigate and institutionalize successful implementation strategies [30]. Having a roadmap for effective implementation can facilitate better and more successful outcomes.

The findings of this study revealed several strategies that KHCC used to implement the Hakeem system. The primary strategies identified in this study include (1) a phased approach and continuous planning, (2) stakeholders' active involvement, (3) collaboration with EHS, (4) training and continuous support, and (5) managing resistance. Study findings also outline specific recommendations that the interviewees offered that may facilitate implementation.

One significant recommendation is to realize that each organization has its unique culture and business processes. Factors like the organization's size, structure, business workflow, IT infrastructure, human resources, and the objectives for the EHR implementation are significant to successful implementation [29]. Organizations need to approach system implementation from their perspective and understand their capacities before implementing by thoroughly analyzing and describing their organizational business processes.

Effective leadership was a significant factor in the successful Hakeem implementation at KHCC. Study participants persistently noted that upper management's active involvement, buy-in, and support were crucial to project success. They assured that active involvement positively affected the team's attitude towards system implementation. One study participant echoed, "*Management and leadership buy-in is an absolute must. The project cannot go forward without an actively involved leadership that provides direction, support, and resources*". The leaders at KHCC seemed to realize that leadership is the impetus for change and acted accordingly. Study participants were positive that the decision-making

process was a collaborative approach among the project team and increased the teams' ownership of the project.

Planning system implementation is crucial for process success. EHRs implementation is complex, lengthy, and resource-costly. Study participants emphasized that organizations should invest considerable time planning exercises to minimize implementation errors. An implementation plan should include workflows for every department and accommodate all needed resources. A system implementation plan begins with identifying the appropriate approach for the organization's business environment. KHCC's phased approach worked well in achieving the implementation goals, but it may not be the best for other organizations. Only the organization can select what works best for it. Healthcare organizations that begin selecting a suitable strategy are more likely to succeed in facilitating implementation and minimizing delays [29].

Another significant recommendation is to create a core project team that actively involves stakeholders. The study participants unanimously agreed that involving representatives from each department and from EHS was an effective strategy to improve outcomes and develop buy-in. Team members were assigned specific roles and were actively involved in all planning and execution activities. It is up to the organization to decide the size and representation of a core project team that meets its particular situation [9]. The project team plans and steers the implementation process considering the organizational environment.

Planning is a considerable element in the implementation process. Before implementing the system, organizations should devote reasonable time and resources to developing clear project plans. A project plan should outline tasks, timelines, system configuration, and training and support activities that meet the organization's needs and objectives [9]. Establishing clear guidelines could significantly enhance EHRs' implementation and use and help healthcare organizations benefit from EHR systems effectively. While executing the project plan, monitoring and evaluation are significant for achieving goals [7]. The project team should be ready to address any issues during system implementation [3].

Recommended steps for implementing the Hakeem system implementation according to the KHCC team, included the following.

• First, the organization must prepare and engage stakeholders to understand change and create a core project team.

• Once a project team is established, it should devote the most considerable portion of operations to planning activities.

• During the planning phase, the organization must thoroughly analyze its business processes, needs, and capabilities. This exercise should allow decision-makers to understand their environment better and select the proper implementation approach. It should also help the organization determine the project cost, timeline, human resources need, and other resources to implement successfully. One study participant clarified, "*The phased approach worked well for KHCC, but that does not mean it will necessarily work well for other organizations*".

• When an overarching plan is in place, a clear timeline and proper monitoring system should be in place for execution.

• Plan execution involves system implementation within the designated timeline, workforce, and system infrastructure. Continuous plan monitoring and improvement are a must to achieve the end goal.

This study's findings align with several research studies that explored success factors involved in EHRs implementation, especially in developed countries. The review of the literature revealed similar results to this study. For example, an umbrella literature review focused on successful EHRs implementation emphasized the significance of the differences among the implementing agencies' organizational factors, such as structure, leadership, size, and governance. [30]. It also highlighted the

importance of involving end-users and creating champions to ensure stakeholders' active participation in the implementation process. The significance of training, support, resources, and workflows was also highlighted as considerable success factors [7, 9, 27, 28, 29,30]. While most of the literature reviewed was conducted in developed countries, no studies were found to address identifying that proved successful in healthcare organizations in Jordan. Establishing clear implementation guidelines could significantly enhance EHRs' implantation and use and help healthcare organizations benefit from EHR systems effectively [9]. This research study is specific to the strategies that KHCC used in EHR implementation and would provide foundational aspects for future researchers trying to advance the scholarly discussion surrounding this research angle.

5. Study Limitations

The limitation identified in this study is the lack of generalizability from the case study design. Lack of generalizability means that study results can apply to a narrow population or a specific situation [31]. Generalizing results from a case study design with a small sample is difficult. However, this study did not intend to generalize results to a large population. Instead, it is concerned with result transferability from one situation to other similar situations [32]. Transferability entails "findings gained in a particular context can offer valuable lessons to other similar settings" [33]. This study aimed to explore and codify KHCC's strategies for overcoming the Hakeem system implementation challenges so that other healthcare organizations can use them and capitalize on the system benefits.

6. Recommendations for Further Research

Further research may focus on the appropriate strategies that fit an organization's unique environment. The findings from this study revealed that a phased approach was adequate for the Hakeem implementation at the KHCC. However, the study participants emphasized that the phased approach worked for their particular situation but may not necessarily work for other organizations. Further research may investigate grounds for selecting a proper implementation strategy that fits a particular organization's culture. Healthcare organizations that begin selecting a suitable strategy are more likely to succeed in facilitating implementation and minimizing delays [34]. Further research may focus on the organizational factors that affect the decision-making process for selecting the proper approach.

Further research may focus on the role of government policy and legislation in achieving Jordan's Hakeem system objectives. The Hakeem initiative was Jordan's first national e-health system in Jordan to reach nationwide EHR implementation by 2020 [6]. The adoption and implementation levels were generally slower than anticipated, but a higher adoption rate and use were noted in large public and teaching hospitals in urban areas [13, 35]. The higher adoption rate in public healthcare facilities suggests better government policy and legislation compliance. Enhancing the Hakeem system objectives beyond the national initiative scope to a national policy that mandates implementation may significantly improve implementation compliance. The lack of policies and legislation is a primary challenge that hinders EHRs' adoption and implementation in Jordan [11]. The global experience with EHRs implementation emphasizes the role of government policy in enhancing implementation. For example, the enactment of the Health Information Technology for Economic and Clinical Health Act (HITECH) in the United States and the European Innovative Medicines Initiative in Europe correlated positively with higher implementation rates [13, 36]. Further research may address the role of government policy in promoting and mandating the Hakeem system adoption and implementation in Jordan.

7. Conclusion

This qualitative single case study aimed to explore and codify KHCC's strategies for overcoming the Hakeem system implementation challenges so that other healthcare organizations can use them and capitalize on the system benefits. The study addressed the problem that many of Jordan's healthcare organizations that lack clear guidelines for implementing EHRs may be reluctant to adopt and implement the Hakeem system and miss the system's potential benefits. The study used a case study design approach to focus on KHCC's experience with EHRs implementation. The findings of this study demonstrated that KHCC used five primary strategies to implement the Hakeem system in all departments. These strategies included a phased approach and continuous planning, stakeholders' active involvement, Collaboration with EHS, training and continuous support, and managing users' resistance.

Ethical statement:

The King Hussein Cancer Center granted the institutional review board (IRB) approval to conduct this study and publish its findings. IRB approval (study number 21 KHCC 139). Informed consent forms were obtained from all study participants and stored in a password-secured database.

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Conflict of interest:

The author declares that there is no conflict of interest.

Author's Contributions:

A. B: Design, Conceptualization, Literature Review, Methodology, Resources and Materials, Data Collection and Analysis, Investigation, and Writing.

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