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The Correlation between the Perceptions of Nursing Students on Spirituality and Spiritual Care and Their Professional Values in the Process of the COVID-19 Pandemic

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ABSTRACT:
Purpose: This study was conducted for the purpose of investigating the correlation between the perceptions of nursing students on spirituality and spiritual care and their professional values in the process of the COVID-19 pandemic.
Material and Methods: The study was carried out with nursing students at the School of Health at a state university in the Mediterranean Region of Turkey between 1 and 14 July 2020. The sample consisted of 279 students. The question forms for the data were prepared on Google Forms, and the data were collected by connection addresses sent to the students. In data collection, a "Personal Information Form", the "Spirituality and Spiritual Care Rating Scale (SSCRS)" and the "Nurses Professional Values Scale-Revised (NPVS-R)" were used.
Results: The students' mean total score in the "NPVS-R" was 102.22±24.34, while their mean total score in the "SSCRS" was 3.79±0.61. There was a significant, positive and weak correlation between the total score and subscale scores of the "NPVS-R" and the score of the "SSCRS".
Conclusion: This study concluded that the perceptions of the nursing students regarding spirituality and spiritual care and their professional values in the COVID-19 pandemic process were on a good level, and as their professional values increased, their spirituality and spiritual care perceptions increased.
Keywords: *Nursing Student, Professional Values, Spirituality, Care*

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INTRODUCTION

COVID-19, which came into the agenda with pneumonia cases with unknown etiology on 31 December 2019 in the city of Wuhan in the Chinese province of Hubei, has began to spread to the entire world fast, and related deaths have increased fastly (Aktuğ et al., 2020). COVID-19 caused the deaths of many patients, loss-related pain, fear, concerns and psychological crises (Turkish Academy of Sciences, 2020). In this process, spiritual care is a vital component of holistic health management, particularly in terms of coping, illness, suffering, and ultimately acceptance of death (Roman et al., 2020). Providing spiritual care leads to positive outcomes like recovering for patients and developing spiritual awareness for nurses (Ramezani et al., 2014). There are many factors that affect the spiritual care of nurses. One of the effective factors in nursing care is the nurse's perception of spiritual needs and care (Ergül and Bayık, 2004). When nursing students, who are the nurses of the future, cannot determine the spiritual needs of the patient correctly, they may not be able to provide holistic care, and thus, the outcomes of the recovery process and patient care are negatively affected (Daghan, 2018). According to the holistic care approach, the dimensions of the individual should not be considered separately from each other and should be handled as a whole (Korkut

Bayındır and Biçer, 2019). Sagkal Midilli et al. (2017) found that 94.1% of students thought it is necessary to ensure the individual/patient with spiritual care, while 69.9% stated that they did not see themselves adequate in terms of ensuring spiritual care to their patients. Kobya Bulut and Meral (2019) reported that student nurses had heard of spiritual care, however the students' knowledge and practices regarding this issue were not enough. Brandstötter et al. (2021) found that nursing students suffered from low spiritual well-being during the COVID-19 lockdown.

Some of the important factors that affect the behaviors of the individual are the values they have (Karaöz, 2000). Values are generally beliefs and attitudes about a goal, object, principle, or behavior (Acaroğlu, 2014). Every individual has personal, social/societal/cultural and professional values that provide meaning for, shape and direct their life (Acaroğlu, 2014). Professional nursing values have been described as important professional nursing principles such as altruism, fairness, human dignity, and integrity that serve as a framework for standards, professional implementation, and assessment (Schmidt and McArthur, 2018). A previous study revealed that the professional behaviors of nursing students were loaded with ethical principles and values (Kaya et al., 2012). While the professional values of nurses guide their application of care behaviors, make decisions and solve ethical problems, they also guide their interactions with health/patient persons, colleagues, other team members and society (Acaroğlu, 2014). Internalization of professional values starts in periods of studentship and continues to develop in the professional socializing process after graduation. For this reason, developing professional values in nursing students should not be neglected (Arkan et al., 2019). No study has been found in the literature examining the correlation between nursing students' perception of spirituality and spiritual care, and their professional values. Cici and Yilmazel (2021) determined that the perspectives of the profession among nurse candidates show a negative trend due to the COVID-19 pandemic. Therefore, it is thought that perceptions of nursing students on spirituality and spiritual care and their professional values will be affected during COVID-19 pandemic. Brandstötter et al. (2021) reported that even though students in 2020 and earlier rated their proficiency in providing spiritual care as high, their caregiving may be affected if their own spiritual well-being remains low for an extended period of time. Among healthcare personel, the professionals that most frequently interact with patients and spend time with them are nurses (Karasu and Öztürk Çopur, 2020). Since the health status of people may be adversely affected during the Covid-19 pandemic process, it is thought that there is a greater need for the application of spiritual care and professional values in this process, so it was considered necessary to know about the correlation between the perceptions of students who would become nurses on spirituality and spiritual care and their professional values in the COVID-19 pandemic process, this study was performed.

MATERIAL and METHODS

Purpose and Type of the Study

This study was performed for the aim of investigating the correlation between the perceptions of nursing students on spirituality and spiritual care and their professional values in the process of the COVID-19 pandemic. This was a descriptive study.

Sampling and Participant

The population of the study consisted of all students of a nursing department at a School of Health at a state university located in the Mediterranean Region of Turkey in the period of 1-14 July 2020 (n=584). The research was completed with 279 students who agreed to participate in the research.

Data Collection Tools

The "Personal Information Form", the "Spirituality and Spiritual Care Rating Scale" and the "Nurses Professional Values Scale-Revised" were utilized.

Personal Information Form

It was created as a result of a review of the literature. It included questions regarding the descriptive characteristics of the students, spiritual care and coronavirus. It consisted of 15 questions, such as seeing education on spiritual care necessary, reason

of choosing the profession of nursing, having coronavirus disease in their environment, and having coronavirus disease in their relatives (Caner et al., 2019; Akın and Yılmaz, 2020; Çelik et al., 2014; Çelik İnce and Utaş Akhan, 2016).

Nurses Professional Values Scale-Revised (NPVS-R)

The Nurses Professional Values Scale was developed by Weis and Schank (2000). It was adopted for the Turkish society by Orak and Alpar (2012). The NPVS-R is a 26-item, 5-point Likert-type (1-not important, 5-most important) scale developed by Weis and Schank (2009). The Turkish validity and reliability study of the NPVS-R was carried out by Acaroğlu in 2014. In the Turkish adaptation study by Acaroğlu (2014), the Cronbach's alpha coefficient of the scale was found as 0.96. The Turkish version of the scale has a 3-factor structure called Care, Professionalism and Trust. There is no inversely scored item in the scale. The score range of the scale is between 26-130. A high score shows strong compliance with professional values (Acaroğlu, 2014). In this study, the Cronbach's alpha coefficient of the total NPVS-R was found as 0.98, whereas those of its care, professionalism and trust subscales were found respectively as 0.98, 0.94 and 0.87.

Spirituality and Spiritual Care Rating Scale (SSCRS)

The scale was developed by McSherry et al. (2002). Its validity and reliability study in Turkish was carried out by Ergül and Bayık Temel (2007). It is a five-point Likert type scale consisting of 17 items. The items are scored from 1 suitable to "absolutely disagree" and 5 corresponding to "absolutely agree". Thirteen items are scored directly, while four items are scored reversely. The score range of the scale is between 17-85 points. Item average scores closer to 5 demonstrate high levels of perception of spirituality and spiritual care. Its Cronbach's alpha coefficient was reported as 0.76. (Ergül and Bayık Temel, 2007). In this study, this coefficient was calculated as 0.82.

Implementation

After obtaining the necessary legal permissions, an "online questionnaire" was applied on the students at the school in the scope of the study. The questions were organized by using Google Forms, and the data were collected by a link sent to the students. Preliminary information about the study was provided to the students in the online questionnaire. Informed consent was included in the online questionnaire. The students filled out the questionnaire after they stated that they agreed to participate in the study.

Statistical Analysis

Data Analysis SPSS version 22 was used for data analysis. In data analysis, frequencies, percentages, minimum and maximum, means and standard deviations were utilized.

In the normally distributed measurements, independent-samples t-test, One-Way ANOVA test (as further analysis, LSD test was used in the case where the variances were homogenous, while Dunnet C test was used otherwise) were used. In the non-normally distributed measurements, Mann Whitney U test, Kruskal Wallis test (Mann Whitney U as further analysis) and Spearman's correlation analysis were used. The Cronbach's alpha coefficient was used. Kurtosis and Skewness values were checked to evaluate the normality of the distribution of the data.

Ethical Approval

For the study to be conducted, written permissions were received from the Atatürk University Nursing Faculty Ethics Committee (Approval Dated: 05/06/2020, Decision Number: 2020-4/13) and the institution where the research was performed. The students were informed regarding the topic of the study. An informed consent page was presented to the participants at the beginning of the questionnaire, and those who agreed continued to fill out the form.

RESULTS

Sample Characteristics

In the study, 72% of the students were 21 years old or younger, 78.5% were female, 30.1% were 1st-year students, and 98.2% was single. 95% of the students were not working at a clinic as a nurse, 44.8% had gotten information regarding spirituality and spiritual care, 42.4% of those who had seen the received information adequate, 92.5% thought

education regarding spiritual care is necessary. 90% of the students did not have any chronic diseases, 53.4% had chronic diseases in their family, 88.2% did not have any dependents, and 44.1% chose nursing as they like helping people. The novel coronavirus disease was present in the environment of 20.8% of the students and in the relatives of 5.7%, while the relatives of 52.7% were psychologically affected by the coronavirus (Table 1).

Table 1. Nursing students' descriptive characteristics and statuses of receiving information on spirituality and spiritual care (n=279)

Variables		n	%
Age	≤21 years	201	72.0
	≥22 years	78	28.0
Gender	Female	219	78.5
	Male	60	21.5
Class	1st	84	30.1
	2nd	79	28.3
	3rd	72	25.8
	4th	44	15.8
Marital status	Married	5	1.8
	Single	274	98.2
Working at the clinic as a nurse	Yes	14	5.0
	No	265	95.0
Getting information regarding spirituality and spiritual care	Yes	125	44.8
	No	154	55.2
Seeing the received information adequate	Yes	53	42.4
	No	72	57.6
Seeing education on spiritual care necessary	Yes	258	92.5
	No	21	7.5
Presence of chronic diseases	Yes	28	10.0
	No	251	90.0
Presence of chronic diseases among family	Yes	149	53.4
	No	130	46.6
Having a dependent relative	Yes	33	11.8
	No	246	88.2
Reason of choosing the profession of nursing	Family's request	29	10.4
	Easy to find a job	83	29.7
	Exam scores to be sufficient	34	12.2
	Liking to help people	123	44.1
	Other*	10	3.6
Having coronavirus disease in their environment	Yes	58	20.8
	No	221	79.2
Having coronavirus disease in their relatives	Yes	16	5.7
	No	263	94.3
Being psychologically affected in their relatives by the coronavirus pandemic	Yes	147	52.7
	No	132	47.3

*Willing to work in the field of health, dreaming of becoming a nurse, seeing the profession suitable for him, liking nursing profession

Students' Scores of the SSCRS and NPVS-R

Considering the distribution of the scores of the scales and their dimensions, the mean scores of the students were 60.13±14.64 in the Care subscale, 30.80±7.55 in the Professionalism subscale, 11.29±2.92 in the Trust subscale and 102.22±24.34 in the total NPVS-R. The mean score of the SSCRS was 3.79±0.61 (Table 2).

Table 2. The mean scores of SSCRS and NPVS-R (n=279)

Scale and Subscales	Min-Max	Mean± Standard Deviation
Care	15-75	60.13±14.64
Professionalism	8-40	30.80±7.55
Trust	3-15	11.29±2.92
NPVS-R total	26-130	102.22±24.34
SSCRS total	1.24-4.76	3.79±0.61

Table 3. Assessment of their mean total scores for NPVS-R according to some descriptive characteristics of students (n=279)

Variables	n	NPVS-R (Mean± Standard Deviation)
Age		
≤21 years	201	102.25±23.54
≥22 years	78	102.13±26.45
Significance		t=0.039 p=0.969
Gender		
Female	219	103.04±22.46
Male	60	99.23±30.27
Significance		t=0.907 p=0.367
Class		
1st	84	103.69±20.95
2nd	79	99.67±22.02
3rd	72	104.56±27.93
4th	44	100.16±28.05
Significance		F=0.715 p=0.544
Marital status		
Married	5	98.00±39.25
Single	274	102.30±24.09
Significance		t=-0.244 p=0.819
Working at the clinic as a nurse		
Yes	14	107.64±27.87
No	265	101.93±24.17
Significance		t=0.855 p=0.393
Getting information regarding spirituality and spiritual care		
Yes	125	99.18±28.70
No	154	104.69±19.88
Significance		t=-1.822 p=0.070
Seeing the received information adequate		
Yes	53	96.58±30.51
No	72	101.08±27.35
Significance		t=-0.865 p=0.389
Seeing education on spiritual care necessary		
Yes	258	103.43±24.04
No	21	87.33±23.64
Significance		t=2.954 p=**0.003**
Presence of chronic diseases		
Yes	28	106.39±23.38
No	251	101.75±24.45
Significance		t=0.957 p=0.340
Presence of chronic diseases among family		
Yes	149	102.32±24.23
No	130	102.11±24.57
Significance		t=0.071 p=0.943
Having a dependent relative		
Yes	33	102.61±24.14
No	246	102.17±24.42
Significance		t=0.097 p=0.923
Reason of choosing the profession of nursing		
Family's request	29	95.93±22.78
Easy to find a job	83	97.07±27.96
Exam scores to be sufficient	34	104.44±23.41
Liking to help people	123	106.41±21.91
Other*	10	104.10±20.33
Significance		F=2.458 p=**0.046**

* Willing to work in the field of health, dreaming of becoming a nurse, seeing the profession suitable for him, liking nursing profession

Table 3. (continued)

Variables	n	NPVS-R (Mean± Standard Deviation)
Having coronavirus disease in their environment		
Yes	58	99.98±26.10
No	221	102.81±23.89
Significance		t=-0.785 p=0.433
Having coronavirus disease in their relatives		
Yes	16	104.81±28.75
No	263	102.06±24.10
Significance		t=0.438 p=0.661
Being psychologically affected in their relatives by the coronavirus pandemic		
Yes	147	104.31±22.70
No	132	99.89±25.94
Significance		t=1.515 p=0.131

*Willing to work in the field of health, dreaming of becoming a nurse, seeing the profession suitable for him, liking nursing profession

Assessment of Their Mean Total Scores for NPVS-R According to Some Descriptive Characteristics of Students

The difference in the mean total NPVS-R score based on the students' status of seeing education on spiritual care necessary (p=0.003) and their reason of choosing the profession of nursing was statistically significant (p=0.046). The scores of those who saw education on spiritual care necessary were higher. In the analysis conducted to identify which group the difference was caused by based on reasons of choosing nursing (LSD), the scores of those who responded to have selected the profession as they liked helping people were higher than those who selected it as their family wanted so and those who selected it as it was easier to find a job. This difference was not statistically significant based on the students' age (p=0.969), gender (p=0.367), class (p=0.544), marital status (p=0.819), status of working at the clinic as a nurse (p=0.393), status of getting information regarding spirituality and spiritual care (p=0.070), status of seeing the received information adequate (p=0.389), presence of chronic disease (p=0.340), presence of chronic disease in the family (p=0.943), status of having a dependent relative (p=0.923), status of having coronavirus disease in their environment (p=0.433), status of having coronavirus disease in their relatives (p=0.661) and their relatives being psychologically affected by the coronavirus pandemic (p=0.131) (Table 3).

Assessment of Their Mean Total Scores for SSCRS According to Some Descriptive Characteristics of Students

The difference in the mean total SSCRS score based on the students' status of having coronavirus disease in their environment (p=0.036) and status of having coronavirus disease in their relatives was statistically significant (p=0.037). Those who did not have coronavirus disease in their environment or relatives had higher mean scores. This difference was not statistically significant based on the students' age (p=0.609), gender (p=0.871), class (p=0.609), marital status (p=0.818), status of working at the clinic as a nurse (p=0.809), status of getting information regarding spirituality and spiritual care (p=0.882), status of seeing the received information adequate (p=0.631), status of seeing education on spiritual care necessary (p=0.080), presence of chronic disease (p=0.143), presence of chronic disease in the family (p=0.973), status of having a dependent relative (p=0.072), reason of choosing the profession of nursing (p=0.751) and their relatives being psychologically affected by the coronavirus pandemic (p=0.963) (Table 4).

Correlation between SSCRS and NPVS-R scores

As seen in Table 5, there was a statistically significant, positive and weak correlation between the care, trust and professionalism subscale and the NPVS-R total scores and the SSCRS scores. As the students' scores in the care, trust and professionalism subscales and the total NPVS-R increased, their SSCRS scores also increased (p=0.000).

Table 4. Assessment of their mean total scores for SSCRS according to some descriptive characteristics of students (n=279)

Variables		n	SSCRS		
			Mean± Standard Deviation	Test	p
Age	≤21 years	201	3.80±0.61	U=7530.000	0.609
	≥22 years	78	3.76±0.60		
Gender	Female	219	3.81±0.58	U=6480.000	0.871
	Male	60	3.73±0.71		
Class	1st	84	3.79±0.64	KW=1.828	0.609
	2nd	79	3.78±0.62		
	3rd	72	3.73±0.64		
	4th	44	3.91±0.47		
Marital status	Married	5	3.52±1.09	U=644.000	0.818
	Single	274	3.79±0.60		
Working at the clinic as a nurse	Yes	14	3.71±0.68	U=1784.000	0.809
	No	265	3.79±0.61		
Getting information regarding spirituality and spiritual care	Yes	125	3.77±0.65	U=9526.000	0.882
	No	154	3.80±0.57		
Seeing the received information adequate	Yes	53	3.77±0.56	U=1812.000	0.631
	No	72	3.77±0.72		
Seeing education on spiritual care necessary	Yes	258	3.81±0.60	U=2088.000	0.080
	No	21	3.59±0.64		
Presence of chronic diseases	Yes	28	3.54±0.80	U=2921.500	0.143
	No	251	3.82±0.58		
Presence of chronic diseases among family	Yes	149	3.80±0.59	U=9662.000	0.973
	No	130	3.78±0.63		
Having a dependent relative	Yes	33	3.57±0.75	U=3277.000	0.072
	No	246	3.82±0.58		
Reason of choosing the profession of nursing	Family's request	29	3.78±0.67	KW=1.918	0.751
	Easy to find a job	83	3.77±0.60		
	Exam scores to be sufficient	34	3.69±0.80		
	Liking to help people	123	3.82±0.56		
	Other*	10	4.01±0.27		
Having coronavirus disease in their environment	Yes	58	3.57±0.79	U=5261.000	**0.036**
	No	221	3.85±0.54		
Having coronavirus disease in their relatives	Yes	16	3.24±0.86	U=1265.000	**0.037**
	No	263	3.82±0.58		
Being psychologically affected in their relatives by the coronavirus pandemic	Yes	147	3.75±0.70	U=9671.000	0.963
	No	132	3.84±0.49		

*Willing to work in the field of health, dreaming of becoming a nurse, seeing the profession suitable for him, liking nursing profession

Table 5. Correlation between SSCRS and NPVS-R scores

		SSCRS
Care	r	0.220
	p	**0.000**
	n	279
Professionalism	r	0.228
	p	**0.000**
	n	279
Trust	r	0.257
	p	**0.000**
	n	279
NPVS-R total	r	0.239
	p	**0.000**
	N	279

DISCUSSION

In our study, the mean score obtained from the total NPVS-R was approximately 102. Considering that the highest possible NPVS-R score is 130, it may be stated that the professional value perceptions of the students were good. The highest perceptions were related to the Care factor (60.13±14.64) which emphasizes values such as humanitarianism, justice

and altruism. The results of some studies show that the students have a high perception of professional value (Arkan et al., 2019; Çulha, 2018; Donmez and Ozsoy, 2016; Peksoy et al., 2020). Some studies found that the highest perceptions were regarding "care" (Çulha, 2018; Donmez and Ozsoy, 2016; Lin et al., 2016; Poorchangizi et al., 2019). The results of this study were in agreement with the previous studies. According to this results, it may be stated that, as the "care" perceptions among the professional values of the nursing students were high, the care, which is the main function of a nurse, perceived well.

In our study, the mean score obtained from the total SSCRS was approximately 3.80. Considering that scores close to 5 on this scale indicate higher levels of perception of the concepts of spirituality and spiritual care, it can be said that nursing students' perceptions of the concepts of spirituality and spiritual care are at a high level. Some studies have found that the students have low perceptions of spirituality and spiritual care (Folami and Onanuga, 2018; Mankan et al., 2014). Some studies have determined high (Akın and Yılmaz, 2020; Köktürk Dalcali and Erden Melikoğlu, 2021; Pour et al., 2017). It may be stated that, some of the previous studies have not supported our findings, as the patient and hospital situations that nursing students encounter throughout their education may be different from each other. It is a positive finding that the level of perception of spirituality and spiritual care, whose importance has emerged once again, especially during the coronavirus process, are high in nursing students in this study.

In this study, significant differences were found among professional values of students based on the students' seeing education on spiritual care necessary and their reason for choosing nursing as a profession. Bang et al. (2011) determined that there was a significant difference in the students' professional values according to the reasons for entering nursing school. The results of this study were in agreement with the previous study. It may be stated that their reason for choosing nursing and seeing education regarding spiritual care necessary affected the students' professional values. It is thought that these characteristics should be taken into account in order for students to gain professional values.

When we examined the students' professional values and perception of spirituality and spiritual care according to factors related to spirituality and spiritual care in this study, in addition to the previous finding, no significant differences were found among professional values of students based on the students' getting information regarding spirituality and spiritual care and seeing the received information adequate. In addition, no significant differences were found in the mean scores of the SSCRS of students based on the students' seeing education on spiritual care necessary, getting information regarding spirituality and spiritual care and seeing the received information adequate. Çelik İnce and Utaş Akhan (2016) reported that nursing students' status of getting information regarding spirituality and spiritual care, whether the state of seeing the information received as sufficient or not, do not affect their level of perception of spirituality and spiritual care. Contrary to our findings, Kobya Bulut and Meral (2019) reported that nursing students who know the concepts of spirituality and spiritual care and take spirituality and spiritual care as course content had higher level of perception of spirituality and spiritual care than for those who had not. In this study, it is thought that the sources from which nursing students receive information on this subject and the quality of the information they receive are not sufficient. In addition, in this study, the majority of the students seen education on spiritual care necessary; but, since nearly half of them have gotten information regarding spirituality and spiritual care and seen the received information adequate, it makes us think that these students have a lack of knowledge regarding spirituality and spiritual care, and that students' approaches to this subject should be known in order for them to be able to practice holistic care.

This study found that students who did not have coronavirus disease in their environment or relatives had higher mean SSCRS score than those who did. According to this result, it may be stated that the status of having coronavirus disease around affects nursing students' spirituality and spiritual care perceptions. It is thought that the reason for the

students who did not have coronavirus disease in their environment or relatives to have higher spirituality and spiritual care perceptions could have been the concern or though of catching the disease themselves or their relatives catching the disease.

This study found that as the professional values of the nursing students increased, their perceptions on spirituality and spiritual care also increased. Köktürk Dalcali and Erden Melikoğlu (2021) found that there was a correlation between the personal values of nursing students and their perceptions of spiritual care. The results of this study were in agreement with the previous study. In this study, it is thought that supporting students' professional values will increase spirituality and spiritual care.

CONCLUSION

Spiritual care and professional values are important in nursing. Spiritual care is an integral part of holistic nursing care. In this study, it was determined that the spirituality and spiritual care perceptions and nursing students' professional values in the COVID-19 pandemic process were on a good level, and as their professional values increased, their spirituality and spiritual care perceptions increased. It may be recommended to pay importance to trainings towards increasing the awareness and knowledge levels of nursing students concerning professional values, spirituality and spiritual care and to conduct more comprehensive studies on this subject.

Conflict of Interest

None declared.

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The Relationship Between Dialysis Symptoms and Psychiatric Symptoms in Individuals Receiving Hemodialysis Treatment

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ABSTRACT:
Purpose: This study was carried out descriptively in order to determine the effect of hemodialysis symptoms on psychiatric symptoms in individuals with hemodialysis (HD) treatment.
Material and Methods: The research was conducted with 104 patients who were scanned in the dialysis service of a public hospital. Personal Information Form, Dialysis Symptom Index (DSI), Brief Symptom Inventory (BSI) were used for data acquisition. The data were analyzed via IBM SPSS 22 software.
Results: Patients mean DSI score (63.086±22.65), BSI total score (57.115±27.67), BSI subscale scores Anxiety (10.903±7.84), Depression (19.452±9.86), Negative self (8.990±6.40), Somatization (10.144±5.44) was found as hostility (7.625±4.32).A positive and significant correlation was determined between the patients DSI score and BSI total score and their subscales Anxiety, Depression, Negative Self, Somatization and Hostility ($p<0.05$).
Conclusion: As a result of the study, it was determined that as the dialysis symptoms of individuals receiving HD treatment increased, their psychiatric symptoms increased. The nurse can contribute to the development of the patient's coping skills by evaluating the physiological and psychiatric symptoms of the disease and making plans accordingly.
Keywords: *Hemodialysis, Dialysis Symptoms, Psychiatric Symptoms*

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INTRODUCTION

Chronic renal failure (CRF) is the loss of kidney function that is gradual and irreversible (Baykan and Yargic, 2012; Ozcan et al., 2000). It is estimated that there are currently more than two million chronic renal patients are on dialysis or have undergone kidney transplantation throughout the world, and roughly 10% of adults have kidney damage (Agarwal, 2015). The prevalence of CRF was shown to be as high as 15.7% in the population-based CREDIT (Chronic Renal Disease in Turkey) screening investigation, which included 10,872 people in Turkey (Suleymanlar et al., 2011). Renal replacement therapy (RRT), hemodialysis (HD) at home or a dialysis clinic, peritoneal dialysis (PD), and transplantation therapy are all options for patients who have reached the stage of CRF (Rimes Stigare et al., 2015). Hemodialysis is one of the most preferred treatment methods in the treatment of CRF (Rahimipour et al., 2015). Hemodialysis is a valuable therapeutic option for keeping patients healthy, improving their quality of life, and lowering mortality and morbidity rates (Davison and Jhangri, 2005; Park and Yoo, 2016). HD treatment can cause some physical, psychological, social, and economic negative effects such as dependence on treatment programs and devices lasting 4-6 hours on certain days of the week, fear and anxiety caused by machine alarms, sexual dysfunctions, loss of time, and workforce, loss of role and function, and

disruption of family order (Aksoy and Ogur, 2015; Melo et al., 2016).Moreover, patients getting hemodialysis therapy have various symptoms, including fatigue, pain, nausea, vomiting, loss of appetite, muscular cramps, sleep disorders, dry skin, itching, restlessness, and anxiety (Akgoz and Arslan, 2017; Moledina and Perry Wilson, 2015; Zamanian and Kharameh, 2015). These symptoms can have a detrimental impact on people's everyday activities and self-care abilities, and often induce a variety of mental problems, including depression and anxiety (Ozçurumez et al., 2003;Ceyhun and Kırpınar, 2019;Yavuz et al., 2012). Depression was found to be present in 25% of hemodialysis patients, while anxiety was found to be present in 28.8% (Topbas and Bingol, 2017). Another study discovered that 91.5 % of HD patients experienced sexual dysfunction (Taylan and Ozkan, 2020). In a study of dialysis patients in Japan, the rate of mental health hospitalization within a year was found to be 10.6% (Fukunishi et al., 2002).When studies with dialysis patients using different scales and diagnostic methods are examined, psychiatric problems have been reported with a frequency of 5-50% (Ozçetin et al., 2009; Hedayati et al., 2009; Balaban et al., 2017). Dialysis-dependent CRF is a serious illness with high disease burden, morbidity, and mortality (Mandel et al., 2017). A comprehensive assessment of the symptoms of patients with CRF provides information about the impact and treatment of the disease. A multidimensional assessment of symptoms also provides information that may be utilized to improve patient care through education and counseling to help patients maintain their physical and psychological well-being (Weisbord et al., 2004). In this context, it is thought that determining the severity of symptoms in hemodialysis patients, and the relationship between symptom control and psychiatric symptoms, will be critical in terms of planning new and beneficial treatment and care applications for both patients and healthcare professionals. Symptom management requires a multidisciplinary approach, especially nurses, who spend the most time with hemodialysis patients, should be aware of this situation. Being aware of the physiological and/or psychiatric symptoms is the first and most important step in appropriate treatment and care.

MATERIALS AND METHODS

Purpose and Type of the Study

This study was carried out descriptively in order to determine the effect of hemodialysis symptoms on psychiatric symptoms in individuals with HD treatment.

Sampling and Participant

The population of the study comprises 128 patients who were followed up with a diagnosis of Chronic Kidney Failure at Batman Regional State Hospital Dialysis Service between November 11 and December 9, 2020. The sample of the study is made up of 104 patients who were selected from this population at the time of the study and met the criteria. A total of 24 patients, 5 of whom did not want to participate in the study, 16 who were illiterate, 3 who were under the age of 18, were excluded from the sample.

Inclusion Criteria:

1. Volunteering to participate in the study
2. Receiving hemodialysis treatment with a diagnosis of CRF
3. Being over 18 years old
4. Being able to read and write

Exclusion Criteria:

1. Being cognitively and communicative at a level that interferes with continuing the interview and completing the questionnaires
2. Refusal to participate in the study

Data Collection Tools

The data were collected in the Dialysis Service of the Batman Regional State Hospital between 11 November and 9 December 2020 by the researcher, after interviewing the patients face to face, informing them about the purpose of the study, and obtaining their consent. “Personal Information Form”, “Dialysis Symptom Index”, and “Short Symptom Inventory” prepared by the researchers were used as data collection tools. Data collection tools were read by the researcher to the patients and filled in line with the answers received. Interviews

were conducted during the hemodialysis procedure. The interview with each patient lasted an average of 20 minutes.

Personal Information Form

There are 13 items on this form, which was prepared by the researcher scanning the literature, to determine the demographic (age, gender, marital status, etc.) and disease (length of disease, family history, etc.) information of the participants.

Dialysis Symptom Index

DSIwas developed by Weisbord et al. in 2004 and its Turkish validity and reliability study was conducted by Onsoz and Usta Yesilbalkan (2013). This scale, which was developed for hemodialysis patients to measure the level of distress associated with physical and emotional symptoms, consists of 30 items. Responses are obtained with a 5-point Likert Scale. The symptoms experienced in the last seven days are answered as yes-no, and if yes, the effect of this symptom is evaluated by 5-point Likert as “1=none, 2=slightly, 3=moderately, 4=very, 5=extremely”. The obtained scores are tallied, and the total scale score is calculated. This value varies between ”0-150”. A value of “0” indicates there are no symptoms. The fact that the overall score ascribed to the answers increased to 150 points implies that the symptoms' severity grew. DSI cap values were determined to be between 0.10 and 0.93, and Cronbach's alpha coefficient was 0.83 (Onsoz and Usta Yesilbakan, 2013). In our study, the Cronbach's alpha value of the scale was determined as 0.87.

Brief Symptom Inventory

The adaptation of the Brief Symptom Inventory (BSI) developed by Derogatis in 1992 to Turkish was made by Sahin and Durak in 1994. From a total of 90 items dispersed among the 9 factors of the SCL-90-R, 53 items with the highest load in each factor were chosen, and an equivalent 5-point Likert-type scale, which can be administered in 5-10 minutes, was created (Derogatis 1992). The individual responding to the scale marks one of the options (0) “None”; (1) “Slightly”; (2) “Moderately”; (3) “Very”; (4) “Extremely” for each question. The minimum and maximum score range that can be obtained from the BSI scale is between 0-212. Higher scores in BSI indicate that psychiatric symptoms are more common in individuals. As a result of the factor analysis, it was stated that the BSI scale consisted of 5 subscales: "Anxiety (12, 13, 28, 31, 32, 36, 38, 42, 43, 45, 46, 47, 49)", "Depression (9, 14, 16, 17, 18, 19, 20, 25, 27, 35, 37, 39)", "Negative self (15, 21, 22, 24, 26, 34, 44, 48, 50, 51, 52, 53)", "Somatization (2, 5, 7, 8, 11, 23, 29, 30, 33)", and "Hostility (1, 3, 4, 6, 10, 40, 41)" (Sahin and Durak, 1994). The minimum and maximum score ranges that can be obtained from the BSI subscales are respectively Anxiety subscale: 0-52, Depression subscale: 0-48, Negative self subscale: 0-48, Somatization subscale: 0-36, Hostility subscale: 0- is 28. In three different studies conducted using the scale developed by Derogatis (1992) on 719 psychiatric, 626 male hypertension patients, and 25 non-patients receiving outpatient treatment, it was stated that the Cronbach Alpha internal consistency coefficients of 9 subscales varied between 0.71 and 0.85 (Derogatis, 1992). The scale, which was adapted into Turkish by Sahin and Durak, was used in three different studies and the Cronbach Alpha internal consistency coefficients obtained from the total scores were found to be between 0.96 and 0.95. In addition, the Cronbach Alpha coefficients obtained for the subscales vary between 0.55 and 0.86 (Sahin and Durak, 1994). In our study, the Cronbach's alpha value of the BSI scale was 0.92, and the Cronbach's Alpha coefficients obtained for the subscales ranged from 0.62 to 0.82.

Statistical Analysis

The IBM SPSS (Statistical Package for Social Sciences 22) for Windows program was utilized for statistical analysis when examining the data acquired from the study. In the analysis of the data, percentile, arithmetic mean, and standard deviation were used to examine the descriptive characteristics of individuals. Analysis of variance was used to compare the mean scores of DSI and BSI according to their socio-demographic characteristics, Kruskal Wallis test and independent samples t-test were used in cases that did not show normal distribution, and Pearson correlation analysis was used to determine the relationship between the Dialysis

Symptom Index and Brief Symptom Inventory mean scores. The value of p<0.05 was taken as the level of significance.

Ethical Approval

Before the research was conducted, the thesis proposal was submitted to the Mardin Artuklu a University Clinical Research Ethics Committee and approval decision dated 09.11.2020 and numbered 2020/8-13 was taken. Written permission was obtained from the management of Batman Regional State Hospital in Turkey, where the research would be conducted, and from the patients.

RESULTS

When the sociodemographic and occupational characteristics of the participants were examined, it was determined that 39.4% (n=41) of the patients were over 65 years old, 55.8% (n=58) were female, 63.5% (n=66) of the patients were married, 76.0% (n=79) lived in the city center, 59.6% (n=62) of the patients were literate and did not graduate from a school, 97.1% (n=101) were not working, 33.7% (n=35) of the patients quit their job due to illness, 38.5% (n=40) had CRF for more than 5 years, 16.3% (n=17) of the patients had a family history of CRF, 13.5% (n=14) lost a relative in the family due to CRF, the disease of 88.5% (n=92) prevented their activities of daily living, 99.0% (n=103) had someone who supported them during the disease, and all of them received their treatment regularly. When the distribution of the symptoms experienced by the patients was examined, it was determined that more than 50% of them experienced nausea (n=53), decreased appetite (n=66), muscle cramps (n=90), shortness of reath (n=56), lightheadedness/dizziness (n=76), numbness and tingling in the feet (n=97), feeling tired or decreased energy (n=98), dry mouth (n=79), bone or joint pain (n=70), headache (n=71), muscle pain (n=86), difficulty in concentrating (n=73), dry skin (n=87), itching (n=66), worry (n=90), feeling nervous (n=87), and difficulty in falling asleep (n=73), difficulty in maintaining sleep (n=86), feeling uncomfortable (n=94), feeling sad (n=97), anxiety (n=94), decreased interest in sexuality (n=56), and difficulty in sexual arousal (n=56). Feeling tired or low energy (n=98) was found to be the most prevalent complaint, while diarrhea (n=12) was shown to be the least common.

The comparison of the Dialysis Symptom Index and Brief Symptom Inventory Subscale averages according to the sociodemographic characteristics of CRF patients are presented in Table 1. Accordingly, in our study, the mean DSI score was found to be significantly higher in those over 65 years of age (68.03±21.83), women (69.59 ±21.25), spouses (71.00±20.71), literate (68.89±21.07) (p<0.05). However, there was no significant difference observed between living place, working status, quitting work due to illness, working status, duration of CRF, presence of CRF in the family, loss of a family member due to CRF, the fact that the disease interfered with daily life activities, having supporters during the disease, and receiving treatment regularly (p>0.05). BSI mean scores were found to be significantly higher in women (65.29±28.67) and literates (63.02±28.88) (p<0.05). However, no significant difference was found between other parameters (p>0.05). When the DSI scale and BSI subscales and mean scores from the BSI were examined according to the age groups of the patients, it was found that there was a significant relationship between the age groups and the dialysis symptom scale (p=0.010), and between the somatization subscale and the age groups (p=0.035) (p<0.05). It was determined that there was no significant relationship between age groups and anxiety, depression, negative self, hostility subscales, and BSI total mean (p>0.05). When the DSI scale and BSI subscales and mean BSI scores were analyzed according to the gender of the patients, it was determined that there was a significant relationship between gender and dialysis symptom scale (p=0.001), between gender and anxiety subscale (p=0.002), between gender and depression subscale (p=0.000), between gender and somatization subscale (p=0.006), and between gender and BSI scale (p=0.001) (p<0.05). When the mean scores of the patients between the DSI scale and BSI subscales and the BSI scale were examined according to their marital status, it was seen that there was a significant relationship between marital status only with the DSI scale (p=0.041) (p<0.05), and it had no significant relationship with the BSI scale

and other subscales (p>0.05). When the mean scores of the patients between the DSI scale and BSI subscales and the BSI scale were examined according to their education level, it was observed that there was a significant relationship between education levels and DSI scale (p=0.001), anxiety subscale (p=0.029), depression (p=0.004) and BSI scale (p=0.027) (p<0.05), while there was no significant relationship between education levels and other subscales (p>0.05). When the mean scores of the DSI scale and BSI subscales and BSI scale were analyzed according to the patients' place of residence, it was seen that there was no significant relationship between the place of residence and the DSI scale and BSI subscales (p>0.05).

Table 1. Comparison of Dialysis Symptom Index (DSI) and Brief Symptom Inventory (BSI) Subscale Means by Socio-Demographic Characteristics of CRF Patients

		Brief Symptom Inventory Subscales					
Features	**Dialysis Symptom Scale X±SD**	**Anxiety X±SD**	**Depression X±SD**	**Negative Self X±SD**	**Somatization X±SD**	**Hostility X±SD**	**Total BSI X±SD**
Age							
18-33 (10)	48.90±23.76	6.70±4.27	17.10±5.89	6.90±2.42	7.20±2.86	7.10±3.81	45.00±12.06
34-49 (22)	51.13±20.22	10.23±8.86	17.36±11.71	11.05±9.81	8.82±5.57	7.68±5.24	55.14±34.87
50-65 (31)	68.03±20.54	12.00±7.47	20.65±9.35	8.74±6.45	10.35±5.89	8.58±4.47	60.32±27.35
Over 65 years old (41)	68.03±21.83	11.46±8.07	20.24±9.97	8.59±4.35	11.41±5.23	7.00±3.76	58.71±26.26
	F=11.296	F=4.316	F=2.504	F=0.896	F=8.590	F=1.980	F=2.738
	p=0.010	p=0.229	p=0.475	p=0.826	**p=0.035**	p=0.577	p=0.434
Gender							
Woman(58)	69.59±21.25	12.95±8.60	22.88±9.71	10.05±6.41	11.45±5.74	7.97±4.39	65.29±28.67
Man (46)	54.89±21.90	8.33±5.88	15.13±8.30	7.65±6.20	8.50±4.59	7.20±4.23	46.80±22.73
	t=3.455	t=3.109	t=4.304	t=1.922	t=2.834	t=0.902	t=3.572
	p=0.001	**p=0.002**	**p=0.000**	p=0.057	**p=0.006**	p=0.367	**p=0.001**
Marital Status							
Single (12)	49.92±21.05	7.92±5.61	19.17±9.29	9.83±7.56	7.42±4.75	8.42±4.90	52.75±26.92
Married (66)	63.64±21.87	11.45±7.65	19.29±9.90	8.86±6.05	10.80±5.55	7.61±4.09	58.02±26.46
Divorced (4)	50.00±35.14	10.00±12.98	12.75±16.50	11.50±15.86	8.50±6.19	10.25±8.22	53.00±58.55
Wife dead (22)	71.00±20.71	11.05±8.54	21.32±8.78	8.45±4.46	9.95±5.15	6.77±3.85	57.55±26.50
	F=2.850	F=0.703	F=0.884	F=0.327	F=1.476	F=0.910	F=0.150
	p=0.041	p=0.552	p=0.452	p=0.806	p=0.223	p=0.439	p=0.929
Educational Status	68.89±21.07	12.48±8.27	22.03±9.76	9.68±6.17	11.48±5.73	7.34±4.10	63.02±28.88
Literate (62)	58.57±22.78	7.82±5.17	16.25±8.68	8.36±5.80	9.00±3.79	8.00±4.42	49.43±20.20
Primary School (28)	46.43±20.03	10.07±8.76	14.43±9.25	7.21±8.34	6.50±5.00	8.14±5.20	46.36±29.81
Medium to high (14)	F=7.131	F=3.685	F=5.929	F=1.032	F=6.196	F=0.338	F=3.736
	p=0.001	**p=0.029**	**p=0.004**	p=0.360	p=0.003	p=0.714	**p=0.027**
Living place							
Province (79)	63.06±22.94	11.04±8.01	19.78±10.12	9.00±6.76	10.24±5.44	7.75±4.43	57.81±28.52
District (7)	67.71±15.75	15.00±10.98	23.57±10.78	11.71±7.56	10.57±7.11	9.29±4.03	70.14±33.60
Village (18)	61.39±24.38	8.72±4.77	16.39±7.81	7.89±3.75	7.89±3.75	6.44±3.79	49.00±19.11
	F=0.194	F=1.686	F=1.539	F=0.897	F=0.137	F=1.226	F=1.593
	p=0.824	p=0.190	p=0.220	p=0.411	p=0.872	p=0.298	p=0.208

The total mean scores of DSI and BSI subscales in our study are given in Table 2. Accordingly, the mean DSI score of the patients was found to be (63.086±22.65), the total BSI score was (57.115±27.67), and BSI subscale scores were; Anxiety (10.903±7.84), Depression (19.452±9.86), Negative Self (8.990±6.40), Somatization (10.144±5.44), Hostility (7.625±4.32).

Table 3 shows the correlation table of the DSI scale with the BSI scale and BSI subscales of the participants. According to this, a positive and significant correlation was found between patients' DSI score and BSI total score and its subscales Anxiety, Depression, Negative Self, Somatization, and Hostility (p<0.05).

Table 2. Table of Mean Scores of Dialysis Symptom Index Scale, Brief Symptom Inventory Scale and Sub-Dimensions

Scales	Alpha Value	Mean±SD
Dialysis Symptom Index	0,873	63.086±22.65
Brief Symptom Inventory	0,926	57.115±27.67
Anxiety Subscale	0,805	10.903±7.84
Depression Subscale	0,824	19.452±9.86
Negative Self Subscale	0,823	8.990±6.40
Somatization Subscale	0,683	10.144±5.44
Hostility Subscale	0,627	7.625±4.32

Table 3. Correlation Table Between Dialysis Symptom Index Scale and Brief Symptom Inventory Scale and Subscales

		Brief Symptom Inventory						
Scales		**DSI**	**Anxiety**	**Depression**	**Negative Self**	**Somatization**	**Hostility**	**BSI**
DSI	Correlation	1	0.502**	0.670**	0.395**	0.660**	0.314**	0.652**
	Significant		0.000	0.000	0.000	0.000	0.001	0.000
Anxiety	Correlation		1	0.753**	0,734**	0.542**	0.518**	0.909**
	Significant			**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Depression	Correlation			1	0.694**	0.532**	0.428**	0.902**
	Significant				**0.000**	**0.000**	**0.000**	**0.000**
Negative Self	Correlation				1	0.448**	0.454**	0.846**
	Significant					**0.000**	**0.000**	**0.000**
Somatization	Correlation					1	0.182	0.672**
	Significant						0.065	**0.000**
Hostility	Correlation						1	0.596**
	Significant							**0.000**
BSI	Correlation							1
	Significant							

**p<0.01 significant

DISCUSSION

Many physical and mental symptoms are seen in patients undergoing hemodialysis. It is important to determine the physical and psychiatric symptoms seen in hemodialysis patients for effective symptom management. In the study, dialysis symptoms and psychiatric symptoms seen in hemodialysis patients were determined and the relationship between these symptoms was evaluated. The first three symptoms most commonly reported by patients in our study were found to be fatigue or low energy (94.2%), numbness and tingling in the feet (93.3%), and sadness (93.3%), with diarrhea (11.1%) being the least prevalent. Akgoz and Arslan's (2017) study found that the most common symptoms were fatigue or low energy, headache 62.9%, bone or joint pain 61% (Akgoz and Arslan, 2017). In the study of Hintistan and Deniz (2018), the most common symptom was found to be fatigue or low energy 83.5% (Hintistan and Deniz, 2018). In the study of Gorıs et al. (2016), the most common symptoms were reported as 85.5% fatigue and low energy, 59.6% muscle cramps, 52.8%, and difficulty in falling asleep (Gorıs et al., 2016). Durmaz Akyol's (2016) study found that the most common symptoms were fatigue, anxiety, and depression and that the majority of patients in the same study group stated that they were tired (Durmaz Akyol, 2016). In the study of Weisbord et al. (2005), it was reported that 72% of the patients had dry skin, 69% had fatigue or low energy and 54% had itching (Weisbord et al., 2005).In the study conducted by Abdelkader et al. (2009), the symptom-experiencing status of those with end-stage renal disease and those with chronic kidney disease were compared, and it was stated that in both groups the highest rate of fatigue was observed (Abdelkader et al., 2009). As a result of the study conducted by Zamanian and Kharameh (2015), it was reported that the most reported physical symptom was fatigue (85.3%), the most common

psychological symptom was uneasiness (77.9%) (Zamanian and Kharameh, 2015). In a study conducted by Yurtsever and Beduk (2003) to evaluate fatigue in 120 HD patients, it was stated that the majority of patients (92.50%) experienced fatigue (Yurtsever and Beduk, 2003). The results of all these studies and our study showed that fatigue or low energy is the most important symptom experienced in dialysis patients, and it was thought that fatigue could be due to physiological processes such as inability to adjust the fluid-electrolyte balance, failure to fulfill endocrine functions, anemia, malnutrition, and inflammation. Fatigue leads to decreased motivation and mental activity, increasing intolerance, depressive and uncomfortable feeling.It was determined that the mean DSI score of the patients in our study was 63,086±22.65, this score was 45.88±26.36 in Akgoz and Arslan's (2017) study, 98.85 ±23.77 in Zamanian and Kharameh's (2015) study, and 38.1±22.8 in Gorıs et al.'s (2016) study (Akgoz and Arslan 2017; Zamanian and Kharameh 2015; Gorıs et al., 2016). In our study, when DSI was examined based on the age groups, the mean symptom score over 65 years old was found to be significantly higher than other age groups ($p<0.05$). Similar to our study results, in the study of Gorıs et al. (2016), it was reported that the incidence of symptoms increases with age (Gorıs et al., 2016). The increase in the incidence of chronic diseases with increasing age, deterioration of fluid and electrolyte balance, weakening of the immune system, and psychological stability were thought to be the reasons for the more common dialysis symptoms. When the DSI was examined by gender, it was observed that the mean symptom score was significantly higher in females than in males ($p<0.05$). Similar to our study results, in the study of Hintistan and Deniz (2018) and the study of Weisbord et al. (2005), it was found that females who received HD treatment had higher overall symptom burden and symptom severity than males (Hintistan and Deniz 2018; Weisbord et al., 2005). The fact that women's socially prescribed duties and obligations remain, and the variables that affect the utilization of health services, such as education level and occupation, are limited, can explain the increased symptom burden and severity in women receiving HD treatment.

When DSI was analyzed according to marital status, the mean symptom score was found to be significantly higher in those whose spouses passed away compared to those who were single, married, and separated ($p<0.05$).In the study of Hintistan and Deniz (2018), the symptom severity of single HD patients was found to be higher than the married ones (Hintistan and Deniz, 2018). By enhancing social support, marital status has an effect on patients' well-being and, as a result, the severity of symptom perception. When DSI is analyzed according to education level, the mean symptom score was found to be significantly higher in literates than primary and secondary school graduates ($p<0.05$). In the studies of Hintistan and Deniz (2018) and Gorıs et al. (2016), it was determined that patients with low education levels experienced more symptoms than dialysis-related symptoms, as in our study (Hintistan and Deniz 2018; Gorıs et al., 2016). In the study conducted by Unal and Bilge (2005) with HD patients, the physical health, social relations, and environmental quality of life scores of patients with high education levels were found to be higher than those with low education levels (Unal and Bilge, 2005). In addition, Theofilu (2011) found that CRF patients with high economic status and education levels had lower anxiety and depression scores than others (Theofilu, 2011).

According to our study results, the total BSI score was found to be 57.115±27.67, and when studies conducted with hemodialysis patients using different scales and diagnostic methods were examined, psychiatric problems were reported with a frequency of 5-50% (Ozçetin et al., 2009, Hedayati et al., 2009; Balaban et al., 2017). When the BSI total score and BSI subscale mean scores were analyzed according to the age groups of the patients, it was determined that there was a significant relationship between the age groups only with the somatization subscale ($p<0.05$). Accordingly, somatic complaints increase significantly as age increases in patients with CRF. When the BSI total score and BSI subscale mean scores were analyzed based on the gender of the patients, total psychiatric symptoms, anxiety, depression, and somatic symptoms were found to be significantly higher in females than in males ($p<0.05$). Another study found that depression, anxiety,

somatization, and interpersonal sensitivity subscales were higher in women than in men, similar to our study (Kose Genc, 2018). Accordingly, it can be said that the position of women in society is a factor that increases the psychological symptom score in general. When the BSI total score and BSI subscale mean scores were analyzed according to the education level of the patients, it was observed that the total psychiatric symptoms, anxiety, and depression symptoms increased significantly as the education level decreased in CRF patients ($p<0.05$). It is thought that the inability of individuals with low educational level to express themselves adequately increases psychiatric problems. A positive and significant correlation was found between patients' DSI score and BSI total score and its subscales (Anxiety, Depression, Negative Self, Somatization, and Hostility) ($p<0.05$). Therefore, as dialysis symptoms increase in individuals with CRF, total psychiatric symptoms, anxiety, depression, negative self, somatization, and hostility symptoms increase significantly ($p<0.05$). According to our study results, many physical symptoms are seen in individuals undergoing hemodialysis, and psychiatric symptoms increase as physical symptoms increase.In individuals undergoing hemodialysis, nurses should evaluate patients biopsychosocioculturally and create a care plan in line with their symptoms, and should help support patients and their families with interventions such as education, counseling and guidance.

CONCLUSION

In our study, the first three symptoms most experienced by individuals undergoing hemodialysis were feeling tired or decreased energy, numbness and tingling in the feet, and feeling sad; The least common symptom was found to be diarrhea. According to our research results, advanced age, low education level and losing a spouse are risk factors for dialysis symptoms in individuals undergoing hemodialysis. According to our research results, low education level and female gender are risk factors for psychiatric symptoms in individuals undergoing hemodialysis. In our study, it was found that psychiatric symptoms, anxiety, depression, negative self, somatization and hostility symptoms increased as dialysis symptoms increased in individuals undergoing hemodialysis.In the light of the research results, it is recommended that individuals with CRF, especially the elderly, women, and those with a low education level, should be evaluated in terms of the causes, degree, and effects of dialysis complications and psychiatric symptoms and supported for their solution. In addition, it is thought that initiating physiological and psychiatric evaluations together with the diagnosis of CRF may enable the early detection of possible problems and the taking of necessary precautions. Finally, psychosocial evaluation of the patient innon-psychiatry clinics by Consultation-Liaison Psychiatry (CLP) nurses, informing and supporting the nurses and other health personnel who will care and treat this patient, and multidisciplinary teamwork are recommend.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Evaluation of Pre-Diagnosis Dietary Habits of Patients with Colorectal Cancer

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ABSTRACT:
Purpose: The aim of this study was to evaluate the effects of lifestyle and obesity on colorectal cancer patients.
Material and Methods: The study was conducted on 40 patients with colorectal cancer (Patient Group- PG) who received diagnosis in the past 6 months and 40 volunteer adult controls (Control Group- CG) who did not have any digestive system disorders and/or diagnosis of cancer. The questionnaire form, which was developed in order to determine the lifestyle and dietary habits of the individuals, was completed by the patients and the individuals in CG. Anthropometric measurements were taken by the researcher.
Results: The general mean age of the individuals was 59.8 ± 10.3 years in the PG and 59.6 ± 10.6 years in the CG. It was found out that colorectal cancer (CRC) history was present in 10% of the individuals with CRC and the history of other cancer types was present in the families of 32.5% of the individuals with CRC. The pre-diagnostic body weights of the individuals in the patient group were found to be higher than the body weights during the study. Sunflower oil consumption is 87.5% among the individuals in the PG and 67.5% among the individuals in the CG ($p<0.05$). The consumption of ready-made soups and meat and chicken bouillon is 37.5%, 40.0% in the PG and 10.0% and 12.5% in the CG, respectively ($p<0.05$).
Conclusion: It can be said that there is a relationship between colorectal cancer and lifestyle factors, and that changes may result in a reduced risk of developing colorectal cancer.
Keywords: *Body mass index, Colorectal cancer, Obesity, Dietary habits*

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INTRODUCTION

Cancer is an ever-increasing health problem all over the world and it is the leading factor of deaths (Fitzmaurice et al., 2015). Around the world, the incidence of cancer is approximately 20% higher among males than females and the incidence rates vary in males and females across the areas of residence (Bray et al., 2018). The World Health Organization (WHO) states that in 2020, there were 935 000 deaths from colon and rectal cancer (World Health Organization, 2021). The incidence rates of colorectal cancer vary according to the regions. The fact that the incidence of colon and rectum cancer varies with 8- and 6-fold variations, respectively, particularly in developing countries can be regarded as an indication of socio-economic development (Bray et al., 2018). The regions with the highest incidence of colon cancer are Europe (Hungary, Slovenia, Slovakia, Holland, and Norway), Australia/New Zealand, North America, and East Asia (Japan and the Korean Republic, Singapore). The rates of rectal cancer incidence have a similar regional distribution and the highest incidence among males is observed in the Korean Republic and the highest among females in Macedonia. It is stated that the incidence rates of colon and rectum cancers are lower in many regions of Africa and South Asia (Bray et al., 2018). It is denoted that colorectal

cancer (CRC), an important health problem of developed countries, arises due to mutual interactions of genetic susceptibility, environmental factors, and precancerous diseases and dietary habits are also effective on their occurrence (Buyukdogan et al., 2009; Buyukdogan ,2009; Topuz ve Aykan, 1998; Vaızoglu et al., 2010). Smoking, diet with high-fat/low-fiber content, and physical inactivity are shown to be among various environmental risk factors effective on the occurrence of CRC (Dong et al., 2017). In addition, between these factors the prevalence of overweight and obesity is dramatically increasing all over the world (Dong et al., 2017).

Obesity develops when exceeding energy consumption overtakes energy expenditure from metabolic and physical activity. Fat becomes deposited and it accumulates as ectopic fat tissue due to the accumulation of excessive or abnormal fat tissue which exceeds genetically and epigenetically determined adipose tissue stores, which leads to an increased risk of numerous disease entities (Avgerinos, 2019). Based on the International Agency for Research on Cancer Working Group (IARC), there is convincing evidence that excess body weight is associated with an increased risk for cancer of at least 13 anatomic sites, including endometrial, esophageal, renal and pancreatic adenocarcinomas, hepatocellular carcinoma, gastric cardia cancer, meningioma, multiple myeloma, colorectal, postmenopausal breast, ovarian, gallbladder, and thyroid cancers (Lauby-Secretan et al., 2016). However, the association between obesity and CRC is controversial. Rather than obesity, body fat distribution particularly abdominal obesity appears to play a role in the development of CRC (Dong et al., 2017). A recently conducted meta-analysis found a higher risk of colon cancer for each 5-unit increment in Body Mass Index (BMI) of 30% among men and 12% among women (Kyrgiou et al., 2017). This study aimed to assess the effects of lifestyle and obesity status of CRC patients on the occurrence of disease.

MATERIAL and METHODS

Purpose and Type of the Study

The aim of this study was to evaluate the effects of lifestyle and obesity on colorectal cancer patients. This descriptive cross-sectional study was conducted in Samsun.

Sampling and participant

This study was carried out on 40 patients (Patient Group-PG) diagnosed with colorectal cancer (CRC) within the last 6 months, who applied to the Oncology Department of Samsun Training and Research Hospital, and 40 volunteer adult controls (Control Group- CG) without any diagnosis of digestive system disorders and/or cancer, who applied to the polyclinics of eye, orthopedics, and otorhinolaryngology. Pregnant females and individuals aged below 18 with any digestive disorders and/or diagnosis of cancer and metastasis were excluded from the study. There are 22 males and 18 females that are age- and sex-matched in each group (a total of 44 males and 36 females).

Data Collection Tools

The question form that was developed in order to determine the lifestyle and dietary habits of all the individuals taken into the scope of the study was implemented by the researcher by using face-to-face interview method. The information about the individuals in the PG was collected to find out the practices both before the diagnosis and during the application of research. Body weight and height of all the individuals were measured and the BMI was calculated in kg/m^2. The body weight of the individuals in the PG before the diagnosis was questioned with the item “usual body weight”.

Statistical Analysis

The data used in the study were assessed through the Statistical Package for the Social Sciences (SPSS) and statistical significance was taken as $p<0.05$. The simple and cross distributions of the data that were determined by counting were presented in tables as numbers and percentiles. The differences between

the groups were analyzed through Chi-square test. The t-test was used for the comparison of two dependent groups that showed a normal distribution and the Wilcoxon test was used for those who did not show a normal distribution (Kalaycı, 2008).

Ethical Approval

The study was approved by the Institutional Review Board and Ethics Committee of Hacettepe University and all the subjects given their written consents in accordance with the Declaration of Helsinki.

RESULTS

Table 1 presents the socio-demographic characteristics of the individuals. Of the individuals, 55% are males and 45% are females. The general mean age of the individuals was 59.8 ± 10.3 years in the PG (60.2 ± 11.7 years for females and 59.6 ± 9.8 years for males) and 59.6 ± 10.6 years in the CG (59.1 ± 11.7 for females and 60.1 ± 10.0 years for males). University graduates comprise 2.5% of the PG and 22.5% of the CG. The individuals in both groups are usually married (97.5% in the PG and 82.5% in the CG).

Table 2 examines the family histories of the individuals in the PG related to CRC or the existence of other types of cancer. It was found out that 4 of the individuals had familial CRC history (rectum in one and colon in three). When the histories of the patients were examined in terms of other cancer types, it was determined that 32.5% had other types of cancer.

Table 3 presents the height, weight, and BMI averages of the individuals. The mean body weight was found to be 78.89 ± 3.16 kg in males and 73.91±3.28 kg in females in the CG. It was determined that the mean body weight at the time of the study was 69.9 ± 10.7 kg for males and 67.4 ± 13.6 kg for females. The body weight of the individuals in the PG prior to the diagnosis was found to be higher than body weight at the time of the study ($Z = -3.208$, $p = 0.001$ for females and $Z = -2.429$, $p = 0.015$ for males). In the same way, it was detected that the pre-diagnosis BMI values, which were 26.3 ± 4.0 kg/m^2 for males and 30.0 ± 5.3 kg/m^2 for females, dropped to 24.8 ± 3.5 kg/m^2 for males and 27.3 ± 4.2 kg/m^2 for females during the study and the difference between the two periods was significant ($p < 0.05$) for both sexes. The pre-diagnosis body weight of the individuals in the PG and the body weight of the individuals in the CG during the study and their BMI values were compared according to sexes, but the differences were not considered significant ($p > 0.05$).

Table 1. Demographic characteristics of individuals

	Control Group						Patient Group					
	Male		Female		Total		Male		Female		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Age												
<44	1	4.5	3	16.7	4	10.0	1	4.5	2	11.1	3	7.5
45-54	6	27.3	2	11.1	8	20.0	7	31.8	3	16.7	19	25.0
55-64	6	27.3	8	44.4	14	35.0	5	22.7	8	44.4	13	32.5
>65	9	40.9	5	27.8	14	35.0	9	40.9	5	27.8	14	35.0
χ±Sd	60.1±10.0		59.1±11.7		59.6±10.6		59.6±9.8		60.2±11.7		59.8±10.3	
Educational Status												
Illiterate	4	18.2	3	16.7	7	17.5	3	13.6	9	50.0	12	30.0
Literate	3	13.6	2	11.1	5	12.5	1	4.5	2	11.1	3	7.5
Primary school	5	22.7	9	50.0	14	35.0	17	77.3	7	38.9	24	60.0
High school	4	18.2	1	5.6	5	12.5	–	–	–	–	–	–
University	6	27.3	3	16.7	9	22.5	1	4.5	–	–	1	2.5
Marital Status												
Single	–	–	1	5.6	1	2.5	–	–	1	5.6	1	2.5
Married	22	100.0	17	94.4	39	97.5	20	90.9	13	72.2	33	82.5
Widow	–	–	–	–	–	–	2	9.1	4	22.2	6	15.0

Table 2. Distribution of individuals according to familial cancer history

	n	%
Colorectal Cancer		
Yes	4	10.0
No	35	87.5
No idea	1	2.5
Colorectal Cancer Type		
Rectum cancer	1	25.0
Colon cancer	3	75.0
Other Cancer Types		
Yes	13	32.5
No	27	67.5

Table 3. Average height of individuals, body weight before and after diagnosis and BMI averages

	Male	Female
	χ±Sd	**χ±Sd**
Patient Group		
Height (cm)	167.81 ± 1.17	156 ± 1.26
Weight (kg)		
Before diagnosis	74.3 ± 12.2	74.1 ± 16.2
After diagnosis	69.9 ± 10.7	67.4 ± 13.6
Z^{BD-AD} [a]	–2.429	–3.208
p	0.015	0.001
BMI (kg/m²)		
Before diagnosis	26.3 ± 4.0	30.0 ± 5.3
After	24.8 ± 3.5	27.3 ± 4.2
Z^{BD-AD} [a]	–3.181	–2.315
p	0.001	0.021
Control Group		
Height (cm)	168.91 ± 1.12	156.83 ± 1.16
Weight (kg)	78.89 ± 3.16	73.91 ± 3.28
Z^{BD-CG}[b]	-1.064	-0.065
p	0.287	0.948
BMI (kg/m²)	27.45 ± 4.48	30.11 ± 5.96
Z^{BD-CG}[b]	-0.678	-0.065
p	0.498	0.948

[a] Wilcoxon Test (BD-AD). [b] Mann- Whitney U Test (BD-CG). BD: Before Diagnosis AD: After Diagnosis

Table 4 presents Consumption frequency of certain nutrients of the individuals. The rates of those who prefer to consume fried eggs are 45% in the CG and 70% in the PG ($p<0.05$). The consumption of boiled red meat is 27.5% in the CG and 5% in the PG ($p<0.05$). Half of the individuals in the PG consume fried fish (PG: 50.0%, CG. 17.5%) ($p<0.05$). The rates of consuming sunflower oil are 87.5% in the PG and 67.5% for the CG ($p<0.05$). The consumption of ready-made soups and chicken/meat bouillon is 37.5% and 40.0% in the PG and 10.0% and 12.5% in the CG, respectively ($p<0.05$).

Table 5 presents the status of skipping meals of the individuals. Although the differences between PG and CG in terms of the status of skipping meals were not significant ($p > 0.05$), it was determined that the rate of those who did not skip meals in the CG and the pre-diagnosis PG was similar (37.5%) and this rate rose to 55.0% in the post-diagnosis PG. The most frequently skipped meal is usually lunch (pre-diagnosis PG: 92.6%, post-diagnosis PG: 85.0%, CG: 52.5%) and it was observed that the individuals in the PG skipped this meal more than those in the CG ($p > 0.05$) prior to the diagnosis. No differences were

found between skipped meals in the PG period to and after the diagnosis (p > 0.05). There is no significant difference between the individuals in the PG and CG in terms of the habit of eating at night (p > 0.05).

Table 4. Consumption frequency of certain nutrients

		Consuming		Not consuming	
		n	%	n	%
Fried eggs	PG	28	70.0	12	30.0
	CG	18	45.0	22	55.0
			X^2= 5.115	p=0.006*	
Boiled red meat	PG	2	5.0	38	95.0
	CG	11	27.5	29	72.5
			X^2= 7.440	p=0.006*	
Fried fish	PG	20	50.0	20	50.0
	CG	7	17.5	33	82.5
			X^2= 9.448	p=0.002*	
Sunflower oil	PG	35	87.5	5	12.5
	CG	27	67.5	13	32.5
			X^2= 4.588	p=0.032*	
Ready-made soups	PG	15	37.5	25	62.5
	CG	4	10.0	36	90.0
			X^2= 8.352	p=0.004*	
Chicken/meat bouillon	PG	16	40.0	24	60.0
	CG	5	12.5	35	87.5
			X^2= 7.813	p=0.005*	

[a] p<0.05

Table 5. Individuals skipping status

	Control Group		Patient Group			
			Before Diagnosis		After Diagnosis	
	n	**%**	**n**	**%**	**n**	**%**
Skipping Meal						
Yes	25	62.5	25	62.5	18	45.0
No	15	37.5	15	37.5	22	55.0
		Z[a]= 0.00	p= 0.309	Z[b]=-1.698	** p=0.090	
Skipped Meal[1]						
Breakfast	1	2.5	1	3.7	2	10.0
Lunch	21	52.5	25	92.6	17	85.0
Dinner	3	7.5	1	3.7	1	5.0
		Z[a]= -0.859	p= 0.050	Z[b]=-1.00	p=0.317	
Night Eating Habit						
Yes	7	17.5	8	20.0	10	25.0
No	33	82.5	32	80.0	30	75.0
		Z[a]=-0.285	p= 0.776	Z[b]=-0.707	p=0.480	

[a]Mann-Whitney U Test (BD-CG). [b]Wilcoxon Test (BD-CG). [1] Individuals marked more than one option.

DISCUSSION

It has been stated that males are at a higher risk than females in terms of developing CRC and mortalities of cancer. This is because biological factors of females such as hormonal and genetic characteristics differ from those of males and they respond differently to the risk of diseases (Payne, 2007). Similarly, in the study carried out by Gürsoy et al. in Kayseri on 250 individuals, 57.6% of the individuals were males, 42.4% were females, and the

male/female ratio was 1.3/1. The CRC prevalence was higher for males than females (Gürsoy et al., 2003). In this study, 55% of the individuals were males, 45% were females, and the male/female ratio was 1.2/1 (Table 1). It is also known that age factor is an important risk factor in CRC development (Bresalier ve Kim, 1998). The risk of CRC occurrence gradually rises in individuals aged between 40-50 years and this risk continues to increase, doubling every 10 years in such a way that it will peak in mid-seventies (Heavey et al., 2004). In this study, 63.6% of the males and 72.2% of the females with CRC are aged 55 years and above, which shows that increased age might be a risk factor for CRC.

The prevalence of obesity shows a remarkable increase in many places of the world and this increase lead to numerous obesity-related diseases (World Health Organization, 2021). High BMI is an important risk factor for certain cancer types (NDC, 2014). It was detected in this study that the pre-diagnosis BMI values, which were 26.3 ± 4.0 kg/m^2 for males and 30.0 ± 5.3 kg/m^2 for females, dropped to 24.8 ± 3. kg/m^2 for males and 27.3 ± 4.2 kg/m^2 for females during the study and the difference between the two periods was significant ($p < 0.05$) for both sexes. Moghaddam et al. examined the data of 9 cohort studies and showed that neither slightly overweight (BMI = 25.0-29.9 kg/m^2) nor excessively overweight (BMI > 30 kg/m^2) females had a statistically significantly increasing risk of CRC compared to females with normal weight (BMI < 25 kg/m^2) (Moghaddam et al., 2007). Caan et al. showed that BMI was related with an increased risk of colon cancer (Caan et al., 1998). In a prospective study conducted in Japan, a positive strong association was detected between BMI and the risk of colon cancer in males, while it was stated there was not a clear association among females (Shimizu, 2013).

It is proposed that there is an association between oil and CRC risk. However, this situation displays differences according to the type of oil (Braga, 1998). In this study, when oil consumption of the individuals was investigated, it was seen that a great majority of the PG consumed sunflower oil on a daily basis. The price of sunflower oil is more affordable compared to other oil types in Turkey, which may be considered as a factor for its higher preference rate. The limitations of this study are that the patient group is limited, and the findings of the study were collected from a single province.

CONCLUSION

In conclusion, as dietary habits and lifestyle, unlike all other factors, can be adjusted in terms of human health, they are highly important in protection against CRC. The process to be followed for protection against CRC can be determined by means of comprehensive cohort studies. By doing this, dietary habits of individuals who have CRC or who face the risk of CRC can be regulated, thus decreasing their risk of developing CRC. Moreover, these changes can provide a supplementary support in treatment of individuals with CRC. Certain types of cancer including CRC can be prevented or their incidence can be lowered with changes to be made in dietary habits and lifestyle.

Conflict of Interest

The authors have no conflicts of interest to declare.

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Frequency of Urinary Tract Stone Disease in Sivas / Sarıyar Village: A Cross-Sectional, Regional Preliminary Research

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ABSTRACT:

Purpose: This survey study was planned with the awareness that there is more urinary tract stone disease in Sivas / Sarıyar village and more patients went to hospitals' urology department. This study aimed to determine the prevalence of urinary tract stone disease and its relationship with age, gender, body weights and eating habits.

Material and Methods: This study is cross-sectional and regional preliminary research. Houses in the village were visited randomly and questions presented in the appendix were asked. In the survey study, the requirements of the Helsinki Agreement were followed. This survey study is the first research in the Sivas region.

Results: According to the evaluation of the survey there were 126 patients and 40 patients with stone findings (166 in total) in Sarıyar village. When the survey findings were evaluated, the incidence of stone was 10.40% in the Sarıyar village.

Conclusion: The high cost of interventional treatments has increased the interest in prophylactic treatment. Therefore, determining the frequency of stone disease has gained importance. According to the survey findings, the incidence of stone was found 10.4% in Sarıyar village. These results are higher than the researches reported in Turkey and the world. As a result, a more comprehensive research may be suggested in the region.

Keywords: *Urolithiasis, Risk Factors, İncidence*

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INTRODUCTION

Urinary stone disease (USD); is a multifactorial event that depends on the interaction of environmental, anatomical and genetic factors (Turkish Urology Academy, 2015). The frequency of USD varies in different regions of the world. USD can negatively affect life of the patient and can occur at any age from birth to death and in both sexes. It may lead to kidney loss and / or failure when its untreated. One of the important features of USD is that it is more likely to reoccur (Turkish Public Health Agency, 2014). The interest in prophylactic treatment has increased because of the high cost of interventional treatments. Therefore, determining the frequency of stone disease has gained more importance. Risk areas determined by epidemiological researches can be educated and started drug treatments. There are prevalence and incidence researches of stone disease in various countries (Curhan, 2007). Although our country is one of the regions where stone disease is common there is not enough prevalence study on this subject. There are researches made in some regions but the number of studies are not enough to determine the prevalence of Turkey (Uluocak et al., 2010; Akıncı et al., 1991). It is a known fact that disease and its treatment process is a great burden on the country's economy. Knowing the frequency of the disease can make it

easier to take precautions (Lotan, 2009). This survey study was planned with the awareness that there is more urinary tract stone disease in Sivas / Sarıyar village and more patients went to hospitals' urology department.

MATERIAL and METHODS

Purpose and Type of the Study

This study is a cross-sectional, and regional preliminary research. The survey was conducted in Sivas / Sarıyar village due to the high number of urinary stones and the number of hospital admissions that supported it. This study aimed to determine the prevalence of urinary tract stone disease and its relationship with age, gender, body weights and eating habits.

Sampling and participant

This study was carried out in Sivas / Sarıyar village. The population of the research consisted of people living in the village (n=320). The study sample included 161 patients (50.3%) who agreed to participate in the study.

Data Collection Tools

Houses in the village were visited randomly and questions presented in the appendix were asked. Age, gender, eating habits (especially water, salt and red meat consumption) were asked to villagers. Daily salt consumption habits were divided into four groups: those who use salt-free diet products, those who do not use salt-free diet products, those who add salt to the food while cooking, and those who add salt to the plate. Height and weight were measured by the researcher. Chronic diseases and urinary system stone disease of the participants were questioned in the questionnaire. Body mass index BMI was calculated by the researchers.

Statistical Analysis

Obtained datas studied in SPSS (ver: 22.01 program). In the evaluation of the data, the chi-square kit was used in multi-eyed layouts in 2x2 layouts. and the level of error was taken as 0.05.

Ethical Approval

In the survey study, the requirements of the Helsinki Agreement were followed. Before data collection, ethics committee approval was gained from the Ethics Committee. The survey participants was received consent form.

RESULTS

The population of Sarıyar village is 1596, and the incidence of stones is 10.40%. According to the evaluation of the survey there were 126 patients, and 40 patients with stone findings (166 in total) in Sarıyar village. Individuals' age included in the study was minimum 7, maximum 84 and the mean age was 40.83 ± 16.27. These individuals were 46.4% women and 53.6% men. 55.1% of individuals were married and 14.9% were single. According to the completed questionnaire, the literacy rate of the patients was determined as 24.05%.

The rest graduated from 33.0% primary school, 24.5% middle school, 10.3% high school, 7.7% college. When their professions were examined 6.2% were civil servants, 20% were workers, 16.2% were farmers, 41.05% were housewives, 7.3% were students, 5.8% were in other professions. Individuals' income was 26.8% less than 500 ₺ (TL), 15.7% between 500-1000 ₺, 37% between 1001-2000 ₺, 11.9% between 2001-3000 ₺, 7.7% more than 3000 ₺. Individuals resided in 78.1% concrete houses, 21.9% masonry houses. 80.8% of the individuals were using mains water and 19.2% were using ready-made water.

Individuals' 24.1% had urinary stone treatment, 24.1% stated that they dropped stones and 19.2% stated that they had been diagnosed with kidney disease. 15.3% of individuals stated that they suffered from stone symptoms, 56.7% was pain and 43.3% was blood in the urine. The average body mass index of the 121 women who participated in the survey was 30.4. The mean body mass index of 140 men was 28.7. Chronic kidney disease was detected in 16 (%13) of 121 women, diabetes mellitus in 35 (%28,9) and hypertension in 57 (%47,1) women. Of the 140 men, 34 (%24,2) had chronic kidney disease, 42 (%30) had diabetes mellitus, and 61 (%43,5) had hypertension.

In this study made in Sarıyar the incidence of stone density was 10.40%. In this survey research urinary stone disease treatment examined according to

gender and the difference was significant (p <0.05). Men had greater rates of urinary stone treatment (Table 1). The difference was found significant when examining the spontaneous stone passage status by gender (p <0.05) Men dropped more urinary Stones (Table 2).

The difference was significant (p <0.05) when examining the presence of kidney failure diagnosed by gender. Males have been diagnosed with greater rates of kidney disease. (Table3).

The difference found significant when the urinary stones were analysed according to income level (p <0.05). Individuals with income between 2001 and 3000 ₺ (TL) had more spontaneous stone passage (Table 4).

The difference was significant when urinary stones analysed according to the amount of water consumed (p <0.05). The spontaneous stone passage rate increased as the amount of drinking water increased (Table 5).

The difference was found insignificant when the urinary stones were analysed by age groups (p> 0.05). The stone drop rate increased when the age increased although the difference was insignificant. The difference between diagnosed renal disease and age groups was found insignificant (p> 0.05). Although the difference was insignificant it was found that the rate of diagnosed kidney disease increased when the age increased (Table 6). No statistically significant difference was found when all parameters were compared with other questions.

Table 1. Urinary stone disease treatment according to gender

			Urinary stone disease treatment		
			Yes	**No**	**Total**
Gender	♀	N	20	101	121
		%	16,5%	83,5%	100,0%
	♂	N	43	97	140
		%	30,7%	69,3%	100,0%
Total		N	63	198	261
		%	24,1%	75,9%	100,0%

Table 2. Urinary stone disease according to gender

			Urinary stone disease		
			Yes	**No**	**Total**
Gender	♀	N	21	100	121
		%	17,4%	82,6%	100,0%
	♂	N	42	98	140
		%	30,0%	70,0%	100,0%
Total		N	63	198	261
		%	24,1%	75,9%	100,0%

Table 3. Kidney failure diagnosed by gender

			Kidney failure diagnosed		
			Yes	**No**	**Total**
Gender	♀	N	16	105	121
		%	13,2%	86,8%	100,0%
	♂	N	34	106	140
		%	24,3%	75,7%	100,0%
Total		N	50	211	261
		%	19,2%	80,8%	100,0%

Table 4. Income level and urinary stone disease status

			Urinary stone disease		
			Yes	**No**	**Total**
Income level	500 ₺ <	n	14	56	70
		%	20,0%	80,0%	100,0%
	500₺-1000₺	n	12	29	41
		%	29,3%	70,7%	100,0%
	1001₺-2000₺	n	17	82	99
		%	17,2%	82,8%	100,0%
	2001₺-3000₺	n	15	16	31
		%	48,4%	51,6%	100,0%
	3000₺ >	n	5	15	20
		%	25,0%	75,0%	100,0%
Total		n	63	198	261
		%	24,1%	75,9%	100,0%

Table 5. Spontaneous stone passage and liquid intake

			Spontaneous stone passage		
			Yes	**No**	**Total**
Liquid intake	No	n	1	9	10
		%	10,0%	90,0%	100,0%
	1 liter	n	18	73	91
		%	19,8%	80,2%	100,0%
	2 liter	n	24	84	108
		%	22,2%	77,8%	100,0%
	3 liter	n	13	27	40
		%	32,5%	67,5%	100,0%
	> 3 liter	n	7	5	12
		%	58,3%	41,7%	100,0%
Total		S	198	261	
		%	75,9%	100,0%	

Tables 6. Age, urinary stone disease, and spontaneous stone passage relationship

			Urinary stone disease		
			Yes	**No**	**Total**
Age	0-10	n	4	7	11
		%	36,4%	63,6%	100,0%
	11-20	n	0	21	21
		%	0,0%	100,0%	100,0%
	21-30	n	7	38	45
		%	15,6%	84,4%	100,0%
	31-40	n	10	46	56
		%	17,9%	82,1%	100,0%
	41-50	n	9	32	41
		%	22,0%	78,0%	100,0%
	51+	n	20	67	87
		%	23,0%	77,0%	100,0%
Total		n	50	211	261
		%	19,2%	80,8%	100,0%

			Spontaneous stone passage		
			Yes	**No**	**Total**
Age	0-10	n	4	7	11
		%	36,4%	63,6%	100,0%
	11-20	n	2	19	21
		%	9,5%	90,5%	100,0%
	21 -30	n	10	35	45
		%	22,2%	77,8%	100,0%
	31 -40	n	14	42	56
		%	25,0%	75,0%	100,0%
	41-50	n	12	29	41
		%	29,3%	70,7%	100,0%
	51+	n	21	66	87
		%	24,1%	75,9%	100,0%
Total		n	63	198	261
		%	24,1%	75,9%	100,0%

DISCUSSION

In this study conducted in Sarıyar, the incidence of stone density was found to be 10.40%. The treatment of urinary system stone disease was examined by gender and the difference was found to be significant. Men had higher rates of urinary stone treatment. When the spontaneous stone passage status by gender was examined, more urinary stones were dropped in men. Males have been diagnosed with greater rates of kidney disease. The spontaneous stone passage rate increased as the amount of drinking water increased. USD is a common health problem especially in developed countries, its prevalence varies according to age, gender, race and geography. Increasing in the incidence and prevalence of urinary stones reported globally. In addition, it was also reported that global warming would affect these trends (Romero et al. 2010). The data obtained in epidemiological studies on stone disease showed that the prevalence of stone disease ranged between 3.5-18.5% (Trinchieri et al., 2000). The prevalence of stone disease is reported 2-8% in the USA (Indridason et al., 2006). In studies conducted in other countries, prevalence in Argentina was found 4% (Pinduli et al., 20016), in China (8%♂, 5%♀) (Peng et al. 2003), in Korea 3.5% (Kim et al., 2002), in Taiwan 9.6% (Lee et al., 2002), in Iran 5.7% (Safarinejad, 2007). The prevalence of stone disease was reported 4.7% in Germany (Hesse et al., 200) and 4.3% in Iceland (Indridason et al., 2006). Akıncı et al. (1991) found the incidence 2.2% and urolithiasis prevalence 14.8% in Turkey which they made in 14 cities with 1,500 people. In the same research, male to female ratio was determined as 1.5/1. Researchers had determined that urinary system stones are most common between the ages of 20-40. Uluocak et al. (2010) reported prevalence of urinary stone disease 11.42% in Tokat. In another study made in central Anatolian region prevalence of urinary stone disease found 5.7% (Tefekli et al., 2005). The high incidence of USD in the region is thought to be due to the fact that the community consists of relatives, they may have similar genetic characteristics, similar living conditions and similar dietary habits in the same geography. Contrary to popular belief, these patients with higher USD rates in this region may require invasive surgical procedures in the future. Due to the fact that the late results of invasive methods such as ESWL, RIRS and PCNL are not known clearly and they create additional costs for the country's economy, necessary measures should be taken in this region before it is too late. However, at the present time prevalence of stone increased, regardless of gender and race. The reason for this increase may be due to changes in nutritional habits, diabetes and obesity which are becoming more common problems. With increasing in the prevalence, the cost allocated to the stone disease treatment and loss of workforce in the diagnosis-treatment process constitutes the socioeconomic side of the problem.

As a result, stone disease is an important public health problem in our country. The main purpose of modern medicine is to inform the society against diseases and to decrease risk rates. Poor eating habits and low fluid intakes are risk factors for stone disease. The society needs education on these issues. We think that health education policies needs to be regulated to improve the socioeconomic level. Avoiding fast-food, consuming plenty of water and fluids, exercising, using less salt and regulating meat carbohydrate intake can be considered as “preventive changes”. Herbal treatment initiated by unauthorized people, often harms more than benefit. Certain drug treatments under the supervision of a doctor may also prevent stone formation. Early diagnosis with equally intervaled health checks is important. In order to lead health policies, more epidemiological studies are needed in a larger population, which includes more information about the disease.

CONCLUSION

This research was carried out in Sivas Sarıyar village with a population of 1596. These findings are consistent with the results of other studies. A high number of patients have been identified in men. 166 of these people were identified as urinary stone patients. When the survey findings evaluated, the incidence of stone was 10.4% in the Sarıyar village. These results are higher than the researches reported in Turkey and the world. As a result, a more comprehensive research can be suggested in the region.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Investigation of The Relationship Between The Religious Orientation of Elderly Dividuals and Their Attitude to Complementary and Alternative Medicine

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ABSTRACT:
Purpose: This study was conducted to examine the relationship between the religious orientation of elderly people and their attitudes towards complementary and alternative medicine.
Material and Methods: This study, which adopted a descriptive and relational screening model, was conducted with the participation of 271 individuals aged 65 and over who were registered in Family Health Centers in the eastern part of Turkey between October - December 2019. Mann Whitney U test was used for binary groups in not normally distributed data. Kruskall Wallis test was also used for data with more than two continuous variables and not normally distributed.
Results: The mean score of Holistic Complementary and Alternative Medicine Attitude Scale scores of the elderly individuals participating in the study was 28.23 ± 7.2; The total mean score of the Religious Orientation Scale was 62.10 ± 5.72. A significant difference was found between the elderly individuals' attitudes towards complementary and alternative medicine and their educational status. In addition, a statistically significant negative correlation was found between the religious orientation of the elderly and their attitudes towards complementary and alternative medicine ($p < 0.05$).
Conclusion: It was found that elderly individuals with higher education have lower attitudes towards complementary and alternative medicine. The high religious orientation of the elderly increases their positive attitude towards complementar y and alternative medicine. In line with these results, awareness on the subject can be increased by educating elderly individuals in primary health care by public health nurses. In addition, it is recommended to conduct the study in different regions and in larger groups.
Keywords: *Attitude, Complementary and Alternative Medicine, Elderly Individual, Religious Orientation*

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INTRODUCTION

Old age is a developmental period that includes psychological, biological and social dimensions (Yildiz, 2012). It is reported that it is affected by factors such as genetic, biochemical, physiological, economic, social, spiritual and lifestyle, which are interdependent and affect each other (Akdeniz et al., 2019). Individuals who face physical and mental characteristics as well as loss of role and other losses in their old age generally have an anxiety state and religion has important effects on the search for meaning (Hökelekli, 2008). Religion has effects ranging from the diet of people to their decisions about diseases and deaths. People have arranged their treatments according to their religious beliefs for centuries (Hökelekli, 2008). Although the relationship between religion and health was discarded with the paradigmatic change in the acquisition of knowledge at the beginning of the 19th century, it more or less continued to be up-to-date and functional in the eyes of the public (Tecim, 2018). Because religious life requires a person to value himself physically and spiritually and to stay away from things that threaten his life. Faith,

whether it is a belief in healing or a belief on which religious arguments are based, has a significant influence on the view of individuals and societies on both traditional and complementary medicine practices and modern medical practices (Mollahaliloglu et al., 2015). In recent years, the use of CAM in the elderly has increased in parallel with the increase in the use of complementary and alternative therapy (CAM) methods in the general population. Many elderly people do not seem to share CAM use with healthcare professionals. However, some CAM methods used by the elderly may require intervention or negatively affect the results that individuals aim with traditional treatments. Therefore, health care professionals have important duties in following this issue and raising awareness (Sackett et al., 2014).

At the beginning of the reasons for choosing CAM methods in the elderly; side effects of drugs or treatments, high treatment and drug fees, relief from feeling of despair, strengthening healthy behaviors (Sağkal et al., 2013).

In the study, Dedeli et al. (Dedeli and Karadakovan, 2011) examined the CAM methods of elderly individuals; 30.0% of older individuals prefer to pray. The use of CAM methods of the elderly varies according to their beliefs, religions, lifestyles and cultures (Kav, 2009; Turan et al., 2010). Due to the limited number of studies on this subject, it is thought that our study will contribute to the literature. It is thought that this study will be a source for studies on the elderly in the future. This study was conducted to examine the relationship between the religious orientation of elderly people and their attitudes towards complementary and alternative medicine.

MATERIAL AND METHODS

Purpose and Type of the Study

This descriptive and relational study was conducted in the Family Health Centers in Agri city Center between October and December 2019.

Sampling and participant

The population of the research consisted of 923 elderly individuals living in Ağrı, 65 years of age and over, registered in this Family Health Center in the city center. It was calculated that 271 individuals should be included in the study with the sampling formula known to the population. The sample of the study consisted of individuals (271 people) who applied to the Family Health Center for any reason between the dates of the study determined by random sampling method and agreed to participate in the study.

Data Collection Tools

In order to collect the research data, Descriptive Characteristics Information Form, Holistic Complementary and Alternative Medicine Attitude Scale (HCAMAS) and Religious Orientation Scale were used. Data were collected by the researchers by face to face interviews with elderly individuals. Data collection took about 15 to 20 minutes.

Introductory Information Form

The form prepared by the researchers in line with the literature, consists of questions including information such as age, gender, marital status, income status (Sağkal et al., 2013).

Holistic Complementary and Alternative Medicine Attitude Scale (HCAMAS)

It was developed in 2003 by Hyland et al. (Hyland et al., 2003). Validity reliability for our country was made by Erci in 2007 (Erci, 2007). Cronbach's alpha, which is the reliability coefficient of the scale, is 0.72. In our study, it was found to be 0.70. The scale has two subscales: Complementary and Alternative Medicine (CAM) and Holistic Health (HH). The scale is a Likert type scale consisting of 11 questions. At least 11 points and at most 66 points can be obtained from the scale. As the score of the scale decreases, positive attitude towards complementary and alternative medicine increases.

Religious Orientation Scale

It was developed by Onay (2000) to determine the extent of religion in people's thoughts, behaviors and emotions (Onay, 2000). The scale has 18 likert type items, of which 12 are straight and 6 are reverse coded. The scale has three sub-dimensions: thought, behavior and emotion. The scale is answered in the form of Never, Sometimes, Usually, Always. The

upper and lower limits of the scale, the lowest is 18; the highest is 72. If the score obtained from the scale increases to 72, it shows the rising religious orientation level. If the score obtained from the scale decreases to 18, it shows the decreasing level of religious orientation. The Cronbach's alpha reliability coefficient of the scale was 95. In our study, it was found to be 0,74.

Statistical Analysis

IBM SPSS V-25 program was used in the statistical analysis of the study. Analyzed is made with SPSS-25 program installed in a university in Turkey. In the research, descriptive features are presented with number (n) and percentage (%). Continuous variables are specified with their mean, standard deviation, minimum and maximum values. The Kolmogorov-Smirnov test was conducted to determine whether the data were normally distributed. Mann Whitney U test was used for binary groups in not normally distributed data. Kruskall Wallis test was also used for data with more than two continuous variables and not normally distributed. In paired comparisons of multiple groups, one of the post-hoc tests, Dunn test was used for data. Spearman correlation test was used to determine the linear relationship between variables and severity of the relationship. P value of <0.05 was considered statistically significant.

Limitations

The fact that this study was conducted in a single region is a limitation of the study.

Ethical Principles

Approval from the Scientific Research Ethics Committee of the relevant University (Date: 18.11.2019, Number: 62) and written permission from the institution where the study will be conducted (from the Provincial Health Directorate) was obtained. The necessary explanations were made to the individuals included in the study, and written permission was obtained from those who wanted to participate in the study.

RESULTS

It was found that 62.4% of the participants were male, 88.6% were married and 41.3% were illiterate. It was found that 71.6% of them are equal to the expenses of their income, 86.3% had social security, 64.9% lived in extended families and the mean age of the group was 71.24 ± 7.1 (Table 1).

According to the findings of the study, the mean score of the Holistic Complementary and Alternative Medicine Attitude Scale score of the elderly individuals was 28.23 ± 7.2 and the lowest score was 11 and the highest score was 49. The total average score of the Religious Orientation Scale was 62.10 ± 5.72. The lowest score obtained from the Religious Orientation Scale was 38 and the highest score was 49 (Table 2).

There was no significant difference between the groups in terms of religious orientation scale score, gender, marital status, educational status, monthly income status, health insurance status, and family type (p>0.05) (Table 3).

A statistically significant difference was found between the mean score of the Holistic Complementary and Alternative Medicine Attitude Scale and education level (p <0.05). In the post-hoc (Dunn) analysis conducted to determine the group originating from the difference between the total score average of the Holistic Complementary and Alternative Medicine Attitude Scale and education level, it was found that the mean score of individuals with higher education graduates was higher than the mean score of all groups. This situation shows that higher education graduates have lower attitudes (Table 3).

There was a statistically significant negative correlation between total score of Holistic Complementary and Alternative Medicine Scale and total score of Religious Orientation Scale (p <0.05). No significant relationship was found between age and attitude towards holistic complement and alternative medicine and religious orientation (p>0.05) (Table 4).

Table 1. Descriptive Characteristics of Individuals Aged 65 and Over (N = 271)

		n	%
Gender	Female	102	37.6
	Male	169	62.4
Marital status	Single	31	11.4
	Married	240	88.6
Education Level	Illiterate	112	41.3
	Primary School	113	41.7
	High School	21	7.7
	University and above	25	9.2
Monthly income status	My income is less than my expense	41	15.1
	My income equals my expense	194	71.6
	My income is more than my expense	36	13.3
Health Assurance Status	Yes	234	86.3
	No	37	13.7
Family Type	Nuclear family	86	31.7
	Extended family	176	64.9
	Broken family	9	3.3
	X ±SD		
Age (years)	71.24±7.1 (min. 65 - max. 112)		

Table 2. Mean Scores of Holistic Complementary and Alternative Medicine Attitude Scale and Religious Orientation Scale and Sub-Dimension of Individuals Aged 65 and Over (N = 271)

Scales	*X* ±SD	Min	Max
Holistic Complementary and Alternative Medicine Attitude Scale	28.23 ± 7.2	11	49
Religious Orientation Scale	62.10 ± 5.72	38	72

Table 3. Distribution of the Scale Score Means According to the Descriptive Characteristics of Individuals Aged 65 and Over (N = 271)

			Religious Orientation Scale		Holistic Complementary and Alternative Medicine Attitude Scale	
		n	*X* ± SD	Test and Significance	*X* ± SD	Test and Significance
Gender	Female	102	62.36±5.70	U: 8310.5	27.91±7.05	U: 8021.0
	Male	169	61.94±5.75	p=.621	28.43±7.30	p=.338
Marital status	Single	31	63.35±5.03	U: 3229.5	28.03±6.97	U: 3522.5
	Married	240	61.94±5.80	p=.231	28.26±7.24	p=630
Education Level	Illiterate	112	62.75±5.56		28.00±7.98	
	Primary School	113	61.78±5.68	KW:3.044	27.91±6.50	KW:12.055
	High School	21	61.90±5.57		26.57±5.97	**p=.007**
	University and above	25	60.76±6.72	p=.385	32.16±6.52	
Monthly income status	My income is less than my expense	41	62.73±4.65		27.85±7.89	
	My income equals my expense	194	62.09±5.56	KW:.206 p=.902	28.04±7.11	KW:.727 p=.695
	My income is more than my expense	36	61.44±7.52		29.72±6.87	
Health Assurance Status	Yes	234	62.03±5.81	U: 4129.0	28.20±7.21	U: 3979.0
	No	37	62.54±5.18	p=.651	28.40±7.17	p=.429
Family Type	Nuclear family	86	61.74±6.66	KW:.858	29.30±5.66	KW:4.90
	Extended family	176	62.40±5.13	p=.651	27.53±7.60	p=.086
	Broken family	9	59.66±6.92		31.66±10.28	

Table 4. The Correlation Between Age and Total Scores of Holistic Complementary and Alternative Medicine Attitude Scale and Religious Orientation Scale

		Total Score of Holistic Complementary and Alternative Medicine Attitude Scale	Total Score of Religious Orientation Scale	Age
Total Score of Holistic Complementary and Alternative Medicine Attitude Scale	r	1		
	p			
Total Score of Religious Orientation Scale	r	-.121	1	
	p	**.047**		
Age	r	-.038	.009	1
	p	.536	.878	

DISCUSSION

In recent years, the attitudes of the elderly towards holistic complementary and alternative medicine have increased (Kav, 2009; Turan et al., 2010). The attitudes of the elderly towards holistic complementary and alternative medicine are shaped according to their cultures, religions and lifestyles (Kav, 2009; Turan et al., 2010). In this section, the findings are discussed in the light of the literature.

According to the findings obtained from the study, the mean score of religious orientation level of the elderly individuals was found to be 62.10 ± 5.72. Higher scores on the scale mean higher religious orientation. We can say that the individuals participating in our study have a high religious orientation. We can explain this situation by being a country that is devoted to religious beliefs. In studies conducted in Turkey, scores of the religious orientation was found close to high (Bulut and Kuşat, 2018; Kurtulan Halici and Karairmak, 2016). Similarly, studies conducted in different regions showed that the religious tendency of the elderly was high(Amjad, 2014; Bengtson et al., 2015; Tiliouine, Cummins, and Davern, 2009; Wen, 2010). The increase in religious orientation in the elderly can be explained by the strengthening of their beliefs as a result of their religious experiences, the fact that religion can be a compensatory support against physiological and psychological limitations in the old age when there is a lot of free time, and the elderly can easily attach to religious values by feeling the reality of death (Arslan, 2009; İnce, 2013).

According to the findings obtained from the study, it was determined that the mean score of the Holistic Complementary and Alternative Medicine Attitude Scale was above the average (28.23 ± 7.2). The higher the score, the higher the negative attitude towards complementary and alternative medicine. Similar results were found in the studies conducted (Barrenberg and Garbe, 2015; Goh et al., 2009; Maggiore et al., 2012; Ozera et al., 2013).

In our study, the mean score of the Holistic Complementary and Alternative Medicine Attitude Scale was found to be statistically significantly higher in those with a university or higher education compared to all other groups ($p < 0.05$). This situation shows that University and above individuals have a negative attitude towards complementary and alternative medicine. Similarly, according to the studies conducted, it was found that those with a high level of education had a negative attitude towards holistic complementary and alternative medicine (Algier et al., 2005; Sjöberg and Wåhlberg, 2002).

In our study, a weak negative correlation was found between the religious orientation of the elderly and their attitudes towards complementary and alternative medicine ($p < 0.05$). As the mean score for religious orientation increases, the mean score for attitude towards complementary and alternative medicine decreases. In other words, the high religious orientation of the elderly increases their positive attitude towards complementary and alternative medicine. Looking at the one study conducted, it was found that there was a similar relationship between them (Mollahaliloglu et al., 2015).

CONCLUSION

It was found that elderly individuals with higher education have lower attitudes towards complementary and alternative medicine. It was determined that there is a negative relationship between the religious orientation of individuals and

their attitudes towards complementary and alternative medicine. The high religious orientation of the elderly increases their positive attitude towards complementary and alternative medicine. In line with these results, elderly individuals can be given continuous education by public health nurses in primary health care to increase their awareness on the subject. In addition, it is recommended to conduct the study in different regions and in larger groups.

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Conflict of Interest

None.

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The Effect of Kinesiological Taping Applied to the Tibialis Anterior Muscle on Gait Parameter in Stroke Patients**

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ABSTRACT:
Purpose: The aim of this study is to examine the immediate effect of kinesiological taping on the tibialis anterior muscle with muscle stimulation technique on gait parameters in individuals with stroke.
Material and Methods: The study included 28 stroke patients with a mean age of 53.57±12.38 years. Gait analysis was performed on the participants at different times with kinesiological taping and sham (plaster-rigid) taping and without any intervention. Kinesiological taping was applied to the tibialis anterior muscle using a muscle technique. Sham taping was applied along the tibialis anterior muscle from the origin to the insertion, with the ankle in a neutral position, without applying any tension to the muscle, skin or tape. The gait parameters of the participants were evaluated with the BTS G-Walk Analysis System.
Results: According to the data obtained as a result of evaluations, it was concluded that the immediate effect of the kinesiological taping applied on the tibialis anterior muscle to the gait parameters was not statistically significant (p> 0.05). In addition, it was concluded that the kinesiological and sham taping applied to the tibialis anterior muscle is not superior to each other (p> 0.05).
Conclusion: Kinesiological taping of the tibialis anterior muscle is not sufficient to improve gait functions in stroke patients.
Keywords: *Stroke; Kinesiotape; Gait Analysis*

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INTRODUCTION

Stroke is a focal (sometimes global) disorder of cerebral function that lasts more than 24 hours or results in death, according to the definition of the World Health Organization (WHO) (Hatano, 1976). Stroke ranks second among the causes of deaths in the world with 11,8%. (Feigin et al., 2013). Approximately one-third of patients with stroke lose their lives within an average of one year, while approximately one-third of those who continue their lives remain dependent on daily life activities for the rest of their lives (Utku, 2007). After the stroke, disorders such as motor control loss, muscle weakness, abnormal movement patterns, spasticity, joint limitations, and sensory dysfunctions, inability to transfer weight to the affected limb, and changes in the gait pattern and balance skills occur (Esquenazi et al., 2009). Changes in gait ability after stroke are related to the severity of the sensorimotor disorder. Half of all acute stroke patients cannot walk, 12% need help during walking, and only 37% can walk independently (Woolley, 2001). The first goal of post-stroke rehabilitation is to regain walking (Goldie et al., 1996). In order to achieve these goals, rehabilitation programs should be prepared by evaluating the person as medical, functional and

psychological. In recent years, various methods have been developed or tried to activate and support the rehabilitation process. One of these methods is the kinesiological taping, which was previously used in musculoskeletal diseases, orthopedic rehabilitation, and athlete's health, but has started to be used in many areas of physiotherapy today. Kinesiological taping is an advantageous application since it is a relatively low cost, easily applicable to patients, non-invasive methods, and has no serious side effects. Therefore, it can be combined safely and comfortably with different treatments (Williams et al., 2012; Halseth et al., 2004). In the literature, studies are examining the effect of kinesiological taping on gait in the lower extremity (Michalak et al., 2009; Kim et al., 2015; Boeskov et al., 2014; Choi et al., 2013), but there is no study on the immediate effect of kinesiological taping applied on the tibialis anterior muscle with muscle stimulation technique. Studies showing the acute effect of kinesiological taping are not clear in the literature. In addition, it is not clear whether the changes in the functional level of the patient are due to the long-term effects of kinesiological taping or the treatment applied in addition to the taping (Qafarizadeh et al., 2018; Koca et al., 2018)**.** Therefore, in our study, it was aimed to examine the effect of kinesiological taping without additional treatment. The aim of this study is to examine the immediate effect of kinesiological taping on the tibialis anterior muscle with muscle stimulation technique on gait parameters in individuals with stroke.

MATERIAL and METHODS

This study was carried out in line with the principles of the Helsinki Declaration between June 2018-May 2019 and the study protocol was approved by relevant institution Ethical Committee for Non-Interventional Clinical Research. (No:60116787-020/41771). This study is registered with ClinicalTrials.gov, Clinical Trial Number: NCT04425811 and was designed as a double-blind study. Twenty-eight stroke individuals with a mean age of 53.57±12.38 years, aged 25-70, who were treated in adult Neurological Rehabilitation Unit, volunteered and had written informed consent were included in the study. Individuals who had a stroke (hemiplegic/hemiparetic) for the first time, had a lesion in a single hemisphere, and had a history of stroke of 1 year were included in the study. Patients with neurological or orthopedic comorbid disease, plantar flexor muscles spasticity greater than 2 according to the Modified Ashworth Scale, and those with communication problems were excluded from the study.

Measurements

The demographic and clinical information of the participants were recorded on a pre-formed form. The dominant side lower limb of the participants was determined as the first preferred lower limb to take steps when starting walking. Then, three evaluation tests were applied to examine the suitability of the participants for the inclusion criteria. Firstly, to determine the cognitive level of the participants, Hodkinson Mental Test (HMT) was recorded and the test score of 7 and above were included in the study. Afterward, the ambulation level of the participants were determined with the Functional Ambulation Classification (FAC), and those with 3 or more scores were included in the study. Finally, the Modified Ashworth Scale (MAS) was used to determine the muscle tone of the person, and those with a score of 2 or less were evaluated by evaluating the plantar flexor muscles spasticity. Turkish validity and reliability of HMT, FAC and MAS have been established (Dirik et al., 2006; Akdeniz et al., 2015; Mehrholz et al., 2005). Gait parameters of the participants included in the study were evaluated with the BTS G-Walk Spatio-Temporal Gait Analysis System.

Research Data Registration Form

Age, weight, height, body mass index (BMI), educational status, occupation, and gender were recorded as demographic data of the casesFor clinical data, clinical diagnosis, affected hemisphere (dominant/non-dominant), dominant side, hemiparesis/hemiplegia duration, and assistive device (orthosis, walking aid, etc.) were recorded. Before the measurements, the participants were informed about the evaluations and the taping application.

Evaluation of Gait Parameters (BTS G-Walk Spatio-Temporal Gait Analysis System)

BTS G-Walk Spatio-Temporal Gait Analysis System was used to evaluate gait parameters. Before and after the taping applications of the patients, gait parameters were measured by asking them to walk with a shoe that they always use daily with a "walk normally" command on a pre-marked and determined 10-meter track and stop with a "stop" command after 10 meters. The analysis port of the BTS G-Walk device is attached to the patient's L4-L5 or L5-S1 vertebra level with a waist belt and secured. By measuring the gait parameters and kinematic analysis of the pelvis through the analysis port, the measurement results are transferred to the computer as numerical and graphical data via the USB connection chip and BlueTooth. The device allows the kinematic analysis of the pelvis to be performed in 3 planes while comparing the right and left extremities with normal values. In addition to the functional analysis of gait disorders secondary to soft tissue injury, amputation, and neurological diseases, it provides objective information to the patient and physiotherapist when used during gait training with different grounds and tools. Gait parameters such as cadence, speed, stride length, stride width, gait cycle duration, stance, and swing phase duration can be calculated (Wren et al., 2011; Trojaniello et al., 2014).

Evaluation Protocol

After the research data record form, HMT, FAC and MAS evaluations applied to the participants, gait parameters of the participants included in the study were measured in three stages:

The First Stage: The cases were asked to walk with the command 'walk 10 meters normally' without any intervention, while the gait parameters were measured with the BTS G-WALK Tempora-Spatial wireless digital gait analysis system (Figure 1).

Figure 1: BTS G-WALK Tempora-Spatial wireless digital gait analysis system

The Second Stage: Following the first stage, the patients were rested for 2 hours without any physical activity, and after the kinesiological taping, gait parameters were measured again.

The Third Stage: In order to exclude the learning effect, gait parameters were re-evaluated by performing sham (plaster-rigid) taping on the 7th day (1 week later) at the third stage.

Kinesiological and sham taping is performed by a physiotherapist certified to practice kinesiotape. Measurement of gait parameters and taping applications were carried out by different

physiotherapists and no information was given about the type of taping applied both to the physiotherapist who measured the gait parameters and to the participants. For sham taping application, skin-colored medical sticking plaster tape was used. No additional treatment was applied to the taping applied to the participants while evaluating the gait parameters. Gait parameters were evaluated with the immediate effect of taping. During the measurement of the gait parameters, each patient was asked to use their daily shoes. The cost of the kinesiological and sticking plaster tape used in the study was covered by the researcher.

Application of Kinesiological and Sham Taping

In our study, kinesiological taping for the tibialis anterior muscle was applied using muscle technique (stimulation). The taping was performed with the participants lying on a stretcher in the supine position. The kinesiological tape was cut in the shape of I considering the participant's muscle length, and the edges were ovalized, the skin was cleaned of moisture, hair and oil. While applying the muscle technique (stimulation), the tibialis anterior muscle was stretched in the plantar flexion and eversion position, and it was applied from the origo to the insertion with a 25-50% tension. It was then activated by applying heat along the tape (Çeliker et al., 2011) (Figure 2).

Sham taping with a plaster-rigid tape was applied along the tibialis anterior muscle from the origin to the insertion, without applying any tension to the muscle, skin or band, with the ankle in the neutral position (Figure 3).

Figure 2: Kinesiological taping on the tibialis anterior muscle with muscle (stimulation) technique

Figure 3: Sham taping application

Statistical Analysis

As a result of the power analysis, considering that the effect size that can be obtained from the study may be at a medium level (dz = 0,5), it was calculated that at least 27 participants should be included in the study in order to obtain 80% power at 95% confidence level. The data were analyzed with IBM SPSS 21.0 software package. Continuous variables were given as mean ± standard deviation, median and categorical variables as numbers and percentages. The normal distribution of the data was analyzed using the "Shapiro-Wilk Test". Repeated one-way analysis of variance (ANOVA) was used for group analysis, and post-hoc Tukey test was used to evaluate the differences between groups. In all analyzes, p≤0,05 was considered statistically significant.

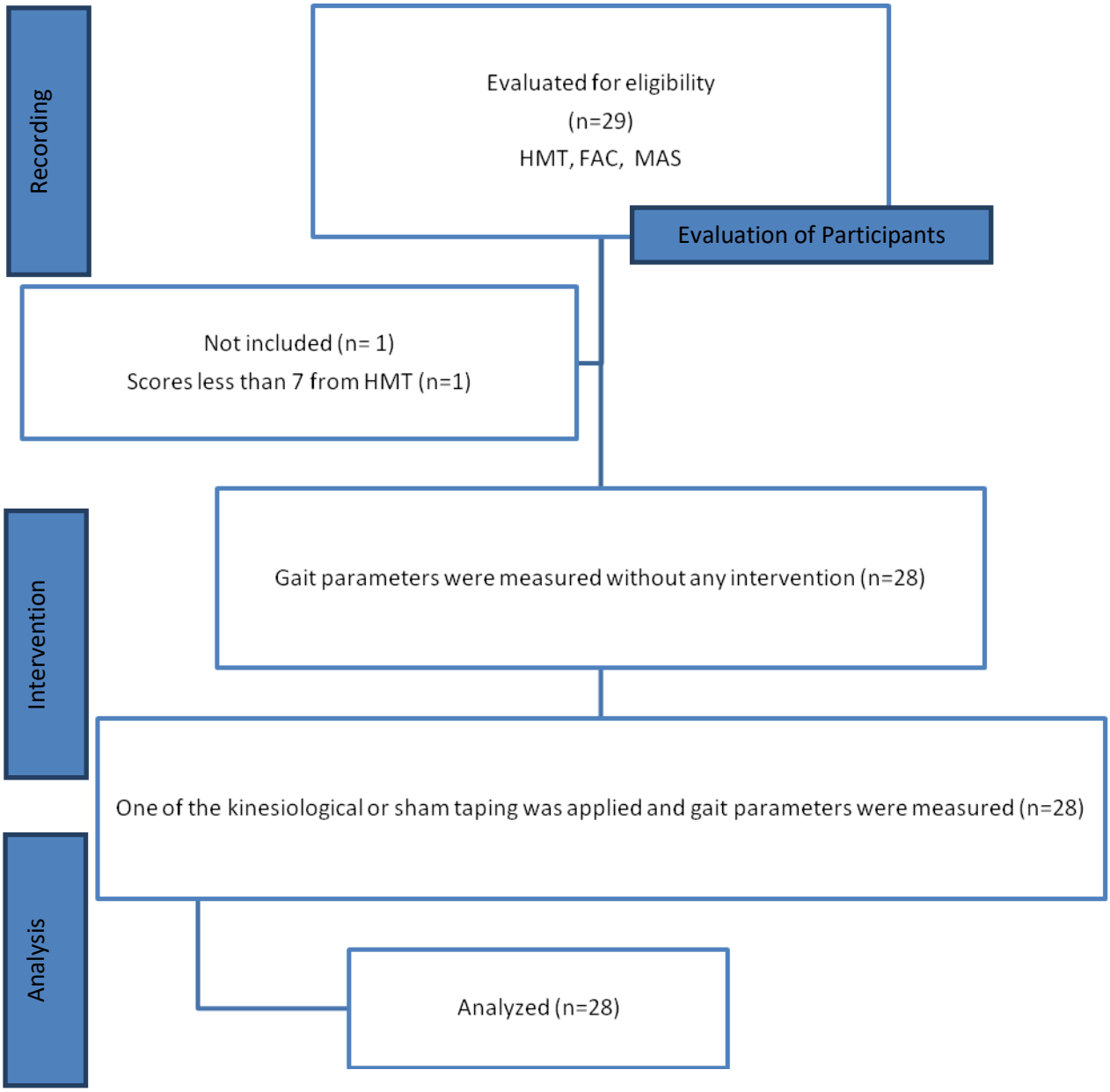

Figure 4: Flow diagram of the study

RESULTS

The flow diagram of our study is as shown in Figure 4. A total of 29 stroke individuals were included in our study. One of the cases was excluded from the study because she could not get enough points from HMT and continued to work with 28 stroke individuals. Five of the evaluated stroke individuals were female (17,9%) and 23 were male (82,1%).

While the right lower limb was dominant in 25 stroke patients, the lower left limb was dominant in 3. While the right hemisphere of 15 of the stroke individuals were affected, the left hemisphere of 13 were affected. While the etiology of stroke in 26 of the participants was Cerebrovascular Incident (CVI), 1 was intracranial mass and 1 was head trauma. The average age of stroke individuals was 53,5±12,3 years. The average of body mass index (BMI) was 27,5±4,8 kg/m^2. Mean stroke durations were 7,75±3,7 months. The average score they received from HMT was 9±1,05, and the average score they received from FAC was 4,3±0,6. According to MAS, the mean degree of spasticity of the plantar flexor muscles was 1,1±0,7 (Table 1).

Gait parameters of individuals with stroke; when the cadence, speed, gait cycle duration, double stride length, stride length, stance and swing phase percentages, double support phase percentage and gait symmetry index values were compared between without tape, kinesiological tape and sham tape, there was no statistically significant difference between the measurements (p>0,05) (Table 2).

Table 1. Demographic information and test results of individuals with stroke

Variables	Individuals with Stroke (n=28)	
	X±SD	Median
Age (years)	53.57±12.3	50.00
BMI (kg/m^2)	27.55±4.8	27.10
Stroke Duration (month)	7.75±3.7	8.50
HMT	9.00±1.05	9.00
FAC	4.32±0.6	4.00
MAS	1.10±0.7	1.00

HMT:Hodkinson Mental Test, FAC: Functional Ambulation Classification, MAS: Modified Ashworth Scale, BMI: Body Mass Index, X: Mean, SD: Standard Deviation.

Table 2. Comparison of gait parameters according to measurements with or without tape

Variables (BTS G-Walk)	Individuals with Stroke (n=28)			F	p*
	X±SD				
	Without Tape	Kinesiological Tape	Sham Tape		
Analysis Duration (s)	24.38±7.4	23.63±6.6	22.84±7.01	0.335	0.716
Cadence (steps/min)	99.67±9.5	98.66±7.9	96.79±11.9	0.603	0.549
Gait Speed (m/s)	0.76±0.2	0.79±0.2	0.80±0.2	0.191	0.826
Left Gait Cycle Duration (s)	1.25±0.1	1.25±0.1	1.29±0.2	0.437	0.647
Right Gait Cycle Duration (s)	1.25±0.1	1.25±0.1	1.29±0.2	0.490	0.614
Left Stride Length (m)	0.96±0.2	0.98±0.2	1.01±0.2	0.222	0.801
Right Stride Length (m)	0.97±0.3	0.98±0.2	1.01±0.2	0.175	0.840
Left Stride Length %	57.14±16.6	58.17±14.7	59.98±13.2	0.260	0.772
Right Stride Length %	57.57±17.3	58.06±14.6	59.96±13.08	0.195	0.824
Left Step Length %	48.68±5.1	49.32±4.2	49.43±4.6	0.210	0.811
Right Step Length %	51.31±5.1	50.67±4.2	50.56±4.6	0.210	0.811
Left Stance Phase %	62.36±5.7	61.61±5.7	60.95±5.2	0.446	0.642
Right Stance Phase %	59.81±5.2	60.01±4.2	59.76±4.3	0.023	0.977
Left Swing Phase %	37.63±5.7	38.38±5.7	39.04±5.2	0.446	0.642
Right Swing Phase %	40.18±5.2	39.98±4.2	40.23±4.3	0.023	0.977
Left First Double Support Phase %	10.93±3.09	10.55±2.7	10.38±3.2	0.240	0.787
Right First Double Support Phase %	11.34±3.7	11.13±3.4	10.31±3.2	0.673	0.513
Left Single Support Phase %	40.17±5.09	39.93±4.2	40.16±4.4	0.023	0.977
Right Single Support Phase %	37.59±5.8	38.37±5.7	39.15±5.3	0.541	0.584
Gait Symmetry Index	86.58±12.4	86.93±12.1	86.77±11.6	0.006	0.994

p* One-Way Repeated ANOVA

Gait parameters of individuals with stroke; when the values of cadence, speed, gait cycle duration, double stride length, stride length, stance and swing phase percentages, double support phase percentage and gait symmetry index values were compared between kinesiological and sham tape, there was no

statistically significant difference (p>0,05) (Table 3). In stroke individuals, the application of kinesiological or sham taping to the tibialis anterior muscle is not superior to each other in terms of immediate effect on gait parameters.

Table 3. Comparison of gait parameters values of kinesiological and sham taping

Variables (BTS G-Walk)	Individuals with Stroke (n=28) X±SD		p*
	Kinesiological Tape	Sham Tape	
Analysis Duration (s)	23.63±6.6	22.84±7.01	0.906
Cadence (steps/min)	98.66±7.9	96.79±11.9	0.763
Gait Speed (m/s)	0.79±0.2	0.80±0.2	0.984
Left Gait Cycle Duration (s)	1.25±0.1	1.29±0.2	0.664
Right Gait Cycle Duration (s)	1.25±0.1	1.29±0.2	0.647
Left Stride Length (m)	0.98±0.2	1.01±0.2	0.905
Right Stride Length (m)	0.98±0.2	1.01±0.2	0.894
Left Stride Length %	58.17±14.7	59.98±13.2	0.892
Right Stride Length %	58.06±14.6	59.96±13.08	0.886
Left Step Length %	49.32±4.2	49.43±4.6	0.995
Right Step Length %	50.67±4.2	50.56±4.6	0.995
Left Stance Phase %	61.61±5.7	60.95±5.2	0.899
Right Stance Phase %	60.01±4.2	59.76±4.3	0.977
Left Swing Phase %	38.38±5.7	39.04±5.2	0.899
Right Swing Phase %	39.98±4.2	40.23±4.3	0.977
Left First Double Support Phase %	10.55±2.7	10.38±3.2	0.976
Right First Double Support Phase %	11.13±3.4	10.31±3.2	0.658
Left Single Support Phase %	39.93±4.2	40.16±4.4	0.981
Right Single Support Phase %	38.37±5.7	39.15±5.3	0.861
Gait Symmetry Index	86.93±12.1	86.77±11.6	0.999

p* post-hoc Tukey

DISCUSSION

According to the results of our study in order to examine the immediate effect of kinesiological taping applied to the tibialis anterior muscle in stroke individuals, we concluded that the immediate effect of kinesiological taping on gait parameters was not statistically significant and we found that kinesiological or sham taping applications did not have superiority to each other. When the literature is examined, studies involving kinesiological tape applications with stroke individuals; It appears to be designed to improve hand functions in the upper extremity, increase muscle activity, reduce shoulder pain and regulate muscle tone, and improve balance in the lower extremity, increase muscle activity and regulate muscle tone (Morris et al., 2013). In the literature, there are studies examining the effect of the kinesiological tape applied on the quadriceps femoris, hamstring and gastrocnemius muscles and around the ankle on spasticity, muscle activity, balance and gait parameters (Michalak et al., 2009; Köseoğlu et al., 2017; Ekiz et al., 2015). Only a limited number of studies have been conducted directly on the stimulation of the tibialis anterior muscle (Kim et al., 2015). Apart from these, it did not contain a single isolated muscle, but also a kinesiological tape study for the ankle joint and many other muscles around it. In the literature, some opinions have been made to explain the role of kinesiological taping in increasing somato-sensory sensation, providing correct proprioceptive input and supporting muscle activity. Garnett et al. suggested the hypothesis that the kinesiological tape acts by increasing interaction between actin and myosin filaments or by increasing muscle activation by skin stimulation (Garnett and Stephens, 1981). Robbins et al. reported that the tape can stabilize the joint or create tension on the skin, thereby increasing proprioception and improving motor functions (Robbins et al., 1995). However, the validity of these views has not been fully proven also these studies have examined healthy muscles rather than spastic muscles. Qafarizadeh et al. conducted a study to examine the immediate and 1-week effect of kinesiological taping

on hand functions and spasticity in stroke individuals and applied the kinesiological tape to the wrist and hand extensor muscles with 50% tension. When the immediate and 1-week effect of the kinesiological tape was evaluated, there was a statistically significant difference in the box and block test and the nine-hole peg test, while there was no statistically significant difference in the flexor muscle spasticity (Qafarizadeh et al., 2018). Koca et al. Investigated the acute period effect of kinesiological taping on hand functions in stroke individuals and applied muscle stimulation technique to the forearm extensor muscle region. As a result of the evaluations, they suggested that the application of kinesiological taping had a positive effect on hand functions and hand grip strength (Koca et al., 2018).

In contrast to these studies (Qafarizadeh et al., 2018; Koca et al., 2018) showing the positive effect of kinesiological taping on upper extremity functions, in our study, kinesiological taping was applied to the lower extremity and it was concluded that it did not affect gait functions positively. Similar to these studies, the immediate effect of kinesiological taping was evaluated by applying muscle stimulation technique. The difference in the results we obtained may be caused by the body weight, which significantly affects the lower extremity, and the inability of the tape to provide sufficient mechanical support. In the studies conducted by Köseoğlu et al. and Kim et al. kinesiological taping was applied around the ankle in combination with the physiotherapy program. As a result, it has been reported that kinesiological taping combined with physiotherapy program is more effective than physiotherapy alone in improving lower extremity functions and gait. In these studies (Köseoğlu et al., 2017; Kim et al., 2012), kinesiological taping applications on the ankle joint and surrounding muscles have been applied to more than one region in order to provide more activation, inhibition and stabilization. It has also been applied for a long time in addition to a physiotherapy program. In our study, the possible immediate functional effect of the kinesiological taping on the tibialis anterior muscle was investigated. These results suggest that short-term kinesiological taping does not have a sufficient functional effect on only one lower extremity muscle and cannot provide sufficient mechanical support to the ankle joint.

Park et al. examined the effect of kinesiological taping on the pressure center of the anterior and posterior leg muscles in their study and stated that the taping application revealed changes in the pressure center (park et al., 2020). No evaluation of pressure changes was made in our study, and it was found that kinesiological taping had no effect on gait parameters. The fact that walking is a dynamic and complex process according to pressure changes suggests that kinesiology taping does not provide sufficient mechanical support during walking.

Szczegielniak et al. Therapeutic kinesiological taping was applied to prevent drop foot during walking in their study to examine the effect of kinesiological taping on walking in patients with acute stroke. The gait of the participants was evaluated before the taping application, 1 hour and 1 day after the taping application with 100 meter walking test. As a result, it was found that taping had a statistically significant effect on walking (Szczegielniak et al., 2012). In this study in the literature, taping was applied to many regions around the ankle. In our study, isolated taping was applied to the tibialis anterior and gait parameters were evaluated using a device that collects objective data such as the BTS G-Walk. In the study conducted by Shin et al. With 15 stroke individuals, gait parameters were evaluated with the GAITRite System by eversion taping on the ankle, placebo taping and without taping. Eversion taping was applied by mechanical correction in ankle dorsiflexion and eversion. According to the measurement results, an improvement was observed in gait parameters with ankle eversion taping applied to patients with chronic stroke (Shin et al., 2019). In our study, unlike this study in the literature, kinesiological taping application was applied not to the ankle joint but to the tibialis anterior muscle by muscle stimulation technique, and its immediate effect on gait parameters was not found to be significant. In addition, kinesiological and sham taping were not superior to each other in immediate effect on gait parameters. Shin et al used kinesiological tape in placebo (sham) taping in their study. In our study, a sticking plaster was used as a placebo (sham) tape. As a result, there is a difference

between these two studies in terms of the taping technique and the tape type used in placebo (sham) control, and it can be thought that these situations are effective in the different results of the studies. In addition, in our study, a 1 week (7 days) time difference was added between gait assessments following the taping practices in order to exclude the learning effect of the participants and to ensure the effect of both tapes used. In the study of Shin et al., There is a 10-minute time difference between the evaluations after both taping. It can be thought that this situation may affect the results of the studies. In most studies in stroke individuals, it was mentioned that combined kinesiological taping with 4-6 week physiotherapy programs may be effective on functional parameters, muscle activity, walking and balance (Köseoğlu et al., 2017; Kim et al., 2012). We planned our study to examine how kinesiological taping can affect function in a pure manner. In these studies, it is not clear whether the positive effect during the rehabilitation program was caused by taping or the rehabilitation process. In our study, we reached the conclusion that the use of kinesiological taping in this way is not effective on function. Possible effects of different taping preferences on functional support in patients with stroke should be examined with strong studies.

Kinesiological taping is popularly used to enhance and support function. However, there is not enough evidence for this. In addition, its use with physical therapy applications makes it difficult to determine its effect. We thought that the effect of kinesiological taping without the use of any treatment method could give more objective data.

CONCLUSION

There are very few studies in the literature on the effects of kinesiological taping in neurological patients. Studies are also related to upper extremity function. The studies carried out include applications for 4-6 weeks together with the physiotherapy program. In this process, treatment-related improvement or the effect of kinesiological tape is not clear. We believe that kinesiological taping is not sufficient, especially in dysfunctions related to spasticity. Therefore, more studies are needed to determine the effectiveness of the kinesiological tape on gait parameters, especially in stroke individuals.

Strengths of Study

The fact that it is one of the few studies in the literature that examines the immediate effectiveness of the kinesiological tape in stroke individuals, is the use of the computerized objective method, BTS G-Walk, which provides numerical and graphical data by performing spatial and temporal analysis of gait rather than clinical and questionnaire tests, and planned as a double-blind study. The weaknesses of our study; The patients with stroke included are heterogeneous and it is a single center study.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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Relationship Between Nursing Students Innovativeness Characteristics and Online Learning Systems Acceptance

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ABSTRACT:
Purpose: This study was aimed to determine the relationship between undergraduate nursing student's individual innovativeness characteristics and technology acceptance during emergency distance learning due to COVID-19 pandemic.
Methods: The cross-sectional study was conducted with 350 nursing students. Personal information form, individual innovativeness scale (IIS), and online learning systems acceptance scale (OLSAS) were used for data collection. The independent samples t-test, One-way ANOVA, Duncan test, Pearson's correlation analysis was used for data analysis.
Results: Most of the nursing students were at a traditionalist and late majority innovativeness characteristic level. Perceived ease of use, perceived usefulness sub-dimensions, and total OLSAS mean scores were 9.67 ± 3.21, 16.26 ± 6.92, and 25.92 ± 9.26, respectively. A statistically significant, weak positive correlation was found between the total IIS, opinion leadership, and risk-taking scores and the total OLSAS, OLSAS-PEU, and OLSAS-PU scores. Students with high OLSAS, perceived ease of use, and perceived usefulness scores expressed positive opinions toward the lesson in all dimensions, such as interest, adaptation, success, perceived benefit from the lesson, and motivation.
Conclusion: It can be said that technology acceptance is important in nursing education and as the perceived ease of use and perceived usefulness increases, a positive effect is seen on outcomes, such as interest, adaptation, motivation and success. When designing online learning systems to be used in nursing education, recommended to take into account innovativeness, the perceived usefulness, ease of use.
Keywords: *Distance education, Innovativeness, Nursing students*

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INTRODUCTION

In line with the measures undertaken during the COVID-19 pandemic, which has affected the whole world in recent years, institutions providing higher education aimed to slow the spread of the virus and help provide a safe learning environment for students. Therefore, face-to-face education was suspended throughout the world (Seven and Abban, 2021; Aguilera-Hermida et al., 2021). In this process, the American Association of Colleges of Nursing (AACN) remained committed to ensuring the safety of faculty and students, but also recognized the importance of continuity of teaching and learning throughout the pandemic (AACN, 2020). Due to the duration of the pandemic being unpredictable, most educational institutions switched over to emergency distance learning through online learning platforms (Ho et al., 2021). Similarly, in Turkey, after the first COVID-19 case was reported, one of the most important measures taken by the Ministry of Education and Higher Education Institutions was to suspend face-to-face education. The training continued with distance education (Telli Yamamoto and Altun, 2020). The COVID-19 pandemic prompted

nursing programs to transfer traditional didactic content synchronously and asynchronously using alternative platforms such as learning management systems (Dewart et al., 2020; Wallace et al., 2021). Online learning management systems used in online learning are software that is developed for the execution, documentation, monitoring, reporting, and automation of the lessons and are important components of distance education (Seven and Abban, 2021). Today, higher education institutions and students were required to quickly adopt distance education and learning methods without any other options due to the COVID-19 pandemic (Hodges et al., 2020; Affouneh et al., 2020; Aguilera-Hermida, 2020; Daniel, 2020). Although these practices have been used in higher education for many years, using an online learning system is a new experience for Turkish nursing educators and students (Seven and Abban, 2021).

Successful transition to online learning is influenced by the user's intention, the usefulness of technology, and the user's adoption of technology to a large extent (Kemp et al., 2019; Yakubu and Dasuki, 2019; Tarhini et al., 2017). According to Davis's technology acceptance model perceived usefulness and perceived ease of use are two important components. The degree to which the person believes that using the particular system would enhance her/his job performance is determined by perceived usefulness, whereas the perceived ease of use was defined as the degree to which the person believes that using the particular system would be free of effort (Marangunić and Granić, 2015). The previous studies have addressed issues related to the adoption of technology and results indicated that there are several effective factors in this regard, such as quality, trust, knowledge sharing, self-efficacy, anxiety etc. (Salloum et al., 2019; Al-Gahtani, 2016; Almaiah et al., 2016). Recently, some studies attention has been drawn to personality as an explanatory factor in the field of information systems (Kim et al., 2021; Li et al., 2006; Turan et al., 2015). Accordingly, it is thought that the innovativeness of individuals may be effective in adapting to rapidly changing scientific and technological developments (Kim et al., 2021, Gündüz, 2021). Rogers divided individuals into five groups as innovative, pioneering, questioning, skeptical, and traditionalist individuals according to their acceptance of innovation (Rogers, 1983). According to this categorization, innovators can be defined as individuals with entrepreneurial and creative skills who like to try new ideas and take risks, think ahead, accept change before anyone else, interact with their environment (Akgün, 2017; Korucu and Olpak, 2015). Although studies on transition to emergency distance education can be found in the literature (Aguilera-Hermida et al., 2021; Ho, et al., 2021). There is a gap in studies in the relevant literature that evaluate nursing students' individual innovativeness characteristics and technology acceptance.

MATERIAL and METHODS

Purpose and Type of the Study

This research was conducted in the 2019-2020 academic year as a cross-sectional study.

Sampling and Participant

The population of the research comprised 450 nursing students studying in a Faculty of Health Sciences in the Central Anatolia Region. The faculty where the research was conducted was using the formal education system; however, face-to-face education was suspended due to the Covid-19 pandemic; therefore, theoretical and practical nursing lessons were taught using distance education and online learning systems in the relevant semester. The sample of the study comprised 350 nursing students who agreed to participate in the study and continued their education during the pandemic, 77.7% of the population was included in the sample.

Data Collection Tools

Due to the COVID-19 pandemic measures, the study was conducted using an online survey. In the first part of the online form prepared, the purpose of the study was explained and informed consent was obtained with a confirmation check box stating that the participant was approved to participate in the study. Data collection tools used in the study were as follows:

Personal Information Form

The form was prepared by the researchers considering relevant literature, questioning the sociodemographic characteristics of the participants and their views on online learning (Çetintaş Öner et al., 2018; Keskin Kızıltepe and Kurtgöz, 2020; Keskin and Özer Kaya, 2020; Tarhan and Doğan, 2018). Before data collection, a pilot study was conducted. The participants of the pilot study were not included in the main study, and no changes were necessary as the form was considered appropriate for the study purpose.

Individual Innovativeness Scale (IIS)

The scale was developed by Hurt et al. (1977) and its validity and reliability study on nurses was conducted by Sarıoğlu Kemer and Altuntaş (2017). IIS is a 5-point Likert type scale and consists of 3 sub-dimensions and 18 items: resistance to change, opinion leadership, and risk taking. In the scale, 11 items are positive (1, 2, 3, 4, 7, 8, 10, 11, 14, 16, 17) and 7 items are negative (18, 15, 13, 12, 9, 6, 5). Negative items are scored in reverse. In the scale, sub-dimension and total scores are obtained by summing the scores from each item. A minimum of 18 and a maximum of 90 points can be obtained from the scale. A score below 57 indicates that the person is a traditionalist/laggards, a score of 58–65 points indicates that the person who has skeptical or timid attitudes towards innovation is a late majority, a score of 66–74 points indicates that the person is a early majority, a score of 75–82 points indicates that the person who act as pioneers for innovation is a early adopters, and a score of over 82 points indicates that the person is an innovator. The Cronbach's alpha value of the scale was found to be 0.82 for the overall scale, and between 0.72 and 0.80 for the sub-dimensions (Sarıoğlu Kemer and Altuntaş, 2017). In the present study, the Cronbach's α coefficient for the opinion leadership dimension of the scale was 0.88, resistance to change was 0.79, risk taking 0.84, and the Cronbach's α coefficient for the overall scale was 0.80.

Online Learning Systems Acceptance Scale (OLSAS)

OLSAS was developed by Ilgaz (2008) based on the scale prepared by Davis (1989) for technology acceptance. OLSAS is a 7-point Likert type scale and consists of 6 items in total and has two factors: perceived ease of use (OLSAS-PEU) and perceived usefulness (OLSAS-PU). The Cronbach alpha coefficient of the scale was found to be 0.89. On the basis of factor scores, the Cronbach α coefficient was found to be 0.90 for PEU and 0.93 for PU (Ilgaz, 2008). In the present study, the Cronbach α coefficient was found to be 0.89 for PEU subscale, 0.95 for PU subscale, and 0.92 for the overall scale.

Statistical Analysis

The data were analyzed using the IBM SPSS Statistics Standard Concurrent User V 26 (IBM Corp., Armonk, New York, USA) statistical package program. Number (n), percentage (%), and mean ± standard deviation ($\bar{x} \pm sd$) values were used in the evaluation of descriptive data. The internal consistency of the scales was evaluated with the Cronbach alpha coefficient. The compatibility of scale scores to normal distribution was evaluated with the Shapiro–Wilk normality test and Q-Q graphs. Levene test was used for evaluating the Homogeneity of variances. Since the scale scores showed normal distribution, independent samples t-test was used to compare two groups, and One-way Anova was used to compare three or more groups. Duncan test was used as multiple comparison test in one-way analysis of variance. Comparisons between scales were made using Pearson's correlation analysis and partial correlation analysis. The significance level was accepted as $p<0.05$.

Ethical Approval

The relevant institutional and ethics committee (Decision no: 2017-KAEK-189_2020.06.23_06) approvals were obtained.

RESULTS

In Table 1, %26.5 of the students were in the first grade. Of the nursing students, 48.6% were between the ages of 21–23, 80% were girls, %96.9 of students were single and 48.9% lived in the city center. In this sample, 78.0% of the nursing students attended online lessons mostly via mobile phone. The technological application used in online learning reduced 42.6% of nursing students' interest in

lessons, reduced 52.0% of the nursing students' adaptation to lessons, and did not affect the academic achievement of 42.6% of nursing students. It was determined that 61.4% of the students did not find the theoretical and practical nursing lessons given online to be beneficial, and 45.7% of them stated that giving nursing lessons online reduced their motivation.

Table 1. Nursing students' introductory characteristics and views on online learning

Features	Number (n)	Percentage (%)
Class		
1. class	93	26.5
2. class	79	22.6
3. class	92	26.3
4. class	86	24.6
Age		
18-20 age	145	41.4
21-23 age	170	48.6
24 and above	35	10.0
Gender		
Female	280	80.0
Male	70	20.0
Marital status		
Married	11	3.1
Single	339	96.9
Place of residence		
Province	171	48.9
District	119	34.0
Village	60	17.1
Device mostly used to attend online classes		
Laptop/desktop/tablet computer	77	22.0
Mobile phones	273	78.0
The effect of the technological application used in online learning on the interest in the lessons		
Increased	53	15.1
Hasn't Changed	148	42.3
Reduced	149	42.6
Influencing the adaptation of the technological application used in online learning to the lessons		
Increased	61	17.4
Hasn't Changed	107	30.6
Reduced	182	52.0
The effect of the technological application used in online learning on the success of the lessons		
Increased	104	29.7
Hasn't Changed	149	42.6
Reduced	97	27.7
Whether you find it useful to offer nursing lessons online		
Yes	135	38.6
No	215	61.4
The effect of online teaching of nursing lessons on motivation		
Increased	67	19.2
Hasn't Changed	123	35.1
Reduced	160	45.7

Table 2 shows nursing students' Innovativesness type, average scores of IIS, and OLSAS sub-dimensions and total scores. According to IIS scores, 39.4% of the nursing students were in the traditionalist group and 38.3% were in the late majority group. Opinion leadership, resistance to change, risk taking, and total IIS mean scores were 25.34 ± 5.77, 18.18 ± 5.34, 15.87 ± 3.38, and 59.39 ± 9.48, respectively. The OLSAS-PEU, PU sub-dimensions, and total OLSAS mean scores of the students were 9.67 ± 3.21, 16.26 ± 6.92, and 25.92 ± 9.26, respectively.

Table 2. Nursing students' Innovativesness type, average scores of IIS, and OLSAS sub-dimensions and total scores

Innovativesness type	**n**	**%**
Traditionalist/Laggards	138	39.4
Late majority	134	38.3
Early majority	65	18.6
Early adopters	8	2.3
Innovators	5	1.4
Total score	350	100
IIS subscale and total scores	$\bar{x} \pm sd$	***M (Min-max)***
Opinion leadership	25.34±5.77	26(7-35)
Resistance to change	18.18±5.34	18(7-35)
Risk taking	15.87±3.38	16(4-20)
IIS total score	59.39±9.48	60(18-90)
OLSAS subscale and total scores	$\bar{x} \pm sd$	***M (Min-max)***
Perceived ease of use-PEU	9.67±3.21	10(2-14)
Perceived usefulness-PU	16.26±6.92	16(4-28)
OLSAS total score	25.92±9.26	26(6-42)

ISS: Individual Innovativeness Scale OLSAS: Online Learning Systems Acceptance Scale
$\bar{x} \pm sd$: mean ± standard deviation M: median, min: minimum, max: maximum

Table 3. Comparison of the scale scores of nursing students according to their introductory characteristics

Variables	**Individual Innovativeness Scale**				**Online Learning Systems Acceptance Scale**		
	Total Score $\bar{x}$±*sd*	Opinion Leadership $\bar{x}$±*sd*	Resistance to Change $\bar{x}$±*sd*	Risk Taking $\bar{x}$±*sd*	Total Score $\bar{x}$±*sd*	Perceived Ease of Use $\bar{x}$±*sd*	Perceived Usefulness $\bar{x}$±*sd*
Class level							
1. class	58.94±7.92	24.27±4.31	19.32±4.38^{a}	15.34±2.92	24.39±7.86^{a}	9.25±2.75	15.13±5.78^{a}
2. class	60.33±8.47	25.83±5.21	18.14±5.07^{ab}	16.35±3.05	26.61±9.04^{ab}	10.05±3.19	16.55±6.91^{ab}
3. class	60.11±9.98	25.74±6.29	18.27±6.11^{ab}	16.09±3.37	28.17±9.96^{b}	9.96±3.25	18.21±7.47^{b}
4. class	58.23±11.22	25.60±6.87	16.87±5.44^{b}	15.75±4.04	24.53±9.64^{a}	9.43±3.60	15.10±7.08^{a}
Test statistics	*F*=0.929 *p*=0.427	*F*=1.456 *p*=0.226	*F*=3.207 *p*=**0.023**	*F*=1.469 *p*=0.223	*F*=3.519 *p*=**0.015**	*F*=1.304 *p*=0.273	*F*=4.193 *p*=**0.006**
Age							
18-20	59.33±7.63	25.13±4.68	18.22±4.79	15.97±2.83	25.91±8.80	9.78±3.03	16.12±6.60
21-23	60.12±9.96	25.67±6.05	18.48±5.67	15.97±3.54	25.89±9.39	9.59±3.22	16.30±7.08
24 and above	56.02±12.99	24.60±8.07	16.51±5.66	14.91±4.42	26.11±10.60	9.51±3.94	16.60±7.62
Test statistics	*F*=2.746 *p*=0.066	*F*=0.662 *p*=0.517	*F*=1.989 *p*=0.138	*F*=1.564 *p*=0.211	*F*=0.008 *p*=0.992	*F*=0.182 *p*=0.834	*F*=0.073 *p*=0.930
Gender							
Female	59.70±8.74	25.68±5.38	17.95±5.27	16.06±3.12	25.36±9.10	9.43±3.16	15.92±6.85
Male	58.12±11.99	23.97±6.98	19.07±5.58	15.08±4.17	28.17±9.57	10.57±3.27	17.60±7.07
Test statistics	*t*=1.032 *p*=0.305	*t*=1.913 *p*=0.059	*t*=1.569 *p*=0.117	*t*=1.844 *p*=0.069	*t*=2.286 *p*=**0.023**	*t*=2.659 *p*=**0.008**	*t*=1.820 *p*=0.070
Marital status							
Married	50.81±12.02	18.55±5.52	20.09±4.70	12.18±3.94	28.36±7.84	9.72±2.65	18.63±6.08
Single	59.67±9.27	25.56±5.64	18.12±5.36	15.99±3.29	25.84±9.29	9.66±3.23	16.17±6.94
Test statistics	*t*=3.083 *p*=**0.002**	*t*=4.058 *p*<**0.001**	*t*=1.208 *p*=0.228	*t*=3.747 *p*<**0.001**	*t*=0.888 *p*=0.375	*t*=0.064 *p*=0.949	*t*=1.158 *p*=0.247
Place of residence							
Province	59.06±9.16	25.33±5.86	17.76±5.35	15.96±3.46	26.40±9.47	9.93±3.11	16.47±7.31
District	59.01±9.93	25.02±5.71	18.36±5.34	15.63±3.31	26.06±8.35	9.71±3.11	16.34±6.16
Village	61.06±9.45	25.98±5.63	19.00±5.30	16.08±3.31	24.27±10.26	8.82±3.59	15.45±7.27
Test statistics	*F*=1.135 *p*=0.323	*F*=0.550 *p*=0.578	*F*=1.306 *p*=0.272	*F*=0.485 *p*=0.616	*F*=1.211 *p*=0.299	*F*=2.710 *p*=0.068	*F*=0.504 *p*=0.605

The superscripts a, b indicate the difference between categories. Categories with the same letters are statistically similar.

Table 4. Comparison of scale scores according to nursing students' views on online learning

Variables	Individual Innovativeness Scale				Online Learning Systems Acceptance Scale		
	Total Score $\bar{x}\pm sd$	Opinion Leadership $\bar{x}\pm sd$	Resistance to Change $\bar{x}\pm sd$	Risk Taking $\bar{x}\pm sd$	Total Score $\bar{x}\pm sd$	Perceived Ease of Use $\bar{x}\pm sd$	Perceived Usefulness $\bar{x}\pm sd$
Device mostly used to attend online classes							
Laptop/desktop/tablet	58.16±8.11	25.21±5.69	16.89±4.41	16.05±3.35	28.49±8.34	10.80±2.38	17.68±6.80
Mobile phones	59.74±9.82	25.37±5.79	18.53±5.53	15.82±3.39	25.19±9.38	9.34±3.34	15.85±6.91
Test statistics	*t*=1.293	*t*=0.228	*t*=2.399	*t*=0.530	*t*=2.786	*t*=4.311	*t*=2.063
	p=0.197	*p*=0.820	*p*=**0.017**	*p*=0.596	*p*=**0.006**	*p*<**0.001**	*p*=**0.040**
The effect of the technological application used in online learning on the interest in the lessons							
Increased	62.39±9.51^a	27.18±6.51^a	18.01±5.62	17.18±2.95^a	34.81±7.12^a	11.66±2.82^a	23.15±4.94^a
Hasn't Changed	58.54±7.89^b	24.80±4.95^b	17.95±4.80	15.79±2.93^b	28.61±6.34^b	10.31±2.26^b	18.29±4.85^b
Reduced	59.15±10.69^b	25.21±6.13^b	18.45±5.75	15.48±3.81^b	20.09±8.63^c	8.31±3.58^c	11.78±6.31^c
Test statistics	*F*=3.338	*F*=3.446	*F*=0.356	*F*=5.171	*F*=91.399	*F*=31.101	*F*=99.785
	p=**0.037**	*p*=**0.033**	*p*=0.701	*p*=**0.006**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
Influencing the adaptation of the technological application used in online learning to the lessons							
Increased	61.47±9.57	26.63±6.32	18.16±5.63	16.67±3.14	34.51±7.09^a	11.66±2.56^a	22.85±5.02^a
Hasn't Changed	58.28±8.51	24.66±5.37	17.74±4.90	15.87±3.08	29.08±6.88^b	10.28±2.69^b	18.80±5.14^b
Reduced	59.34±9.92	25.30±5.75	18.43±5.49	15.59±3.58	21.18±8.21^c	8.64±3.29^c	12.54±6.02^c
Test statistics	*F*=2.224	*F*=2.306	*F*=0.579	*F*=2.321	*F*=82.648	*F*=26.288	*F*=93.228
	p=0.110	*p*=0.101	*p*=0.561	*p*=0.100	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
The effect of the technological application used in online learning on the success of the lessons							
Increased	60.42±8.51	25.83±5.81	18.39±4.75	16.19±3.19^a	32.01±7.56^a	11.21±2.62^a	20.79±5.52^a
Hasn't Changed	59.67±7.98	25.75±5.09	17.74±5.13	16.18±2.84^a	25.92±8.16^b	9.58±2.95^b	16.34±6.15^b
Reduced	57.83±12.12	24.17±6.52	18.61±6.19	15.05±4.13^b	19.39±7.99^c	8.13±3.43^c	11.25±5.96^c
Test statistics	*F*=2.001	*F*=2.772	*F*=0.889	*F*=4.016	*F*=63.275	*F*=26.455	*F*=65.179
	p=0.137	*p*=0.064	*p*=0.412	*p*=**0.019**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
Whether you find it useful to offer nursing lessons online							
Yes	60.38±8.39	26.04±5.72	17.85±5.03	16.48±2.88	32.61±6.53	11.17±2.50	21.44±4.60
No	58.76±10.07	24.89±5.76	18.37±5.53	15.48±3.61	21.72±8.18	8.72±3.26	13.00±6.11
Test statistics	*t*=1.561	*t*=1.817	*t*=0.882	*t*=2.700	*t*=13.746	*t*=7.918	*t*=14.692
	p=0.119	*p*=0.070	*p*=0.378	*p*=**0.007**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**
The effect of online teaching of nursing lessons on motivation							
Increased	62.10±8.90^a	28.86±5.73^a	18.52±5.64	16.71±2.84^a	34.21±6.94^a	11.41±2.73^a	22.79±4.98^a
Hasn't Changed	58.39±7.59^b	24.73±5.47^b	17.77±4.66	15.88±2.92$^{a\ b}$	28.42±6.48^b	10.26±2.32^b	18.14±4.80^b
Reduced	59.01±10.77^b	25.16±5.92^b	18.34±5.70	15.61±3.84^b	20.54±8.53^c	8.47±3.52^c	12.06±6.23^c
Test statistics	*F*=3.604	*F*=3.139	*F*=0.569	*F*=3.064	*F*=87.237	*F*=26.616	*F*=99.676
	p=**0.028**	*p*=**0.045**	*p*=0.566	*p*=**0.048**	*p*<**0.001**	*p*<**0.001**	*p*<**0.001**

The *superscripts a, b,c indicate the difference between categories. Categories with the same letters are statistically similar.*

Table 5. The relationship between nursing students' ındividual ınnovatioveness characteristics and acceptance of online learning systems

Individual Innovativeness Scale	Online Learning Systems Acceptance Scale		
Subscales	Total Score	Perceived Ease of Use	Perceived Usefulness
Total score	*r*=0.215; *p*<0.001	*r*=0.197; *p*<0.001	*r*=0.196; *p*<0.001
Opinion leadership	*r*=0.243; *p*<0.001	*r*=0.300; *p*<0.001	*r*=0.185; *p*<0.001
Resistance to change	*r*=-0.064; *p*=0.230	*r*=-0.198; *p*<0.001	*r*=0.006; *p*=0.915
Risk taking	*r*=0.290; *p*<0.001	*r*=0.353; *p*<0.001	*r*=0.223; *p*<0.001

In table 3 provides comparison the scale scores of nursing students according to their introductory characteristics. When the IIS and OLSAS scores were compared according to the introductory characteristics of nursing students, resistance to change scores of the first-grade students were significantly higher than the fourth graders. The total OLSAS and OLSAS-PU scores of the third-year students were significantly higher than those of the first- and fourth-year students. The total and subscale scores of IIS and OLSAS showed a similar distribution according to age groups. The total OLSAS and OLSAS-PEU scores of male students were statistically higher than female students (p= 0.023; p= 0.008). The IIS total score, opinion leadership, and risk-taking scores of single students were significantly higher (p= 0.002; p<0.001; p<0.001). The ISS and OLSAS total score and subscale scores showed statistically similar distribution according to place of residence.

In table 4, while the IIS resistance to change scores of those who used mobile phones to attend classes in online learning were significantly higher than those who used other devices (p= 0.017); the total OLSAS, OLSAS-PEU, and OLSAS-PU scores were statistically lower as compared to those using other devices (p= 0.006; p<0.001; p= 0.040). IIS total, opinion leadership, and risk-taking scores of the students who stated that the technological application used increased their interest in the lessons were higher than the students who stated that the technological application did not affect or decrease their interest in the lessons (p=0.037; p=0.033; p=0.006).

The mean scores for OLSAS total, OLSAS-PEU, and OLSAS-PU differed statistically in all categories (p<0.001). While the mean OLSAS score was the highest in the group that reported increased interest in the lesson, it was the lowest in those who reported decreased interest. According to the answers given to the technological application used in online learning affecting the adaptation to the lessons, the IIS scores showed a statistically similar distribution (p>0.05).

However, OLSAS scores were the highest for those who reported increased adaptation to the lesson and were lowest for those who reported decreased adaptation to the lesson (p<0.001). The risk-taking scores of the students who stated that technological application reduced their success in the lessons were significantly lower than the students who stated that it increased their success or did not affect it (p=0.019). The OLSAS scores were the highest for those who reported increased success and the lowest for those who reported decreased success (p<0.001). Those who found online learning useful in nursing education had significantly higher risk taking (p=0.007), total OLSAS, OLSAS-PEU, and OLSAS-PU scores compared to those who did not find it useful (p<0.001). Students who reported that online nursing education increased their motivation had higher total IIS scores, opinion leadership, and risk-taking scores compared to those who reported decreased motivation (p=0.028; p=0.045; p=0.048). While the total OLSAS, OLSAS-PEU, and OLSAS-PU scores were higher in students with increased motivation, students who reported decreased motivation had the lowest scores (p<0.001) (Table 4).

In Table 5, a statistically significant, weak positive correlation was found between the total IIS, opinion leadership, and risk-taking scores and the total OLSAS, OLSAS-PEU, and OLSAS-PU scores. A weak negative correlation was found between the IIS resistance to change scores and the OLSAS-PEU scores (r= −0.198; p<0.001). The correlation coefficients between the IIS resistance to change scores and the OLSAS total and OLSAS-PU scores were not statistically significant (p> 0.05).

DISCUSSION

This research was conducted to determine the relationship between nursing students' individual innovativeness characteristics and online learning systems acceptance. In this study, more than three-quarters of the nursing students used mobile phones to participate in online classes (Table 1). In the study of Keskin Kızıltepe and Kurtgöz, it was determined that 57.1% of nursing students had access to online classes by computer and 41.9% by smart phone during distance education (Keskin Kızıltepe and Kurtgöz, 2020). The technological application used in online learning decreased the interest of approximately half of the nursing students in the

lessons, decreased the adaptation of more than half of the students to the lessons, and did not affect the academic success of approximately half of the students in this study (Table 1). Keskin Kızıltepe and Kurtgöz found nursing students had difficulties in following the lessons and participating in the lessons, understanding and learning the theoretical and practical aspects of the lesson, and felt inadequate in clinical practice (Keskin Kızıltepe and Kurtgöz, 2020). More than half of the students reported that they did not find online theoretical and applied nursing lessons to be useful and nearly half of the students online lessons decreased their motivation in this study (Table 1). This may be because students started using online learning systems with no preparation due to the Covid-19 pandemic. As a matter of fact, in their research on digital transformation in education and students' readiness for online learning, Sarıtaş and Barutçu found that students felt inadequate in terms of online learning control (Sarıtaş and Barutçu, 2020). Another reason why students do not find online learning useful in nursing may be due to the thought that online learning would not be sufficient to provide them with competence because it is a practice-based profession. Kahyaoğlu Süt and Küçükkaya stated that 87.5% of the students did not approve distance education in nursing, 79.8% thought that it is not possible to provide all programs in nursing with distance education, and 83.5% thought that online education will cause deficiencies in laboratory and clinical practices that have an important place in a practice-oriented profession, such as nursing (Kahyaoğlu Süt and Küçükkaya, 2016). Özbay and Çınar, stated that nursing students think that distance education is insufficient to provide practice-based competencies in nursing and may cause deficiencies in laboratory and clinical practices, which are crucial nursing (Özbay and Çınar, 2020). In another study, most of the students did not find web-based distance education as effective as face-to-face education, and the contribution of web-based distance education to students' theoretical knowledge level was higher than its contribution toward practical skills (Keskin and Özer Kaya, 2020). More than half of the nursing students were in the traditionalist and late majority group according to their IIS scores (Table 2).

Looking at other studies evaluating nursing students' individual innovativeness characteristics; Ertuğ and Kaya, found that students had low level of innovativeness and most of them were in early majority category; Bodur, found that students had low level of innovativeness, were highly in early majority, and were early adopters; Zengin et al., found that students were in early majority characteristic; and Özen et al., on the other hand, found that 41.1% of nursing students were early adopters and 40.3% were early majority (Ertuğ and Kaya, 2017; Bodur, 2018; Zengin et al., 2019; Özen et al., 2020). Similar to the present research, Erol et al., found that the majority of nursing students were late majority and traditionalists and Tarhan and Doğan, found that one-third fell in the late majority innovator category (Erol et al., 2018; Tarhan and Doğan, 2018). In the present study, the resistance to change scores of the nursing students differed according to their grade, and the first-year students' resistance to change scores were significantly higher than the fourth graders. One aspect of human behavior which seems to be critical for technology acceptance is resistance to change. Contrary to the findings of the present study, in Utli and Vural Doğru's research, no difference was found between the IIS scores of nursing and midwifery students with respect to their grades (Utli and Vural Doğru, 2018). Similarly, Durmuş İskender et al., found that there was no difference between the IIS scores of nursing students with respect to their grades (Durmuş İskender et al., 2018). It was found that OLSAS total and OLSAS-PU scores were higher in the third grade than in the first and fourth grades (Table 3). The reason for this may be that the first graders have not taken the technology-related lessons yet and most of the lessons of the last year curriculum are applied vocational courses.

In the present study, no difference was found between IIS sub-dimension scores according to gender (Table 3). In the study of Sis Çelik et al., examining nurses' individual innovativeness characteristics and influencing factors according to their gender roles, it was determined that those in feminine roles were traditionalists toward innovations (Sis Çelik et al., 2020). In the present

study, the total OLSAS and OLSAS-PEU scores were significantly higher in males than in females. In line with stereotypes emerging within the framework of traditional gendered division of labor, these scores are likely to be higher for boys, as girls tend to use technological devices less. While the IIS resistance to change scores of those who used mobile phones to attend classes in online learning were significantly higher than those who used other devices; the OLSAS total, OLSAS-PEU, and PU scores were significantly lower than those using other devices (Table 4). Although the widespread use of distance education supported with information technologies provides important opportunities, such as equal opportunity in education and the elimination of time and space limitations, the difference between learners' access to technology due to socioeconomic differences in society is still an important problem (Sezgin and Fırat, 2020). Although more technologically equipped smart mobile phones are used today, it can be said that trying to follow lessons from small screens has negative consequences in terms of PEU and PU in online learning.

The students who stated that the technological application used in online education increased their interest in the lessons had statistically higher IIS total scores, opinion leadership, and risk-taking scores. This can be interpreted as those who take risks in using new technologies and who are open to new ideas are more interested in online lessons. Similarly, OLSAS total scores, PEU, and PU scores were higher in those who answered that online learning systems increased their interest in the lesson. This finding was interpreted as the fact that the systems used in online learning were user friendly and useful in contrast to complex systems that require effort to learn, and interest in the lesson is also important (Table 4). The IIS scores showed a statistically similar distribution according to the effect of the technological application used in online learning on the adaptation to the lessons ($p > 0.05$). While the OLSAS scores were highest in all categories for students who reported “increased adaptation”, they were lowest in those who reported “decreased adaptation” (Table 4). The COVID-19 pandemic caused an urgent transition from face-to-face education to distance education. This resulted in the rapid introduction of online learning systems in students' lives. Online methods require not only a high level of self-directed learning in terms of students' volition and skills but also a high level of readiness for technological capacity of digital learning platforms (Kim et al., 2021; UNESCO, 2020). In this context, the high adaptation of students with high technology acceptance to online lessons reveals the importance of PEU and PU.

The risk-taking scores of the students who stated that the technological application used in online learning decreased their academic success was significantly lower than the students who stated that it increased or did not affect their academic success. OLSAS scores differed significantly in all categories. While the OLSAS scores were highest for those who reported “increased success”, they were lowest for those who reported “decreased success” (Table 4). In the present scenario, within the distance education model, educational activities are performed through online learning environments. The effective ability of the teaching staff to teach and the students to learn in the online learning environments is directly related to the usefulness of these platforms. Crowther et al., have determined that problems arising due to the usability of the website/platforms used in education can affect academic success (Crowther et al., 2004). This finding can be interpreted as risk taking for trying a new application as well as accepting online learning systems is related to academic success. The IIS total, opinion leadership, and risk-taking scores were higher for students who reported that online nursing classes increased their motivation. The OLSAS total, PEU, and PU scores differed significantly in all categories. While the students with increased motivation had the highest scores, students with decreased motivation had the lowest scores (Table 4). Motivation includes the student's intrinsic motivation to learn, the inherent satisfaction of the activity, and the intention to reach a goal. Motivated students participate in self-regulated activities that help them reach their targets (Kemp et al., 2019). Similarly, Geng et al., found that technology readiness positively influenced learning motivation during blended learning in higher education (Geng et al., 2019).

A weak positive correlation was found between nursing students' total IIS score, opinion leadership, risk-taking scores and OLSAS total, PEU, and PU scores (Table 5). This can be interpreted as the students who are open to new ideas and take risks in using new applications can adopt new technology more easily and PEU and PU are higher for these people. Kim et al., found that innovativeness had no moderate effect between attitude and perceived ease of use and perceived usefulness. They found that user innovation regulates the relationship between subjective norms and behavioral intention (Kim et al., 2021). In the present study, PEU increased as the resistance to change decreased. In this context, it is thought that the innovative characteristics of the students in this study are important in technology acceptance.

CONCLUSION

In the present study, the individual innovativeness characteristics of most of the nursing students were at a traditionalist and late majority level. Perceived ease of use and perceived usefulness in online learning were moderate. Students with high mean scores on the opinion leadership sub-dimension of the IIS stated that the online learning systems used in nursing education increased their interest and motivation in the lesson. Students with high scores on the risk-taking sub-dimension of IIS stated that their interest and motivation for the lesson and academic success increased and they found online nursing lessons useful. Students with high OLSAS, perceived ease of use, and perceived usefulness scores expressed positive opinions toward the lesson in all dimensions, such as interest, adaptation, success, perceived benefit from the lesson, and motivation. A weak positive correlation was found between the IIS opinion leadership and risk-taking scores and the OLSAS total, OLSAS-PEU, and PU scores. As the perceived ease of use increased, the resistance to change decreased.

In this respect, it can be said that individuals' acentence of technology is higher for people who are open to new ideas and take risks. It can be said that technology acceptance is important in nursing education and as the perceived ease of use and perceived usefulness increases, a positive effect is seen on outcomes, such as interest, adaptation, motivation and success. Distance education practices in nursing education should be innovative, evidence-based, and at the same time student-centered and accessible to all. The results of this study can be used for designing online learning systems to be used in nursing education, taking into account the perceived usefulness and ease of use dimensions. Similarly, it is recommended to contribute to the development of innovativeness in students with innovative systems that will increase the number of people who not dread making mistakes, are courageous, have confidence, do not hesitate to ask questions, have the ability to dream, know the value of being different, and are successful in creating new concepts.

Conflict of Interest

The authors report no actual or potential conflicts of interest.

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Determination of Genetic Diversity and Similarity Among Methicillin Resistant *Staphylococcus aureus* strains by RAPD-PCR

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ABSTRACT:
Purpose: RAPD PCR is a method used to determine genetic relatedness between bacteria. In this method, PCR is performed using a small amount of DNA and randomly selected primers at low annealing temperature. The aim of this study was to determine the genetic diversity and genetic similarity of Methicillin Resistant *Staphylococcus aureus* (MRSA) strains isolated from clinical samples.
Material and Methods: Thirty-two MRSA strains were identified by conventional methods. Methicillin resistance of strains were determined by PCR using the *mec*A gene primers. These strains were genetically typed by RAPD PCR using primers OLP-11 and OLP-13. Bionumerics V7.5 (Applied Maths) program was used for analysis and dendograms were generated by unweighted pair group method with arithmetic averages (UPGMA).
Results: All strains were confirmed as MRSA by PCR. Many different bands from 400 bp to 1000 bp were detected by RAPD PCR and five clusters (1-5) with OLP-11 and four clusters (1-4) were formed with OLP-13. In RAPD PCR performed with OLP-11 and OLP-13 primers, 80% (cluster 3-5) and 86% (cluster 1-4) similarities were found, respectively. MRSA strains isolated from wound samples were found to be more genetically similar to each other, with at least one in each cluster.
Conclusion: RAPD PCR was found to be an effective method for the evaluation of genetic similarity and genetic diversity of MRSA strains.
Keywords: *MRSA, mecA, OLP-11, OLP-13, RAPD PCR*

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INTRODUCTION

Staphylococcus aureus is a Gram-positive, coagulase-positive, spherical, forming grape-like clusters bacterium belonging to the Staphylococcaceae family, which is often present asymptomatically in the skin, skin glands, mucous membranes, nose and intestines of healthy individuals (Gould et al., 1995). *S. aureus* can cause skin and soft tissue infections, endocarditis, osteomyelitis, pneumonia, bacteremia (Ma et al., 2020). Although antibiotics such as penicillin and methicillin were effective against *S. aureus* in the mid-20th century, Methicillin-Resistant *S. aureus* (MRSA) strains that emerged in the following years remain a significant threat to human health today (McGuinness et al., 2017). Bacterial peptidoglycan stabilizes the intracellular pressure and maintains the cell shape. Peptidoglycan consists of glycan chains of N-acetylglucosamine and N-acetylmuramic acid cross-linked with peptides linked to N-acetylmuramic acid. Penicillin-binding proteins perform the polymerization (transglycosylation) of glycan chains and the transpeptidation between glycan chains (Sauvage et al., 2008). The transpeptidase activity of penicillin-binding proteins (PBPs), which are essential in peptidoglycan synthesis in the bacterial cell wall, is inhibited by β-

lactam antibiotics (Typas et al., 2011; Egan et al., 2017). Penicillin binding protein (PBP2a) has a weak affinity for β-lactams, so MRSA strains are resistant to all β-lactam antimicrobials (Ivbule et al., 2017). This protein is produced by the *mecA* gene. The *mecA* gene is located on *Staphylococcal cassette chromosome* (SCCmec) (Shoen et al., 2019). The *mecA* gene causes methicillin resistance (Fuda et al., 2004). The gold standard test used for MRSA identification is the detection of the *mec*A gene by PCR (Maes et al., 2002).

Many genotyping methods are used to identify MRSA strains, such as multilocus sequence typing (MLST), multiocus variable number tandem repeat analysis (MLVA), pulse field gel electrophoresis (PFGE), random amplified polymorphism DNA (RAPD) PCR, restriction fragment length polymorhic DNA (RFLP) PCR (Hookey et al., 1998; Rabello et al., 2007; Hennekinne et al., 2003; Sabat et al., 2003; Reinoso et al., 2004). RAPD PCR method is more useful than other methods with its easy application, fast results and cost-effectiveness. (Hakimi et al., 2017). RAPD PCR method is used for many purposes, identification of species and strains (Cocconcelli et al., 1995), analysis of genetic diversity (Koh et al., 1999), construction of genetic maps (Binelli et al., 1994), determination of genetic variation (Keshava et al., 1999), evaluation of genotoxicity of environmental pollutants (Rocco et al., 2011), etc. In this method, PCR is performed with a small amount of DNA using a randomly selected short single primer at low annealing temperature, amplicons are analyzed by agarose gel electrophoresis and the similarity among the strains is evaluated (Williams et al., 1990).

The aim of this study is to determine the genetic diversity and genetic similarity of MRSA strains isolated from clinical samples by RAPD PCR method.

MATERIAL AND METHODS

Bacterial strains and identification

Thirty-two MRSA strains (wound, tracheal aspirate, joint fluid, tissue, prosthetic-tissue, catheter tip, abscess, bronchoalveolar lavage) isolated from clinical samples were included in this study. MRSA strains were obtained from Ankara University İbni Sina and Cebeci Hospital microbiology laboratories. Identification of strains were carried out by conventional methods (Kloos and Schleifer, 1986). The phenotypic determination of methicillin resistance was performed using 30 µg cefoxitin (Bioanalyse, Türkiye) by disk diffusion method, according to the European Committee on Antimicrobial Suscepti-bility Testing recommendations recommendations (EUCAST, 2021).

DNA extraction of strains

Bacteria in the stock culture were thawed at room temperature and passaged into 5% sheep blood agar medium. After incubation at 35±1°C for 18±2 hours, DNA isolation was performed by using the DNA isolation kit (Thermo Scientific GeneJET Genomic DNA Purification Kit, Lithuania) in accordance with the manufacturer's recommendations.

*mec*A gene amplification

Genotypic determination of methicillin resistance was performed as described by Radenoviç (Radenoviç et al., 2016). *mec*A-F (5'-AAA ATC GAT GGT AAA GGT TGG C-3'), *mec*A-R (5'-AGT TCT GCA GTA CCG GAT TTG C-3') primers were used for *mec*A gene amplification. The PCR reaction (50 µl) contains 5 µl of × 10X PCR buffer (added $MgCl_2$) , 0.4 µl of 25 mM dNTPs, 0.25 µl of 5U/µl of Taq DNA polymerase, 2 µl of 10 µM each of the primers, 35.35 µl ddH_2O and 5 µl of template DNA. The amplification was carried out in a Thermal Cycler (LONGGENE A300, China). PCR amplification conditions: initial denaturation at 94 °C for 5 min, denaturation at 94 °C for 30 s, annealing at 55 °C for 30 s, extension at 72 °C for 1 min (40 cycles) final extension at 72 °C for 5 minutes.

RAPD-PCR

The RAPD-PCR assay was performed as described by Williams with some modifications (Williams et al., 1990). Primers OLP11 (5'-ACGATGAGCC-3') and OLP13 (5'-ACCGCCTGCT-3') were used in RAPD-PCR (Zare et al., 2019). The PCR reaction (50 µl) contains 5 µl of × 10X PCR buffer (added $MgCl_2$) , 0.4 µl of 25 mM dNTPs, 0.25 µl of 5U/µl of Taq DNA polymerase, 1,5 µl of 100 µM each of the primers, 37.85 µl ddH_2O and 5 µl of template DNA. Ampilifications were

performed in a thermal cycle (LONGGENE A300, China). The amplification was performed as follows: initial denaturation at 94 °C for 5 mins, denaturation at 93 °C for 1 min, annealing at 45 °C for 90 s, extension at 72 °C for 1 min (40 cycles) and final extension at 72 °C for 7 minutes.

Analysis of amplicons in electrophoresis

Amplification products were analyzed by electrophoresis (RunVIEW, Cleaver Scientific, UK) on a 1.5% agarose gel (PRONA, Spain) containing ethidium bromide (0.5µg/ml) and visualized under UV light (Vılbert Lourmat Photodocumentation and Imaging Systems, France). A 100 bp DNA ladder (GeneDirex Inc., USA) was used to assess the size of the amplicons.

Analysis of RAPD PCR data & statistics

Bionumerics V7.5 (Applied Maths) program was used for analysis. Similarities of band profiles were determined by Dice Similarity coefficient and dendograms were created by unweighted pair group method with arithmetic averages (UPGMA). Groups with 95% similarity in dendograms are called clusters. Chi-square analysis was used to determine whether there was a relationship between the groups obtained and the origin of the bacteria.

RESULT & DISCUSSION

Thirty-two MRSA strains isolated from various clinical samples were identified by phenotypic methods. Two different methods were used to determine methicillin resistance of strains, the Kirby-Bauer disk diffusion method using cefoxitin disk and *mecA* gene was investigated by PCR. All strains resistant to cefoxitin and producing a 533 bp band by PCR were confirmed as MRSA (Figure 1).

Genetic relatedness of thirty-two MRSA strains were investigated by RAPD PCR using OLP-11 and OLP-13 primers. A large number of bands with sizes ranging from 400 bp to 1000 bp were produced by RAPD PCR (Figure 2, Figure 3). Based on 100% similarity, dendograms containing clusters were generated. As a result of RAPD PCR performed with OLP-11 primer, band formation was observed in all strains and the strains were divided into five clusters (1-5). Cluster 3 contains the most strains (11 isolates) and cluster 2 the least (2 isolates). Cluster 3 and cluster 4 consist of wound samples with 72.7% and 77.7% respectively. The dendogram showed 80% similarity between cluster 3 and cluster 5. RAPD PCR performed with OLP-13 showed band formation except for the 26th strain. The strains were divided into 4 clusters (1-4). Cluster 1, which contains 18 isolates, is the largest cluster. Cluster 4 has two isolates and 86% similar to cluster 1. The percentages of similarity in the clusters are variable (Figure 4, Figure 5). In RAPD PCR performed with OLP-11 and OLP-13, it was observed that the MRSA strains isolated from wound samples were genetically similar to each other and there was at least one wound sample in each cluster. It was found that there was a statistically significant relationship between the origin of the bacteria and the bacterial groups ($p<0,05$).

RAPD PCR is preferred for its easy application and fast results. In this method, there is no need for preliminary information about the genome of the organism to be examined (Williams et al., 1990).

In many studies, it has been stated that *S.aureus* is widely used for typing by RAPD PCR (Tambic et al., 1997; Onasanya et al., 2003; Morandi et al., 2010). Reinoso et al. (2004) divided eighty *S.aureus* isolates into eleven groups, one group being human isolates and the other groups bovine isolates. Zare et al. (2019) In their study, which included fifty *S.aureus* strains isolated from banknote, food, human infections and bovine mastitis, the largest number of bands were obtained from six bovine mastitis isolates with the OLP-13 primer, they observed no correlation between the RAPD pattern and the source of the isolate, except for clusters containing only strains from the same sources and host specificity. Debnath and Chikkaswamy, (2015) reported that three clusters were formed by the inter-location spread of ninety-seven clinical MRSA strains. Kurlenda et al. (2007) in the study, which included two hundred and thirty-four MRSA strains, they found no association between the strains and the hospital department or type of infection. Nikbakht et al. (2008) observed the same patterns in eighty MRSA strains isolated from inpatients and hospital staff, they stated that this result indicates in-

hospital transmission. Some studies have reported the transmission of MRSA strains from animals to humans (Nnachi et al., 2014; Juhasz Kaszanyitzky et al., 2007).

Lee (2003) determined that fifteen animal MRSA isolates were similar to six human isolates and reported that these isolates were transmitted by consuming foods of animal origin. In this study, genetic relatedness of MRSA strains were investigated by RAPD PCR using OLP-11 and OLP 13 primers. The similarity of MRSA strains isolated from wound samples and the presence of at least one in each cluster suggest that there may be in-hospital transmission.

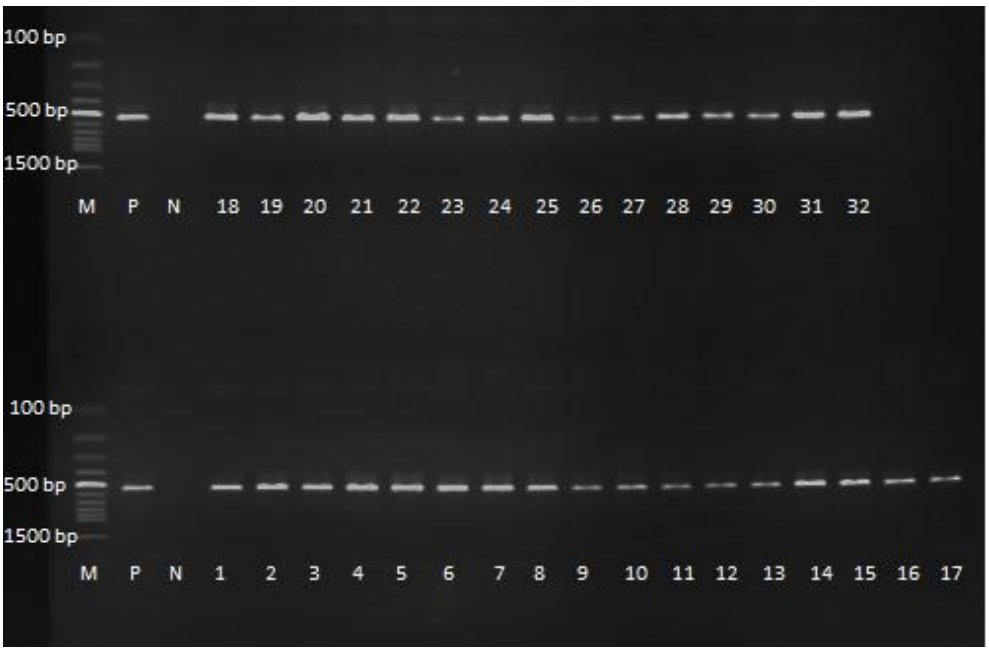

Figure 1. Agarose gel electrophoresis of *mec*A gene. M: 100 bp DNA Ladder, P: Positive control (*S.aureus* ATCC 43300), N: Negatif control (sterile distilled water), 1-32; *S.aureus* positive isolates (533 bp)

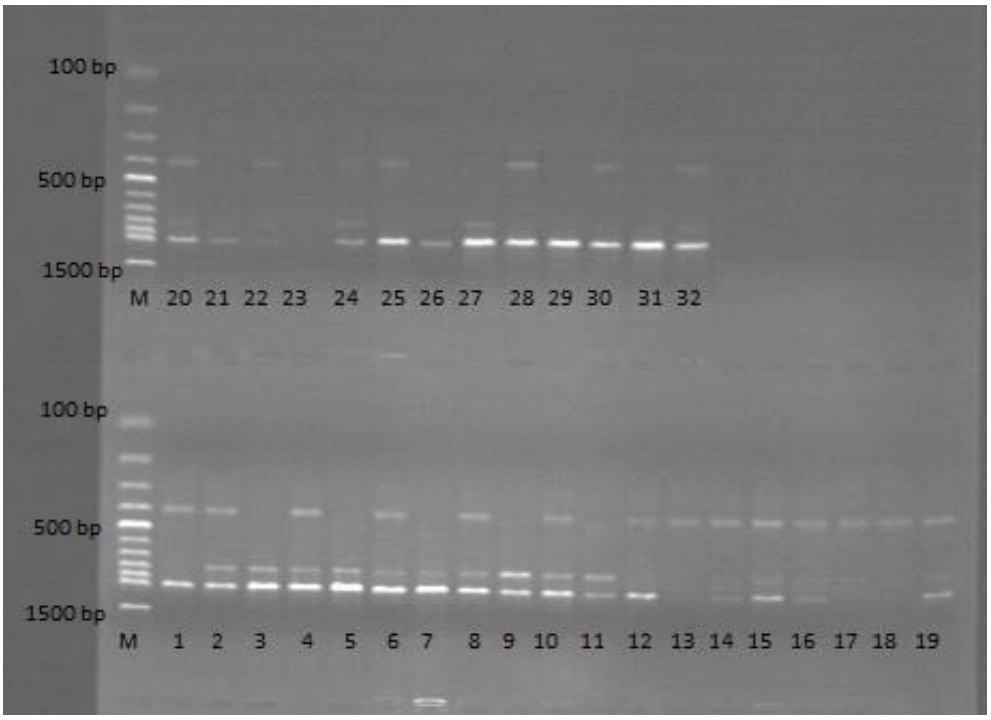

Figure 2. RAPD PCR (OLP-11)

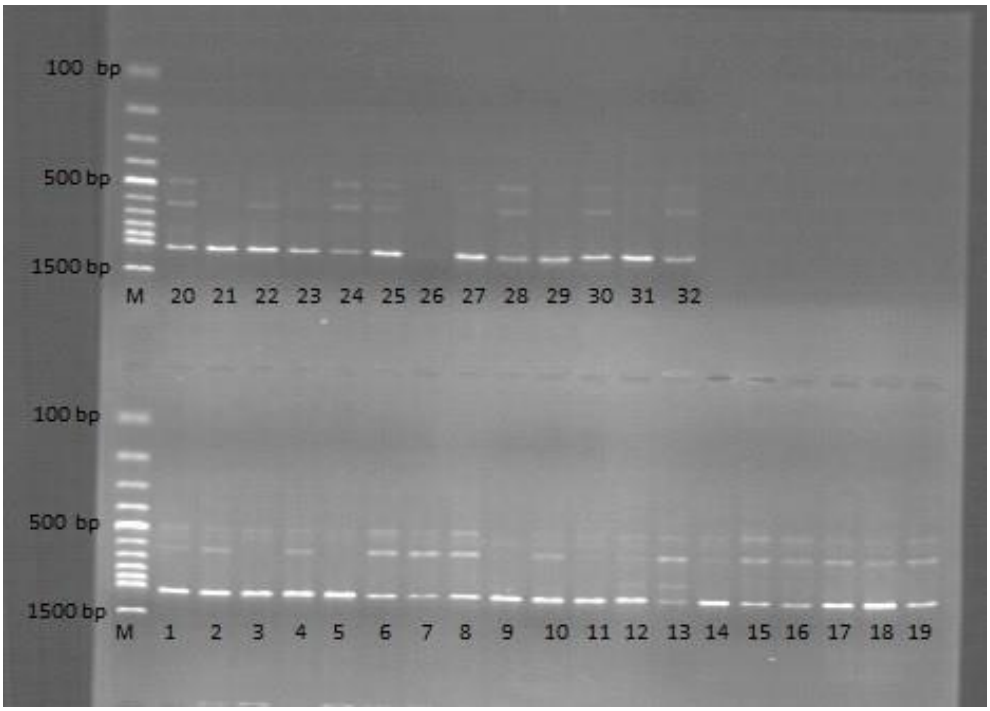

Figure 3. RAPD PCR (OLP-13)

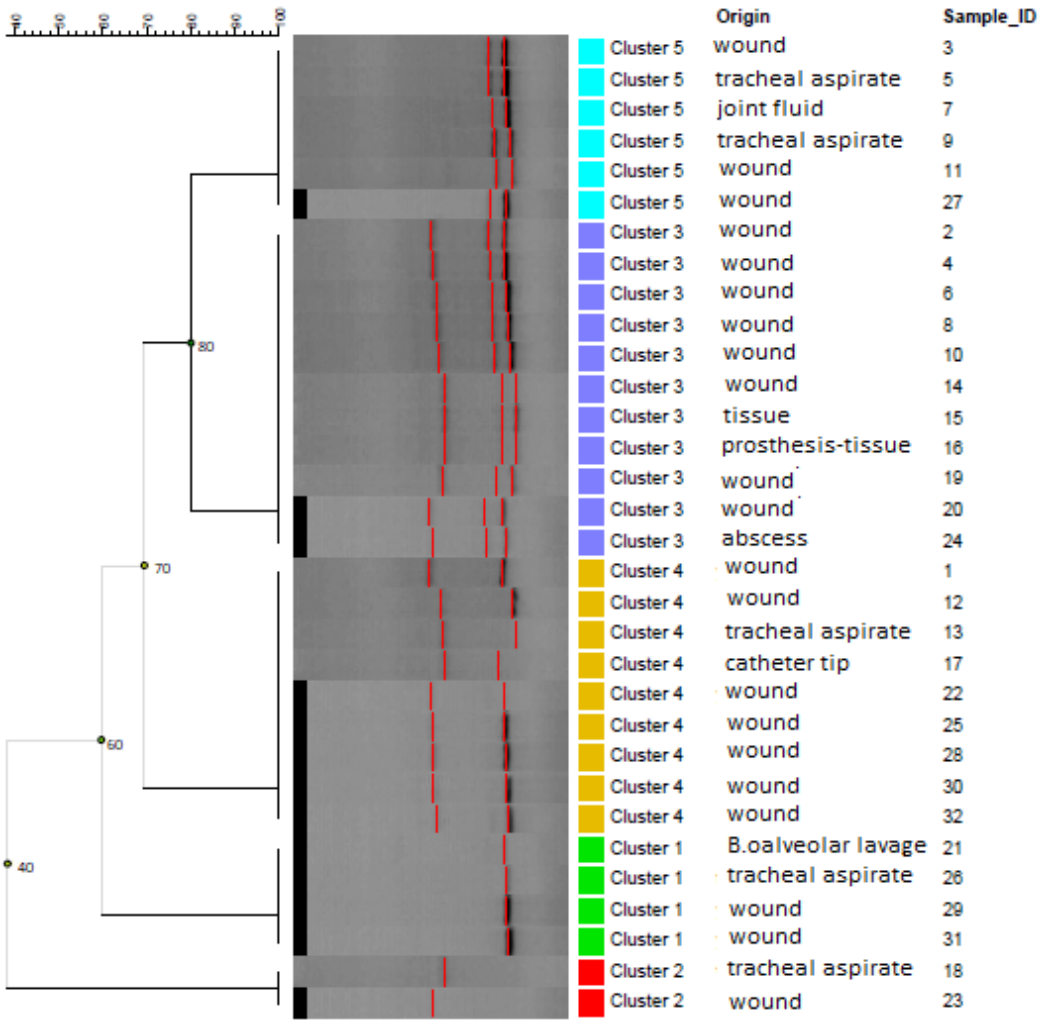

Figure 4. Dendogram of MRSA strains (OLP-11)

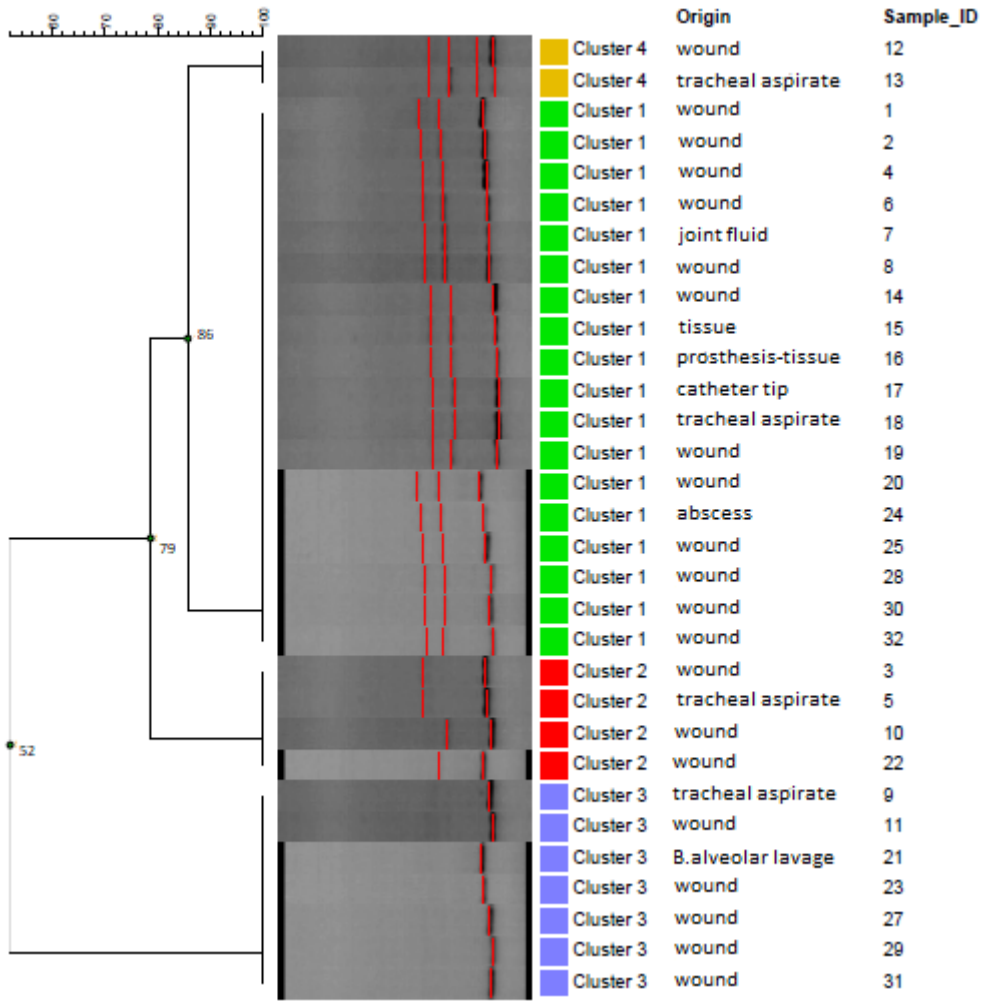

Figure 5. Dendogram of MRSA strains (OLP-13)

CONCLUSION

MRSA continues to cause both community and hospital-acquired infections. Finding the source of MRSA infections and monitoring the spread are important for the treatment of infections. RAPD PCR is a method used to determine the genetic diversity and clonal relationship in MRSA strains. In this study, RAPD PCR analysis of strains were performed with two different primers and dendograms were generated. It was observed that RAPD PCR is an effective method for determining the genetic relatedness of MRSA strains isolated from clinicalsamples.

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