MIDDLE BLACK SEA JOURNAL OF HEALTH SCIENCE

MARCH 2024 VOLUME 10 ISSUE 1

ISSN 2149-7796

MIDDLE BLACK SEA JOURNAL OF HEALTH SCIENCE (MBSJHS)

Middle Black Sea Journal of Health Science

The Middle Black Sea Journal of Health Science, which is international journal, is published by Ordu University Institute of Health Sciences on behalf of the Middle Black Sea Universities Collaboration Platform

e-ISSN 2149-7796

Middle Black Sea Journal of Health Science

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Web site: https://dergipark.org.tr/en/pub/mbsjohs

Sort of Publication: Periodically

Publication Date and Place: 28 /03/ 2024, ORDU, TURKEY

Publishing Kind: Online

Indexing: *Turkey Citation Index, SOBIAD, Rootindexing, Academic Resource ındex, Fatcat index, Researcgate, EuroPub, Gooogle Scholar, Turk Medline, Index Copernicus*

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The aim of the journal is to contribute to the international literature with clinical and experimental research articles, case reports, reviews and letters to the editor in the field of health sciences.

The target audience of the journal is all scientists working in the field of health, graduate students and researchers in this field.

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Middle Black Sea Journal of Health Science

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Chapter in Edited Book: Hornbeck P. Assay for antibody production. In: Colign JE. Kruisbeek AM, Marguiles DH, editors. Current Protocols in Immunology. New York: Greene Publishing Associates; 1991. p. 105-32.

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Editor(s) as Author: Balows A. Mousier WJ, Herramaflfl KL, editors. Manual of Clinical Microbiology. Fifth Edition. Washington DC: IRL Press. 1990. p. 105-32.

Conference Paper: Entrala E, Mascaro C. New structural findings in Cryptosporidium parvum oocysts. Eighth International Congress of Parasitology (ICOPA VIII); October 10-14; Izmir-Turkey: 1994. p. 1250-75

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Structure

Title

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Key words

Introduction

Methods

Results

Discussion

Conclusion

Acknowledgements

References (most 40)

Whole text should not exceed 4500 words except for resources and English summary.

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Structure

Title

Abstract should be structured with subheadings (Objective, Methods, Results, and Conclusion) (average 200-400 word)

Key Words

Introduction

Methods

Results

Discussion

Conclusion

Acknowledgements

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Introduction

Case report

Discussion

Conclusion

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Structure

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Key words

Introduction

The compilation text also including appropriate sub-headings,

Conclusion

Acknowledgements

References (most 50)

Whole text should not exceed 6550 words except for resources and English summary.

Middle Black Sea Journal of Health Science

MARCH 2024 **VOLUME 10** **ISSUE 1**

CONTENTS

EDITORIAL

Our second issue of 2024

We are delighted to present original articles from various fields in this issue of our journal, aimed at offering new and valuable contributions to the world of science.

Enriched by the contributions of distinguished scientists, our content enhances the quality and diversity of our journal.

We hope that the articles in this issue will make significant contributions to scientific knowledge, and we look forward to bringing you more high-quality and original works in future issues.

Prof. Dr. Ülkü KARAMAN

Editor

Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 1-15**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1358747

Knowledge and Awareness Level of Healthcare Professionals about Adult and Pediatric Basic Life Support

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Received: 13 September 2023, Accepted: 07 February 2024, Published online: 28 March 2024

Abstract

Objective: This study aimed to evaluate healthcare professionals' knowledge levels and attitudes toward adult and pediatric basic life support in a tertiary university hospital.

Methods: The data of the research was collected by questionnaire method. A total of 351 healthcare professionals who agreed to participate in the study and filled out the questionnaire form were included in the analysis of the study. Twenty-nine questions about adult and pediatric basic life support were asked to the participants; each group was analyzed in terms of gender, age groups, working unit, working time, and duties.

Results: The study was completed with 351 participants, mostly women, working in the emergency department and surgical sciences as research assistants, nurses, and health technicians, working for less than 5 years, and mostly over 26 years old. Most participants had received training in basic life support, used automatic external defibrillators, and performed cardiopulmonary resuscitation before. The rate of correct answers to questions about general information about adult and pediatric basic life support, circulation, airway, defibrillation rhythms, and doses of drugs were low. A statistical difference was found in the total questionnaire score regarding duty, working time, and their department.

Conclusion: The level of knowledge of healthcare professionals on adult and pediatric basic life support is inadequate and out of date and should be improved with education and training programs

Keyword: Resuscitation, Life Support Care, Health Personnel

Suggested Citation: Babacan A, Özmen MM, Knowledge and Awareness Level of Healthcare Professionals about Adult and Pediatric Basic Life Support Mid Blac Sea Journal of Health Sci, 2024;10(1):1-15.

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INTRODUCTION

The diagnosis of CPA is confirmed by loss of consciousness, absence of pulse, and respiration triad. Some simple but emergency applications requiring adequate knowledge and experience to regain respiration and circulation in a case of CPA are defined as "Cardiopulmonary Resuscitation" (CPR). The resuscitation process includes basic life support (BLS) and advanced life support (ALS). BLS is formed by ensuring airway patency, application of artificial respiration, chest compressions, and an automatic external defibrillator (AED) (1). In the 1998 guideline of the European Resuscitation Council (ERC), it is stated that “having basic life support knowledge and skills is the duty of all healthcare professionals” (2). Algorithms and guidelines on cardiopulmonary resuscitation practices are published and updated every five years.

The aim of this study was to determine the level of knowledge and awareness of healthcare professionals working in internal medicine and surgery clinics about adult and pediatric basic life support.

METHODS

Study design and participants and questionnaires

This is a descriptive study conducted to determine the level of knowledge and awareness of healthcare professionals on adult and pediatric basic life support and the up-to-dateness of their current knowledge. The study was conducted at Hacettepe University Hospital between 10.02.2012/31.03.2012. A questionnaire form was given to the volunteers (research assistants, nurses, intern doctors, health technicians, and employee-trainee paramedics) working in the internal and surgical units of Hacettepe University Faculty of Medicine hospitals. A 35-question questionnaire form prepared by the researcher and developed based on the American Heart Association (AHA) 2010 adult and pediatric BLS guidelines was used (1). The questionnaire was prepared in three sections. In the 1st part, demographic characteristics (gender, age, department of work, term of office, duty); in the 2nd part, 6 questions about personal training and proficiency status about BLS; and in the 3rd part, statements about evaluating their knowledge and awareness about BLS. The questionnaire was prepared with 20 questions about adult basic life support, 9 about pediatric basic life support, and 29 questions. The choices of the questions in the second part were "Yes" and "No," and the choices of the questions in the third part were prepared in triple Likert type as "I agree", "I am undecided", and "I do not agree".; and only one answer option was correct. Those who gave correct answers were given a “1” point, and those who marked the wrong answer options were given a “0” point. The study was completed with 351 participants. The answers

to the questions were analyzed in terms of gender, age groups, unit of service, tenure, years of work in the duty unit, and occupation.

Inclusion and exclusion criteria

Healthcare professionals working in internal medicine and surgery clinics were included in the study. The data of 351 healthcare professionals who answered all the questions were analyzed. Personnel who did not agree to participate in the study and completed the survey form incompletely were excluded.

Ethical consideration

The study was conducted between 10.2.2012 and 31.3.2012 after obtaining the approval of Hacettepe University Senate Ethics Committee with 08.02.2012-698 number.

Statistical analysis

The SPSS version 25.0 software (IBM®, New York, USA) was used for statistical analysis. Descriptive statistics were used to summarize the baseline characteristics of the participants. The measurement data were expressed as mean with standard deviation or median and IQR (interquartile range) with 25th-75th percentiles) according to the parametric distribution of the variables. The Chi-square test was used to compare categorical variables between groups. VAS scores in patients with the groups at different time points were analyzed by the Friedman test, and two repeated VAS scores were analyzed with the Mann-Whitney U test within groups. $P < 0.05$ was considered statistically significant.

RESULTS

Demographic findings

A total of 351 people working in our hospital's internal and surgical units participated in our study. Of the participants, 67.2% (236/351) were women, and 32.8% (n=115) were male. 46.6% (110/351) of them were between 18-25 years of age, and 53.4% (126/351) were ≥26 years of age. The distribution of the participants by gender and age groups is given in Figure 1. The distribution of the participants in terms of their duties is given in Table 1. Most of them were research assistants and nurses. The highest number of participants was from the emergency department (ED) 29.1%, followed by general surgery 9.1%) and internal medicine 6.8%. The distribution of the participants according to the unit of duty is shown in Figure 2.

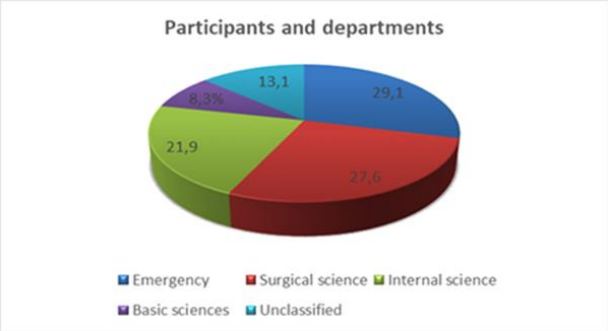

Figure 1. Years and gender distribution

Personal Training and Competence Status

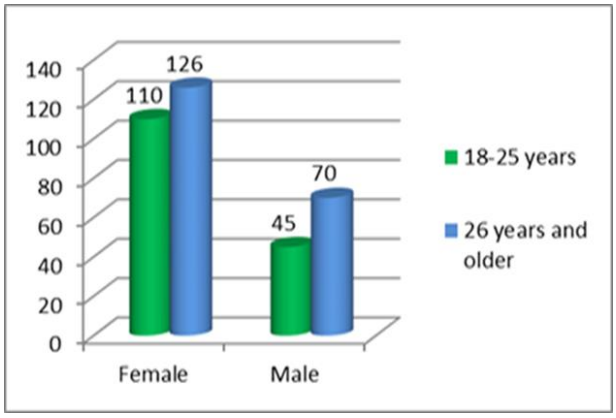

Figure 2. The distribution of the participants according to the place of duty

Findings Regarding BLS

The participants were asked 6 questions about adult and pediatric basic life support knowledge and skills, and they were asked to answer "Yes-No" in the second part of the survey. The ratio of correct/wrong answers is presented in Table 2. The answers were evaluated in terms of gender, age groups, working unit, and occupations and given in Table 3. It was found that the training and competence levels of paramedics, those working for less than 5 years, and those working in the emergency department were significantly higher. ($p<0.05$)

Findings for evaluating their approach and knowledge of BLS

The correct/wrong answers to each question are given in Table 4. Seven questions (7th, 8th, 9th, 13th, 19th, 20th, and 21st) were asked about adult BLS general information, for which "I agree" was the correct answer. It was observed that 8.0% (n=28) of participants got a full score of "7". It was observed that paramedics working in the profession for 6-10 years and female trainee paramedics were the most successful groups (0.038, $p<0.01$, and $p>0.001$). Two questions (15th and 16th) were about pediatric BLS. The correct answer was "I agree" for question 15 and "I do not agree" for question 16. It was observed that the research assistants aged 18-25, working for 6-10 years, and research assistants were successful groups (0.041, $p<0.01$, and $p<0.01$).

The evaluation step of BLS was evaluated in question 10. The correct answer ratio was 77.2% with the "I agree" statement. Health care professionals working in basic sciences were more and answered the question correctly. Those who work in basic sciences were more successful than other professionals working in other units ($p<0.001$). Four questions (11th, 18th, 29th, and 30th) were asked under the BLS circulation evaluation title. For the 11th and 30th questions, "I agree" was the correct answer; for questions 18 and 29, "I do not agree" was the correct answer. Trainee paramedics were significantly more successful than other occupational groups ($p<0.001$).

Three questions (12th, 17th,33th) were asked under the title of evaluation of pediatric BLS circulation. "I agree" was the correct answer for questions 12 and 33, and "I do not agree" was the correct answer for question 17. Paramedics with 6-10 years of tenure were more successful than other groups ($p<0.01$ and p0.001). Three questions (14th, 24th, and 26th), for all of

which I agree" was the correct answer, were asked under the BLS airway patency. Those working in surgical sciences and trainee paramedics were the most successful groups regarding unit and occupation (p =0.02, p<0.001).

Airway patency for pediatric BLS airway was evaluated with the 32nd question. “I do not agree” was the correct answer. Research assistants, nurses working in the ED, and participants with less than 5 years of tenure were more successful than other groups (p<0.01, p =0.025, and p<0.00). Two questions (23rd and 28th) were asked about the evaluation of pediatric BLS respiration. The answer "I agree" was correct for both questions. Research assistants were the most successful occupational group (P =0.001).

Two questions (25th and 27th) were asked about the adult defibrillation in BLS. The correct answers were “I agree” and “I do not agree” for the questions. Those who work in the emergency department, who have been working for less than 5 years and nurses were found to be more successful. (p =0.032, p<0.001, p<0.001).

The level of knowledge of pediatric BLS defibrillation dose was evaluated in question 35. "I agree" was the correct answer. Paramedics, professionals who were 18-25 years old, working in the emergency room, and with less than 5 years of tenure, were successful in terms of occupation, age, unit on duty, and duration of working (p<0.001 for all comparisons).

The questions related to defibrillation rhythms and defibrillator usage in BLS were questions 22, 31, and 34; for all three questions, "I disagree" was the right answer. Participants working in clinical sciences rather than basic sciences, with less than 5 years of tenure, and working in their unit for 6-10 years were successful groups (0.020, p<0.001, p<0.001, and p0.001, respectively).

From a general point of view of the results of the study, adult BLS knowledge was evaluated using 20 questions. The correct answer rate was more than 50% in 12 questions, and the knowledge level was moderate. Pediatric BLS was evaluated with 9 questions. The correct answer rate was above 50% in 5 questions, and the knowledge level was moderate.

Table 1. Occupational groups of the participants

Occupation	N	%
Research Assistant	80	22.8
Intern Doctor	77	21.9
Nurse	80	22.8
Health Technician	65	18.5
Working Paramedic	10	2.8
Trainee Paramedic	39	11.1
Total	351	100

Table 2. Findings of personal education and competence status related to basic life support

Questions	Yes: N/ (%)	No: N/ (%)
1. I can apply necessary basic life support to adult or pediatric patients	172(77.2)	80(22.8)
2. I have applied artificial respiration many times	73(20.8)	278(79.2)
3. I have applied cardiac massage many times	195(55.6)	156(44.2)
4. I had adult and pediatric basic life support training life support and applied.	233(66.4)	117(33.3)
5. I have received training in the use of AED /Manual defibrillator	223(63.5)	127(36.2)
6. I have used AED/Manuel defibrillator many times	121(34.5)	229(65.2)

AED: Automatic external defibrillator

Table 3. Analysis of personal training and competence findings related to BLS P values concerning the question number

	1.	2.	3.	4.	5.	6.
Gender						
Female	0.831	0.088	0.799	0.537	**<0.01**	0.200
Male						
Age groups						
18-25 years	0.060	0.464	0.532	0.521	0.093	<0.001
26 years and over						
Department						
Basic sciences						
Emergency service	**<0.001**	0.003	**<0.001**	0.052	**<0.001**	0.014
İnternal sciences						
Surgical sciences						
Tenure						
5 years	**<0.001**	0.037	**<0.001**	**0.001**	**<0.001**	**<0.001**
6-10 years						
10 years and over						
Occupation						
Research assistant						
Intern doctor						
Nurse	**<0.001**	**<0.01**	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Health technician						
Paramedic						
Trainee paramedic						

Table 4. Survey questions and answers

Questions	I agree n (%)	Undecided n (%)	I disagree n (%)
7. All of the non-medicated interventions that anyone can do without using medical tools and equipment at the scene are called basic life support	265(75.5)	35(10)	51(14.5)
8. Use of AED (automatic external defibrillator) was part of basic life support	168(47.9)	68(19.4)	112(32.8)
9. If an adult or child patient is unresponsive, not breathing, or breathing abnormally, it is called arrest, and basic life support should be started**.**	276(78.6)	29(8.3)	46(13.1)
10. In the first step of the adult basic life support flow chart, Ensuring the safety of the rescuer and the patient -evaluation of unresponsiveness (is he conscious, is he breathing)-if the patient is unresponsive, has no breathing/breathing abnormally-112 to call for help.	271(77.2)	33(9.4)	46(13.1)
11. In the basic life support flow chart, the next step after compression is to provide airway patency.	230(65.5)	23(6.6)	98(27.6)
12. If the child does not have a pulse or the pulse rate is below 60/min, cardiac massage should be started if there are signs of circulatory disorder.	227(64.7)	73(20.8)	51(14.5)
13. Non-healthcare rescuers should perform compressions only for unresponsive adults who are not breathing or have a normal breathing pattern**.**	135(38.8)	68(19.4)	148(42.2)

14. The step after airway patency in the basic life support flow chart is breathing.	240(68.4)	54(15.4)	57(16.2)
15. Compression (heart massage) / ventilation (artificial respiration) ratio for the child patient if there are two rescuers It should be 15/2.	227(64.7)	60(17.1)	64(18.2)
16. The basic life support flow chart sequence should be A (airway)-B (respiratory)-C (cardiac massage) for pediatric patients.	227(64.7)	561(14.5)	73(20.8)
17. Pulse control in pediatric patients, firstly from the femoral artery; if not, from the carotid artery, should be considered.	159(45.3)	88(25.1)	104(29.6)
18. For effective chest compression in an adult patient, lay the patient on a soft surface over the sternum. Put your hand on it, place your other hand on it, and interlock your fingers; stretch the chest wall 5-10 press quickly and forcefully, at least 150 times per minute, to collapse cm.	66(18.8)	38(10.8)	247(70.4)
19. Compression (heart massage) / ventilation (artificial respiration) ratio for single rescuer adult and child (except newborn) should be 30 /2 in the patient	271(77.2)	38(10.8)	42(12)
20. The ″Look-listen-feel″ flowchart in BLS has been removed for all rescuers, healthcare professionals or not.	139(39.6)	96(27.4)	115(32.8)
21. In case of suffocation, trauma, intoxication, or any child respiratory arrest, the first 5 rounds of CPR should be performed, and then 112 should be called for help.	190(54.1)	70(19.9)	90(25.6)
22. (If you are not a healthcare professional, skip to question 23). Asystole is a defibrillated rhythm.	73(20.8)	43(12.3)	220(62.7)
23. Breathing normally from mouth to mouth and nose in infants and mouth to mouth in a child is applied two times; each breath is given for 1 second, and raising of the rib cage indicates effective exhalation.	267(76.1)	57(16.2)	27(7.7)
24. Airway patency is also provided by the chin thrust maneuver. This maneuver is for those with cervical injuries. It is recommended for patients to be performed by healthcare professionals.	267(76.1)	51(14.5)	33(9.4)
25. (If you are not a healthcare professional, skip to question 26). Defibrillators depend on the nature of the current they deliver. They are divided into biphasic and monophasic. Biphasics have a lower current than monophasics.	167(47.6)	129(36.8)	43(12.3)
26. In an adult without trauma, the airway was opened with the head-back-chin-up maneuver	293(83.5)	39(11.1)	19(5.4)
27. (If you are not a healthcare professional, skip to question 28) Defibrillation dose applied in an adult patient 360j for biphasic defibrillators	121(34.5)	62(17.7)	159(45.3)
28. A child with a pulse above 60 who is not breathing or has a normal breathing pattern in patients at a rate of at least 12-20/min (3-5 seconds) until rescued breathing and spontaneous breathing returns should be given	221(63)	107(30.5)	23(6.6)
29. Adult and pediatric basic life support flowchart after compression, AED (automatic If an external defibrillator has been reached, defibrillation should be performed.	151(43)	91(25.9)	109(31.1)
30. Pulse control is not recommended for rescuers who are not medical personnel; rescuers lack breathing or start chest compressions depending on the superficiality.	169(48.1)	70(19.9)	111(31.6)
31. When the OED comes on, turn on the device and place the pads on the chest; while the device performs the rhythm control, give three continuous shocks; if there is a shockable rhythm, check the pulse after the shock; if there is no pulse, start CPR.	128(36.5)	56(16)	167(47.6)
32. Airway patency in children of all age groups is provided by placing an elevation under the head.	91(25.9)	100(28.5)	160(45.6)

33. While applying BLS with a single rescuer, lay the patient on a hard surface for effective chest compression; in the child/infant patient with two fingers in the middle of the sternum, 1/3 of the anterior-posterior diameter of the rib cage, approximately 4 cm in infants, approximately 5 cm in children, press quickly and firmly at least 100 times per minute	254(72.4)	58(16.5)	39(11.1)
34. VF (ventricular fibrillation) is not a defibrillated rhythm.	47(13.4)	40(11.4)	250(71.2)
35. The dose for defibrillation in a pediatric patient is 2-4j/kg .	155(44.2)	166(47.3)	16(4.6)

DISCUSSION

Resuscitation is a clinical intervention that has attracted people's attention since ancient times. Today, it has become a branch of science emphasized by modern medicine. Resuscitation guidelines published every five years reflect the international consensus and are translated into many languages to be accessible worldwide. The main goal is to optimize the return of spontaneous circulation of cardiac arrest victims without neurological deficits.

The changes made in the 2010 guidelines are significant and noteworthy. BLS was significantly simplified, and different approaches were proposed for paramedics and public rescuers. For community rescuers, the recommendation to start a chest massage without checking for a pulse in an unresponsive patient was emphasized (1). While the BLS steps for adult and pediatric patients were A-B-C, in the 2010 guideline they were changed to C-A-B, and the compression/ventilation ratio was changed to 30/2. The "Look, Listen, Feel" application was removed. The chest compression application method was updated as the sternum should collapse at least 5 cm with compression, and the compression rate should be at least 100/min. The AED use was integrated as part of BLS, and it was mentioned that healthcare professionals and public rescuers can apply AEDs (1, 2).

The 2015 BLS guidelines are not a comprehensive revision of the 2010 guidelines. Some recommendations in the 2010 guidelines were emphasized and some were withdrawn. The BLS steps for adult and pediatric patients are C-A-B, and the compression-to-ventilation ratio is 30/2, as in the 2010 guidelines. The "look-listen-feel" method is again recommended to check whether breathing is normal. As in the 2010 guideline, the same chest compression depth is recommended. In this context, while a depth of 5 cm is recommended, it is warned not to compress more than 6 cm. The rate of chest massage was set as 100-120/min, and it was mentioned that the chest should be allowed to expand totally after each massage (1, 3, 4).

There are many studies in the literature concerning the level of knowledge and skills of healthcare personnel on BLS. In our study, the level of knowledge about adult BLS was evaluated over 20 questions. In 12 questions, the ratio of correct answers was above 50%, and

the knowledge level of the participants was considered moderate. The level of knowledge about pediatric BLS was evaluated over 9 questions. The ratio of correct answers was more than 50% in 5 questions, and the knowledge level of the participants was considered moderate. There was no difference according to gender in terms of the correct answer rates given to the survey questions. However, the ratio of correct answers was significantly higher in the 18-25 age group and those who had been working for less than 5 years compared to the other age and working time groups.

Bilir et al. found that gender and tenure did not affect the level of knowledge in their study (5). Wilson et al. found that age, gender, and previous education did not affect BLS knowledge and skills (6). Kımaz et al. found that age, gender, tenure, and previous BLS training did not affect the level of knowledge (7). In a study conducted by Ülger et al. in 2013, it was reported that the life support success scores of the personnel in the 18-25 age group, and the group with 1-5 years of experience were higher (8). In a study conducted by Kartal in 2017 on CPR applications, it was reported that gender did not affect the level of knowledge and that the correct answer rates of the group aged 18-25 years and those working more than or equal to 10 years in the profession were higher (9).

In our study, the BLS knowledge level of healthcare personnel working in clinical sciences was significantly higher than those working in basic medical sciences. The highest rate of correct answers among clinical sciences belongs to emergency medicine personnel. Paramedics and research assistants were the most successful occupational group, while intern doctors and health technicians were generally considered unsuccessful. Bilir et al. found no difference between the basic life support knowledge levels of physicians in basic and clinical medical sciences (5). Still, the knowledge levels of physicians working in the units of internal sciences were higher than others. On the other hand, Şener et al. reported that the knowledge and skill levels of the physicians working in anesthesia and reanimation and ED were better than those working in other clinical departments (10). Demirtaş et al. found that the mean knowledge level score of ED physicians was statistically significantly higher than physicians working in other departments (11). The mean life support knowledge score of healthcare personnel working in the emergency clinic was higher than those working in the intensive care clinic in the study of Kartal (9). Our results support the findings of Şener et al. and Demirtaş et al. (10, 11). This difference may be due to their

training and the fact that they perform more resuscitations in their daily clinical practice.

In our study, the correct answer rates were low in questions 8, 13, 16, 20, 29, and 30 which included 2010 guideline updates, and questions 25, 27, 31, and 35 which were related to the general characteristics of defibrillators doses and defibrillation application. The results of this study show that healthcare workers do not follow the guidelines closely and their BLS knowledge is not up to date. We believe that the low rate of AED training and use by the participants affected the correct answer rates to these questions. Supporting these data, Kallestedt et al. revealed that 37% of healthcare workers did not know the current information about CPR (12). In the study conducted by Çelikli et al. 16.7% of the participants answered the question "How should the order of BLS applications be?" and 44% of the participants answered the question "By whom should be applied?" correctly. The rate of health personnel following current BLS information was found to be 34.7% (13). In the study of Kara et al., 11 questions were asked about the level of BLS knowledge, the response rates to only 3 questions were found to be above 50% and it was concluded that their level of BLS knowledge was insufficient, and they did not follow the current information on the subject (14). When the answers given to the questions in Karta's study were examined; it was found that 41.7% knew that the basic life support sequence in adults was C-A-B. 75% did not know the location of the paddles during defibrillation, and 73% did not know the appropriate joule level according to the type of defibrillator (monophasic/biphasic) during defibrillation. At the end of the study, it was observed that the information on the topics included in the current guidelines was not up to date (9).

There are different results regarding the level of BLS knowledge in the literature. BLS practices should be well-known and effectively implemented by physicians and nurses. However, some studies have shown that the level of knowledge and skills may not be sufficient even among physicians and nurses. In our study, the level of BLS knowledge was found to be moderate. Kalhori et al. determined the awareness level of nurses working in a training and research hospital as good under the 2010 CPR guideline (15). Some studies that found the level of knowledge low and insufficient. Kavalcı et al. found that only 54% of research assistants in a medical faculty hospital had sufficient knowledge (16). Silverplats et al. found that only 41% of the physicians surveyed had sufficient theoretical knowledge about CPR and were successful in performing CPR (17). Irfan et al. showed that the mean score on a 100-point questionnaire of the BLS was 53.5% for physicians and 38.4% for nurses. They also found that physician participants with previous BLS training and

length of employment were important determinants of knowledge level (18). Similarly, Binkhorst et al. found that older specialist pediatricians had lower BLS skills than their younger colleagues (19). Kendir et al. investigated the level of knowledge of nurses, emergency medical technicians, and paramedics about basic and advanced life support guidelines in children. They found that the basic life support knowledge scores of paramedics and professionals working in emergency departments and pediatric intensive care units were low, but advanced life support knowledge scores were high (20). Mavioğlu et al. showed that trainees failed in BLS theoretical and practical exams in their study titled "Evaluation of pediatric BLS application skills. The most successful occupational group was found to be trainee paramedics and research assistants (21). Çolak et al. showed that the level of knowledge of those who followed the guidelines and had previously received CPR training was significantly higher but that the knowledge level of the participants about CPR practices was not good in general (22). In the study conducted by Aygin et al. based on the 2015 guidelines, the rate of those who correctly answered the BLS sequence for pediatric patients was 41.2% and the level of BLS knowledge was found to be moderate (23). Yıldırım et al. found that although healthcare personnel received training about the guidelines, they could not fully comprehend the life support issue (24).

Although the importance of cardiopulmonary resuscitation has been proven in the literature, it is reported that survival rates are low and the reason for this is ineffective management of the CPR process. The importance of current CPR guidelines in effective management is emphasized and it is stated that adequate knowledge of healthcare workers on this subject plays a critical role in survival from cardiac arrest (17). It has been reported that CPR training significantly contributes positively to the level of knowledge and CPR success rates are higher in those with high self-confidence. Many studies have shown that practical BLS training will further increase the effectiveness of the training. However, studies have shown that knowledge and skills on CPR are inadequate, and the theoretical and practical skills gained are insufficient for different reasons and decrease further over time (25). Therefore, the importance of training was emphasized in the guidelines, and it was aimed to provide public rescuers, civil defense teams, healthcare workers in the field, emergency healthcare teams, or resuscitation teams with the ability to perform CPR at the level of actual clinical performance (4). The 2010 guidelines recommend that physicians receive CPR training more frequently than every six months. The authors also suggested that doctors and nurses working in departments with a high

likelihood of intervening in a critically ill patient should be trained. It is stated that BLS and AED courses within the scope of in-hospital resuscitation training can be attended not only by physicians and nurses working in departments with a high probability of intervening in a critically ill patient but also by healthcare personnel working in clinics with a relatively low probability of encountering cardiac arrest and outside the clinic (1).

As a result, although the BLS training status and self-confidence of the participants in our study were high, their knowledge levels were found to be moderate. Although it is not expected that the need to follow current information about BLS is identical in health professional groups with different working areas and responsibilities, we think that the difference in BLS training may be due to the frequency of CPR cases and the lack of following current guidelines.

Limitations

First of all, our study is a single-center study. Participants were not asked any questions about the time since their last BLS training. Since it was a questionnaire study, skill levels in practical applications were not evaluated; questions were answered based on thoughts, memories, and experiences. Our study was prepared according to the 2010 BLS guidelines. Two new guidelines have been published since 2012 when the study was conducted. First of all, it should be noted that there were no major innovations in the 2015 and 2020 guidelines; some of the recommendations in the 2010 BLS guideline were emphasized, and some were pushed to the background. In addition, the 2020 BLS guideline was published during the pandemic period and recommendations were made for BLS in COVID-19 patients despite the lack of clear evidence regarding the optimal treatment of COVID-19 patients and the risk of transmission and infection. In addition, guidelines are published to establish certain standards for healthcare professionals and to ensure consensus and agreement. The published information is not a definitive rule for healthcare professionals, but rather is a recommendation. As a matter of fact, the ERC 2015 guideline is not the only way for resuscitation; it contains widely accepted opinions for the safe and effective implementation of resuscitation. It was emphasized that the publication of new and updated treatment recommendations should not be perceived as unsafe or ineffective clinical approaches applied currently (3,4).

CONCLUSION

The success of resuscitation is closely related to the quality of the training, training approaches, and education methods. Healthcare professionals can obtain knowledge, competence, and self-confidence in BLS through theoretical and practical training at regular intervals organized by a resuscitation

committee supported by hospital administration and in accordance with guidelines.

Ethics Committee Approval: Ethics Committee Approval: Ethics approval for this study was obtained from the Hacettepe University Senate Ethics Committee (ethics committee date: 08.02.2012, ethics committee number: 698).

Peer-review: Externally peer-reviewed

Author Contributions: Concept: AB, MMO, Design: AB, MMO, Data Collection and Processing: AB, MMO, Analysis and Interpretation: AB, MMO, Writing: AB, MMO,

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci
March 2024; 10(1): 16-28

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1390530

The Effect of Menopause Symptoms on Female Genital Self-Perception in Postmenopausal Women

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Received: 16 October 2023, Accepted: 05 March 2024, Published online: 28 March 2024

Abstract

Objective: This study aimed to investigate the effects of menopausal symptoms on Female Genital Self-Perception (FGSP) in postmenopausal women.

Methods: This descriptive and relationship-seeking study was conducted with women aged 40 and above who applied to the Family Medicine Outpatient Clinic of a tertiary hospital between June and December 2022, who have not had a menstrual period for at least 12 months, and who met the inclusion criteria. The Patient Information Form, The Menopause Rating Scale (MRS), Vulvovaginal Symptom Questionnaire (VSQ), and the Female Genital Self-Image Scale (FGSIS) were used to obtain the data.

Results: The mean age of 203 women included in the study was 57.53±6.70. The total mean scores obtained from the scales was 15.40±7.7 for MRS, 3.75±3.96 for VSQ, and 18.99 ±4.34 for FGSIS. An inverse and statistically significant relationship were found between MRS and VSQ total and sub-dimension scores and FGSIS scores (p:0.001 for all). A significant relationship was found between FGSIS score and body mass index and parity (r:-0.154, p:0.028 and r:-0.258, p:0.001). University graduates, those who had regular gynecological examinations, and people with a very good perception of general health status had significantly higher FGSIS scores (p:0.001 for all).

Conclusion: According to the scale scores, the FGSP of postmenopausal women was moderate and negatively affected by the increase in menopausal symptoms. Obesity, an increase in the number of parities, low education level, and poor health perception were the factors that negatively affected FGSP.

Keywords: Female Genitalia, Post Menopause, Self-Perception

Suggested Citation: Bilgin İ, Tunç Karaman S, Basat O, The Effect of Menopause Symptoms on Female Genital Self-Perception in Postmenopausal Women Mid Blac Sea Journal of Health Sci, 2024;10(1):16-28.

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INTRODUCTION

With the onset of the menopausal period, symptoms such as vaginal atrophy and hot flashes that occur because of hormonal changes, and the termination of reproductive ability affect women biopsychosocially (1-3). Self-perception, which is a concept that includes women's thoughts, feelings, and perceptions about their bodies, may deteriorate over time (4).

Female genital self-perception (FGSP), which is an extension of self-perception, expresses the attitude and perception that a woman develops regarding her genital organs (5). FGSP, which is directly related to sexual functions, experiences, and satisfaction, may vary in different periods of life (6-9). It was found to be better overall in the younger age group (10-12). An increase in FGSP has been associated with an increase in sexual function and quality of sexual life (13).

It is also important because it is related to health behavior in women as well as sexual function (5,14). As a matter of fact, it has been observed that women who have negative perceptions about their sexual organs postpone their regular gynecological examinations (14-16).

With our current knowledge, a limited number of studies investigating FGSP in postmenopausal women have been found (11,17). In the postmenopausal period, FGSP might be adversely affected due to anatomical and functional changes related to menopause in the urogenital system, dissatisfaction with the appearance of the genital organs, and sexual dysfunction (17). Considering that the average life expectancy and therefore the years spent in the postmenopausal period is prolonged, it is necessary to increase the awareness of both women and health professionals (18).

The aim of this study was to examine the effects of menopausal symptoms on female genital self-perception in postmenopausal women.

METHODS

Study design

This was a single-centered, prospective, descriptive, and relationship-seeking study. It was conducted with individuals who applied to the Family Medicine Outpatient Clinic of a tertiary hospital between 01.06.2022 and 08.12.2022.

Power analysis was performed with the help of the G*Power 3.1 software program, based on literature data (19). It was determined that 150 women should be included in the sample with 95% power, a 5% margin of error, and an effect size of 0.264. 203 participants were included in the study.

Sample Selection Criteria

Women aged 40 and over who had not had a menstrual period for at least 12 months, who did not have a serious pathology in the genitourinary system, who did not use

medications that could cause urinary symptoms, and who agreed to participate were included in the study.

Those under the age of 40, those who have menstruated in the last 12 months, serious pathology in the genitourinary system (cancerous or precancerous lesion, lichen sclerosis, infection diseases, sexual trauma, history of previous surgery), those who use drugs that may cause urinary symptoms (diuretics, antipsychotics, antidepressants, antispasmodics), those who have communication difficulties and those who were illiterate were excluded from the study.

Data Collecting Tools

Patient Information Form, the Menopause Rating Scale (MRS), the Vulvovaginal Symptom Questionnaire (VSQ) and The Female Genital Self-Image Scale (FGSIS) were used to obtain the data.

Patient Information Form

The sociodemographic, general medical, obstetric, and gynecological characteristics of the participants were questioned with the Patient Information Form prepared by us.

The Menopause Rating Scale

Schneider et al. developed The Menopause Rating Scale in 1992 and adapted into English in 1996 (20, 21). The Turkish validity and reliability study was conducted by Can Gürkan in 2005. MRS, consists of 11 items, and 3 sub-dimensions: somatic complaints, psychological complaints, and urogenital complaints. A score between 0 and 44 can be obtained from the scale, and high score indicates the severity of the complaints. The Cronbach's alpha coefficient for the whole scale is 0.84 (22). In this study Cronbach's alpha was found 0.807.

The Vulvovaginal Symptom Questionnaire

Erekson et al. developed The Vulvovaginal Symptom Questionnaire in 2013 (23). VSQ was adapted into Turkish by Tekin et al. in 2022. It consists of 21 items and 4 sub-dimensions which assess symptoms, the impact on emotions, the impact on life and the impact on sexual life. A total score between 0 and 21 can be obtained from the scale. High scores indicate that vulvovaginal symptoms have a greater effect on the relevant sub-dimension. Cronbach's alpha coefficient was 0.822 in sexually active and 0.873 in passive individuals (24). In this study Cronbach's alpha was found 0.879.

The Female Genital Self-Image Scale

The Female Genital Self-Image Scale (FGSIS) was developed by Herbenick et al. in 2010 (5). The Turkish validity and reliability study was conducted in 2019 by Kaya et al. A total score between 7 and 28 can be obtained from this 7-item scale. Higher scores indicate a more positive genital self-perception. Cronbach's alpha coefficient was found to be 0.818 in the

Turkish version (25). In this study Cronbach's alpha was found 0.767.

Ethical approval

Ethical permission to perform this study was obtained from the University of Health Sciences Turkey, Gaziosmanpaşa Training and Research Hospital Local Ethics Committee (Approval No:87; Date:25.05.2022). The study was conducted under the principles of the Declaration of Helsinki. All participants included in the study were informed in detail. Necessary permissions were obtained.

Statistical Analysis

IBM SPSS Statistics v.22 program was used for statistical analysis. According to Kolmogorov-Smirnov and Shapiro-Wilks tests, it was determined that the parameters did not show normal distribution. Descriptive statistical methods (mean, standard deviation, median, frequency and Interquartile Range (IQR)) were used to evaluate the study data. Since the parameters do not have a normal distribution, the Kruskal Wallis test (post hoc Dunn's test) was used for comparison of parameters between more than two groups. The Mann Whitney U test was used for comparisons between two groups. Spearman's rho correlation test was used to examine the relationships between parameters. Significance was evaluated at the $p<0.05$ level.

RESULTS

This study was conducted with 203 female participants aging between 42 to 80 years. The distribution of sociodemographic, medical, obstetric, and gynecological characteristics of the participants is given in Table-1.

In Table-2, descriptive statistics of the scores obtained from the scales are presented. The total mean scores obtained from the scales were 15.40±7.70 for MRS and 3.75±3.96 for VSQ. According to these results, the participants' general and vulvovaginal menopause symptoms were evaluated as moderate to low. The FGSIS total score was 18.99±4.34, and the participants were considered to have moderate FGSP.

In Table-3, the correlation between the sub-dimension and total scores of the scales was examined. An inverse and significant relationship was found between MRS and VSQ total and sub-dimension scores and FGSIS scores (p:0.001 for all).

A significant inverse relationship was found between FGSIS score and BMI and parity (r: -0.154, p:0.028 and r: -0.258, p:0.001). However, no relationship was found between FGSIS score and age.

The evaluation of the sub-dimensions and total scores obtained from the scales according to the various characteristics of the participants is presented in Table-4. Accordingly, the MRS total scores were statistically significantly higher in those with low income, those with a

history of gynecological disease, and those with a negative general health perception (p:0.013; p:0,001; p:0.001, respectively). VSQ total scores were statistically significantly higher in those who are married, those with a history of gynecological disease, and those who have an active sexual life (p:0.001; p:0.002; p:0,001; respectively). University graduates, those who went to regular gynecological examinations, and those who had a very good perception of general health had significantly higher FGSIS scores (p:0.001 for all).

Table-1. Distribution of various characteristics of the participants (n=203)

		Min-Max	Mean±SD
Age (years)		42-80	57.53±6.70
BMI (kg/m^2)		18.96-48.18	29.28±5.27
		Min-Max	**Median (IQR)**
Total number of pregnancies (n=197)		1-12	4 (2)
Age at menopause		27-58	47 (8)
Menopause duration		1-45	10 (12)
		n	**%**
Education level	Literate	35	17.2
	Primary school	111	54.7
	Middle school	26	12.8
	High school	20	9.9
	University	11	5.4
Marital status	Single	3	1.5
	Widow	56	27.6
	Married	144	70.9
Income level	Low	84	41.4
	Middle	106	52.2
	High	13	6.4
Chronic disease	No	52	25.6
	Yes	151	74.4
Weight status according to BMI	Normal	52	25.6
	Overweight	66	32.5
	Obese	85	41.9
How to go through menopause	Natural menopause	172	84.7
	Surgical menopause	31	15.3
History of gynecological disease	No	92	45.3
	Yes	111	54.7
Active sexual life	No	73	36
	Yes	130	64
Regular gynecological examination	No	148	72.9
	Yes	55	27.1
General perception of health	Very good	17	8.4
	Good	59	29.1
	Moderate	100	49.3
	Weak	18	8.9
	Very weak	9	4.4

Data presented as n (%), min max, Mean±SD of the participants. BMI: Body Mass Index.

Table-2. Descriptive statistics of the total and sub-dimension scores of the scales

	Min-Max	Mean±SD	Median	IQR	Cronbach's alpha
MRS					
MRS Total score	0-35	15.40±7.70	15	11	0.807
Somatic complaints	0-7	2.70±1.88	3	3	0.517
Psychological complaints	0-23	9.58±5.04	9	7	0.763
Urogenital complaints	0-10	3.12±2.50	3	4	0.562
VSQ					
VSQ total score	0-19	3.75±3.96	2	5	0.879
Symptoms subscale	0-7	1.49±1.70	1	2	0.697
Emotions subscale	0-4	0.72±1.15	0	1	0.760
Life impact subscale	0-4	0.31±0.81	0	0	0.762
Sexual impact subscale	0-6	1.24±1.46	1	1	0.833
FGSIS	8-28	18.99±4.34	19	6	0.767

Data presented as n (%), min max, Mean±SD, median and IQR of the participants.
FGSIS: Female Genital Self-Image Scale, IQR: Interquartile Range, MRS: Menopause Rating Scale, VSQ: Vulvovaginal Symptom Questionnaire.

Table-3. The correlation of the sub-dimensions and total scores of the scales

		MRS Total	MRS-S	MRS-P	MRS-U	VSQ Total	VSQ-S	VSQ-E	VSQ-LI	VSQ-SI	FGSIS
MRS Total	r	1									
	p	.									
MRS-S	r	0.683	1								
	p	**0.001***	.								
MRS-P	r	0.925	0.518	1							
	p	**0.001***	**0.001***	.							
MRS-U	r	0.633	0.272	0.406	1						
	p	**0.001***	**0.001***	**0.001***	.						
VSQ Total	r	0.380	0.246	0.276	0.454	1					
	p	**0.001***	**0.001***	**0.001***	**0.001***	.					
VSQ-S	r	0.338	0.218	0.254	0.382	0.888	1				
	p	**0.001***	**0.002***	**0.001***	**0.001***	**0.001***	.				
VSQ-E	r	0.344	0.186	0.286	0.330	0.760	0.627	1			
	p	**0.001***	**0.008***	**0.001***	**0.001***	**0.001***	**0.001***	.			
VSQ-LI	r	0.281	0.169	0.226	0.266	0.568	0.527	0.580	1		
	p	**0.001***	**0.016***	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***	.		
VSQ-SI	r	0.161	0.130	0.067	0.311	0.562	0.251	0.272	0.119	1	
	p	**0.022***	**0.065**	**0.339**	**0.001***	**0.001***	**0.001***	**0.001***	0.090	.	
FGSIS	r	-0.445	-0.236	-0.389	-0.409	-0.313	-0.286	-0.310	-0.233	-0.074	1
	p	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***	**0.001***	**0.291**	.

**Spearman's rho correlation test *p<0.05*
FGSIS: Female Genital Self-Image Scale, MRS: Menopause Rating Scale, MRS-P: Psychological, MRS-S: Somatic, MRS-U: Urogenital, VSQ: Vulvovaginal Questionnaire, VSQ-E: Emotions, VSQ-LI: Life impact, VSQ-SI: Sexual impact, VSQ-S: Symptoms.

Table-4. Evaluation of the sub-dimension and total scores of the scales according to the various characteristics of the participants

		MRS Total	VSQ Total	FGSIS total
		Median (IQR)	**Median (IQR)**	**Median (IQR)**
Education level	Literate	17 (15)	2 (5)	18 (6)
	Primary sch.	14 (9)	2 (4)	18 (6)
	Middle sch	14 (6.75)	3 (7)	18.5 (8)
	High sch.	17 (14.25)	2 (6.75)	20 (8.5)
	University	13 (8)	1 (3)	24 (6)
	[1]p	0.366	0.462	**0.001***
Marital status	Single	15 (-) **	3 (-) **	22 (-) **
	Widow	14.5 (13.5)	2 (3)	19 (5.75)
	Married	15 (10.75)	3 (7)	19 (6)
	[1]p	0.945	**0.001***	0.221
Income status	Low	16 (10)	3 (4.75)	19 (5.75)
	Middle	14.5 (13)	2 (5)	18 (6)
	High	9 (9)	1 (3)	21 (5.5)
	[1]p	**0.013***	0.291	0.259
Chronic disease	No	15 (7.75)	2 (3.75)	19 (6.5)
	Yes	15 (11)	2 (5)	19 (6)
	[2]p	0.980	0.686	0.165
Groups by BMI	Normal	15 (11.5)	2.5 (4)	20.5 (6)
	Overweight	15 (8.25)	2 (4.25)	19 (5.5)
	Obese	14 (11.5)	3 (5)	18 (6)
	[1]p	0.849	0.221	0.072
How to go through menopause	Natural	15 (11)	2 (5)	19 (6)
	Surgery	16 (12)	2 (3)	18 (6)
	[2]p	0.692	0.638	0.744
History of gynecological disease	No	13 (9)	2 (2)	19.5 (6)
	Yes	16 (13)	3 (7)	18 (5)
	[2]p	**0.001***	**0.002***	0.171
Continuing sexual life	No	15 (13)	2 (3.5)	19 (6)
	Yes	14 (9.25)	3 (6)	19 (6)
	[2]p	0.603	**0.001***	0.143
Regular gynecological examination	No	15 (11)	2 (4)	18 (6)
	Yes	14 (9)	3 (6)	21 (6)
	p	0.620	0.238	**0.001**[2]
General perception of health	Very good	7 (11.5)	1 (3.5)	23 (9.5)
	Good	11 (8)	2 (3)	20 (5)
	Moderate	16 (9)	2 (4.75)	19 (5)
	Weak	23.5 (11.75)	5 (7.5)	16 (6.25)
	Very weak	24 (7)	2 (12)	15 (4)
	[1]p	**0.001**[1]*	0.116	**0.001**[1]*

[1]*Kruskal Wallis Test.* [2]*Mann Whitney U Test.* **p<0.05*

***IQR could not be calculated since the number of singles was 3 and there was no 75.P value.*

BMI: Body Mass Index, FGSIS: Female Genital Self-Image Scale, IQR: Interquartile Range MRS: Menopause Rating Scale, VSQ: Vulvovaginal Symptom Questionnaire.

DISCUSSION

In this study examining the effects of menopausal symptoms on genital self-perception in postmenopausal women, general and vulvovaginal symptoms of menopause were reported as moderate-low levels, and genital self-perception was found to be moderate. As the effect of the symptoms of menopause increased, FGSP was negatively affected.

The genital self-perception expresses the attitude and perception that the women develop due to her genital organs (6). Many studies examine the FGSP and carry out with people of different ages and characteristics (4,10-12,26).

In a study examining the genital self-perception and sexual response in men and women, FGSP levels were found to be high. Positive FGSP was associated with positive feelings about the body and increased sexual satisfaction in women (10). In another study examining the relationship between FGSP levels and sexual distress, nearly half of the participants were young women, and most of them were positive towards FGSP (11). In a study in which women who regularly do sports were subjected, the relationship between sexual function and FGSP was evaluated, and FGSP levels of all participants were found to be quite high (27).

In the postmenopausal period, the discomfort caused by vulvovaginal symptoms negatively affects women's emotions and self-confidence and can negatively affect both women and their partners sexually. Country-specific or cultural differences regarding women's perceptions of sexuality in the postmenopausal period and the impact of menopausal symptoms have been previously reported (28). Namely, the data from the CLOSER survey in South Africa has shown that almost half of the post-menopausal women are upset that their bodies are not 'working' the way they used to, a third no longer find themselves sexually attractive and almost a quarter feel like 'less of a woman'. (29). Similar results were obtained when the CLOSER study was conducted in Europe and North America (30-32). A limited number of studies have been found examining directly ‘’the concept of FGSP’’ in postmenopausal women. In a randomized controlled study, FGSP was found to be low in postmenopausal women (17).

The FGSP levels of postmenopausal women were found to be moderate in our study. When compared to the literature, it was observed that the FGSP levels of younger women were lower. However, as menopausal symptoms increased, FGSP decreased in the participants. Considering that the various symptoms that begin to appear with menopause negatively affect women's physical and mental health, as well as their sexual health, it is an expected result that genital self-perception will also be negatively affected.

Age is an important factor in the change of FGSP in different periods of life (9). In the

thesis study by Çamlıca, in which examine the genital perception in women between the ages of 19-49, it was found that FGSP decreased as age increased (12). According to Rowen et al., on the other hand, as the age of women decreases, FGSP decreases (26). In the study of Ayar et al. among women aged 21-49 years, no correlation was observed between age increase and FGSP (4). Similarly, in a thesis study examining FGSP in sexually active women, no relationship was found between age and FGSP (33).

In our study, no relationship was found between the age of the participants, the age at which they entered menopause, and the years that passed in menopause and FGSP. In most studies in the literature, it was observed that the inclusion rate of postmenopausal women was low. Hence, it is thought that evaluations should be made on postmenopausal women in future studies.

In previous studies, it was shown that as the socioeconomic level improves, the FGSP is also positively affected. Indeed, Ayar et al. reported that as the level of education and income increases, the FGSP increases significantly, and those who take an active role in business life had a more positive FGSP (4). Similarly, Rowen et al. reported less genital dissatisfaction in women with higher education (26). Rouzi et al., on the other hand, observed a positive and significant relationship between education level and FGSP, but did not find a relationship between employment status and FGSP (34).

Consistent with the literature, in our study, while FGSP was better in women with higher education levels and working women, no relationship was found between income status and FGSP.

Sexual health status directly affects genital self-perception. As a matter of fact, there are studies in the literature showing that FGSP is lower in women with genital diseases (9,12, 33, 35-37). A positive FGSP is generally associated with women's positive feelings about their bodies and increased sexual satisfaction (10). Even in women with vulvar disease, it was reported that FGSP changes positively as sexual functions improve (37). FGSP levels were found to be lower in premenopausal women with dyspareunia than in those without dyspareunia (38).

Although there is no statistically significant difference according to Table 4, FGSP was lower in patients with a history of genital disease. A negative perception of their health status also led to lower FGSP, which was consistent with the literature. It is an expected result that these conditions, which may cause changes in the genital organs and sexual functions of women, negatively affect FGSP.

But surprisingly, no significant difference was found between women who had an active sexual life and those who did not. It is thought

that this result may have been reached differently from the literature since the variables such as frequency were not questioned when evaluating sexual activity in our study. Because in our society sharing the details of "sexual activity'' is relatively undesirable.

CONCLUSION

In conclusion, FGSP of postmenopausal women was moderate and negatively affected by the increase in menopausal symptoms. High education level, good perception of health status, and low BMI were the factors that increased FGSP. In the postmenopausal period, women should be evaluated for improvement of FGSP. Physicians' awareness of increasing women's genital self-perceptions should be increased, and information should be provided on this issue.

Ethics Committee Approval: Ethics committee approval was received for this study from Gaziosmanpaşa Trainig and Research Hospital, Clinical Research Ethics Committee of Health Sciences University (Approval No:87; Date:25.05.2022).

Peer-review: Externally peer-reviewed

Author Contributions: Concept: İB, STK, OB, Design: İB, STK, OB, Data Collection and Processing: İB, STK, Analysis and Interpretation: İB, STK, Writing: İB, STK, OB

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 29-41**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1391162

A Bibliometric Analysis Study of Global Academic Articles on Malaria and Contribution of Türkiye

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Received: 15 October 2023, Accepted: 07 February 2024, Published online: 28 March 2024

Abstract

Objective: Malaria is a parasitic infection that has a significant negative influence on public health around the world, including Türkiye in recent years with the prevalence of imported cases. This study was conducted to provide a bibliometric analysis of publications on malaria in Türkiye and worldwide, and to determine Türkiye's current position in malaria research.

Methods: This study was observational, descriptive, and retrospective designed study and utilized scientometric technique and scientific mapping. The research was conducted in the Web of Science online database. The MESH keywords (malaria OR plasmodium) were used. The title (TI) field and only Science Citation Index Expanded (SCI-E) index was used for the search queries. The following inclusion and exclusion criteria were applied: The studies published after the end of 2022 were excluded and only the articles were chosen according to the document type.

Results: On the basis of the defined search, 31376 articles were extracted from the WoS database indexed in the SCI-E category, for the period 1970-2022. The earliest article was published in 1970 and the most of the articles were published in 2021 (n=1274). There was a growth in publications number since end of the 1970s. A total 469 countries contributed the malaria literature. The United States of America (USA) (32.07%), England (18.56%) and France (9.90%) were the leading countries on the malaria literature according to the published article numbers. Türkiye ranked in 71st. A total of 80 articles were retrieved according to search criteria. The articles were cited 1347 times totally and 17.75 times per article. The mean of H index was 18. The earliest articles were published in 1987. The number of articles limited but since 2005 never dropped below two articles per year.

Conclusion: Scientific production from Türkiye is low. This topic can be improved by increasing both the financial support for and the involvement of researchers in national and international collaborative research projects.

Keywords: Bibliometric Analysis, Malaria, Plasmodium, Publications

Suggested Citation: Aydemir S, Diril H, Alkan S, Barlık F, Ekici A. A Bibliometric Analysis Study of Global Academic Articles on Malaria and Contribution of Türkiye Mid Blac Sea Journal of Health Sci, 2024;10(1):29-41.

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INTRODUCTION

Plasmodium genus protozoa, which are spread by an infected female *Anopheles* mosquito, cause malaria, a potentially fatal parasitic infection (1). People infected with malaria often experience symptoms such as fever, chills and sweating. If left untreated, *Plasmodium falciparum* infection has a bad prognosis and a high fatality rate (2).

According to World Health Organization (WHO) 2021 malaria report**,** mortality decreased consistently worldwide between 2000 and 2019, from 896000 in 2000 to 562000 in 2015 and to 558000 in 2019. A predicted 47000 (68%) of the additional 69000 fatalities from malaria were attributed to service interruptions during the Covid-19 pandemic, which resulted in a 12% increase in mortality from malaria in 2020 compared to 2019. 29 countries accounting for 96 percent of all malaria fatalities globally. Just over half of all malaria deaths worldwide in 2020 were caused by six countries: Nigeria (27%), the Democratic Republic of the Congo (12%), Uganda (5%), Mozambique (4%), Angola (3%), and Burkina Faso (3%). In 85 malaria-endemic countries (including French, Guiana), there were an expected 241 million cases of malaria in 2020, up from 227 million in 2019, with most of this rise coming from the WHO African Region. There were 224 million probable malaria cases at the baseline year of 2015 for the Global Technical Strategy for Malaria 2016-2030 (3).

The revised WHO malaria guideline includes updates for intermittent preventive treatment during pregnancy, perennial malaria chemoprevention, formerly known as intermittent preventive treatment in infants, seasonal malaria chemoprevention, and new recommendations for intermittent preventive treatment in school-aged children, postdischarge malaria chemoprevention, and mass drug administration for malaria (4).

The ambitious objective of eliminating malaria by 2040 faces significant obstacles because to the wide variety and complexity of human malarias. *P. falciparum*-specific technologies have been developed with the aim of lowering the high loads of this parasite and the resulting morbidity and death. However, none of these techniques are well adapted to either the specific job of eliminating low-level transmission or dealing with all *Plasmodium* species and associated anopheline vectors, from a practical or technological standpoint. A strategy of attacking the easiest target species first and then moving on to the next has to be reexamined because all malaria species in humans contribute significantly to severe morbidity and death (5). The success in

lowering global mortality from *P. falciparum* malaria should not be sacrificed in favor of a focus on all *Plasmodium* species, but the aim of malaria control does not equal to merely reducing disease burden. All species must be included in malaria control since they can all result in morbidity and mortality (6)

While malaria was a common disease in Türkiye in previous years, indigenous malaria transmission has ended as a result of the successful studies carried out by the Ministry of Health of the Republic of Türkiye. Currently, only international malaria cases are reported. However, malaria cases originating from abroad are seen in Türkiye due to the presence of mosquito species that transmit malaria, climate and environmental factors, large population movements, and an increase in the number of people traveling to and coming from countries where malaria is endemic. Moreover, we continue our activities within the framework of the Malaria Elimination Program, as the risk of malaria still continues due to irregular migrants, our country's location in the subtropical region where malaria can spread, and the increase in average air temperatures due to climate change (7).

This study aims to quantitatively analyze pertinent research using a bibliometric analysis in order to describe the evolution and experience of global malaria literature and make comparisons with Türkiye.

METHODS

Study design

This study was observational, descriptive, and retrospective designed study and utilized scientometric technique and scientific mapping. Since there are no human or animal subjects involved, institutional review board permission is not required.

Data Collection

On August 8, 2023, a comprehensive search was conducted in the WoSCC of the ISI Web of Science (Thomson Reuters, Philadelphia, PA, USA) online database. This database contains articles from high-impact, highest scientific journals from throughout the world.

Terms and retrieval techniques used were as follows: The MESH keywords (malaria * OR *plasmodium**) were used. The title (TI) field and only Science Citation Index Expanded (SCI-E) index was used for the search queries.

The following inclusion and exclusion criteria were applied:

(1) The studies published after the end of 2022 were excluded;
(2) Only SCI-E index was used for the search queries.
(3) Only the articles were chosen according to the document type.
(4) The research areas were restricted only to 6 research areas (parasitology, tropical

medicine, microbiology, infectious diseases, immunology and general internal medicine).

Data Analysis

The journals, the authors and affiliations (institution or organization and country), the years that the articles were published, the citation numbers, the scientific categories, the keywords and automatically generated from the titles of the articles were all obtained using WoSCC.

The descriptive analysis of the publication years, citation counts, scientific categories, first authors, affiliations, nations, and journals was carried out using Microsoft Excel.

Statistical Analysis

The tables and graphs were created using Microsoft Word and Microsoft Excel, respectively. Data visualization was carried out using the VOSviewer 1.6.18 software (Leiden University, Leiden, The Netherlands) was used citation tree rings and lines to create the maps.

RESULTS

General features of the global articles

On the basis of the defined search, 31376 articles were extracted from the WoS database indexed in the SCI-E category, for the period 1970-2022. The earliest article was published in 1970 and the most of the articles were published in 2021 (n=1274). There was a growth in publications number since end of the 1970s (Figure 1). The annual number of publication was obviously related to publication year, and the correlation coefficient R2 reached 0.9466 (Figure 1).

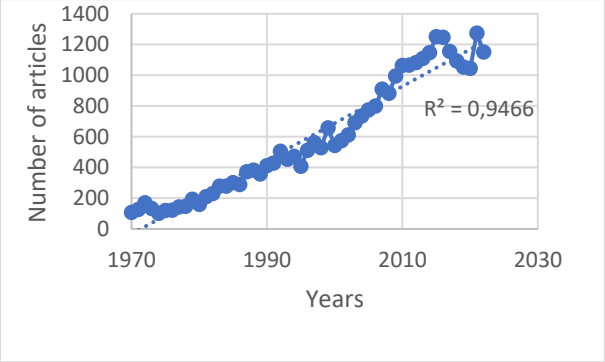

Figure 1. The growing number of the articles over the years.

A total 469 countries contributed the malaria literature. The United States of America (USA) (31.84%), England (18.57%) and France (9.99%) were the leading countries on the malaria literature according to the published article numbers (Figure 2).

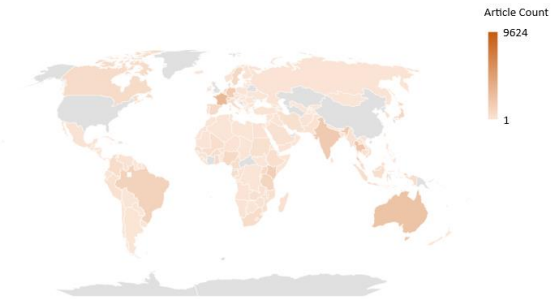

Figure 2. Global malaria research map

The vast majority of articles were from Parasitology, Tropical Medicine and Infectious Diseases research areas (Figure 3).

A total of 12014 affiliations/organisations globally contributed the global malaria research. The affiliations/organisations from England were ranked first in terms of according to the publication numbers (Table 1).

Table 1. Global ranking of affiliations/organisations on malaria research.

Affiliations/organisations	Record Count	% of 31376
University of London	2328	7.42
Udice French Research Universities	2077	6.62
London School of Hygiene Tropical Medicine	2044	6.51
University of Oxford	1841	5.87
Mahidol University	1479	4.71
Universite Paris Cite	1360	4.33
Le Reseau International Des Instituts Pasteur Riip	1252	3.99
National Institutes Of Health Nih Usa	1236	3.94
United States Department Of Defense	1232	3.93
Centers For Disease Control Prevention Usa	1214	3.87
University Of California System	1037	3.31
Walter Reed Army Institute Of Research Wrair	1019	3.25
Nih National Institute Of Allergy Infectious Diseases Niaid	997	3.18
Kenya Medical Research Institute	981	3.13
United States Army	960	3.06
Institut De Recherche Pour Le Developpement Ird	920	2.93
World Health Organization	867	2.76
Centre National De La Recherche Scientifique Cnrs	814	2.59
Institut National De La Sante Et De La Recherche Medicale Inserm	806	2.57
Minist HLTH	801	2.55
Institut Pasteur Paris	786	2.51
University Of Basel	748	2.38
Liverpool School Of Tropical Medicine	738	2.35
Swiss Tropical Public Health Institute	721	2.30
Indian Council Of Medical Research ICMR	700	2.23

*Showing 25 out of 12014 entries

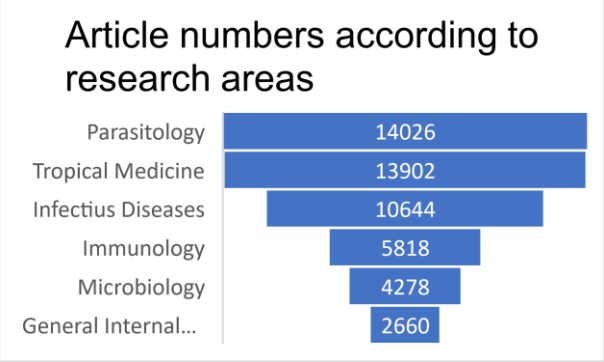

Figure 3. The summary of the article numbers according to research areas

General features of the articles from Türkiye

A total of 80 articles were retrieved according to search criteria. The articles were cited 1347 times totally and 17.75 times per article. The mean of H index was 18. The earliest articles were published in 1987 (8,9). The number of articles limited but since 2005 never dropped below two articles per year (Figure 4). The most of the articles were published in 2022 (n=9). Only 0.25% of the publications on malaria were made in Türkiye. Türkiye was ranking 71st place according to article numbers on malaria research in parasitology, tropical medicine, microbiology, infectious diseases, immunology and general internal medicine research areas (Table 2).

Harran University (18.75%), Erciyes University (10%) and Cukurova University (8.75%) were made the greatest contrubitions from Türkiye, according to search criteria (Table 3).

A total funding agency sponsored the Türkiye's publications on malaria (Table 4). Although funding agencies from different countries sponsored, the most sponsored funding agencies was the Scientific and Technological Research Council of Türkiye (TUBİTAK).

Table 2. Top 10 countries and Türkiye's place in the rankingon malaria research in parasitology, tropical medicine, microbiology, infectious diseases, immunology and general internal medicine research areas**.**

Ranking	Countries/Regions	Record Count	% of 31376
1	USA	10061	32.07
2	England	5824	18.56
3	France	3106	9.90
4	Australia	2362	7.53
5	Thailand	2112	6.73
6	India	1908	6.08
7	Switzerland	1883	6.00
8	Germany	1745	5.56
9	Kenya	1599	5.10
10	Netherlands	1516	4.83
71*	Türkiye	80	0.25

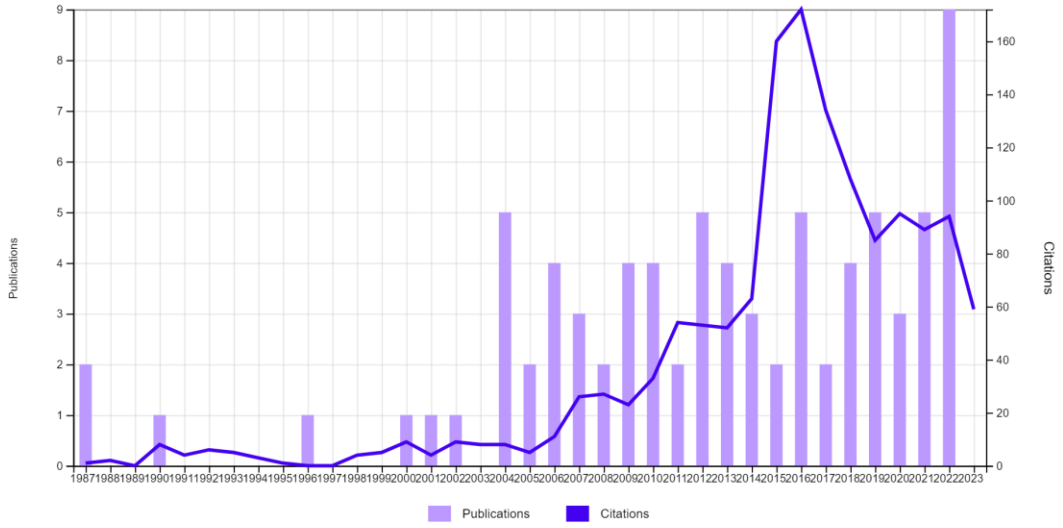

Figure 4. Number of articles and citations from Türkiye over the years.

Table 3. The ranking of affiliations/organisations on malaria research from Türkiye in selected research areas.

Affiliatons	Record Count	% of 80
Harran University	15	18.75
Erciyes University	8	10.00
Cukurova University	7	8.75
Ege University	7	8.75
Bezmialem Vakıf University	6	7.50
Celal Bayar University	5	6.25
Gülhane Military Medical Academy	5	6.25
Hacettepe University	5	6.25
Osaka University	5	6.25
Mersin University	4	5.00

*Showing 10 out of 200 entries

Table 4. The leading funding agencies of Türkiye's publications.

Funding Agencies	Record Count	% of 80
TUBİTAK	8	10.00
National Institutes of Health NIH USA	4	5.00
United States Department of Health Human Services	4	5.00
European Commission	3	3.75
Hitit University	2	2.50
Japan Society for the Promotion of Science	2	2.50
Ministry of Education Culture Sports Science and Technology Japan Mext	2	2.50
Ministry of Health Labour and Welfare Japan	2	2.50
National Natural Science Foundation of China	2	2.50
Near East University	2	2.50

*Showing 10 out of 51 entries

Mapping for article from Türkiye

In the publications made in Türkiye, cooperation has been made with authors from 17 different countries, mainly USA, Japan, China and Sweden (Figure 5).

262 researchers took part in the publications made in Türkiye, and Zeyrek FY (5 articles) were included in the publications at most. In the publications, it is seen that the cooperation between the authors is low (Figure 6).

The first five keywords used in publications in Türkiye were Malaria, *Plasmodium vivax*, Türkiye, *Plasmodium falciparum*, Nested-PCR (Figure 7).

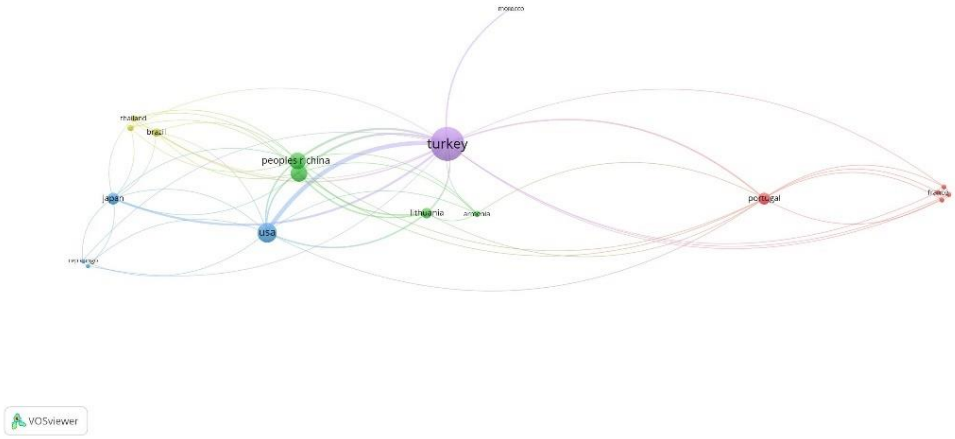

Figure 5: Collaboration map of authors from different countries involved in publications in Türkiye

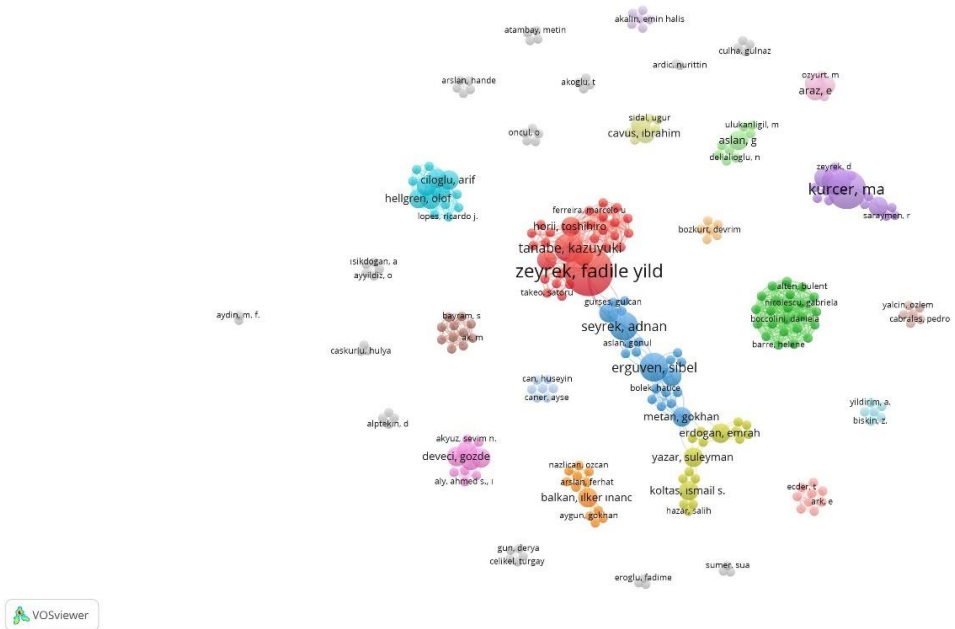

Figure 6. Collaboration map of authors in publications in Türkiye

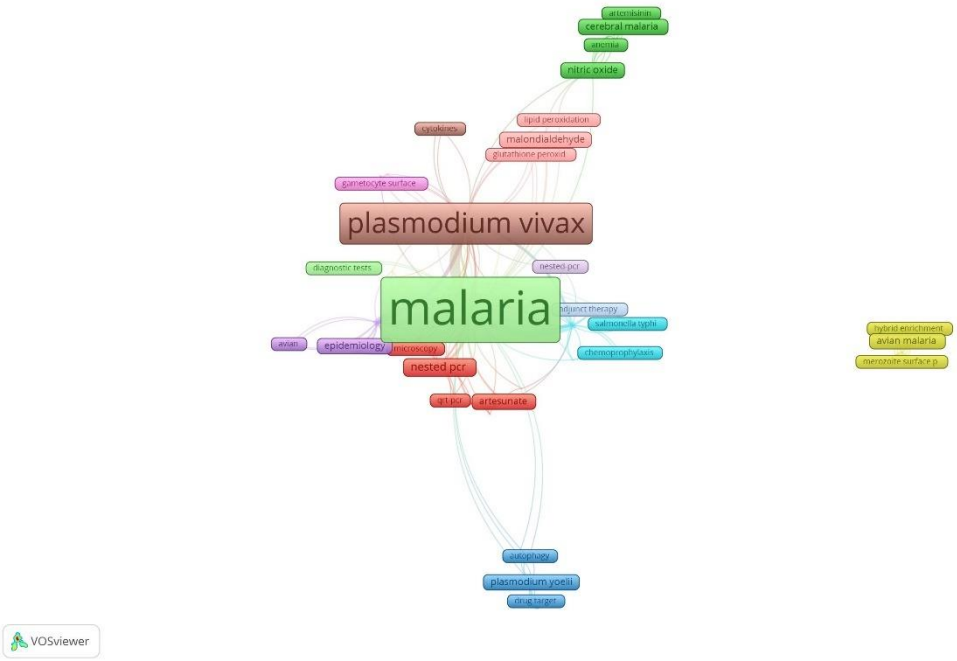

Figure 7. Map of keywords used in publications made in Türkiye

DISCUSSION

There have been a few bibliometric analyses of studies on malaria (10-16), but there is no similar study making a comparison with Türkiye. Studies conducted in the past, in particular on an analysis of global funding provided by research agencies for carrying out malaria research by different countries at different intervals of time, reveal that the country's research output and its quality heavily depend on the funds provided for research purposes (17, 18). This study aims to quantitatively analyze pertinent research using a bibliometric analysis in order to describe the evolution and experience of global malaria literature and make comparisons with Türkiye.

Even though the majority of prior studies (10-16) used databases like PubMed (web edition), MEDLINE, Scopus databeses etc. to analyze the global output of research on malaria in terms of disease burden, subfields of research, malaria vaccines, the amount and type of research conducted in developed and developing countries, the distribution of articles in journals, etc. We preferred WoS database and selected research areas.

Malaria has been an important health problem throughout history and has caused great harm to mankind, possibly leading to the destruction of many civilisations (19, 20). Today it is one of the world's major health problems. Throughout the world, public and private organisations interested in human health are prioritising studies on malaria. As a result, the number of studies on malaria is increasing, as is the number of publications on malaria in scientific

journals (21). With this study, it was understood that the increase in the number of publications was linear and the most publications were made in 2021. This result shows that malaria is still current worldwide and is still a serious health problem for humanity.

Malaria cases are mostly observed in some countries in Africa and Asia (22). In this study, however, it was understood that the USA and European countries were the countries that carried out the most studies on malaria. These countries are home to many international public and private organisations working to eradicate malaria. In addition, public and private organisations in these countries cooperate technologically, scientifically and politically to combat the disease (21). The efforts made in these countries in the past and present have not been without success. The global fight against malaria began in 1955 with a programme to eradicate mosquitoes using DDT. The programme covered the United States, southern Europe, the Caribbean and malaria-endemic areas of South Asia, but only three African countries (South Africa, Zimbabwe and Swaziland) were part of the programme. In 1975, the WHO announced that malaria had been eradicated from Europe and that all recorded cases were due to migration. After that year, malaria cases in Europe were linked to travel and migrants from endemic areas. Although the potential for the spread of malaria in Europe is very low, especially in the western and northern parts of the country, awareness of the disease needs to be raised and public health needs to be maintained at a high level to prevent the possibility of transmission to Europe (22). In addition, the fight against malaria in endemic areas should continue. The US and European countries are at the forefront of malaria research because of this awareness.

Malaria has been an epidemic in Anatolia throughout history and played a major role in the collapse of many ancient civilisations on the Aegean and Mediterranean coasts. Malaria continued to be a public health problem during the Ottoman Empire (23, 24). During the Balkan War and the First World War, almost three quarters of the population were reported to have malaria (25). The Ottoman Army suffered the most from malaria among many other factors during the First World War (24). During the War of Independence, due to the prevalence of malaria, the crops in the fields could not be harvested and flour or bread could not be sent to the soldiers fighting at the front. Immediately after the proclamation of the Republic (1924), anti-malaria programmes were prepared and the legal, organisational and material requirements necessary for the effective implementation of this programme were fulfilled. There were three major epidemics in Türkiye after the proclamation of the Republic. The first was between 1929 and 1944. During this period, the number of registered cases reached its peak in 1932 with

72500. After this year, the increase in the number of cases stopped and even started to decrease. However, a second epidemic began in 1939, the start of the Second World War, and the number of registered cases rose to 146000 in 1942. It was not until 1947 that this epidemic was brought under control. After that year and until 1975, the number of cases remained low and relatively stable (23). Past outbreaks show that even though malaria is under control in Türkiye, there is a potential for new outbreaks to occur. In Türkiye, an average of 200-250 cases of malaria of foreign origin are reported each year. On average, 1-4 people die each year from *P. falciparum* malaria of foreign origin. Most foreign cases acquire the parasite from African countries where malaria is endemic, such as Sudan, Nigeria, Equatorial Guinea, Uganda, Gabon and Ghana. *P. vivax* infections, which account for about 20 per cent of foreign malaria cases, are mostly acquired in countries such as Iran, Pakistan and Afghanistan (26). Türkiye has achieved a 99% reduction in malaria, from 11,381 cases in 2000 to nine relapses in 2010, thanks to its effective malaria control programme (27). There have been no locally acquired cases reported in Türkiye since 2010, but a locally acquired malaria case was reported in a patient with leukemia in 2023 (28).

This study shows that at least two studies per year have been conducted in Türkiye since 2005, and Türkiye ranks 71st in the world in this area. Harran University was identified as the university where the most studies were conducted. Migration from malaria endemic regions, the disappearance of physical borders between urban and rural areas, global climate change, the construction of many dams and the transition to irrigated agriculture, and the resistance of mosquitoes to insecticides and of the parasite to antimalarial drugs are increasing the possibility of malaria epidemics every day. For this reason, Türkiye should increase malaria awareness and continue to work on malaria in order not to lose the gains made in the fight against malaria in the past.

CONCLUSION

In conclusion, to enhance the impact of malaria research in Türkiye, it is advisable to promote national collaboration between basic research and clinical research institutes. This can be achieved through increased financial support from funding agencies for national collaborative research projects and fostering extensive international collaboration.

Limitations

This research has several limitations. It was not feasible to read all of the published articles in their entirety in order to offer further details. The options provided by database applications also place restrictions on the types of factors that may be examined in bibliometric research. Future research may examine other databases besides Thomson Reuters Web of Science. The

amount of citations and publication frequency in trachoma may be impacted by the fact that the present study only utilized one database search (WoS). We restricted the scope of our investigation by excluding non-English literature and papers that were not included in the WoS database. The documents other than search criteria were not included in the study and we did not make content analysis.

Ethics Committee Approval: The study complied with the Helsinki Declaration, which was revised in 2013. Ethics committee approval is not required as there is no human or animal research

Peer-review: Externally peer-reviewed

Author Contributions: Concept: SA, AE, HD, Design: SA, SA, Data Collection and Processing: SA, SA, AE; HD, Analysis and Interpretation: SA, SA, AE; HD, Writing: HD, SA, SA

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 42-49**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1396927

Otologic Symptoms and Quality of Life in Individuals with Temporomandibular Disorders: A Cross-Sectional Study

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Received: 28 October 2023, Accepted: 03 March 2024, Published online: 28 March 2024

Abstract

Objective: Temporomandibular disorder (TMD) occurs as a result of alterations in the masticatory muscles and temporomandibular joint (TMJ). Otologic symptoms such as earache, hearing loss, and tinnitus may be observed in TMD patients and may impair quality of life (QOL). This paper aims to evaluate the frequency of otological symptoms, and their association with QOL in TMD patients.

Methods: The archival records of patients who applied to the Maxillofacial Surgery Clinic of Ordu University with TMD complaints between December 2022 and August 2023 were reviewed retrospectively. Demographic data, otological symptoms such as tinnitus, hearing loss, and earache, and Visual Analog Scale (VAS) scores regarding QOL and masticatory efficacy were recorded.

Results: One hundred-four patients (83 females, 21 males), with a mean age of 35.75 ± 15.09 years were included. No significant differences were observed among patients with/without earache, tinnitus, and hearing loss in terms of QOL and masticatory efficiency scores ($p > 0.05$), except significant difference between patients with/without tinnitus in terms of QOL ($p < 0.01$). No significant differences were observed between genders in QOL and masticatory efficiency scores ($p > 0.05$).

Conclusion: The frequency of otologic symptoms in TMD patients is high and tinnitus significantly impacts the QOL. For the optimum management of TMD patients with otological symptoms a multidisciplinary approach with dental clinicians and otolaryngologists should be performed.

Keywords: Otolaryngology, Quality of Life, Temporomandibular Disorders, Tinnitus

Suggested Citation: Torul D, Ömezli MM, Yılmaz MF. Otologic Symptoms and Quality of Life in Individuals with Temporomandibular Disorders: A Cross-Sectional Study Mid Blac Sea Journal of Health Sci, 2024;10(1):41-48.

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Note: This study was presented at the 30th Turkish Association of Oral and Maxillofacial Surgery (TAOMS) congress.

INTRODUCTION

Temporomandibular disorder (TMD) is a musculoskeletal disorder that affects the temporomandibular joint (TMJ), masticatory muscles, and surrounding bone/soft tissue components (1,2). TMD is more frequently seen between the second and fourth decade, and predominantly in women (3,4). TMD prevalence is reported to be >5%. TMD is suggested to have multifactorial etiology and may be associated with parafunctional habits, hormonal effects, trauma, and internal derangements (2,5). TMD symptoms include pain, joint noise, limitation, and deviation in mandibular movements. Otological symptoms like earache, hearing loss, tinnitus, vertigo, fullness, and dizziness may also be observed (6,7).

The earlier reports about the relationship between TMJ and otological symptoms were reported by Wright and Manson in the early 1920s (8,9). Wright mentioned that hearing loss may develop as a result of posterior displacement of the condyles due to the abnormal relationship between the maxilla and mandible (8). Manson corrected the position of the mandible using dentures in a patient with buzzing in the ears and improved the patient's hearing (9). Decker evaluated 6 cases of hearing loss in 1925 and stated that after the relationship between the maxilla and mandible was restored correctly, hearing improved in all patients except 1 case (10). Goodfriend established a relationship between the tinnitus incidence and dysfunction in the stomatognathic system in 1933 (11,12).

In the following years, various pathophysiological mechanisms have been reported to explain the relationship between TMD and otological symptoms. Costen et al. named the association of otological complaints and temporomandibular dysfunction as Costen's Syndrome in 1934 and suggested that temporomandibular deformity leads to eustachian tube compression, the chorda tympani and/or auriculotemporal nerve compression, leading to the development of otological symptoms (13,14). Myrhaug et al. stated that as a result of biting anomalies, the tensor tympani-tensor veli palatini muscles, stimulated by the 5th cranial nerve, are affected along with the masticatory muscles. It has been reported that tensor tympani contraction affects the tympanic membrane (15). Through anatomical dissections, Pinto suggested a tiny ligament between the neck of the malleus to the capsule of the temporomandibular joint, joint disc, and sphenomandibular ligament. It has been stated that this ligament can move the ossicular chain and tympanic membrane in patients in whom the TMJ capsule or disc moves (16). Komori stated that this tiny ligament consists of 2 ligamentous structures. However, no movement was found in these structures that could lead to otological symptoms (17). Loughner stated that the

anterior malleolar ligament might cause middle ear damage through the sphenomandibular ligament, and this possibility is higher than the disco-malleolar ligament (18).

The frequency of otological symptoms in TMD patients has been evaluated in many studies (19-24). However, studies evaluating the relationship between otological symptoms and quality of life (QOL) are limited and focused on tinnitus (25,26). The purpose of this study was to evaluate the frequency of otological symptoms and their relationship with QOL in patients with TMD.

METHODS

In this study with a cross-sectional design, the archival records of patients admitted to the Maxillofacial Surgery Clinic between December 2022 and August 2023 with TMD complaints were analyzed retrospectively. The study design was approved by the University Ethics Committee (No:2023/259) and was conducted in accordance with the ethical standards specified in the Helsinki Declaration. Patients with complete archival records were included, while the records of patients who had undergone surgery in the maxillofacial region, who had received radiotherapy and/or chemotherapy, who had undergone neurosurgical operation, and who had undergone otorhinolaryngology-related operations were excluded.

The archival records of the patients were examined and demographic data, otologic symptoms (tinnitus, hearing loss, ear pain), QOL, and masticatory efficiency data were recorded. The otological symptoms of the patients were recorded based on the patient reports during the examination process. Patients were asked whether they had ear pain, hearing loss, and tinnitus and yes or no answers were recorded in the patient chart. Similarly, QOL and chewing efficiency were evaluated during clinical examination using the 0-100-point Visual Analog Scale (VAS) in which 0 indicated the lowest QOL and masticatory efficiency, while 100 showed the highest QOL and chewing efficiency.

Statistical Analysis

Statistical analyses were performed with SPSS (version 20.0, IBM Corp, Armonk, NY). The normality of the data was evaluated with Kolmogorov-Simirnov test. The data were presented for continuous variables as mean±standard deviation. Numbers/percentages were given for categorical variables. The Mann-Whitney U test was used to compare VAS scores among genders and patients with /without otologic symptoms. $p<0.05$ was considered as significant.

RESULTS

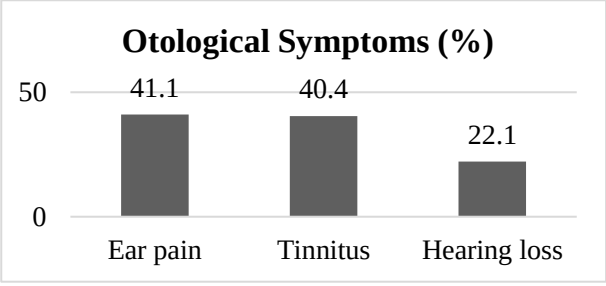
One-hundred-four patients (83 females, 21 males) with a mean age of 35.75 ± 15.09 years were included in the study. While 52 patients

(40%) reported no otological symptoms, 62 patients (60%) reported at least one of the otological symptoms (Table 1). The most frequent otological symptom was earache (n = 43, 41.1%), followed by tinnitus (n = 42, 40.4%) and hearing loss (n = 23, 22.1%) (Graph 1).

No significant differences were observed among patients with/without earache, tinnitus, and hearing loss in terms of QOL and masticatory efficiency scores ($p > 0.05$), except significant difference between patients with/without tinnitus in terms of QOL ($p < 0.001$) (Table 2). Between genders regarding QOL and masticatory efficiency no significant differences were observed ($p > 0.05$) (Table 3).

Table 1. Demographic characteristics of patients and prevalence of otological symptoms

Demographic Data		
Age (year)		35.75 ± 15.09
Gender	**Female (n)**	83
	Male (n)	21
Otological Symptoms		
n (%)		62 (60)



Graph 1. Distribution of patients regarding otological symptoms

Table 2. Comparison of quality of life and masticatory efficiency scores according to otological symptoms

Otologic Symptoms		VAS score		P*
Ear pain	**no**	VAS-q	54.34 ± 26.85	0.087
	yes	VAS-q	45.81 ± 24.99	
	no	VAS-m	55.98 ± 29.56	0.244
	yes	VAS-m	49.06 ± 28.45	
Hearing loss	**no**	VAS-q	51.91 ± 25.74	0.493
	yes	VAS-q	46.95 ± 28.51	
	no	VAS-m	52.28 ± 29.41	0.592
	yes	VAS-m	56.08 ± 29.5	
Tinnitus	**no**	VAS-q	57.74 ± 24.92	**<0.001**
	yes	VAS-q	40.59 ± 25.80	
	no	VAS-m	56.61 ± 28.33	0.157
	yes	VAS-m	47.97 ± 30.34	

*: Mann Whitney U test, VAS-q: Quality of life, VAS-m: Masticatory efficiency

Table 3. Comparison of quality of life and masticatory efficiency scores according to gender

VAS/Gender		VAS score	P*
VAS-q	Female	49.21 ± 27.38	0.269
	Male	57.14 ± 21	
VAS-m	Female	51.50 ± 28.97	0.297
	Male	59.52 ± 30.57	

DISCUSSION

The frequency of otological symptoms in patients with TMD and their relationship with QOL and masticatory efficiency were evaluated in the present study. Otological symptoms were observed in 60% of patients presenting with TMD. The most common otological symptoms were earache (41.1%) and tinnitus (40.4%), followed by hearing loss (22.1%).

The presence of otological symptoms in patients with TMD has been evaluated in many studies and different results have been obtained

(20-24). Cooper et al. found that 79% of the patients with TMD evaluated had otological symptoms. Otalgia and tinnitus were the most common symptoms with 53%, while hearing loss was found in 22% of patients (21). Tüz et al. observed that 77.5% of patients with TMD had at least one otological symptom and the most common symptoms were otalgia (50%) and tinnitus (45.5%), respectively. Hearing loss was found in 23.5% of the patients (22). Kusdra et al. studied the relation between otological symptoms and TMD and discovered that 87% of TMD patients developed such symptoms. The most common symptoms were tinnitus (42%) and ear fullness (39%) (20). Felicio et al. reported otological symptoms in individuals with TMD as ear fullness (90%), earache (65%), and tinnitus (60%), respectively (24). Toledo et al. published a systematic review including 8 studies and reported the most frequent otological symptoms associated with TMD as ear fullness (74.8%), ear pain (55.1%), and tinnitus (52.1%), respectively (23). The presence of otological symptoms in patients with TMD may vary in different studies. It is thought that the diagnosis of TMD and otological symptoms using different methods is the probable cause of this result.

Tinnitus can be defined as an imaginary auditory experience that develops in the absence of external auditory stimuli (27). In this study, tinnitus was seen in 40.4% of the patients presenting to the clinic with TMD. Chole et al. reported tinnitus in 59% of the patients in the TMD group and found that TMD was significantly associated with tinnitus (28). In other studies, tinnitus in TMD patients was reported to be 36.6% (29) and 30.4% (30). In a systematic review of 22 studies, Skog et al. found that the frequency of tinnitus in TMD patients ranged from 3.7% to 70% (31).

In this study, the relation between otological symptoms and QOL was evaluated using the VAS, and a significant difference was seen in terms of QOL in patients with and without tinnitus. In the literature, studies evaluating the effect of otological symptoms on QOL are limited (25,26). Lacerda et al. explored the relationship between tinnitus and QOL in patients with TMD with the Tinnitus Handicap Inventory (THI) and reported that tinnitus had a moderate effect on QOL (25). Calderon et al. evaluated the relationship between tinnitus and pain intensity and QOL in their study. The Oral Health Impact Profile (OHIP) scale was used to assess QOL, and it was reported that pain was more effective on QOL than tinnitus (26).

Some limitations need to be considered when interpreting the results. The sample size was too limited to generalize the findings, and the distribution of data by gender was unbalanced. Due to the retrospective design of the study, otological symptoms were evaluated through archival records, and audiological tests were not used. The timing of the occurrence of TMD and otological symptoms could not be

determined. VAS is used for the evaluation of masticatory efficiency which is a subjective method.

CONCLUSION

The present study suggests that the frequency of otologic symptoms in TMD patients is high and tinnitus has a significant effect on the QOL. For the optimum management of TMD patients with otological symptoms a multidisciplinary approach with dental clinicians and otolaryngologists should be performed.

Ethics Committee Approval: Approval for the study was obtained Ordu University Clinical Research Ethics Committee with the decision number 2023/259.

Peer-review: Externally peer-reviewed

Author Contributions: Concept: DT, MMO, MFY, Design: DT, MMO, MFY, Data Collection and Processing: MFY, Analysis and Interpretation: DT, Writing: DT, MMO, MFY

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 50-58**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1398018

Relationship Between Abdominal Aortic Aneurysm and Inflammatory Markers

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Received: 29 October 2023, Accepted: 17 January 2024, Published online: 28 March 2024

Abstract

Objective: In this study, we aimed to investigate the relationship between abdominal aortic aneurysm and systemic immune inflammation index (SII), neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR) and other inflammatory markers, especially those derived from complete blood count.

Methods: Retrospectively, 72 consecutive patients admitted to our clinic for Abdominal Endovascular Aneurysm Repair (EVAR) for abdominal aortic aneurysm (AAA) between January 2019 and January 2022 were included in the study. Routine blood samples were taken before EVAR operation. NLR, PLR, SII of the patients were calculated and, RDW, Mean Platelet Volume (MPV), C-reactive protein values and other laboratory tests were recorded. They were compared with an age-matched control group.

Results: The age of the patients included in the study was 67.7 ± 10.6 years and the majority were male. The frequency of hypertension and coronary artery disease was also higher. In the comparison of hematologic parameters with the control group, MPV was 10.4(9.6-11.2) versus 9.5(8.6-10.1), p<0.001; CRP was 5(1.625-42.135) versus 3.21(2.08-4.75), p=0.04, NLR was 3.46(2.15-6.69) versus 2.29(1.65-2.78), p<0.001. SII was 682.54(417.08-1522.72) versus 558.22(405.33-711.31), p=0.02. The most significant association with the presence of ascending aortic aneurysm was observed between NLR.

Conclusion: Inflammatory markers, CRP, SII, NLR, MPV are significantly higher in patients with AAA. In patients with AAA, the association between aneurysm and NLR appears to be better. When following up these patients, it may be especially useful to look at CRP, SII, NLR, MPV levels.

Keyword: Aortic Aneurysm, Systemic İmmune İnflammation İndex, Neurophil Lymphocyte Ratio

Suggested Citation: Bektaş O, Ürkmez M. Relationship Between Abdominal Aortic Aneurysm and Inflammatory Markers Mid Blac Sea Journal of Health Sci, 2024;10(1):50-58.

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INTRODUCTION

Aortic aneurysm is a progressive and degenerative disease characterised by an increase in the cross-sectional diameter of any segment of the aorta of at least 50% above the cross-sectional diameter required for the age and body surface area of the individual (1). Today, it is still increasing in frequency and continues to cause morbidity and mortality. The risk factors involved in aneurysm formation and development are quite similar to the risk factors associated with coronary artery disease (2).

There are many cytokines that have local and systemic effects in the etiopathogenesis of aortic aneurysm and have been shown to be associated with medial degenerative changes. In the pathogenesis, lymphocytes and protease activity, macrophages and IL 6 were found to be involved as the source of proinflammatory cytokines (3). Therefore, it is emphasized that aortic aneurysm is an inflammatory response. It has been observed that inflammation is important not only in the formation of cardiovascular diseases but also in the complications that may occur later (4). Therefore, we aimed to investigate the relationship between Systemic immune inflammation index (SII), Neutrophil-to-lymphocyte ratio (NLR), C Reactive Protein (CRP) and Platelet-to-lymphocyte ratio (PLR), MPW, RDW and abdominal aortic aneurysm.

METHODS

Baseline clinical data were obtained retrospectively by reviewing the records of 72 consecutive patients who underwent computed tomography angiography of the aorta, were diagnosed with abdominal aortic aneurysm (AAA) and scheduled for Abdominal Endovascular Aneurysm Repair (EVAR) between January 2019 and January 2022 in our center. Patients with active systemic infections, malignant tumors, hematopoietic system disorders or known autoimmune diseases that may affect peripheral blood cells were excluded.

Biochemical analysis

Complete blood counts and biochemical parameters were examined in the venous blood samples taken from the antecubital vein. Complete blood count analyzes were performed with the same device, which was checked and maintained at regular hourly intervals in the central laboratory. Blood samples were collected in standard tubes containing a fixed amount of ethyl diamine tetra acidic acid. A complete blood count was measured within one hour following blood sample collection.

Neutrophil to lymphocyte ratio (NLR) was calculated by dividing neutrophil count by lymphocyte count, and platelet to lymphocyte ratio (PLR) was calculated by dividing platelet count by lymphocyte count. Systemic immune inflammation index (SII) was calculated by

multiplying the platelet count by NLR (5). The data obtained were compared with the age-matched control group.

All patients included in the study undervent 2D transthoracic echocardiographic (TTE) evaluation performed by an experienced cardiologist. (Philips, iE33, the Netherlands). Left ventricular (LV) end-systolic dimension, end-diastolic dimension and wall thickness were measured according to the guidelines of the American Society of Echocardiography. LV end-systolic and end-diastolic volumes and ejection fraction were measured from the apical four--chamber view and two-chamber views using the modified Simpson's method.

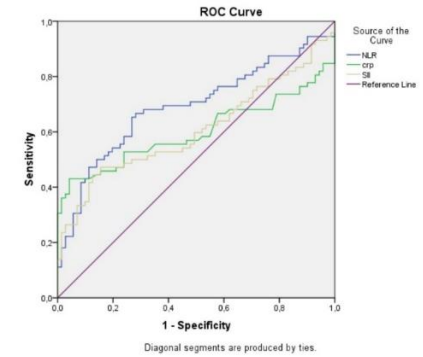
Our study was approved by the local ethics committee and institutional review board. In addition, our study was consistent with the Declaration of Helsinki.

Statistical analysis

Data were analyzed using SPSS 22.0 (SPSS Inc., Chicago, Illinois, USA). The categorical variables were expressed as the number with a percentage (n%). Chi-square analysis was used to compare categorical variables. The normality of the data was tested using the Kolmogorov Kolmogorov-Smirnov test. Variables are expressed as mean ± standard deviation (SD) and median (25th, 75th percentile) as appropriate. Significance test (independent t-test) and Mann-Whitney U test were used to compare the research and control groups based on the normality of the data. Receiver operating characteristic (ROC) curve analyses were performed to obtain the area under the curve (AUC) of NLR, CRP, and SII to determine the best diagnostic performance.

RESULTS

A total of 72 patients, 54 of whom were male, and 75 control groups were included in the study. The age of the patients was 67.7 ± 10.6 years, and the majority were male. The frequency of hypertension and coronary artery disease was also higher. Demographic data of the patient and control groups are summarized in Table 1. In the comparison of hematologic parameters with the control group, MPV was 10.4(9.6-11.2) versus 9.5(8.6-10.1), p<0.001; CRP was 5(1.625-42.135) versus 3.21(2.08-4.75), p=0.04, NLR was 3.46(2.15-6.69) versus 2.29(1.65-2.78), SII was 682.54(417.08-1522.72) versus 558.22(405.33-711.31), p=0.02 (Table 2). The most significant association with AAA was found to be with NLR (Figure 1.).



Area Under the Curve

Test Result Variable(s)	Area
NLR	,691
crp	,599
SII	,607

The test result variable(s): crp has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

Figure 1. Diagnoal segments are produced by ties

Table 1. Demographic data

Variable	EVAR +, n=72	Control, n=75	p value
Age (years)	67.7 ± 10.6	62.8 ± 11.5	0,112
Gender (male) n(%)	54 (75)	41 (54,7)	0,008
Hypertension n(%)	58 (80,6)	22 (31)	<0.001
DM, n(%)	20 (27,8)	25 (33,3)	0,219
Smoking n(%)	39 (54,2)	39 (52)	0,95
CAD n(%)	39 (54,2)	5(7)	<0.001

CAD: Coronary artery disease, DM: Diabetes mellitus, EVAR: Abdominal endovascular aneurysm repair

Table 2. Hematological and laboratory data of the study population

Variable	EVAR +, n=72	Control, n=75	p value
Hemoglobin (g/dl)	13.65(11.77-14.65)	14.3(12.8-15.6)	0,002
Hematocrit (%)	40.7(35.85-43.47)	42.9(38.2-46.4)	0,004
WBC (10^9/L)	8.42(7-10.54)	7.24(5.82-8.7)	0,01
Neutrophil (10^9/L)	6.13(3.75-8.39)	4.45(3.5-5.3)	<0.001
Lymphocyte (10^9/L)	1.6(1.055-2.27)	1.9(1.5-2.34)	0,03
Platelet (10^3/L)	194.5(155-253.75)	244(201-288)	0,002
MPV (fL)	10.4(9.6-11.2)	9.5(8.6-10.1)	<0.001
RDW (%)	13.85(13.2-14.6)	13.4(12.9-14.3)	0,066
Creatinine (mg/dl)	0.96(0.84-1.17)	0.86(0.73-0.94)	<0.001
CRP (mg/dl)	5(1,625-42,135)	3.21(2.08-4.75)	0,04
NLR	3.46(2.15-6.69)	2.29(1.65-2.78)	<0.001
PLR	130.18(96.55-176.88)	126.43(94.81-170.50)	0,552
SII	682.54(417.08-1522.72)	558.22(405.33-711.31)	0,02
EF (%)	60(51.5-60)	55(50-60)	0,378

WBC: White blood cell, MPV: Mean platelet volume, RDW: Red blood cell distribution width, CRP: C-reactive protein, NLR: Neutrophil to lymphocyte ratio, PLR: Platelet to lymphocyte ratio, SII: Systemic inflammation index, EF: Ejection fraction

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DISCUSSION

When the results of our study were evaluated, CRP, MPV, NLR and SII were found to be significantly increased among inflammatory markers in patients with AAA. It suggests that these biomarkers have an impact on the development of AAA and may also guide its treatment.

Aneurysm advancement is multifactorial in nature, with both a genetic predisposition and natural components acting together to initiate a cascade of arterial degradation. An vital portion part of aneurysm improvement is the ubiquitous inflammatory cell infiltrate, which has been illustrated in all abdominal aortic aneurysms. In spite of the fact that this inflammation is more articulated in 'Inflammatory AAAs' current understanding favours one pathological process with changing degrees of inflammation rather than the distinct clinical entity first proposed by Walker. A modern think about has certified this hypothesis by illustrating indistinguishable HLA alleles working in both inflammatory and degenerative AAA, supporting the concept of a common immune-mediated pathogenesis.

Ordinary aortic tissue contains few on the off chance that any provocative cells in differentiate to AAA tissue extricate which demonstrate gross inflammatory changes. Koch et al. illustrated that aortic inflammation existed as a progressive continuum from generally

noninflammatory to inflammatory AAA. This more prominent understanding of the pathophysiology has fortified intrigued in focused on pharmacotherapy pointed at both lessening inflammation activity to diminish aneurysm growth.(6) These studies and hypotheses show the relationship between Inflammation and AAA, but also show the importance of our study.

In recent years, many studies have found that inflammatory markers, which are biomarkers that are easy to calculate from complete blood count data and require no additional cost, predict prognosis and survival in many different diseases. Previous studies have shown that AAA dilatation is associated with coronary artery disease, ischemic stroke, acute myocardial infarction, and cardiovascular mortality (7). Because of the similarity in the pathophysiology of these diseases, it is not surprising that there is evidence that AAA is an inflammatory process, including histologic evidence supporting the presence of lymphocytes and macrophages and inflammatory cytokines observed in the adventitia layer in patients with abdominal aortic aneurysms (8-9). In a study examining patients with AAA and chronic aortic dissection, elevated hs-CRP levels and increased white blood cell levels are another indicator of the presence of an inflammatory condition (10). Like these studies, in our study, CRP and white blood cells were significantly higher in patients with AAA.

Mean platelet volume (MPV) is considered an indicator of platelet activity and aggregation capacity (11). High MPV values have been found to be associated with atherothrombotic disorders such as atherosclerosis, myocardial ischemia, and cerebrovascular events (12). Many studies have shown that MPV can be used as a diagnostic marker for inflammatory disorders (13-14). In our study, the MPV value was significantly higher in patients with AAA. This finding seems to be important in confirming the relationship of AAA with inflammation.

Markers derived from complete blood count such as PLR, NLR, SII index have been found to be associated with cancer prognosis (15-16), cardiovascular diseases (17) and all-cause mortality (18-19).

In cardiovascular diseases, neutrophils secrete inflammatory mediators that can cause vessel wall degeneration (20). Neutrophilia has been associated with prothrombotic conditions accompanied by plaque disruption, direct endothelial cell damage and microvascular occlusion, increased blood viscosity and hypercoagulability (21). Additionally, there are some studies showing a negative correlation between neutrophil catalase activity and aortic size. This suggests that neutrophils have an important role in aneurysm formation (22). On the other hand, lymphocytes have an

antiatherosclerotic role as they regulate the inflammatory response (23). Low lymphocyte count reflects adverse physiological stress levels and is associated with worse cardiovascular outcomes (24). Considering these results in the literature, it is very valuable that the best association with AAA was determined by the NLR value in our study. In another study demonstrating the value of NLR in patients with AAA, Kordzadeh et al. showed that preoperative NLR was an independent predictor of 30-day morbidity, independent of gender, AAA size, blood loss, length of hospital stay, and comorbidities (25-26). One of our findings that will support these studies is that the SII index, calculated in relation to NLR, was found to be significantly higher in patients with AAA.

The limitations of our study are that it was retrospective as in many previous studies, it was single centered, and the number of patients was small.

CONCLUSION

In conclusion, beyond these limitations, our results suggest that CRP, NLR, MPV and SII are associated with AAA. It may be useful to evaluate these inflammatory markers derived from routine blood samples in the follow-up and treatment of patients.

Ethics Committee Approval: Ethics Committee Approval: Ethics approval for this study was obtained from the Ordu University Senate Ethics Committee (ethics committee date: 23.06.2023, ethics committee number: 172).

Peer-review: Externally peer-reviewed

Author Contributions: Concept: OB, MÜ, Design: OB, MÜ, Data Collection and Processing: OB, MÜ, Analysis and Interpretation: OB, MÜ, Writing: OB, MÜ

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 59-70**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1399632

Assessment of Quality of Lıfe in Patients with Anorectal Malformations

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Received: 03 December 2023, Accepted: 25 December 2024, Published online: 28 March 2024

Abstract

Objective: Our main purpose in this study is to examine the effects of patients on their quality of life (QOL) according to anorectal malformations (ARM) types, and to compare them to patients with stool incontinence in the healthy population.

Methods: The research group was selected from 116 patients who were operated due to ARM between 2004-2018 and fulfilled the inclusion criteria, in University of Health Science İzmir Dr. Behçet Uz Pediatric Diseases and Surgery Training and Research Hospital. The control group was composed of 12 participants among 348 children between the ages 5-15 who were operated for phimosis in 2018 -2019. Fecal Incontinence Related Life Quality Questionnaire (QQVCFCA) scales were applied to both groups. SPSS 22.0 program was used.

Results: The research group was completed with 75 participants and the control group with 12 participants. The QQVCFCA score of the low-type ARM was significantly higher than the participants with the high-type ARM ($p < 0.001$). The QQVCFCA score was lower in patients with additional anomalies, poor physical examination, presence of fistula and ongoing problems. There was no significant difference between the study group and the control group in terms of QQVCFCA score. However, high type ARM patients were found to have lower QQVCFCA ($p < 0.001$) scores than the control group.

Conclusion: QOL results of high-type ARM patients were significantly higher than low-type ARM. While there is no significant difference in quality of life as total score; In behavior, lifestyle, and depression subtypes, the results were worse than the control group.

Keyword: Anorectal Malformation, Quality of Life, QQVCFCA

Suggested Citation: Altınok V, Temir ZG. Assessment of Quality of Lıfe in Patients with Anorectal Malformations Mid Blac Sea Journal of Health Sci, 2024;10(1):59-70.

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INTRODUCTION

Anorectal malformations (ARM) constitute a group of diseases known for centuries, primarily affecting the urogenital system and other systems. These are rare anomalies, with an average incidence of approximately 1 in 4,000-5,000 live births, as reported in various publications (1-3). While present in both genders, they are slightly more prevalent in males. There is evidence of familial predisposition and genetic susceptibility (4-8). The etiology is uncertain, and it is considered to be multifactorial (9). Fecal incontinence following surgical treatment is a distressing condition that impairs the quality of life, affecting both patients and their families. Despite surgical intervention in ARM patients, they often experience lifelong issues related to defecation (10-13)

In patients with ARM, the sphincter mechanism is variably affected. Striated muscles may be underdeveloped or completely normal. Sensation and proprioception are impacted to varying degrees. Constipation is a significant issue in patients where the rectosigmoid colonic innervation is preserved during surgery. It is the most commonly encountered problem postoperatively, more frequently observed in patients with a low-type ARM. Megarectosigmoid colon may develop due to constipation, leading to further impairment of bowel movement and overflow fecal incontinence. Soiling, a less common manifestation, represents a leakage of stool in a smearing pattern and occurs more rarely than constipation (14).

Despite numerous classifications, the anatomical classification proposed by Stephens and Smith in 1984, known as the Wingspread classification, has been the most comprehensible and widely used until recent times. Based on the relationship of the blind end of the rectum with the levator muscles, this classification divides anorectal malformations into three main groups: high type (supralevator), low type (infralevator), and intermediate type. The most common type in males is rectobulbar fistula, while in females, rectovestibular fistula ranks first (Table 1) (15).

Table 1. The Wingspread classification in anorectal malformations (ARM)

	High	Intermediate	Low	Unclassifiable
Female	Fistula-free anorectal agenesis Rektovaginal fistula	Rektovestibula fistula Rektovaginal fistula	Anovestibular fistula Anocutaneous fistula Anal stenosis	Rare malformations Persistan cloaka
Male	Fistula-free anorectal agenesis	Rectrourethral fistula Fistül-free anal agenezis	Anocutaneus fistula Anal stenosis Anovestibular fistula	Rare malformations

In anorectal malformations, the overall incidence of associated anomalies is known to range between 25% and 75% (16). Particularly, genitourinary system anomalies are quite common. While approximately 60% of high

and intermediate-type ARM cases exhibit genitourinary malformations and vesicoureteral reflux, the frequency of genitourinary malformations in low-type ARMs is only about 15-20% (17). Cardiovascular anomalies are also frequent in association with ARM. Anomalies such as ventricular septal defects (VSD) and Tetralogy of Fallot are present in 22% of cases (4, 18). Vertebral anomalies, on the other hand, are more commonly related to the sacrococcygeal region, including conditions like sacral agenesis and spina bifida. Tethered cord is the most common spinal anomaly associated with ARM (19). Gastrointestinal system anomalies also frequently accompany ARM, with esophageal atresia observed in 10% of cases (20).

The primary objectives in the examination, imaging, and laboratory studies for anorectal malformations are to understand the type of atresia, demonstrate any existing fistula, and detect additional anomalies. The success of surgical treatment is closely associated with the presence of concurrent anomalies, the chosen surgical technique, and particularly the innervation status of the anorectal region (21,22).

The PSARP (Posterior Sagittal Anorectoplasty) technique, developed by Pena and de Vries in 1982 and currently employed as the standard surgical approach for ARM treatment worldwide, is recognized for its enhanced preservation of sphincter muscles and perirectal nerves (23).

Despite the successful implementation of treatment in children with anorectal malformations, issues such as constipation, fecal incontinence, and soiling may manifest in the subsequent period. These problems can lead to consequences that impact the child's social life, school, friendships, home, and family relationships (24-26).

In this study, our primary objective is to investigate the quality of life in patients with ARM who have undergone surgery and completed definitive operations at our clinic, based on ARM subtypes. Additionally, we aim to compare these patients with individuals from a healthy population who experience fecal incontinence due to surgical and non-ARM-related causes. The focus is on assessing and contrasting the quality of life among these groups.

METHODS

The study group consisted of 116 patients aged 4 and above with ARM who underwent surgery and completed definitive operations at the Pediatric Surgery Clinic of University of Health Sciece Izmir Dr. Behçet Uz Children's Diseases and Surgery Health Practice and Research Center between 2004 and 2018. These patients had a minimum of 6 months elapsed since the completion of their definitive operations and did not exhibit motor or mental retardation. The

control group consisted of 12 children who had a fecal incontinence with no organic pathology. The data of control group obtained based on by interviewing the families of 348 patients who had surgery for phimosis in our clinic between 2018 and 2019.

One participant from the study group succumbed, 28 individuals were unreachable, 7 declined to participate despite being reached, and 5 did not attend follow-up appointments at the outpatient clinic; thus, they were excluded from the study. The study was completed with a total of 75 participants with ARM. For the control group, comprising 348 children aged 5-15 who underwent surgery for phimosis without any additional medical conditions, 12 (3.4%) were selected based on complaints of fecal incontinence or soiling.

The assessment of physical examination and administration of the questionnaire involved contacting patients and their families via telephone and inviting them to the hospital. Family members were informed about the study, and informed consent was obtained by signing the informed consent form. Patients were subjected to the Quality of Life in Children and Adolescents with Fecal Incontinence Questionnaire (QQVCFCA), which consists of 24 questions grouped into four categories: lifestyle, behavior, depression, and embarrassment. Each question was scored from negative to positive on a scale of 1-2-3-4. The total scores for each group were calculated by dividing the sum of the scores by the number of questions, resulting in average scores.

In our study, patients with a stoma were classified as having a high-type an ARM, while those without a stoma were considered to have a low-type ARM. The physical examination of patients was conducted with the permission of their families, provided appropriate outpatient clinic conditions were ensured. Patient records were retrospectively reviewed to gather information on the gender, birth dates, age at presentation, operation dates and methods, and any additional anomalies if present.

Ethical approval was obtained with protocol number 2019/272 from the Institutional Review Board.

Statistical analysis

Statistical analyses were conducted using the SPSS (Statistical Package for Social Sciences, IBM Inc., Chicago, Illinois, USA) 22 Windows program for the evaluation of the acquired data. The chi-square test was employed for the analysis of categorical data, the Mann-Whitney U test was used for variables not following a normal distribution, and Kruskal-Wallis one-way analysis of variance was applied for comparing mean and standard deviation values across more than two groups.

RESULTS

The age of participants in the study group ranged from 5 to 20 years, with a mean age of 9.06±2.82 years. Of the study group, 43

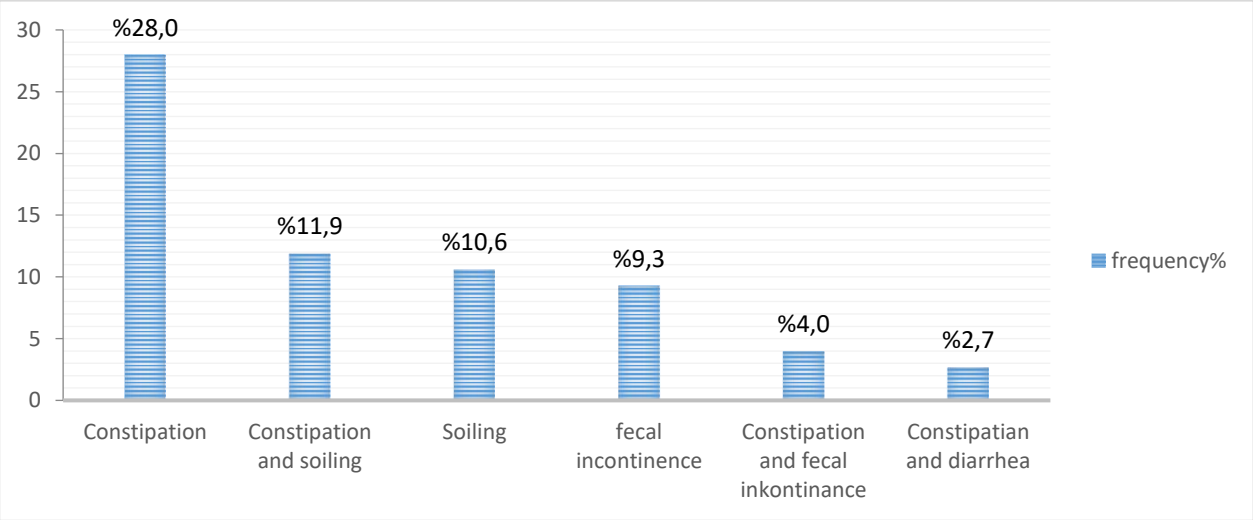
(57.4%) were male, and 32 (42.6%) were female. Thirty-five patients (46.7%) were aged 10 or above. Among them, 49 (65.3%) had a low-type ARM, and 26 (34.7%) had a high-type ARM. A total of 28 patients (37.3%) had fistulas, while among those with a high-type ARM, 24 (92.3%) had fistulas.

While 53.1% of participants with a low-type ARM were male and 46.9% were female, 65.4% of those with a high-type ARM were male, and 34.6% were female. The distribution of study group participants based on ARM subtypes and gender is presented.

In the study, patients who was performed colostomy were considered as high-type ARM, while those without colostomy were considered as low-type ARM. Due to different surgeons different clinical approaches varied. Therefore, Table 2 includes patients with rectovestibular fistula in both high and low-type ARMs.

Table 2. Distribution of participants in the study group according to ARM subtypes

	Male Number (%)	**Female Number (%)**	**Total (%)**
Low type ARM			
Fistula-free imperforate anus	14 (87,5)	2 (12,5)	16(32,7)
Anteriorperianal fistula	5 (31,2)	11 (68,8)	16 (32,7)
Rectovestibular fistula	-	8 (100,0)	8 (16,3)
Anocutanezosis fistula	4 (100,0)	-	4 (8,1)
Anal stenozis	3 (100,0)	-	3 (6,1)
Anteriorektopic anus	-	2 (100,0)	2 (4,1)
Total	**26 (53,1)**	**23 (46,9)**	**49 (100,0)**
High Type ARM			
Rectovesikal fisula	6 (100,0)	-	6 (23,1)
Rectobulbar fistula	6 (100,0)	-	6 (23,1)
Rectoprostatik fistula	4 (100,0)	-	4 (15,3)
Rectovestibular fistül		5 (100,0)	5 (19,2)
Cloaka		3 (100,0)	3 (11,6)
Fistula-free rectal atresia	1 (50,0)	1 (50,0)	2 (7,7)
Total	**17 (65,4)**	**9 (34,6)**	**26 (100,0)**



Graph 1. Distribution of postoperative bowel problems among participants in the study group

Table 3. Comparison of QQVCFCA scores between participants in the study group and the control group

		Median	Mean±SD	25 – 75 Percentiles	Test value*; p
QQVCFCA	ARM	14,28	13,19±2,75	10,47-15,42	379,500; 0,385
	Control	14,45	14,56±0,81	13,71-15,49	
Lifestyle	ARM	3,42	3,26±0,72	2,71-4,00	**241,000; 0,009**
	Control	4,00	3,84±0,19	3,61-4,00	
Behavior	ARM	3,57	3,42±0,63	3,00-4,00	**282,500; 0,036**
	Control	3,85	3,84±0,12	3,71-4,00	
Depression	ARM	3,42	3,24±0,64	2,71-3,71	**270,000; 0,026**
	Control	3,86	3,67±0,22	3,43-3,86	
Embarrassment	ARM	3,67	3,26±0,89	2,33-4,00	337,000; 0,153
	Control	3,33	3,19±0,48	3,00-3,67	

*Mann Whitney U test

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At least one additional anomaly was present in 38 patients (50.7%) with ARM. Upon evaluating ARM patients for associated anomalies in the study, 24 patients (32.0%) exhibited genitourinary anomalies, 20 (26.7%) had cardiac anomalies, 9 (12.0%) presented gastrointestinal anomalies, 8 (10.7%) had skeletal anomalies, and 7 (9.3%) showed neurological problems. Stomas were created in 26 cases (34.7%).

Among the participants with low-type ARM in the study, 21 (42.9%) underwent PSARP, 18 (36.7%) underwent anoplasty, and 10 (20.4%) underwent mini-PSARP. All patients with high-type ARM had a stoma created.

Thirty six patients (48%) reported active complaints related to bowel issues or fecal incontinence. The number of patients with favorable physical examination findings was 43 (57.3%). After surgery, 50 patients (57.3%) reported experiencing surgery-related bowel problems. The distribution of bowel problems among the participants in the study group is presented in Graph 1.

While 15 patients (30.6%) with low-type ARM reported ongoing bowel problems, 20 patients (80.8%) with high-type ARM reported experiencing continued bowel problems. Among low-type ARM patients, 9 (18.4%) had only constipation, 2 (4.1%) had only fecal incontinence, 2 (4.1%) experienced constipation and soiling, 1 (2%) had fecal incontinence and constipation, and 1 (2%) had only soiling problems. Among high-type ARM patients, 6 (26.9%) had only soiling, 6 (23.1%) had constipation and soiling, 5 (19.1%) had only fecal incontinence, 2 (7.7%) had diarrhea and constipation, 1 (3.8%) had constipation and

fecal incontinence, and 1 (3.8%) had only constipation problems.

In the study group, the QQVCFCA score of patients with low-type ARM was found to be significantly higher compared to those with high-type ARM (p<0.001). Additionally, it was observed that the QQVCFCA score was lower in participants with additional anomalies (p<0.001), those with fistula presence (p<0.001), and those experiencing ongoing postoperative problems (p<0.001). Furthermore, in advanced analysis, patients with favorable physical examination findings were found to have a significantly higher QQVCFCA score compared to other patients (p<0.001).

The QQVCFCA (p<0.001), lifestyle (p<0.001), behavior (p<0.001), depression (p<0.001), and embarrassment (p<0.001) scores of patients with low-type ARM were observed to be higher than those of patients with high-type ARM.

No significant difference was found in the median scores of QQVCFCA between those with and without additional anomalies in both high-type and low-type anorectal malformations (p=0.615, p=0.218)

No significant difference was observed in QQVCFCA scores (p=0.385) between the study group and the control group. However, it was noted that the lifestyle (p=0.009), behavior (p=0.036), and depression (p=0.026) scores of ARM patients were lower compared to the control group. Nevertheless, there was no significant difference in embarrassment scores (p=0.153) between the two groups. The comparison of QQVCFCA scores between the study group and the control group is presented in Table 3.

No significant difference was observed in QQVCFCA scores (p=0.296) between patients with low-type ARM and the control group. However, it was noted that the QQVCFCA scores of patients with high-type ARM were significantly lower compared to the control group (p<0.001).

The median QQVCFCA scores of patients with low-type ARM were higher for those with favorable physical examination findings compared to those with unfavorable findings (p=0.005). In patients with high-type ARM, the median QQVCFCA scores of those with favorable physical examination findings were higher compared to those with both moderate and unfavorable physical examination findings (p=0.003).

DISCUSSION

The incidence of additional anomalies in all anorectal malformations varies between 25-75% (4, 5, 27). According to different series, the frequency of urogenital anomalies has been reported between 28-89% (5, 17, 28-30). Metts et al. found this rate to be between 38.5-50% (31). In our study, genitourinary system anomalies were the most common, occurring in 32% of cases. Generally, cardiovascular anomalies are observed in ARM patients at a

rate of 12-22%. In some series, this rate has been reported between 6-27% (30-33). The frequency of concomitant cardiovascular anomalies in our study was found to be 26.7%.

When postoperative complaints were evaluated, it was determined that 36 out of 75 patients (48%) experienced ongoing bowel problems. The most common accompanying problems were constipation (27.8%), constipation and soiling together (22.2%), fecal incontinence (19.4%), and soiling alone (19.4%). In a study by Oyania et al., it was reported that out of 100 patients, 35% experienced ongoing bowel problems, with 49% having soiling, 23% experiencing constipation, and 39% having fecal incontinence (34). On the other hand, in another study by Çavuşoğlu et al., constipation was found in 79% of cases, and fecal incontinence or soiling was observed in 74% of the same patient group (35).

Ongoing bowel problems were present in 16 patients with low-type ARM (32.6%) and 20 patients with high-type ARM (76.9%). The likelihood of experiencing bowel problems increases with the complexity of the deformity. Zheng et al. also hypothesized this and demonstrated fewer complications in patients with low-type ARM in their study (36).

Similar to other related studies, the control group was selected from a healthy population (24, 34, 37). The main reason for our preference for both populations in the study to have fecal incontinence, as in other similar studies, is to emphasize the impact of ARM on bowel function and quality of life.

In our study, the QQVCFCA score in children under 10 years was found to be lower compared to children over 10 years; however, the result was not statistically significant (p=0.080). Grano's study, similar to our research, identified a positive correlation between increasing age and better quality of life results (24). This outcome may be associated with the growing acceptance of the disease and the gained experience in coping with the problem as children and their families age. In a study by Hartman et al., bowel functions were shown to improve with increasing age, but the quality of life was negatively affected with age, attributed to psychosocial difficulties in adolescence (38). Wigander's study yielded similar results to Hartman's, although statistical significance was not established (39).

The impact of gender on the quality of life (QoL) in children with anorectal malformations (ARM) was not demonstrated (p=0.312). In the study by Grano et al., better QoL results were observed in girls in the child age group, while in the adolescent group, boys showed better results (24). Michel et al.'s study found no gender differences in the child age group, but in the adolescent group, there was a decline in QoL in girls. Hormonal changes, especially

during adolescence, were considered to be influential in this regard (40).

In our study, it was observed that the QoL scores in patients with low-type ARM were higher in four categories, namely lifestyle, behavior, depression, and embarrassment, as well as the total score ($p<0.001$). In Tannuri's study using the same questionnaire, scores in the lifestyle and behavior sections were slightly higher in high-type ARM, while scores in other sections were higher in low-type ARM; however, all these results were statistically insignificant (37). In a study conducted by Hartman, it was demonstrated that QoL deteriorates in complex ARM cases (38).

When evaluating anal sphincter tone, it was found that patients with a favorable physical examination, fewer postoperative bowel problems, and those who did not undergo reoperation had better QoL outcomes ($p<0.001$). When assessed separately as high-type and low-type, both groups showed better QoL in individuals with a favorable physical examination ($p=0.003$, $p=0.005$).

The study group did not show a significant difference in QQVCFCA scores compared to the control group ($p=0.385$). However, lifestyle ($p=0.009$), behavior ($p=0.036$), and depression ($p=0.026$) scores of ARM patients were lower than those of the control group. Nevertheless, there was no significant difference in embarrassment scores between the two groups ($p=0.153$). When evaluating based on ARM types, there was no significant difference in QQVCFCA scores between patients with low-type ARM and the control group ($p=0.296$). However, high-type ARM patients had lower QQVCFCA scores compared to the control group ($p<0.001$). Grano et al. demonstrated in their study that malformations adversely affected QoL (26). Our study used a different questionnaire (PedsQL), and when compared with a healthy population, it was found that emotional status, social situation, school performance, and total quality of life were worse in children with ARM. Tannuri's study, which used QQVCFCA, revealed negative effects of ARM on total quality of life and all subgroups ($p<0.001$) (37).

The abundance of patients residing in different cities and the extended time since the operation date, leading to potential changes in contact information, may have posed limitations in reaching, engaging, and ensuring continuity with the patients. While the requirement for fecal incontinence in the control group distinguishes our study from others, it resulted in a slightly lower number of participants in the control group compared to the patient population. The QQVCFCA scale was chosen as the measurement tool due to its specific development for the pediatric age group and gastrointestinal disorders. Furthermore, the scales' advantages include their easy comprehensibility, absence of

medical terminology, and lack of gender-based variations.

CONCLUSION

In conclusion, the QoL in children with low-type ARM does not vary significantly compared to pediatric individuals in the community without fecal incontinence. However, in children with high-type ARM, both aspects are adversely affected. Nevertheless, we believe that further research in this domain is warranted.

Ethics Committee Approval: The ethical approval for this study was obtained from the Institutional Review Board of Dr. Behçet Uz Pediatric Diseases and Surgery Training and Research Hospital (ethics committee date and number: 2019/272)

Peer-review: Externally peer-reviewed

Author Contributions: Concept: VA, ZGT, Design: VA, ZGT, Data Collection and Processing: VA, ZGT, Analysis and Interpretation: VA, ZGT, Writing: VA, ZGT

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci
March 2024; 10(1): 71-80

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1405504

Hematological and Inflammatory Parameters to Predict the Develop Surgical Site Infection After Cesarean Section

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Received: 15 December 2023, Accepted: 03 March 2024, Published online: 28 March 2024

Abstract

Objective: This study seeks to illustrate the efficacy of inflammatory hematological markers in patients who develop site infections following a cesarean section, while also establishing reference values for these parameters.

Methods: This retrospective, single-center study was conducted at Ordu University Training and Research Hospital from January 2016 to January 2023. A comparison was made between 42 cases where surgical site infection developed after cesarean section and 42 cases. The data for this study were obtained from hospital medical records, which encompass of demographic, general medical, obstetric, and neonatal information. Preoperative complete blood count (CBC) was included in the analysis.

Results: Statistically significant differences were observed among preoperative hematological and inflammation markers, including "PLT, WBC, NOT, PCT, MLR, DNLR, NLO, PLO, MPVPR, LP, RDWPR, NLRNPR, SII. ROC analysis revealed that optimal cutoff values were statistically significant for most laboratory parameters and blood count-derived ratios in patients with post-Cesarean wound infection. The largest AUC for SII was 0.861 with the cut-off value of 892.03 (sensivity %76 and specifity %76).

Conclusion: This article has revealed differences between hematological and inflammatory markers in patients developing complications at the incision site after cesarean section. To assess the risk of surgical site infection development and reduce morbidity and hospitalization durations, further research in this area is needed.

Keyword: Complete Blood Count, Hematological Parameters, Pregnancy

Suggested Citation: Karakaya TK, Keskin DD. Hematological and Inflammatory Parameters to Predict the Develop Surgical Site Infection After Cesarean Section. Mid Blac Sea Journal of Health Sci, 2024;10(1):71-80.

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INTRODUCTION

Cesarean section (CS) is a widely performed surgical procedure that has been in practice for over a millennium, making them one of the oldest surgical interventions in history (1).

While generally considered safe, Cesarean section (CS) can give rise to several complications, such as excessive blood loss, injury to nearby organs, infections, and the development of adhesions (2). Infectious complications that occur after a Cesarean section (CS) can be categorized into two groups: general infections, which encompass pneumonia, urinary tract infections, mastitis, pyelonephritis and specific gynecological infections such as ovarian vein thrombosis, endometritis, and surgical site infection (SSI). The occurrence rates of endometritis and surgical site infections (SSI) fall within a range of 0.3% to 7.3% for endometritis and 1% to 23% for SSI (3). Post-operative infections following cesarean section, particularly surgical site infections (SSI), significantly contribute to patient morbidity and mortality. They lead to extended hospital stays, hinder the quality of patient recovery, and place a substantial financial strain on healthcare systems.

Various factors increase the risk of specific gynecological infections after cesarean sections. Several factors increase the risk of certain gynecological infections after a caesarean section. These include younger maternal age, obesity, diabetes, immunosuppressive disorders, corticosteroid therapy, reduced frequency of antenatal care, chorioamnionitis, history of repeated caesarean section, emergency caesarean section and 60-minute surgery, wound closure with staples, and excessive blood loss (4). Diverse approaches have been suggested to mitigate the incidence and severity of post-cesarean section infections. These include preoperative antiseptic showers, preoperative preparation of the incision site with antiseptics, administration of prophylactic antibiotics, avoidance of manual placenta removal, and prompt removal of urinary catheters (5).

In recent years, there is accumulating suggests regarding the potential utilization of hematological indicators such as Mean Platelet Volume (MPV), Plateletcrit (PCT), Red Blood Cell Distribution Width (RDW), Platelet-to-Lymphocyte Ratio (PLR), Platelet-Lymphocyte Ratio (PLR), Neutrophil-Lymphocyte Ratio (NLR), Derived Neutrophil-Lymphocyte Ratio (d-NLR), Monocyte-Lymphocyte Ratio (MLR), Neutrophil-Platelet Ratio (NPR), Mean Platelet Volume-Platelet Ratio (MPVPR), Lymphocyte times Platelet (LxP), Red Cell Distribution Width-to-Platelet Ratio (RDWPR), NLRNPR (NLR/NPR), and SII (Systemic Immune Inflammation index as indicators of systemic inflammation, especially in asymptomatic cases where other systemic inflammation markers are not elevated, NLR

and PLR can be readily computed by dividing the absolute count of neutrophils or platelets, respectively, by the absolute count of lymphocytes (6).

These indicators contribute to inflammation and the processes associated with inflammation. They have demonstrated their predictive potential in various medical fields, including gastroenterology, oncology, cardiology , and orthopedics (7). More recently, NLR and PLR have been the subject of research in the field of obstetrics and gynecology. These markers have been associated with a range of conditions, including polycystic ovary syndrome, endometriosis, ovarian hyperstimulation syndrome, and adverse pregnancy outcomes such as preeclampsia and gestational diabetes (GDM) (8, 9).

Considering the increasing rate of cesarean sections, the prevalence of specific gynecological infections after high-risk cesarean procedures, and the potential benefits of utilizing existing blood tests with predictive capabilities, we aimed to investigate whether routine hematological indices obtained before and after cesarean sections can be associated with and aid in the early prediction of the development of specific gynecological infections.

METHODS

This retrospective, single-center study was conducted at Ordu University Training and Research Hospital from January 2016 to January 2023. Due to being the largest women's health and maternity clinic in the Ordu region, this hospital conducts a significant number of cesarean operations. This study was conducted with the approval of the Ordu University Ethics Committee. The study was conducted in accordance with the principles outlined in the Declaration of Helsinki.

A comparison was made between 42 cases where surgical site infection developed after cesarean section and 42 cases where it did not, within the dates of 01/01/2016 to 01/06/2023 at the Department of Obstetrics and Gynecology of Ordu University Faculty of Medicine Training and Research Hospital. After the first three days, infections that developed were included in the study. The study will not include cases with missing data, such as those with placental abruption, vasa previa, placenta previa, cord prolapse, uterine rupture, and emergency cesareans due to fetal distress. Additionally, cases with a history of chorioamnionitis and early membrane rupture, as well as cesareans performed with incisions other than Pfannenstiel, will be excluded. Patients with a BMI greater than 35, cases with acute and/or chronic known maternal infections, and individuals who have recently used corticosteroids for any reason will not be part of the study. Furthermore, cases with various hematological conditions like idiopathic thrombocytopenia purpura,

thrombotic thrombocytopenic purpura, and hematological malignancies will be excluded. Patients with diseases that can alter complete blood count, such as systemic lupus erythematosus, nephropathy, renal, or hepatic dysfunction, will also not be included. Finally, individuals who did not receive preoperative prophylactic antibiotic therapy will be excluded from the study.

The data for this study were obtained from hospital medical records, which encompass a wide range of demographic, general medical, obstetric, and neonatal information. Preoperative complete blood count (CBC) was included in the analysis. The study assessed various Complete Blood Count (CBC) variables, including hemoglobin, hematocrit, mean corpuscle volume, red blood cell distribution width, white blood cells, neutrophils, lymphocytes, platelets, and mean platelet volume. Furthermore, from these variables, calculations were performed to derive metrics such as Mean Platelet Volume (MPV), Plateletcrit (PCT), Red Cell Distribution Width (RDW), Platelet-to-Lymphocyte Ratio (PLR), Systemic Inflammation Markers like Neutrophil-to-Lymphocyte Ratio (NLR), derived Neutrophil-to-Lymphocyte Ratio (d-NLR), Monocyte-to-Lymphocyte Ratio (MLR), Neutrophil-Platelet Ratio (NPR), Mean Platelet Volume-Platelet Ratio (MPVPR), Lymphocyte multiplied by Platelet (LxP), Red Cell Distribution Width-to-Platelet Ratio (RDWPR), NLRNPR (NLR/NPR), and SII (Systemic Immune Inflammation Index).

Women were categorized as having a postoperative surgical site infection if they experienced an elevation in body temperature or displayed indications of a surgical site infection throughout their postoperative hospital stay. Additionally, this classification extended to those who were rehospitalized within six weeks after childbirth due to symptoms of fever or surgical site infection.

The SPSS 21 program was planned to be used for the comparison of numerical data as follows: Student t-test for two-group comparisons, One Way Anova for comparisons involving more than two groups, Chi-square and Fisher Exact tests for comparing categorical data. The analyses will be carried out at a 95% confidence level (p=0.05). Descriptive statistical methods and correlation analyses will be utilized in the research. Data acquired from the study will be depicted in a presentation format as the average value along with the associated standard deviation. The normal distribution of numerical variables will be assessed using the Kolmogorov-Smirnov and Shapiro-Wilks tests. Independent samples t-test will be applied for numerical variables showing a normal distribution, while the Mann-Whitney U test will be used for those not showing a normal distribution. The analysis of the Receiver Operating Characteristic (ROC)

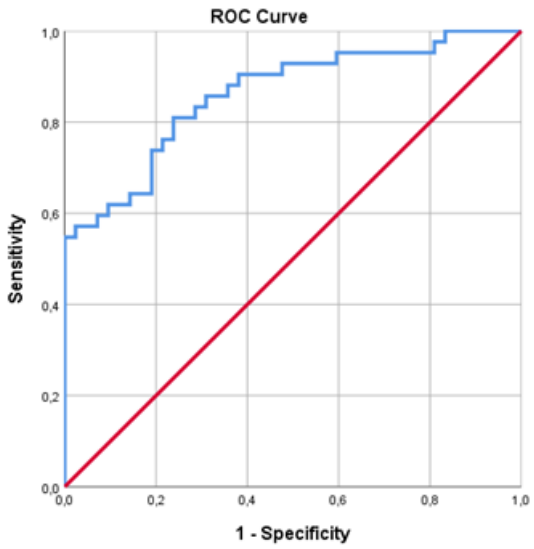
curve will be conducted, and the Area Under the Curve (AUC) will be interpreted as follows: AUC between 0.9 and 1 is considered excellent, AUC between 0.8 and 0.9 is good, AUC between 0.7 and 0.8 is fair, AUC between 0.6 and 0.7 is poor, and AUC between 0.5 and 0.6 is considered unsuccessful.

RESULTS

In the study, 42 cases of post-Cesarean section wound infections were compared with 42 cases in the control group. The demographic data, including age and BMI (Body Mass Index), did not show any significant differences between the groups. Statistically significant differences were observed among preoperative hematological and inflammation markers, including "PLT, WBC, NOT, PCT, MLR, DNLR, NLO, PLO, MPVPR, LP, RDWPR, NLRNPR, SII.The hospitalization durations of patients, the 1st and 5th minute APGAR scores of the infants, and umbilical cord pH values did not show any statistically significant difference (Table 1).

Table 1. Hematologic indices, hematologic ratios

Preop Blood Samples	Surgical Site İnfection	Control	P Value
PLT	271.43±65.31	210.71±49.87	<0.001
WBC	11.43±2.85	9.22±2.20	<0.001
NEU	8.63±2.50	6.46±1.57	<0.001
PCT	0.25±0.05	0.22±0.04	0.01
dNLR	3.27±1.16	2.43±0.52	<0.001
NLR	4.54±1.66	3.35±0.80	<0.001
PLR	141.06±39.58	112.63±34.54	0.001
MPVPR	0.039±0.011	0.053±0.015	<0.001
LYM*PLT	575.14±297.61	429.85±192.66	0.01
RDWPR	0.167±0.045	0.212±0.056	<0.001
NLRNPR	101.92±29.02	81.89±25.03	0.001
SII	1191.90±339.54	700.79±207.48	<0.001



Graphic 1. SII Roc Analysis

ROC analysis revealed that optimal cutoff values were statistically significant for most laboratory parameters and blood count-derived ratios in patients with post-Cesarean wound infection (Graphic 1). The largest AUC for SII was 0.861 with the cut-off value of 892.03 (sensivity %76 and specifity %76). "PLT, WBC, Neutrophil, D-NLR, and NLR have been observed at a moderate level (0.7-AUC-0.8)

DISCUSSION

In this study, the effect of hemogram parameters and inflammatory markers on predicting postoperative infections in the surgical area following cesarean section was investigated. There is currently an insufficient number of studies related to predicting the development of incision site infections after cesarean section. Predictability with inflammation markers and adapting parameters commonly examined in other diseases for incision site infections following cesarean

section is limited. Full blood count is an excellent choice due to its cost-effectiveness and easy accessibility. In preoperative complete blood counts, the number of platelets, white blood cells, and neutrophils was significantly higher in patients who developed surgical site infections after cesarean section. Platelet counts can increase in response to inflammation. This is because platelets play a crucial role in the body's immune response and inflammation processes. When inflammation occurs, the immune system triggers an increase in platelet production to aid in the repair of damaged tissues (10). Feng et al. study has shown that platelets are significantly elevated in individuals with Crohn's disease, an inflammatory condition. This finding is associated with the disease activity of Crohn's (11). White Blood Cell (WBC) and neutrophils can increase during inflammation because the body's immune system responds. When an inflammatory process occurs, the immune system mobilizes white blood cells to combat infections, injuries, or other forms of tissue damage. This elevated WBC and neutrophil count is a result of the immune system's effort to defend the body (12). According to the results obtained in your study, you observed that platecrit values were significantly higher in the group that developed surgical site infections. Additionally, in a study conducted by Çelik et al. involving patients with ST-Elevated Myocardial Infarction (STEMI), it was shown that patients with higher platecrit values had worse long-term angiography outcomes (13). In the study conducted by Işık et al., it was found that plateletcrit (PCT) values were significantly higher in patients who experienced preterm birth (14).

In our study, we found that the derived neutrophil-to-lymphocyte ratio was significantly higher in patients who developed surgical site infections. Belaj et al. also observed a similar trend, with elevated values of this ratio in patients with leg ischemia (15). In our study, we found a significantly elevated neutrophil-to-lymphocyte ratio (NLR) in patients who developed surgical site infections. Similarly, in the study conducted by Biyik et al. (16), it was observed that patients who experienced spontaneous abortion in the first trimester had higher NLR values. Yuce research also indicated that pregnant women who delivered prematurely had higher NLR values compared to those who gave birth at term (17). The platelet-lymphocyte ratio is considered an important indicator for assessing inflammation. In our research, we observed that the platelet-lymphocyte ratio was significantly higher in patients who developed surgical site infections. Similarly, a study conducted by Keles et al indicated that the platelet-lymphocyte ratio was significant in determining the spectrum and histological type of placenta accreta (18). In our study, we found a significantly lower mean platelet

volume/platelet count ratio in the group that developed infections. Zhang et al had previously shown that in colorectal cancer, tumor markers were elevated, while they were significantly lower in the group of patients who developed lymph node invasion (19). In our study, we found that the value obtained by multiplying lymphocytes with platelets was significantly higher in the group that developed infections. However, in a study conducted by Zhu et al., they observed that in the group of children under 6 years old who developed influenza, the value obtained by multiplying lymphocytes with platelets were significantly lower (20). In our study, we found that the Red Cell Distribution Width-to-Platelet Ratio (RDW-PLT ratio) were significantly lower in the group that developed infections. Similarly, Wang et al have also shown that the RDW-PLT ratio is significantly lower in newborns with good neonatal intensive care unit outcomes (21). In our study, we found that the Neutrophil-to-Lymphocyte Ratio (NLR) /Platelet-to-Lymphocyte Ratio (NPR) values were significantly higher in the group that developed infections. Similarly, Keskin et al., in their study on pregnant women with COVID-19, found that the NLR /NPR values were significantly higher in those who experienced severe infections compared to those with mild infections (22). In our study, we found a significant increase in the Systemic Immune Inflammation Index in the group with infections. Akdulum and colleagues, in their research, examined routine blood samples from patients throughout pregnancy who developed preeclampsia. They found that the Systemic Immune Inflammation Index was significantly higher in the group that did not develop preeclampsia (23).

In this study, the advantage is that all the women examined were patients who underwent surgery and were followed by the same team in the same center. This study is one of the first in this regard. However, unfortunately, the retrospective design of the study and the small sample size are limitations of this study.

CONCLUSION

The objective of this investigation is to examine hematological parameters linked to the occurrence of wound infections following cesarean sections and to distinctly outline all the inflammation indices easily obtainable through a basic blood count. This study primarily discloses that individuals experiencing post-cesarean section wound infections show associations with elevated white blood cell count, increased neutrophil count, as well as heightened platelet, platelet crit, neutrophil-to-lymphocyte ratio (NLR), derived neutrophil-to-lymphocyte ratio (dNLR), platelet-to-lymphocyte ratio (PLR), average platelet volume-platelet ratio (MPVPR), lymphocyte time-platelet count (L*P), red blood cell to platelet distribution width ratio (RDWPR), systemic immune index

(SII), and neutrophil-lymphocyte-platelet ratio (NLNPR).

Although these markers have been investigated in the broader populace, there is a scarcity of research within the existing literature focused on pregnant individuals. Further studies are essential to identify patients at risk of developing post-Cesarean section wound infections and to mitigate both morbidity and the duration of hospitalization.

Ethics Committee Approval: Ethics Committee Approval: Ethics approval for this study was obtained from the Ordu University Senate Ethics Committee (ethics committee date and number: 21.07.2023 and 192)

Peer-review: Externally peer-reviewed

Author Contributions: Concept: TKK, DDK, Design: TKK, DDK, Data Collection and Processing: TKK, DDK, Analysis and Interpretation: TKK, DDK, Writing: VA, ZGT

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 81-96**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1399632

Examining Factors Influencing Length of Stay for Inpatients at Alcohol and Substance Addiction Treatment Center

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Received: 03 December 2023, Accepted: 25 December 2024, Published online: 28 March 2024

Abstract

Objective: The aim of this study is to determine the impact of impulsivity, treatment motivation, anxiety, and cognitive distortions on the duration of inpatient treatment for substance use.

Methods: The sample for the study consisted of 200 volunteer patients receiving inpatient treatment at the Alcohol and Substance Addiction Treatment Center. Participants underwent a general psychopathological evaluation using the Structured Clinical Interview for DSM-5 (SCID-5) administered by the clinician. All participants were given the Case Report Form prepared by the clinician along with the Barratt Impulsivity Scale-11 Short Form (BIS), Automatic Thoughts Scale (ATS), State and Trait Anxiety Inventory (STAI-I, STAI-II) and Treatment Motivation Questionnaire (TMQ).

Results: A significant distinction was noted in discharge statuses when comparing scores on the Barratt Impulsiveness Scale and nonplaning impulsiveness subscale, and the State and Trait Anxiety Inventory and Automatic Thoughts Scale. Those who were discharged with remission had notably lower scores compared to those who left voluntarily or were discharged due to rule violation ($p< 0.001$). Negative significant correlations were found between length of stay and Barratt Impulsiveness Scale and its subscales [BIS-T ($p<0.001$), BIS-NI ($p<0.001$), BD-MI ($p=0.002$), BD-AI ($p<0.001$)], State-Trait Anxiety Inventory ($p<0.001$), and Automatic Thoughts Scale ($p<0.001$) scores. Positive significant correlations were observed between duration of substance use and Barratt Impulsiveness Scale and its subscales [BIS-T ($p<0.001$), BIS-NI ($p<0.001$), BD-MI ($p=0.003$), BD-AI ($p=0.021$)], State-Trait Anxiety Inventory ($p<0.001$), and Automatic Thoughts Scale ($p=0.035$) scores.

Conclusion: This study demonstrates a relationship between the length of time spent in inpatient treatment, discharge outcomes, and certain substance use behaviors, impulsivity, automatic thoughts, and anxiety in substance abuse patients.

Keyword: Anxiety, Automatic Thought, Impulsivity, Motivation, Substance

Suggested Citation: Peker O. Examining Factors Influencing Length of Stay for Inpatients at Alcohol and Substance Addiction Treatment Center Mid Blac Sea Journal of Health Sci, 2024;10(1):81-96.

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INTRODUCTION

Among the most common psychiatric disorders, alcohol and substance use disorder is a major contributor to disability in society and is a significant public health concern (1). The United Nations World Drug Report released in 2023 revealed that substance use has risen by 23% over the past decade, and it is projected that one in every 17 individuals between the ages of 15 and 64 use substances in 2021 (2).

While outpatient treatment is commonly utilized for substance addiction, those with low treatment compliance and a high risk of relapse are typically recommended for inpatient treatment. The implementation of inpatient treatment targets the intricate treatment demands of patients. Despite efforts, a recurring difficulty is that a substantial portion of patients are unable to complete the intended inpatient program as planned (3). Factors leading to the discontinuation of treatment or release of inpatient substance addiction patients can vary based on the individual, illness, treatment facility, and personnel. In addition to the patient's age, gender, education level, expectations for treatment, and comorbidities, disease-related factors like multiple substance use, type of substance, and the intensity of withdrawal symptoms and cravings must also be taken into account. Apart from the treatment facility's physical setup and features, the training and professional mindset of the treatment staff can also play a role in treatment discontinuation.

One of the patient-related factors is impulsivity characteristics. Impulsivity can be defined as the act of responding rapidly and without planning to an internal or external stimulus, with little regard for the potential positive or negative effects on oneself or others (4,5). Substance use affects the activity of the prefrontal cortex, which is responsible for impulse control. These circumstances may provoke patients to exhibit behaviors such as carelessness, impatience, seeking excitement, and taking risks that are deemed too excessive or unsuitable for the setting, often resulting in undesirable outcomes (6). Conversely, research has shown that individuals with high impulsivity are at a higher risk for substance use and relapse (7,8). Impulsivity, which is the core symptom of some psychiatric diseases, is discussed in a three-dimensional structure. Motor impulsivity defines acting without thinking, attention-related impulsivity describes the lack of focus or inability to concentrate, and inability to plan impulsivity describes the lack of prediction or foresight about the future (23).

Treatment motivation plays a significant role in the initiation and continuation of treatment for substance use disorders (9). In order for an addicted person to recover, they must be willing to give up the source of their pleasure and endure the challenges of ongoing treatment. For this reason, the treatment's effectiveness is greatly influenced by a person's determination and eagerness to continue with the treatment process (10). The research indicates that a lack of readiness for change and low motivation for treatment are strong predictors of relapse (11,12). The continuity of patients' treatment is negatively impacted by this situation, which could result in them discontinuing the treatment process (13).

Automatic thoughts are cognitions specific to the environment and situation that take place in the mind flow and mostly accompany moments of emotional distress. These thoughts arise spontaneously. They are difficult to detect because they are often quite fast and general. Dysfunctional beliefs in the cognitive structure shape the individual's thoughts and cause cognitive consequences called cognitive errors or distortions specific to psychopathology. Although these cognitive errors are a normal functioning of the mind, they occur more frequently, systematically and inappropriately in mental disorders. In situations where problems occur, these cognitive distortions, which normally occur in everyone, begin to operate more rigidly and inappropriately. Automatic thoughts that are inappropriate for the situation also cause cognitive distortions to occur (14). Internal and external triggers that push a person to use substances also activate cognitive distortions. This situation causes cravings and plans to use substances (15,16).

Findings from epidemiological and treatment studies show that anxiety, depression and substance use disorders often occur together and that the interaction is multifaceted and variable (17). Addressing the coping mechanisms of those struggling with alcohol and substance addiction is an important issue that should not be overlooked. When faced with difficulties, individuals engage in a multidimensional process that involves their thoughts, emotions, and actions. This process aims to reduce the perceived level of stress. Multiple factors, such as cultural background, personal beliefs, available resources, and psychological well-being, can influence it (18,19). If an individual is unable to manage their stress levels, it may impact their ability to cope with their problems and could result in disruptions to their treatment, potentially raising the risk of relapse (20).

These findings highlight the importance of conducting additional research to uncover the intricate connection between substance use, impulsivity, treatment motivation, anxiety, cognitive distortion, and length of stay in the context of substance addiction. Therefore, this study aims to determine the effects of

impulsivity, treatment motivation, anxiety and cognitive distortion on the length of stay in patients receiving inpatient treatment due to substance use.

METHODS

Study Design and Sample

The data of the study were collected between November 2023 and January 2024, after receiving approval from a University Hospital Ethics Committee (ethics committee approval number: HRU/23.23.36). 200 volunteer patients with alcohol and substance use disorders receiving inpatient treatment at the Alcohol and Substance Addiction Treatment Center (AMATEM) were included in this study. Admissions to the alcohol and substance addiction clinic are based on voluntary admission. Patients may be discharged upon the request of the treatment team if they fail to adhere to the clinic's various regulations post-admission. Additionally, individuals may also choose to discharge themselves, even if they comply with the rules. For the general psychopathological evaluation of the participants, the Structured Clinical Interview for DSM-5 (SCID-5) was administered by the clinician. In addition, all participants were given a Case Report Form prepared by the clinician (age, gender, substance use characteristics, etc.), Barratt Impulsivity Scale-11-Short Form, Automatic Thoughts Scale, State and Trait Anxiety Scale, and Treatment Motivation Questionnaire. Semi-structured interviews and scales with the patients were administered before admission (just before the patient was admitted to the ward). Criteria for inclusion in the study; It was defined as being over the age of 18 and under the age of 65, voluntarily applying for alcohol and substance use disorder treatment, being literate, and agreeing to participate in the study after being informed. Exclusion criteria of the study; It was defined as being under the age of 18 and over the age of 65, a history of neurological disease, being illiterate, and mental disability.

Assessment Tools

Case Report Form

In this form, age, gender, marital status, education, employment status, military status, prison and probation history, self-destruction and suicide history, history of psychiatric admission other than substance addiction, family history of substance use, substance use characteristics (preferred substance, duration of substance use, frequency and amount of substance use) and past treatment histories were questioned. At the same time, discharge status and scores obtained from other data collection tools were also stated in the case report form.

Structured Clinical Interview for DSM-5 (SCID-5-CV)

Structured Clinical Interview for DSM-5 (SCID-5-CV) is a semi-structured interview guide developed to establish DSM-5 diagnoses. After obtaining consent to participate in the

study, general psychopathology was determined using the structured clinical interview (SCID) for DSM-V axis I disorders and diagnostic confirmation was made in terms of alcohol and substance use disorders. The Turkish validity and reliability of the scale was conducted by Elbir et al. in 2019 (21).

Treatment Motivation Questionnaire (TMQ): The scale consists of 26 items and is in a 5-point Likert format (Strongly Agree-Strongly Disagree). A Turkish validity and reliability study was conducted and it includes 4 factors: intrinsic motivation, extrinsic motivation, interpersonal help seeking, and confidence in treatment (13).

State-Trait Anxiety Inventory (STAI TX-1, STAI TX-2)

The scale consists of two parts: a 20-item "state anxiety form" created to determine what is felt at the moment, and a 20-item "trait anxiety form" created to determine what has been felt in the last seven days. The scale provides a 4-point Likert-type evaluation (1-not at all, 2-somewhat, 3-very much, 4-completely). In this study, both the state and trait anxiety subscales of the inventory were used. Its Turkish adaptation and validity and reliability studies were conducted by Öner and Compte in 1983 (22).

Barratt Impulsiveness Scale-11-Short Form (BIS-11-Sf)

The scale developed to measure the impulsivity of individuals and was developed by Güleç et al. (2013) adapted it to Turkish and conducted a validity and reliability study (23). The scale consists of a total of 15 items of 4-point Likert type. The scale has three subscales: attentional impulsiveness, motor impulsiveness, and inability to plan impulsiveness. When calculating the scale score, the scores obtained from the items are summed. As the total score increases, the degree of impulsivity also increases.

Automatic Thoughts Scale (ATS)

The scale consists of 30 items and is scored between 1-5. Turkish validity and reliability were conducted by Şahin and Şahin (1992) (24). High total scores from the scale indicate that the individual's negative automatic thoughts occur frequently.

Statistical analysis

Analyzes were evaluated in SPSS (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL) 22 package program. In the study, descriptive data are shown as n and % values in categorical data, and as mean±standard deviation (Mean±SD) and median interquartile range (25-75 percentile values) values in continuous data. The suitability of continuous variables for normal distribution was evaluated with the Kolmogorov-Smirnov test. Kruskal Wallis test was used to compare more than two variables. Spearman correlation test was used to

examine the relationship between continuous variables. In the analyses, the statistical significance level was accepted as $p<0.05$.

RESULTS

200 patients with a median age of 28.0 (25.0-32.0) were included in the study. The participants were all men. 38% of the participants were employed, 58% were married, and 28% were primary school graduates or below. 32% of the patients had a drug-related prison history and 10% had a drug-unrelated prison history. 82% of the participants completed their military service, 8% were exempt and 10% received an unfit report while continuing their military service. While 30% of the participants had a history of suicide, 12% had psychiatric comorbidities.

Table 1. Substance use characteristics of the patients

		n	%
Probation	Yes	104	52.0
	No	96	48.0
Prefered Subtance	Heroin	120	60.0
	Methamphetamine	68	34.0
	Marijuana	4	2.0
	Synthetic Marijuana	8	4.0
Prefered Subtance Duration of Use/year, Median (IQR)		7.0 (4.0-10.0)	
Prefered Subtance Use Quantity/gr, Median (IQR)		2.0 (1.0-3.0)	
Prefered Subtance Usage Frequency	Less than 1 per week	24	12.0
	1-3 Times a Week	20	10.0
	Most of the Week	12	6.0
	Every day	144	72.0
Longest Separation Time From the Substance /Month, Median (IQR)		7.0 (2.0-12.0)	
Additional Substance Use	Yes	144	72.0
	No	56	28.0
Age of Starting Substance, Median (IQR)		19.5 (16.0-23.0)	
Inpatient treatment	Yes	132	66.0
	No	68	34.0
Number of Inpatient Treatments, Median (IQR)		3.0 (1.0-4.0)	
Psychiatric Admission Other Than Substance Use	Yes	52	26.0
	No	148	74.0
Substance Use In the Family	Yes	16	8.0
	No	184	92.0
Length of Stay /day, Median (IQR)		14.0 (6.0-17.0)	
Discharge Status	Remission	92	46.0
	Voluntarily	88	44.0
	Rule of Violation	20	10.0

52% of the patients had a probation history. 60% of the patients used heroin, 34% methamphetamine, 2% marijuana and 4% synthetic marijuana. While 72% of the participants took substances every day, 72% also used additional substances. While 66% of

the patients received inpatient treatment, 26% had psychiatric applications other than substance addiction. 82% of the participants had a family history of substance use. While 46% of the patients were discharged with remission, 44% were discharged voluntarily and 10% were discharged with rule violations (Table 1).

Table 2. Comparison of scale scores according to discharge status

	All Patients (n=200)	Remission (n=92)	Voluntarily (n=88)	Rule of Violation (n=20)	p*
	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	
BIS-T	35.0 (26.0-40.0)	26.0 (23.0-32.0)[a]	39.5 (35.0-46.0)[b]	35.0 (35.0-45.0)[b]	**<0.001**
BIS-NI	12.0 (9.0-15.0)	10.0 (7.0-11.0)[a]	14.0 (12.0-15.0)[b]	15.0 (14.0-17.0)[b]	**<0.001**
BIS-MI	11.0 (9.0-14.0)	9.0 (7.0-11.0)[a]	13.5 (12.0-17.0)[b]	9.5 (9.0-15.0)[a,b]	**<0.001**
BIS-AI	10.0 (9.0-13.0)	9.0 (7.0-10.0)[a]	13.5 (10.0-15.0)[b]	11.0 (9.0-11.0)[a,b]	**<0.001**
STAI-I	50.0 (37.0-57.0)	37.0 (34.0-42.0)[a]	55.0 (52.0-57.0)[b]	60.0 (50.0-61.0)[b]	**<0.001**
STAI-II	48.0 (38.0-56.0)	38.0 (33.0-44.0)[a]	55.0 (49.0-59.0)[b]	54.0 (52.0-57.0)[b]	**<0.001**
ATS-T	87.5 (70.0-106.0)	67.5 (48.0-81.0)[a]	102.5 (95.0-118.5)[b]	106.0 (98.0-117.0)[b]	**<0.001**
TMQ-T	62.5 (45.0-72.0)	63.0 (57.0-69.0)	61.5 (33.0-74.0)	76.0 (42.0-78.0)	0.582
TMA-IM	36.0 (32.0-44.0)	36.0 (34.0-43.0)	36.5 (15.0-42.0)	44.0 (20.0-46.0)	0.627
TMA-HS	14.0 (9.0-17.0)	14.0 (9.0-17.0)	11.5 (6.5-17.0)	14.0 (14.0-17.0)	0.922
TMA-CT	5.0 (3.0-7.0)	4.0 (3.0-6.0)	5.0 (3.0-8.0)	6.0 (4.0-8.0)	0.398
TMA-EM	7.0 (5.0-10.0)	7.0 (4.0-9.0)	7.0 (5.0-10.0)	6.0 (4.0-9.0)	0.477

BIS-T: Barratt Impulsiveness Scale; BIS-NI: Barratt Impulsiveness Scale Nonplanning Impulsiveness.; BD-MI: Barratt Impulsiveness Scale Motor Impulsiveness; BIS-AI: Barratt Impulsiveness Scale Attentional Impulsiveness; STAI-I: State Anxiety Inventory; STAI-II: Trait Anxiety Inventory; ATS-T: Automatic Thoughts Scale; TMQ-T: Treatment Motivation Questionnaire; TMQ-IM: Treatment Motivation Questionnaire Internal Motivation; TMQ-HS: Treatment Motivation Questionnaire Help Seeking; TMA-CT: Treatment Motivation Questionnaire confidence in Treatment; TMQ-EM: Treatment Motivation Questionnaire External Motivation. *Kruskal Wallis analysis was applied.

Significant differences were observed among discharge statuses in terms of BIS-T, BD-NI, STAI-I, STAI-II, and ATS-T scores, which stemmed from the difference between patients achieving remission and those discharged against medical advice or due to rule violation, with the scores of remission patients being lower ($p<0.001$). Significant differences were also noted among discharge statuses in terms of BIS-MI and BIS-AI scores, attributed to the difference between patients achieving remission and those discharged against medical advice, with the scores of remission patients being lower ($p<0.001$). No significant differences were observed among discharge statuses in terms of other scores ($p>0.05$) (Table 2).

A significant negative correlation was observed between length of stay and BIS-T ($r= -0.486$, $p<0.001$), BIS-NI ($r=-0.505$, $p<0.001$), BIS-MI ($r=-0.302$, $p=0.002$), BIS-AI ($r= -0.390$, $p<0.001$), STAI-I (r-0.679, $p<0.001$), STAI-II ($r=-0.598$, $p<0.001$) and ATS-T ($r=-0.668$, $p<0.001$). A positive significant correlation was observed between duration of substance use and BIS-T ($r=0.387$, $p<0.001$), BIS-NI ($r=0.520$, $p<0.001$), BIS-MI ($r=0.301$, $p=0.003$), BIS-AI ($r=0.230$, $p=0.021$), STAI-I ($r=0.452$, $p<0.001$), STAI-II ($r=0.548$, $p<0.001$) and ATS-T ($r=0.211$, $p=0.035$). Negative significant relationships was observed between the longest separation time from the substance and BIS-T ($r=-0.308$, $p=0.002$), BIS-MI ($r=-0.433$, $p<0.001$), BIS-AI ($r=-0.230$,

p=0.021), STAI-I (r=-0.299, p=0.003), STAI-II (r=-0.325, p=0.001) and ATS-T (r=-0.419, p<0.001) (Table 3).

Table 3. Correlation of scales with various parameters

		Length of Stay	Age	Duration of Subtance Use	Subtance Use Quantity	Longest Separation Time From the Substance	Age of Starting Substance	Number of inpatient treatments
BIS-T	r	**-0.486**	0.043	**0.387**	-0.071	**-0.308**	0.041	0.217
	p	**<0.001**	0.668	**<0.001**	0.484	**0.002**	0.683	0.080
BIS-NI	r	**-0.505**	0.017	**0.520**	-0.188	-0.143	0.052	0.226
	p	**<0.001**	0.866	**<0.001**	0.061	0.157	0.610	0.056
BIS-MI	r	**-0.302**	0.085	**0.301**	0.048	**-0.433**	0.137	0.194
	p	**0.002**	0.399	**0.003**	0.632	**<0.001**	0.175	0.118
BIS-AI	r	**-0.390**	-0.024	**0.230**	-0.019	**-0.230**	-0.144	0.072
	p	**<0.001**	0.810	**0.021**	0.849	**0.021**	0.154	0.564
STAI-I	r	**-0.679**	0.078	**0.452**	0.011	**-0.299**	0.024	-0.114
	p	**<0.001**	0.438	**<0.001**	0.917	**0.003**	0.811	0.362
STAI-II	r	**-0.598**	0.138	**0.548**	-0.027	**-0.325**	0.053	-0.148
	p	**<0.001**	0.171	**<0.001**	0.789	**0.001**	0.603	0.235
ATS-T	r	**-0.668**	0.104	**0.211**	0.045	**-0.419**	-.0.032	0.068
	p	**<0.001**	0.302	**0.035**	0.655	**<0.001**	0.749	0.587
TMQ-T	r	-0.002	-0.149	-0.178	0.007	-0.009	-0.118	0.006
	p	0.986	0.139	0.062	0.942	0.928	0.242	0.965
TMQ-IM	r	0.055	-0.165	-0.188	-0.032	-0.115	0.019	-0.072
	p	0.585	0.101	0.061	0.749	0.256	0.854	0.566
TMQ-HS	r	-0.013	-0.044	-0.126	-0.074	0.162	-0.172	-0.045
	p	0.894	0.664	0.213	0.463	0.107	0.087	0.721
TMQ-CT	r	-0.020	-0.036	-0.001	0.106	0.106	-0.183	0.161
	p	0.847	0.725	0.993	0.293	0.295	0.068	0.196
TMQ-DM	r	0.053	-0.095	-0.142	0.057	-0.118	0.068	-0.014
	p	0.600	0.346	0.159	0.573	0.244	0.504	0.914

BIS-T: Barratt Impulsiveness Scale; BIS-NI: Barratt Impulsiveness Scale Nonplanning Impulsiveness.; BD-MI: Barratt Impulsiveness Scale Motor Impulsiveness; BIS-AI: Barratt Impulsiveness Scale Attentional Impulsiveness; STAI-I: State Anxiety Inventory; STAI-II: Trait Anxiety Inventory; ATS-T: Automatic Thoughts Scale; TMQ-T: Treatment Motivation Questionnaire; TMQ-IM: Treatment Motivation Questionnaire Internal Motivation; TMQ-HS: Treatment Motivation Questionnaire Help Seeking; TMA-CT: Treatment Motivation Questionnaire confidence in Treatment; TMQ-EM: Treatment Motivation Questionnaire External Motivation. *Spearman Correlation analysis was applied.

A significant positive correlation was observed between BIS-T score and BIS-NI (r=0.779, p<0.001), BIS-MI (r=0.863, p<0.001), BIS-AI (r=0.830, p<0.001), STAI-I (r= 0.635, p<0.001), STAI-II (r=0.644, p<0.001) and ATS-T (r=0.646, p<0.001). A significant positive correlation was observed between BIS-NI score and BIS-MI (r=0.482, p<0.001), BIS-AI (r=0.455, p<0.001), STAI-I (r=0.548, p<0.001), STAI-II (r=0.530, p<0.001), and ATS-T (r=0.509, p<0.001). Additionally, a significant negative correlation was found between BIS-NI score and TMA-IM (r=-0.200, p=0.047). A significant positive correlation was observed between BIS-MI and BIS-AI (r=0.705, p<0.001), STAI-I (r=0.514, p<0.001), STAI-II (r=0.541, p<0.001), and ATS-T (r=0.566, p<0.001). A significant positive correlation was observed between BIS-AI and STAI-I (r=0.548, p<0.001), STAI-II (r=0.550, p<0.001), and ATS-T (r=0.572, p<0.001). A significant positive correlation was observed

between STAI-I and STAI-II (r=0.833, p<0.001) and ATS-T (r=0.832, p<0.001). A significant positive correlation was observed between STAI-II and ATS-T (r=0.755, p<0.001). A significant positive correlation was observed between TMQ-T and TMA-IM (r=0.877, p<0.001), TMA-HS (r=0.773, p<0.001), TMA-CT (r=0.401, p<0.001), and TMA-EM (r=0.561, p<0.001). A positive significant relationship was observed between TMA-IM and TMA-HS (r=0.557, p<0.001) and TMA-EM (r=0.425, p<0.001). A positive significant relationship was observed between TMA-HS and TMA-CT (r=0.259, p=0.009) and TMA-EM (r=0.341, p=0.001) (Table 4).

Table 4. The correlation of the scores of the scales.

		BIS-T	BIS-NI	BIS-MI	BIS-AI	STAI-I	STAI-II	ATS-T	TMQ-T	TMA-IM	TMA-HS	TMA-CT
BIS-NI	r	**0.779**										
	p	**<0.001**										
BIS-MI	r	**0.863**	**0.482**									
	p	**<0.001**	**<0.001**									
BIS-AI	r	**0.830**	**0.455**	**0.705**								
	p	**<0.001**	**<0.001**	**<0.001**								
STAI-I	r	**0.635**	**0.548**	**0.514**	**0.548**							
	p	**<0.001**	**<0.001**	**<0.001**	**<0.001**							
STAI-II	r	**0.644**	**0.530**	**0.541**	**0.550**	**0.833**						
	p	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**						
ATS-T	r	**0.646**	**0.509**	**0.566**	**0.572**	**0.832**	**0.755**					
	p	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**					
TMQ-T	r	0.007	-0.112	0.131	-0.031	-0.066	-0.002	0.021				
	p	0.943	0.268	0.194	0.756	0.516	0.983	0.839				
TMQ-IM	r	-0.073	**-0.200**	0.115	-0.077	-0.081	-0.086	-0.036	**0.887**			
	p	0.471	**0.047**	0.254	0.448	0.421	0.397	0.724	**<0.001**			
TMQ-HS	r	-0.123	-0.162	-0.065	-0.124	-0.193	-0.133	-0.034	**0.773**	**0.557**		
	p	0.222	0.108	0.519	0.219	0.055	0.186	0.733	**<0.001**	**<0.001**		
TMQ-CT	r	0.093	-0.014	0.156	0.054	0.050	0.171	0.163	**0.401**	0.195	**0.259**	
	p	0.359	0.891	0.121	0.597	0.623	0.090	0.105	**<0.001**	0.052	**0.009**	
TMQ-DM	r	0.046	-0.016	0.109	-0.040	-0.093	0.073	-0.094	**0.561**	**0.425**	**0.341**	0.148
	p	0.647	0.874	0.280	0.691	0.360	0.471	0.354	**<0.001**	**<0.001**	**0.001**	0.142

BIS-T: Barratt Impulsiveness Scale; BIS-NI: Barratt Impulsiveness Scale Nonplanning Impulsiveness.; BD-MI: Barratt Impulsiveness Scale Motor Impulsiveness; BIS-AI: Barratt Impulsiveness Scale Attentional Impulsiveness; STAI-I: State Anxiety Inventory; STAI-II: Trait Anxiety Inventory; ATS-T: Automatic Thoughts Scale; TMQ-T: Treatment Motivation Questionnaire; TMQ-IM: Treatment Motivation Questionnaire Internal Motivation; TMQ-HS: Treatment Motivation Questionnaire Help Seeking; TMA-CT: Treatment Motivation Questionnaire confidence in Treatment; TMQ-EM: Treatment Motivation Questionnaire External Motivation.

*Spearman Correlation analysis was applied.

DISCUSSION

In this study, the relationships between impulsivity, treatment motivation, automatic thoughts and anxiety levels, discharge status and substance use characteristics of patients receiving inpatient treatment at the Alcohol and Substance Treatment Center (AMATEM) were examined. The results of this study reveal that there is a relationship between impulsivity scale and subscale scores, automatic thought scale scores, and state-trait anxiety scale scores and discharge status and length of stay.

Individuals with high levels of impulsivity have a higher risk of trying substances and

subsequently developing addiction (25). The instant positive reinforcement (euphoria, relaxation, pleasure, etc.) that occurs after substance use is preferred by individuals over great rewards such as a healthier life, better social life and work life (26). The length of time patients stay in both outpatient and inpatient treatment and complete treatment is also affected by impulsivity. Impulsivity is an important factor in patients discontinuing treatment, remaining abstinent from substances for shorter periods of time, and increasing the risk of relapse (27). In a study conducted on impulsivity and treatment duration, it was concluded that the level of impulsivity was higher in those who stopped treatment early than in those who completed treatment (28). In this study, it was found that individuals discharged voluntarily or due to rule violation exhibited higher levels of impulsivity (across all scales and subscales) compared to those discharged with remission. This study also found a positive relationship between impulsivity and duration of substance use. The correlation between impulsivity and substance use duration suggests that individuals with stronger impulsive drives are more likely to engage in prolonged substance use.

It has been reported in the literature that there is a positive relationship between substance use and anxiety level (29,30). One reason why the anxiety level of addicted individuals is found to be higher than their healthy peers is that when the individual becomes addicted to the substance and becomes aware of his addiction, even attempting to quit substance use or reduce the dose can cause anxiety. Regardless of the severity of withdrawal symptoms of individuals who have stopped using substances, the emergence of these symptoms may contribute to an increase in the level of anxiety (31). Another factor that increases the level of anxiety may be that life without substances creates fear. The anxiety level of the patient who stays away from substances and receives inpatient treatment may increase. This may trigger a desire to end treatment early and shorten the length of stay. In a study, it was found that mental distress was the most obvious precursor to discontinuing treatment in individuals with substance use receiving inpatient treatment (32). In this study, it was found that there was a positive relationship between anxiety level and duration of substance use, and a negative relationship between the longest period of abstinence from the substance. Individuals may turn to the use of the substance in order to reduce their anxiety levels. However, this avoidance mechanism may have the opposite effect over time, and as substance use increases, anxiety levels may tend to increase. Increased anxiety levels can often negatively affect the longest period of separation from substances. This situation is related to the individual's tendency to use substances during periods when he feels

anxious or his efforts to stay away from substances weaken during these periods. Anxiety can be viewed as an escape or coping mechanism for substance use.

In this study, it was found that individuals discharged due to rule violation or voluntarily exhibited a higher frequency of negative automatic thoughts. Substance-related decisions are often automatic and immediate (33). Studies indicate that cognitive errors are observed in individuals before the initiation of substance use (34). These cognitive errors can negatively affect individuals' decision-making mechanisms (e.g., quitting substance use, seeking treatment, adhering to treatment, etc.). Additionally, prolonged exposure to substances can also lead to negative changes in cognition. Yin and Knowlton assert that once substance use behavior is learned, it is guided by negative automatic thoughts (35). In another study, Charles-Walsh et al. reported decreased cognitive control and the involvement of automatic cognitive processes in heroin addiction (36). Additionally in this study, a negative relationship was found between negative automatic thoughts and the longest seperation from the subtances, while a positive relationship was found between negative automatic thoughts and the duration of substance use. Having more negative automatic thoughts may pave the way for the individual to turn to substance use and early termination of treatment in challenging situations (receiving inpatient treatment in a ward, having certain rules, staying away from substances and the social environment, etc.) (37).

One of the unexpected results of this study is that there is no relationship between the treatment motivation total score and subscale scores and the duration of substance use, the longest period of abstinence from the substance, and the length of hospitalization. When patients are evaluated for hospitalization in this clinic, an interview is conducted to ensure that they are willing to quit using the substance completely and to increase their motivation for treatment. In addition, the fact that the treatment motivation questionnaire used as a measurement tool is based on patients' self-report may cause patients to reach high values when filling out the scale. As a matter of fact, in the analyzes made according to the discharge status of the patients, treatment motivation total scores and subscale scores were found to be higher in patients who were discharged voluntarily and with rule violations than in patients who were discharged with remission. Several studies in the literature, similar to this study, concluded that increased treatment motivation may be a factor that makes it difficult for substance addicts to stay in treatment (38,39). On the other hand, the fact that higher treatment motivation was observed in those who were discharged voluntarily and due to rule violations suggests that motivation depends on extrinsic motivation rather than

intrinsic motivation. In other words, this may be due to the fact that individuals who come to treatment due to family pressure do not care about this pressure after a while and leave the treatment voluntarily. Additionally, highly motivated individuals can expect rapid and dramatic recovery. When such expectations are not met, they may become disappointed and lose their commitment to treatment. Additionally, in this study, higher scores in intrinsic motivation, impulsivity, and anxiety were found among individuals discharged due to rule violation or voluntarily. Despite the high level of intrinsic motivation, it was not sufficient for individuals to maintain treatment continuity. Therefore, assisting individuals with high intrinsic motivation in coping with anxious situations they may encounter during inpatient treatment and facilitating the development of adaptive strategies for impulsivity could increase their treatment participation and continuity.

In this study, the relationship between the scale scores was also analyzed statistically. It was determined that there was a positive significant relationship between impulsivity scale and subscale scores, state-trait anxiety scale scores, and automatic thought scale scores. It was determined that there was a negative significant relationship only between the intrinsic motivation scores of the treatment motivation questionnaire and the impulsivity and inability to plan subscale scores.

Negative automatic thoughts can often increase anxiety levels. Negative thought patterns can lead the individual to evaluate events negatively and cause anxiety (40). Individuals with high anxiety levels may feel the need to cope with stress, and in this case, their impulsive behavior may increase. Negative automatic thoughts can also affect an individual's emotional state and trigger impulsive behavior. For example, thoughts such as “I will not be able to get rid of the substance” may cause the individual to feel bad and resort to impulsive behaviors to relieve this emotional state. Individuals with high intrinsic motivation can generally focus on specific goals, develop effective strategies to achieve these goals, and have a more positive course in treatment (13,41). Therefore, strong planning skills may have a positive relationship with intrinsic motivation.

There are a number of limitations in this study. The first of these is that there is no inpatient service for women in this clinic, so all participants are men. Secondly, the fact that the scales used are based on self-report makes the answers to the questions subjective. Thirdly, the universe of the research is limited to being a private center only. Finally, another limitation of the study is the non-utilization of partial regression analysis; this situation may hinder the ability to assess the effects of specific

independent variables (such as length of stay, discharge status, motivation, etc.) independently from other variables, thus potentially limiting a comprehensive understanding of the relationships. The most important strength of this study is that it examines the factors that are thought to affect the treatment duration of individuals with substance use. Thus, new data was provided in order to extend the treatment period of individuals using substances. Another strength is the large sample size and the use of SCID in individual interviews. When the relevant literature was examined, no study was found that addressed the effects of treatment motivation, automatic thoughts, anxiety and impulsivity levels of individuals hospitalized due to substance use on the length of stay. This research contributes to the literature in this aspect. Future studies should consider the possibility of conducting focus group interviews in which participants are encouraged to share openly and freely about themselves. Conducting these studies in a multicenter structure with a larger sample size may increase the generalizability of the results.

CONCLUSION

The results of this research show that there is a relationship between length of stay, discharge status, and some substance use characteristics and impulsivity, automatic thoughts, and anxiety in patients hospitalized due to substance use. In this context, when considering inpatient treatment of patients, it is important to take these factors into account for treatment continuity.

Ethics Committee Approval: The ethical approval for this study was obtained from the Harran University Clinical Research Ethics Committee (ethics committee date and number: 11.12.2023/23)

Peer-review: Externally peer-reviewed

Author Contributions: Concept: OP, Design: OP, Data Collection and Processing: OP, Analysis and Interpretation: OP, Writing: OP,

Conflict of Interest: The author declared no conflict of interest.

Financial Disclosure: The author declared that this study has not received no financial support.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci

March 2024; 10(1): 97-106

RESEARCH ARTICLE

DOI: 10.19127/mbsjohs.1415693

Influencing Factors for Joint Awareness After Total Hip Arthroplasty: A Cross-Sectional Study

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Received: 15 October 2023, Accepted: 07 February 2024, Published online: 28 March 2024

Abstract

Objective: Total hip arthroplasty (THA) is a common procedure nowadays, with hospitals easily reaching hundreds of surgeries a year and considering the cross-sectional nature. Joint awareness (JA) is indicative of the patient's adaptation and satisfaction after THA. The current study investigated the relationship between joint awareness, joint position sense (JPS), mobility level, activities of daily living, and hip pain level in patients with THA.

Methods: This is a cross-sectional study involving 50 individuals with THA (31.48±55.14 weeks post-surgery; mean age was 54.32±18.28 years). Factors related to joint awareness were examined with linear regression analysis. Hip Joint position sense (JPS) was measured with a digital inclinometer, pain level was measured with a Visual Analog Scale (VAS), joint awareness was assessed with the Forgotten Joint Score-12, and mobility level was assessed with the Parker Mobility Index.

Results: The factors that have a statistically significant effect on the joint awareness are age, pain, mobility, and BMI ($p = 0.002$, $p = 0.040$, $p<0.001$, $p = 0.010$, and $p = 0.010$, respectively). According to the Beta coefficients, it is seen that the independent variables with the highest effect in absolute terms are mobility (Beta = 0.599) and age (Beta = 0.448).

Conclusion: According to our results, younger patients were less adaptive to the artificial joint following THA. The mobility level was also a strong predictive factor in joint awareness. Physiotherapy and rehabilitation programs should focus on joint awareness in terms of age and mobility level in patients with THA.

Keywords: Arthroplasty, Joint Awareness, Age, Mobility, Proprioception

Suggested Citation: Gökşen A, Çaylak R, Çekok FK, Kınıklı Gİ Influencing Factors for Joint Awareness After Total Hip Arthroplasty: A Cross-Sectional Study Mid Blac Sea Journal of Health Sci, 2024;10(1):67-106.

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INTRODUCTION

Developing surgical techniques, patient satisfaction becoming a factor affecting the success of surgery, and the increase in the conscious patient population have increased interest in patient-based scales. 'Artificial joint forgetting' is a recently coined term that refers to the ability to forget about an artificial joint after joint arthroplasty surgery (1). This ability has been identified as a significant factor in joint arthroplasty surgery success and overall patient satisfaction (2-4). Current studies report that the primary goal of patients after total hip arthroplasty (THA) is to adapt to prostheses all over the world (5). The goal of THA is to have the patient perceive the artificial joint as a normal body limb and achieve the highest possible satisfaction. Post-surgical outcome assessments increasingly involve joint-specific parameters, such as patient satisfaction, joint awareness, pain, level of mobility, or joint position sense (JPS) (6). Adaptation to the artificial joint after THA is only possible with the improvement of hip perception and function. In the hip joint, structures such as joint capsule, chondral surface and labarum associated with JPS are removed during arthroplasty surgery (7). Following THA, joint position sense is provided by stimuli from receptors on the muscles and skin, the sense of sight, and the balance centre in the inner ear (8). Studies predict that hip joint awareness improves linearly over time after THA, like muscle strength and patient symptoms (2). Investigating the factors related to joint awareness will provide ideas for creating new strategies for prosthesis adaptation.

This study's main aim is to examine the factors associated with the joint awareness following THA. The hypothesis of the study was that joint position sense, pain, mobility level, body mass index, postoperative day and age would be a predictive role in joint awareness in patients undergoing THA.

METHODS

Study design

The present study is a prospective cross-sectional design was employed.

Study place and period

This study included individuals who received THA in the Private Acıbadem Orthopedia Hospital from May 2022 to July 2023.

Study population

Patients who could not understand the measurement method, could not complete the measurement, or had dementia were excluded. Patients who completed the sixth week after THA surgery, which was performed through the posterior approach, were included. The study was approved by the non-interventional clinical research ethics committee of Tarsus University (Decision number: 2022/07, Date: 10.05.2022). This cross-sectional study was conducted between 11 May 2022 and 1 July 2023. Power analysis was performed for

multiple linear regression analysis with the expectation of a correlation of at least 0.5-0.60 between the independent variables and the artificial joint score. When the R-square statistic was taken as 0.30, the calculated effect size was calculated as f-square = 0.429, and the sample size calculated for 5% Type I error, 80% power, and 9 independent variables was calculated as 46 people. Approximately fifty-one people were planned to be included in the study, with a loss rate of approximately 10% predicted. Power analysis was performed with G Power (version 3.1.9.6).

Data on physical properties

Age height weight gender recorded. The body mass index was obtained by dividing the weight by the square of the height.

Evaluation of pain

The intensity of pain was evaluated with a visual analog scale. The patient was asked to give a value between zero to ten for the pain he felt during the activity. This method is reliable and valid (9).

Evaluation of joint awareness

The FJS-12 (Forgotten Joint Scale) is a 12-item questionnaire that assesses joint awareness, including questions about the hip joint during daily activities (10, 11). Scores on the scale range from 0 to 100, with higher scores indicating better joint awareness. A high value reflects the ability of the patient to forget about the affected/ replaced joint. It is valid and reliable for hip arthroplasty (Cronbach's alpha ranging from 0.70 to 0.95 was adequate) (11).

Evaluation of hip joint position sense (hip proprioception)

A digital inclinometer (Baseline ® Digital Inclinometer, Jtech Medical Industries, Inc., Salt Lake City, Utah) was used to evaluate joint position sense. It is a valid and reliable tool for hip joint (ICC value is 0.92-0.97) (12). Measurements were taken while the participants were in the supine position and in a calm and quiet environment. Only the affected sides of participants who had undergone surgery were evaluated (13). Individuals were instructed to move their hip to 50% of their current range (target position) and hold for five seconds. Then they actively moved their hip to the target position and performed flexion and abduction movements. The amount of deviation from the target angle was recorded. This measurement was made for both hip flexion and abduction.

Evaluation of mobility level

The patient's mobility level was used to evaluate the Parker Mobility Index. It is valid and reliable tool for hip joint (95% confidence interval: 0.696–0.773) (14). The Parker Mobility Index is a 3-point scale that is often preferred by orthopaedic surgeons as it is convenient in assessing patient function.

Statistical Analysis

According to the referenced article (literature review), correlation statistics of 0.60 between

artificial joint score and mobility and 0.70 with VAS were reported (15). In this context, power analysis was performed for multiple linear regression analysis with the expectation of a correlation of at least 0.5-0.60 between the independent variables and the artificial joint score. When the R-square statistic was taken as 0.30, the calculated effect size was calculated as f-square = 0.429, and the sample size calculated for 5% Type I error, 80% power, and 9 independent variables was calculated as 46 people. Approximately fifty-one people were planned to be included in the study, with a loss rate of approximately 10% predicted. Power analysis was performed with G Power (version 3.1.9.6). Multiple linear regression analyses were performed to analyse the relationship between the artificial joint score and independent variables such as BMI, hip proprioception, mobility level, gender, age, postoperative, pain. Descriptive data was given as mean standard deviation. The backward elimination approach was preferred as the variable selection method. According to this approach, after the model is established with all independent variables, the one that contributes the least to the model (that is, the independent variable with the largest p) is removed from the model, and the model is rebuilt. This process is repeated until the p value for the independent variables is less than 0.10 and the final model is reached. Among these variables, the standardized regression coefficient (Beta) was examined to determine the variable that had the highest effect on the artificial joint score. The data were analyzed with the SPSS 22 package program. Demographic data are expressed as percentages and numbers. Tests were performed in accordance with normal distribution.

RESULTS

Fifty patients with THA (thirty-four females, sixteen males) were included in the study (Table 1). The mean age of THA patients was 54.32±18.28 years. The mean body mass index (BMI) of THA patients was 27.27±3.6 kg/m2. All physical properties of the participants are presented in detail in Table 1.

Independent variables in first step: BMI, hip position sense, parker mobility index, sex, age, postop, pain, hip abduction position sense. (R=0.838 R-sqr=0.702, Adj-Rsqr=0.661, F(df1=6, df2=43)=16.915, p<0.001. The regression model obtained for the artificial joint score-dependent variable is presented below, (Table 2). The resulting model was found to be statistically significant (F(df1=4, df2=45)=21.063, p<0.001), and approximately 60–65% of the variability in the dependent variable of the artificial joint score was explained by the model (R-sqr=0.652, Adj-Rsqr=0.621). According to the obtained model, the independent variables that have a statistically significant effect on the artificial joint score are age, pain, mobility, and BMI (p = <0.001, p = 0.038, p = 0.001, and p = 0.030,

respectively). If the obtained unstandardized coefficients are to be interpreted, A one unit increase in the age variable results in a 0.919 unit increase in the artificial joint score. A one-unit increase in the VAS pain variable resulted in a 4.767-unit decrease in the artificial joint score. A one-unit increase in the parquet mobility variable results in a 14,796-unit increase in the artificial joint score. A one-unit increase in the BMI variable results in a 2,485-unit increase in the artificial joint score. If it is desired to determine the variable that has the highest effect on the artificial joint score among these variables, the standardized regression coefficient (Beta) should be examined. According to the beta coefficients, it is seen that the independent variables with the highest effect in absolute terms are mobility (Beta = 0.599), age (Beta = 0.448), pain (Beta = -0.252), and BMI (Beta = -0.252), (Table 2).

Table 1. Demographic and clinical characteristics of the participants (n=50).

		THA (n=50)
Age, years (Mean±SD)		54.32±18.28
Sex, n (%)	Female	34 (68)
	Male	16 (32)
Prosthesis indication (%)	Osteoarthritis	%40
	avascular necrosis	%26
	femoral head and neck fracture	%18
	Hip dysplasia	%12
	Missing value	%4
BMI, kg/m^2(Mean±SD)		26.56±4.15
Post op. Time (week)		31.48±55.14

n: Number, SD: Standard Deviation, THA: Total hip arthroplasty, BMI: Body mass index, op: operation

Table 2. Findings from multiple linear regression analysis for artificial joint score.

	Unstandardized Coefficients		**Standardized Coefficients**			**95.0% Confidence Interval for B**	
	B	**Std. Error**	**Beta**	**t**	**p**	**Lower Bound**	**Upper Bound**
(Constant)	-104.431	44.214		-2.362	0.023	-193.597	-15.264
Sex	-16.448	9.079	-0.206	-1.812	0.077	-34.757	1.861
Age	0.685	0.209	0.333	3.284	0.002	0.264	1.105
Pain	-4.486	2.113	-0.237	-2.123	0.040	-8.748	-0.224
Mobility	18.223	2.942	0.738	6.194	<0.001	12.290	24.157
BMI	2.914	1.079	0.238	2.701	0.010	0.739	5.090

Dependent variable: Joint Awareness, Independent variables in first step: BMI, hip position sense, parker mobility index, sex, age, postop, pain, hip abduction position sense. R=0.838 R-sqr=0.702, Adj-Rsqr=0.661, F(df1=6, df2=43)=16.915, p<0.001

DISCUSSION

The present study found that the patient's younger age and low mobility level were the most important and negative factors affecting joint adaptation after hip replacement. Also, high pain levels and a high BMI affect patients' joint adaptation negatively. The low prosthetic adaptation of young patients suggests that arthroplasty should be considered as the last option in treatment for these patients. Adaptation to the prosthesis brings happiness and success in treatment. According to the literature, orthopaedists prefer to perform hip replacement surgery on THA (16). Another important result of this study is that the mobility level is related to joint awareness. From a clinical perspective, any application that will

increase the patient's mobility level after arthroplasty facilitates the adaptation process to the prosthesis. It increases the patient's adaptation and, therefore, satisfaction. It is extremely important to motivate the patient to be physically active and rehabilitate after arthroplasty. Joint position sense was not found to be a factor affecting joint awareness. The reason of this fact that, the patients included in the study were in the chronic phase. A rapid recovery is achieved in patients who complete the sixth week after surgery. Re-establishment of intra-articular negative pressure and the recovery of the muscles provides joint stabilization. It has been proven in the literature that patients in the chronic period have more advantages than individuals with osteoarthritis or those with arthroplasty in the acute phase in mobility, function, pain, and other areas. Joint position sense and joint awareness are not related is evidence of recovery for patients in the chronic phase. The fact that age is one of the most crucial factors affecting joint awareness is a very striking issue and needs to be investigated. This result shows that it is more difficult for young individuals to adapt to the arthroplasty than older individuals. The reasons for this may be higher expectations, physical fitness level, and prosthesis-related depression in young individuals, but more research with wider age ranges is needed on these topics. Hip replacement surgeries are mostly performed on young individuals, which has limited the studies in this field. In fact, a very wide age range was not studied in our study (17).

THA involves the sacrifice of the joint capsule and its mechanoreceptors. However, studies have also shown that the sensory and proprioceptive role of the joint capsule is compensated by the activity of muscle mechanoreceptors. After undergoing THA, patients who forget about their artificial joint during everyday life tend to report higher satisfaction and functional participation. Therefore, mobility and joint awareness are in a mutual relationship in hip arthroplasty patients. An individual adapted to his artificial joint may be more mobile. Another thought is that the physical fitness level of the patient with high mobility will be better, thus joint awareness will also be positively affected. Studies in the literature have found a relationship between functional scales and joint awareness. Since functional outcome scales are commonly used after hip arthroplasty surgery, there are fewer publications on mobility in the literature. Although functional results and mobility level seem to be similar, mobility is a more comprehensive concept.

Pain was found to be a major factor influencing joint awareness, as patients with higher levels of pain tended to have a lower sense of joint awareness. Studies in the literature support these results (1, 15, 18). Previous studies have reported that pain sensation is associated with proprioception and that it reduces receptor

sensitivity and impairs efferent sensory input (19).

When the studies on mobility are examined, there are studies reporting that the ability to forget the artificial joint and mobility develop according to osteoarthritis after both knee and THA surgery (20, 21). The time passed over arthroplasty is directly proportional to the improvement in the perception of artificial joints. In the literature, randomized controlled research was shown that no difference in joint awareness after total knee arthroplasty which have different types of fixations (22). In patients with advanced osteoarthritis, the attachment surface is impaired and there is no accurate sensory input. It has been reported that in advanced osteoarthritis, intra-articular oedema, pain, cartilage erosion, ligament damage, immobility and many other factors impair movement perception in patients with osteoarthritis. The artificial joint not only offers a solution to the impaired function, but also corrects motion perception and sensory input.

Studies in the literature show that; The patient's happiness and success in activities of daily living are related to the ability to forget the artificial joint (23). It is not a generalizable result that patients with a higher body mass index have better adaptation to the artificial joint. First, the patient's daily living activities may be limited or may cause severe pain before arthroplasty. It has been proven in the literature that a high body mass index is a condition that worsens the prognosis of osteoarthritis.

Patients who completed the acute period (6 weeks post-op) were included in the study. The wide interval between the post-operative period has created an advantage in terms of evaluating whether the post-operative period influences adaptation to the joint (joint awareness). In fact, it was observed that the post-operative period was not related to the ability to adapt to the joint. We can say that the patient has adapted to a joint that has gone through the acute phase, has created intra-articular negative pressure, and has overcome the inflammatory processes such as pain and oedema. Different results may occur in the acute phase or in more problematic surgeries, such as revision surgery. However, if we talk about the chronic period, we can say that the physiological improvement in the joint facilitates adaptation.

Limitations and strengths

The study would have been much more valuable if the preoperative and acute period evaluation results of the patients included in the study could have been followed. However, the subject of the study is current, and the results are thought to be interesting. Many surgical techniques can be used in hip surgery (anterior/anterolateral approach). Since the muscle group incised in the posterior surgical intervention used in the study was different from the muscle groups incised in other interventions, the results of the study can only

be stated for patients who underwent the posterior approach. This is a limitation. Joint awareness is a topic that has been talked about for the last 10 years and whose importance is increasing day by day. This study is original in terms of the idea it examines. In future studies, a comparative examination of the joint awareness of hip prosthesis patients in the acute-subacute and chronic periods will contribute to science.

CONCLUSION

After THA, age, mobility, pain and BMI are factors that interact with joint awareness. It is easier for older patients to adapt to arthroplasty. Considering the healing process that occurs in the joint, joint position sense is no longer a factor affecting joint awareness for a patient in the chronic period.

Ethics Committee Approval: Ethic Approval: Ethics committee approval was received for this study from Tarsus University Non-Invasive Clinical Research Ethics Committee. (Decision number: 2022/07, Date: 10.05.2022).

Peer-review: Externally peer-reviewed

Author Contributions: Concept: AG, RÇ, FKÇ, GİK, Design: AG, RÇ, FKÇ, GİK, Data Collection and Processing: AG, RÇ, FKÇ, GİK, Analysis and Interpretation: AG, RÇ, FKÇ, GİK, Writing: AG, RÇ, FKÇ, GİK

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: Tarsus University Scientific Research Projects Coordination Unit supported this work. The project number is SBF.22.002. Funding budget was used for equipment support.

Acknowledgements: The authors would like to thank all the people who accepted to participate in this study.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 107-118**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1419906

Determination of the Intensive Care Nurses' Attitudes towards Evidence-Based Practices

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Received: 15 January 2024, Accepted: 13 March 2024, Published online: 28 March 2024

Abstract

Objective: This research was carried out to determine the attitudes of intensive care nurses towards evidence-based nursing.

Methods: This descriptive study was conducted with 134 nurses working in the intensive care units of a university hospital between January and June 2021. Research data were collected by online data collection technique using "Descriptive Form for Nurses" and "Evidence-Based Nursing Attitude Questionnaire (EBNAQ)". The obtained data were analyzed by using descriptive statistics (number, percentage, mean) and Mann Whitney U tests in the computer-aided SPSS package program.

Results: It was determined that the intensive care nurses' mean total score in the Evidence-Based Nursing Attitude Questionnaire (EBNAQ)was 66.35±6.22. Evidence-Based Practice Intentions Subscale was found to be higher in female nurses than in male nurses ($p<0.05$). Moreover, nurses with 11 years or more of professional experience had a higher mean score in the subscale Emotions Related to Evidence-Based Nursing than those with 10 years or less of intensive care and professional experience ($p < 0.05$).

Conclusion: It was determined that the attitudes of the nurses toward Evidence-Based Nursing were found to be positive. Moreover, it was determined that the nurses who had knowledge about evidence-based practice had more positive attitudes toward Evidence-Based Nursing.

Keywords: Evidence, Evidence-Based Practice, Nursing, Attitude, Intensive Care

Suggested Citation: Söylemez N, Güneş D. Determination of the Intensive Care Nurses' Attitudes towards Evidence-Based Practices. Mid Blac Sea Journal of Health Sci, 2024;10(1):107-118.

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INTRODUCTION

An innovative healthcare system requires patient-centered care and efficiency based on scientific evidence to provide high-quality care. In addition, it is a complex nonlinear process, and each step requires different competencies such as knowledge, attitude, and behavior (1). With rapid changes in the healthcare system, more emphasis is placed on improving quality, performance, patient safety, and cost control. Therefore, it is the professional responsibility of nurses to use the best scientific evidence and integrate accessible research evidence into decision-making processes to design and implement health care plans (2–4).

EBP (Evidence-based practice), composed of components such as formulating clinical questions, the integration of best available evidence, evaluating its validity relevance, and feasibility (2,5), is a basic competency for nurses to provide quality care. It requires the application of research evidence with clinical expertise and patient values when making care decisions (6–8).

Evidence-based practice is a global concept that requires the use of the best evidence about patient care through critical evaluation and synthesis, as well as the deliberate, explicit, and reasonable use of the best available evidence when making decisions about the care/treatment (9). Evidence-based practice is an important feature that moves the nursing profession away from traditional and ineffective practices. It improves patient outcomes by employing scientific and well-reasoned decisions and promotes consistency of care by improving standards (10).

Evidence-based nursing practice guides nurses in incorporating a patient perspective into theory and evidence. Thus, nurses can provide safe and quality care to their patients (9). It is important to integrate theory and care practices in establishing the scientific foundations for nursing to gain a professional identity. For this reason, nurses need to use information resources in clinical practices, gain professional autonomy, increase the quality of care, and use the obtained information in care practices (11). EBP improves nurses' problem-solving and decision-making skills. It is important in terms of informing nurses of current information, improving clinical decision-making and judgment, and increasing the participation of patient preferences and values in the decision-making process. In this regard, evidence-based practice is accepted as a paradigm shift in nursing care (12).

The use of EBP in intensive care units, where nursing care is predominantly involved, is possible with the attitudes and skills of the nurses working in these units. Therefore, this study was conducted to evaluate the attitudes of nurses working in intensive care units towards evidence-based nursing.

METHODS

Study design

The research is a descriptive study.

Time and place of the study

The research was conducted between January and June 2021 in the intensive care units of a university hospital in eastern Turkey (Internal Medicine Intensive Care Unit, Neonatal Intensive Care Unit, Anesthesia and Reanimation Intensive Care Unit, Coronary Intensive Care Unit, Gastroenterology Intensive Care Unit, Pediatric Intensive Care Unit, Cardiovascular Surgery Intensive Care Unit and Neurology Intensive Care Unit).

Population and sample of the study

The study population was composed of 178 nurses working in the intensive care units of the specified university hospital. Sampling was not conducted from the population in the research. Intensive care nurses who volunteered to participate the study were included in the sample of the study. In this study, 134 nurses who agreed to participate in the research were included in the sample of the study. The sample represented 75% of the population. The scope of the research included only permanent staff nurses of the intensive care unit. Nurses working temporarily or as interns in the intensive care units were not included.

Data collection tool

Data were obtained from the Descriptive Form for Nurses and Evidence-Based Nursing Attitude Questionnaire (EBNAQ) (13) which were created in line with the literature by the researchers (14–16).

Descriptive form for nurses

It consisted of questions aiming to evaluate the characteristics of nurses such as gender, age, educational status, marital status, length of service in the intensive care unit, the intensive care unit where s/he is working, working style, participation in scientific meetings, membership in professional associations, and following scientific publications.

Evidence-Based Nursing Attitude Questionnaire (EBNAQ)

The Turkish validity and reliability of the EBNAQ, which was developed by Ruzafa-Martínez et al. in 2011, were evaluated by Ayhan et al. in 2015. This 15-item scale is a five-point Likert type. (1-Strongly Disagree; 2-Disagree; 3-Somewhat agree; 4-Agree; 5-Strongly Agree). Eight of the items include positive statements (1st, 2nd, 5th, 7th, 9th, 11th, 13th, 14th items) and seven of them contain negative statements (3rd, 4th, 6th, 8th, 10th, 12th, 15. items). A minimum of 15 and a maximum of 75 points are obtained from the scale. The scale has no breakpoints. A high score from the scale indicates that the attitude towards evidence-based nursing is positive. The scale has three subscales including Beliefs

and Expectations Towards Evidence-Based Nursing Subscale (1,2,7,9,11,13 and 14 articles), Emotions Related to Evidence-Based Nursing Subscale, and Evidence-based Practice Intention Subscale (16).

Ayhan et al. reported that the original scale's beliefs and expectations towards evidence-based nursing were α=0.86, evidence-based practice intention was α=0.63, emotions related to evidence-based nursing were α=0.70, and the total Cronbach's alpha coefficient for the scale was 0.85 (16).

In this study, the total Cronbach's Alpha coefficient of EBNAQ was calculated as α=0.86. In addition, the scale's Beliefs and Expectations towards Evidence-Based Nursing subscale Cronbach Alpha coefficient was α=0.76, the Evidence-Based Practice Intention subscale Cronbach Alpha coefficient was α=0.76, and Emotions Related to Evidence-Based Nursing Subscale Cronbach Alpha coefficient was α=0.77.

Data collection

Data were collected from intensive care nurses using an online data collection technique through the link https://forms.gle/hWq2D76aBoGoAboc6. The survey form link was shared with the nurses through WhatsApp groups where intensive care nurses are registered, enabling them to access and fill out the forms online.

Statistical analysis

IBM SPSS 21.0 for Windows (Armonk, NY: IBM Corp) was used in the analysis of the research data. Descriptive characteristics and scores on the Attitude towards Evidence-Based Nursing scale for intensive care nurses were analyzed using numbers, percentages, standard deviation, and mean. In the analysis of the difference between some descriptive characteristics of intensive care nurses and scores on the Evidence-Based Nursing scale, numbers, percentages, mean, standard deviation, and the Mann-Whitney U test were utilized. A value of 0.05 was accepted as the significance level in the study.

Limitations of the research

The limitations of the study are that the study was conducted in a single institution and the data was based on nurses' self-reports.

Ethical dimension

Necessary permissions were obtained from Maria Rufaza-Martinez, who developed the scale used in the research, and Yasemin Ayhan, who conducted the Turkish validity and reliability of the scale. Before starting the study, ethics committee approval was obtained from the Non-Interventional Research Ethics Committee of a university (Decision number 2020/16-22), legal permission was obtained from the hospital where the study was conducted, and informed consent was obtained from the nurses who agreed to participate in the study.

RESULTS

The mean age of the intensive care nurses is 28.27±5.35 years, 74.6% of them are women. It was observed that 10.4% of intensive care nurses had completed high school, 8.2% had completed associate degrees, 75.4% had completed bachelor's degrees, and 6.0% had completed postgraduate education. Additionally, it was found that 10.4% of working intensive care nurses were continuing their education at any level (completing their bachelor's degree, continuing their associate degree, or pursuing postgraduate education). While 83.6% have 10 years or less working experience, 92.5% have 10 years or less intensive care work experience. 34.3% of the intensive care nurses attended scientific meetings, 9.7% were members of a professional association and 38.1% of intensive care nurses follow scientific publications. In addition, 34.3% of the intensive care nurses stated that they knew the concept of evidence-based nursing, and 80.4% of them stated that they learned the concept of evidence-based nursing (EBN) from the educational institutions they studied (Table 1).

The total mean EBNAQ score of the intensive care nurses is calculated as 66.35±6.22, the mean score in the subscale Beliefs and Expectations towards Evidence-Based Nursing is 31.73±2.97, the mean score in subscale Evidence-Based Practice Intention is 16.88±2.15, and the mean score in subscale Emotions Related to Evidence-Based Nursing is 17.73±2.03 (Table 2).

While the female nurses' mean score in the subscale Evidence-Based Practice Intention was 17.12±2.02, male nurses' mean score in the subscale Evidence-Based Practice Intention was calculated as 16.17±2.40. The correlation between the gender of the intensive care nurses and the mean score in the subscale Evidence-Based Practice Intention was statistically significant ($p<0.05$, Table 3).

When the intensive care nurses' mean scores in EBNAQ were evaluated according to the working time in the profession, it was determined that the mean score of the nurses working for 10 years or less in the subscale Emotions Related to Evidence-Based Nursing was 17.57±2.04, and the mean score of those with 11 years or more working experience was 18.59±1.76.When the nurses' EBNAQ and the mean scores in the subscale were evaluated according to their working time in the intensive care unit, it was determined that mean score of the nurses who have worked for 10 years or less in the subscale Emotions Related to Evidence-Based Nursing is 17.62±2.05, and mean score of the nurses who have working experience of 11 years or more in the subscale is 19.20±1.03. The correlation between the nurses' working time in the intensive care unit and their mean score in the scale Emotions Related to Evidence-Based Nursing was found to be statistically significant ($p<0.05$, Table 3).

When the nurses' professional associations' membership status and EBNAQ and its subscale mean scores were evaluated, it was seen that scores in the subscale Beliefs and Expectations Towards Evidence-Based Nursing were 30.07±3.22 for those who were members of a professional association, and 31.91±2.90 for those who were not. A statistically significant correlation was found between the Beliefs and Expectations towards Evidence-Based Nursing subscale mean score and the status of nurses not being a member of a professional association ($p<0.05$, Table 3).

Table 1. Distribution of Descriptive Features of the Intensive Care Nurses

Characteristics	N	%
Age (Mean±SD)	28.27±5.35	
Gender		
Female	100	74.6
Male	34	25.4
Education Level		
High school	14	10.4
Associate Degree	11	8.2
Undergraduate	101	75.4
Graduate	8	6.0
The Status of Continuing an Education		
Yes	14	10.4
No	120	89.6
Continuing Learning Process* (n=14)		
Associate Degree	3	21.4
Undergraduate	2	14.2
Graduate	9	64.4
Working Time in the Profession		
10 years and below	112	83.6
11 years and above	22	16.4
Intensive Care Unit Where The Nurse Works		
Internal Medicine Intensive Care	41	30.6
Neonatal Intensive Care	33	24.6
Anesthesia Intensive Care	27	20.1
Coronary Intensive Care	10	7.5
Gastroenterology Intensive Care	8	6.0
Pediatric Intensive Care	6	4.5
CVS Intensive Care	5	3.7
Neurology Intensive Care	4	3.0
Working Time in the Intensive Care Unit		
10 years and below	124	92.5
11 years and above	10	7.5
Status of Attending a Scientific Meeting		
Yes	46	34.3
No	88	65.7
Professional Association Membership Status		
Yes	13	9.7
No	121	90.3
Professional Association Membership* (n=13)		
Turkish Nurses Association	3	23.0
Intensive Care Nurses Association	2	15.3
Other**	8	61.7
Following Scientific Publication		
Yes	51	38.1
No	88	61.9

Table 2. Mean Scores of the Attitude towards Evidence-Based Nursing Questionnaire

Scale Score (n=134)	Mean ± S.S.	Min.	Max.
EBNAQ	66.35 ± 6.22	51	75
Beliefs and Expectations Towards EBN	31.73 ± 2.97	21	35
Evidence-based Practice Intention	16.88 ± 2.15	12	20
Emotions Related to EBN	17.73 ± 2.03	4	20

Table 3. The Distribution of the Relationship Between the Variables Related to Intensive Care Nurses and the EBNAQ and Its Subscales

Characteristics		Beliefs and Expectations		Practice Intention		Emotions		EBNAQ	
	N	Mean	SS	Mean	SS	Mean	SS	Mean	SS
Gender									
Female	100	31.81	3.13	17.12	2.02	17.89	1.94	68.62	6.30
Male	34	31.52	2.48	16.17	2.40	17.29	2.24	65.00	5.87
t/p		U=155.0 p=0.46		**U=1310.0 p=0.04***		U=1466.0 p=0.22		U=1402.0 p=0.12	
Working Time in the Profession									
10 years and less	112	31.66	2.82	16.77	2.14	17.57	2.04	66.01	6.08
11 years and more	22	32.09	3.74	17.40	2.19	18.59	1.76	68.09	6.76
t/p		U=1055.0 p=0.28		U=1018.5 p=0.19		**U=857.5 p=0.02***		U=966.0 p=0.10	
Working Time in ICU									
10 years and less									
11 years and more	124	31.63	2.96	16.85	2.19	17.62	2.05	66.11	6.29
	10	33.00	2.94	17.20	1.68	19.20	1.03	69.40	4.50
t/p		U=440.5 p=0.12		U=573.0 p=0.68		**U=350.0 p=0.02***		U=460.5 p=0.17	
Professional Association Membership									
Yes	13	30.07	3.22	16.23	1.73	17.30	1.97	63.61	6.19
No	121	31.91	2.90	16.95	2.19	17.78	2.04	66.65	6.18
t/p		**U=515.0 p=0.03***		U=623.0 p=0.21		U=670.5 p=0.37		U=542.0 p=0.06	

DISCUSSION

Beliefs, attitudes, and social norms influence individuals' intentions to engage in a particular behavior. The literature emphasizes that there is also a correlation between attitudes and Evidence-Based Practices (EBP) in healthcare settings (17). EBP facilitates the clinical decision-making process by considering the feasibility, significance, and effectiveness of health services (18). It is seen that nurses who use an evidence-based approach in societies that support EBP make a difference in patient care (19). The use of EBP is needed in order to reduce the increasing costs in health care and to increase the effectiveness of the care (20). Therefore, it is important to develop a positive attitude towards EBP.

In this study, it was observed that the nurses' total mean score in EBNAQ was 66.35±6.22. The lowest score obtained from the scale is 15 and the highest score is 75. High scores show that the attitude of the nurses towards evidence-based nursing is positive. When other studies on the subject are examined, mean score of the nurses in EBNAQ was determined as

61.87±9.44 by Ayhan et al. (2015), as 57.20±9.06 by Dikmen et al. (2018), as 59.68 ± 6.91 by Al-Maskari & Patterson (2018), as 57.66±7.96 by Yıldırım &Yıldız (2020), and as 46.36±3.95 by Yilmaz et al. (2020). Although there is a difference between EBNAQ mean scores in this study and other studies, it is seen that the mean scores of the nurses are similar and moderate level. These data suggest that nurses have a positive attitude towards evidence-based nursing (16,21–24) .

In this study, it was found that female nurses had a higher mean total score in EBNAQ compared to male nurses, and a statistically significant relationship was found between the genders and the mean score in the subscale Evidence-Based Practice. Dikmen et al. (2018) reported that female nurses had a higher mean total score in EBNAQ compared to male nurses and that there was a statistically significant correlation in the subscale Beliefs and Expectations towards Evidence-Based Nursing. Other studies such as Daştan and Hintistan (2018), Durmus (2017), Patelarou et al. (2017), Yıldırım and Yıldız (2020) show that female nurses have a higher mean total score in EBNAQ compared to male nurses but there is no significant correlation between genders. Although it is thought that the low number of male nurses in this study and other studies has led to this result, it has been concluded that the attitudes of female nurses towards evidence-based nursing are more positive than male nurses (14,22,23,25,26).

In some studies, it is reported that increasing education levels have a positive effect on general attitudes towards EBP (14,24). However, this study and other similar studies show that the level of education does not affect the mean scores in EBNAQ. This suggests that it is due to the fact that nurses included in the study have similar educational levels (27–29).

In this study, it was determined that ICU nurses who have worked in the profession and the intensive care unit for 11 years or more have a high mean score in the subscale Emotions Related to Evidence-Based Nursing. When similar studies supporting this finding were examined, it was found that Yıldırım and Yıldız (2020) reported that nurses' mean scores in the subscale Beliefs and Expectations towards Evidence-Based Nursing were higher in nurses who completed one year in the profession (22). Durmuş (2017) stated that nurses' mean score in EBNAQ, their mean score in the subscale Emotions Related to Evidence-Based Nursing, and their mean scores in the subscale Beliefs and Expectations Towards Evidence-Based Nursing were higher in nurses who had a working experience of five years or less (26). Daştan and Hintistan (2018) reported that nurses with a working experience of one to six years had a higher mean score in EBNAQ than other groups (25). Patelarou et al. (2017) stated in their study that nurses with short working

experience have a more positive attitude towards EBP (14). Contrary to these findings, some studies show that there is no significant correlation between the mean total score of EBNAQ and working experience (28).

When the status of being a member of a professional association of the intensive care nurses participating in this study and their mean scores in the subscale Beliefs and Expectations towards Evidence-Based Nursing were examined, it was seen that the mean score of those who were not members of the association was higher than those who were members. Yılmaz et al. (2020) reported that there was a significant correlation in the Beliefs and Expectations towards Evidence-Based Nursing subscale mean score, while the mean scores of the EBNAQ and other subscales of the nurses who were not members of the professional association were high and statistically significant (21). This result obtained in the studies suggests that it may be due to the higher number of nurses who are not members of an association.

In the study, it was seen that the mean score of the nurses who attended scientific meetings and followed the scientific publications in EBNAQ was higher than the nurses who did not attend the meetings and did not follow the scientific publications, but this result was not statistically significant. Kilicli et al (2019) reported that nurses' participation in scientific studies significantly increased the subscale mean score in the Evidence-Based Practice Intention. Moreover, Yıldırım and Yıldız (2020) reported that the participation of nurses in scientific studies statistically significantly increased the subscale mean scores and total scores of the EBNAQ ((15,22). Other studies, on the other hand, show that the correlation between nurses who attend scientific meetings and follow publications and nurses who do not follow scientific publications/do not attend scientific meetings is not significant (21,25,30). Professionalization in nursing requires high professional knowledge and continuous development. It is thought that nurses improve their professional knowledge with scientific meetings they attend and scientific research they do, and thus they raise their level of nursing professionalism (30). Nurses' experience in conducting and publishing the research increases their knowledge about the steps of the research process. It also improves their awareness of the importance of EBP. Therefore, it is important to encourage nurses to involve research, publication, and scientific activities.

CONCLUSION

According to the data obtained from the study, it was determined that considering the intensive care nurses; female nurses' overall mean total score of EBNAQ and Evidence-Based Practice Intention Practice subscale mean score is higher than that of male nurses. Nurses with intensive care and professional experience of 11 years or

more had a high mean score in the subscale Emotions Related to Evidence-Based Nursing. It was also observed that the mean score in the subscale Beliefs and Expectations towards Evidence-Based Nursing was high in those who were not members of a professional association. In addition, it was concluded that having knowledge about the concept of EBN increased the nurses' mean score in EBNAQ.

In line with these results; it is recommended to disseminate EBP awareness in the nursing education process, to encourage nurses who working in the clinical field to employ EBP, and to create appropriate conditions in which they can integrate the EBP into care. It is also recommended to organize training programs that include EBP's contributions to nursing care for nurses working in intensive care units, to become a member of the association, to follow scientific publications, to have work experience, and to conduct studies on evaluate the effect of gender and education level on the EBNAQ score.

Ethics Committee Approval: Ethic Approval: Ethics committee approval was received for this study from Fırat University Non-Invasive Clinical Research Ethics Committee. (Decision number:2020/16-22, Date: 04.12.2020).

Peer-review: Externally peer-reviewed

Author Contributions: Concept: NS, DG, Design: NS, DG, Data Collection and Processing: NS, DG, Analysis and Interpretation: NS, DG, Writing: NS, DG,

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

Acknowledgements: The authors would like to thank the people who all nurses in this study.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 119-122**

CASE REPORT **DOI:** 10.19127/mbsjohs.1362970

Deep Brain Stimulation Treatment for Genetic Parkinson's Disease: A Case Report

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Received: 19 Semtember 2023, Accepted: 24 October 2023, Published online: 28 March 2024

Abstract

Parkinson's disease (PD) is the second most common neurodegenerative disease and its prevalence has been projected to double over the next 30 years. The diagnosis of PD is bradykinesia and resting tremor or rigidity. PD is a progressive neurodegenerative disease with both motor and nonmotor symptoms. There are many medical options for the treatment of PD but levodopa remains the mainstay. Deep brain stimulation (DBS) is a safe neurosurgical symptomatic treatment for eligible patients with advanced disease in whom medical therapy fails to provide adequate symptom control and a good quality of life or in whom dopaminergic drugs cause severe side effects such as dyskinesias. In this case report, a 44-year-old female patient with a history of tremor and genetic Parkinson's disease, who presented to the clinic with the complaint of excessive increase in tremor in recent years, firstly with drug treatment and then with DBS treatment is reported.

Keywords: Deep Brain Stimulation, Parkinsonism, Parkinson’s Disease

Suggested Citation: Akçay G, Kuzu Mumcu M, Gülensoy B, Sorar M, Yılmaz A. Deep Brain Stimulation Treatment for Genetic Parkinson's Disease: A Case Report. Mid Blac Sea Journal of Health Sci, 2024;10(1):118-121

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INTRODUCTION

Parkinson's disease (PD) is a movement disorder that is difficult to diagnose and treat but is common among neurological diseases (1, 2). Currently, there isn't a specific test to diagnose Parkinson's disease. Resting tremor, bradykinesia, rigidity and loss of postural

reflexes are generally considered the cardinal signs of PD. PD patients have motor and non-motor symptoms. Medical management of PD patients is difficult due to the limited availability of drug therapy and the fact that levodopa is the mainstay of treatment. However, levodopa-induced dyskinesia is commonly seen in Parkinson's patients treated with levodopa (2). This side effect usually occurs after a long period of treatment. Different surgical approaches, including unilateral pallidotomy and deep brain stimulation (DBS), give very good results in PD patients who cannot be managed with medication alone (2). DBS is a safe neurosurgical symptomatic treatment for suitable patients with advanced disease in whom medical therapy fails to provide adequate symptom control and a good quality of life or in whom dopaminergic drugs cause severe side effects such as dyskinesias (2). In this case report, a 44-year-old patient with genetic Parkinson's disease was admitted to the clinic with complaints of foot dragging, difficulty walking, and tremor on the left side. The patient, who also had diphasic dyskinesia, was treated with the method as a result of not responding to apomorphine treatment.

CASE

A 44-year-old female patient with genetic Parkinson's disease with a history of foot dragging, difficulty walking, and left-sided tremor presented to the clinic with the complaint of an excessive increase in tremor, especially in the last 2.5 years, although she had tremor for many years. The patient also had diphasic dyskinesia. The patient who did not benefit from apomorphine was treated with the DBS method after she responded to Levodopa. A brain pacemaker was implanted, and DBS surgery was performed (Fig. 1 and Fig. 2).

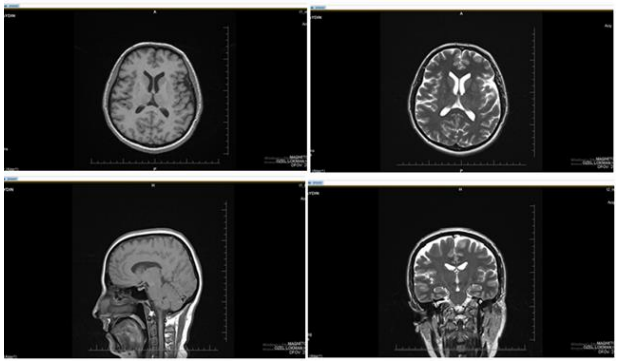

Figure 1. Pre-operative MRI

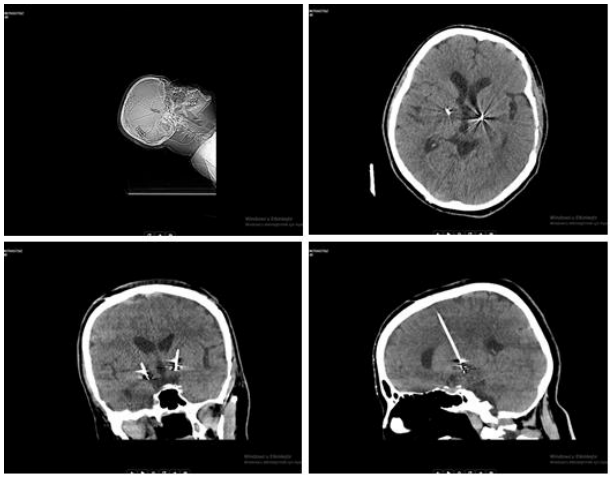

Figure 2. Post-operative CT

In six months after DBS treatment, his symptoms regressed markedly and no complaint of diphasic dyskinesia was observed. While the baseline Unified Parkinson's Disease Rating Scale (UPDRS) motor score was 23, the score was 7 in the 6th month after DBS treatment. The patient complained of leg pain,

and pregabalin 2*225 mg was started. At the end of the second year, intermittent pain in both legs did not improve or progress with DBS adjustment. In addition, while rigidity and bradykinesia in bilateral hands were 0/0, resting tremor was present in the right hand + resting tremor and there was no postural instability.

DISCUSSION

PD is a common movement disorder with motor and non-motor symptoms that is difficult to treat among neurological diseases (1). PD is a progressive neurodegenerative disease caused by the loss of dopaminergic neuronal cells in the substantia nigra pars compacta (3). Medical management of PD patients is difficult due to the limited availability of drug therapies such as levodopa (1). In addition, after a long period of treatment with levodopa in Parkinson's patients, side effects such as levodopa-induced dyskinesia occur (2). Different surgical approaches, including DBS, give very good results in PD patients who cannot be managed with medication alone. It has been a therapeutic option for the treatment of PD for over 30 years (4). It is an effective treatment modality in advanced patients in whom medical therapy fails to provide adequate symptom control and a good quality of life or in whom dopaminergic drugs cause severe side effects such as dyskinesias (2). In a clinical trial, DBS treatment applied to patients with mid-stage Parkinson's disease showed improvement in quality of life, reduction in drug use and improvement in motor scores (5-7). Deuschl et al. showed that DBS treatment was effective even at an earlier stage of PD (7). In this study, a patient with genetic Parkinson's disease and a history of foot dragging, difficulty walking, and left-sided tremor was treated with the DBS method. Similar to other studies in the literature, in our study, it was shown that a favorable response could be obtained with DBS treatment in a drug-resistant patient despite a genetic history.

CONCLUSION

In conclusion, the patient who had tremors for many years and did not respond to levodopa and pramipexole, Pramipexole, Cipralex and Benexol, recovered after DBS treatment. The DBS method is an effective treatment for Parkinson's patients who do not respond to Parkinson's drugs such as Levodopa.

Ethics Committee Approval: The presented study is qualitative and consent was obtained by giving information about the study by one-to-one interviews with the subjects who agreed to participate. The study was carried out by paying attention to the Declaration of Helsinki.

Peer-review: Externally peer-reviewed

Author Contributions: Concept: GA Design: GA, MKK, BG, MS, AY, Data Collection and Processing: GA, MKK, BG, MS, AY Analysis

and Interpretation: GA Writing: GA, MKK, BG, MS, AY

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

Acknowledgements: The authors would like to thank the people who all nurses in this study.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci
March 2024; 10(1): 123-130

CASE REPORT **DOI:** 10.19127/mbsjohs.1374750

Surgical Management of an Elderly Patient with Mental Nerve Hyperesthesia: A Case Report

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Received: 11 October 2023, Accepted: 07 February 2024, Published online: 28 March 2024

Abstract

Prolonged use of removable dentures and age-related bone remodeling can result in atrophy of the alveolar crest and lead to functional impairments and complications such as inflammation and hypersensitivity. The effectiveness of nerve transposition surgery and implant rehabilitation in reducing these complaints in atrophic mandibles is remarkable. This case study involves a 63-year old female patient who developed trigeminal nerve neuropathy, starting after use of removable dentures, with the complaint of pain around the right foramen mentale. Advanced resorption in the posterior alveolar crests of the mandible was identified through radiological examinations. After two months, there was a significant improvement in symptoms and post-operative hypoesthesia was achieved by the agency of implant rehabilitation and the inferior transposition of the right mental nerve. This case emphasizes the importance of nerve transposition surgery in severe atrophic crests, superiorly located mental foramina or hyperesthesia induced by removable prostheses.

Keywords: Bone Atrophy, Nerve Transposition, Implantology

Suggested Citation: Uranbey Ö, Ayrancı F. Surgical Management of an Elderly Patient with Mental Nerve Hyperesthesia: A Case Report Mid Blac Sea Journal of Health Sci, 2024;10(1):122-129.

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INTRODUCTION

Successful dental implant placement in atrophic mandibles remains a notable clinical challenge in oral and maxillofacial surgery (1). Dental practitioners have documented the neuropathic pain associated with mental nerve hypersensitivity thoroughly which can result

from significant alveolar bone loss following long-term total denture use (2).These neuropathic disorders, notably mental nerve hypersensitivity, can significantly impair a patient's quality of life (3). Effective management of these complex cases requires finding the right balance between achieving optimal dental rehabilitation and addressing the neurological symptoms together (4).

Atrophy of alveolar crests, resulting from long-term use of removable prostheses and the effects of aging on bone remodeling, execerbates these complaints. Impaired chewing and disharmony of the prostheses may cause inflammation in the oral cavity, hyperesthesia, and pathological fractures (5). Nerve transposition surgery and implant rehabilitation can reduce the incidence of these complications in cases of atrophic mandibles (6).

This case report analyzes a combined approach of dental implant placement in conjunction with mental nerve transposition in a patient with an atrophic mandible and hyperesthesia of the mental nerve.

CASE

A 63-year-old female patient was admitted to our clinic with a complaint of pain in the region surrounding the right foramen mentale. The study was conducted in accordance with well-established protocols. Trigger points leading to sharp pain were identified on palpation during the clinical examination. Trigeminal neuropathy was considered when it became clear that the pain began during the function of the removable prosthesis but persisted when the prosthesis was not in use. Radiographic examination identified significant resorption in the posterior alveolar crests of the mandible (Fig 1A, 1B). A dental volumetric tomography scan located bilateral mental nerve tracts 2mm below the alveolar ridge, along with an anterior loop that included the incisive branch. The large diameter of the mental nerve was 4.10mm on the right and 3.30mm on the left side (Fig 2).

A lingualized full-thickness incision was carefully performed on the alveolar crest. The flap was reflected supraperiosteally with half thickness and the mental nerve was meticulously dissected from the surrounding tissues. Two vertical osteotomies approximately 1cm in length and a horizontal osteotomy measuring approximately 5mm wide at the base were performed to create space for the transfer of the mental nerve to its new location. The mental nerve was released at the foramen level and gently moved to its new position using a metal hook (Fig 3).

The block bone removed from osteotomy was used as a particle graft for the implantation site of an overdenture. Prior to implant placement in the anterior region of the mandible (Nucleoss® T6, İzmir, Türkiye), the right mental nerve was inferiorly transposed using piezosurgery. Following determination of the nerve's new

position, a sterile, resorbable sponge was placed on top of the nerve bundle to prevent coronal movement, and the flap was closed with a primary intention (Doğsan, Trabzon, Türkiye). The postoperative clinical course was uneventful, and there was minimal discomfort. Ultimately, symptom reduction and hypoesthesia were achieved within 2 months after surgery (Fig 4).

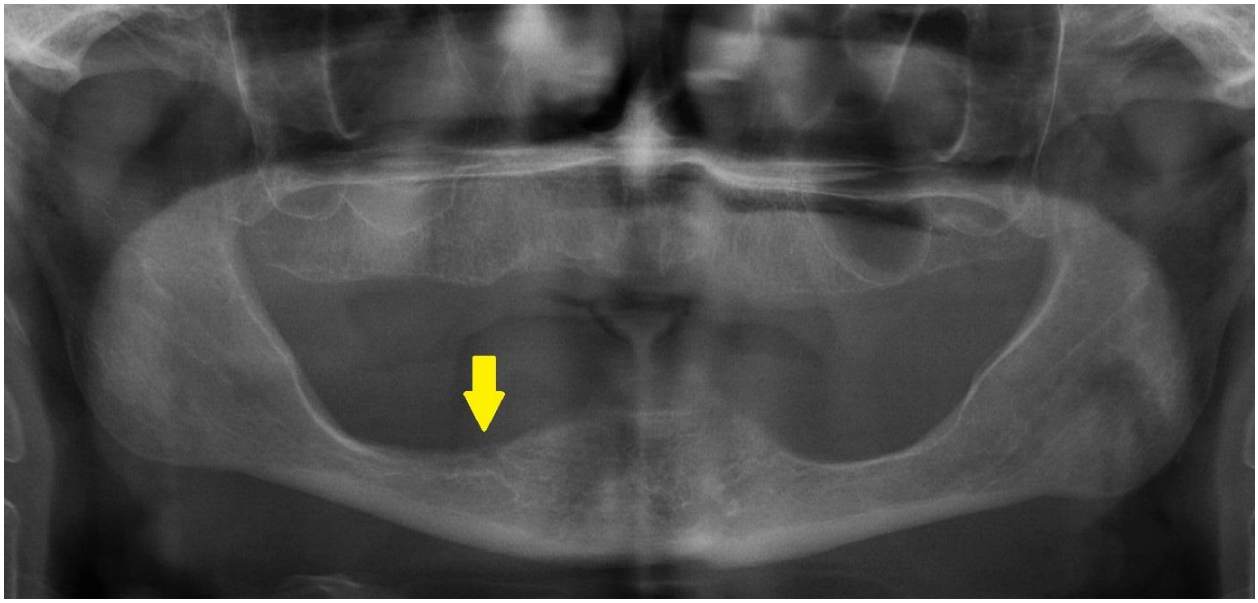

Figure 1A. Radiography showing remarkable resorption in the posterior mandible.

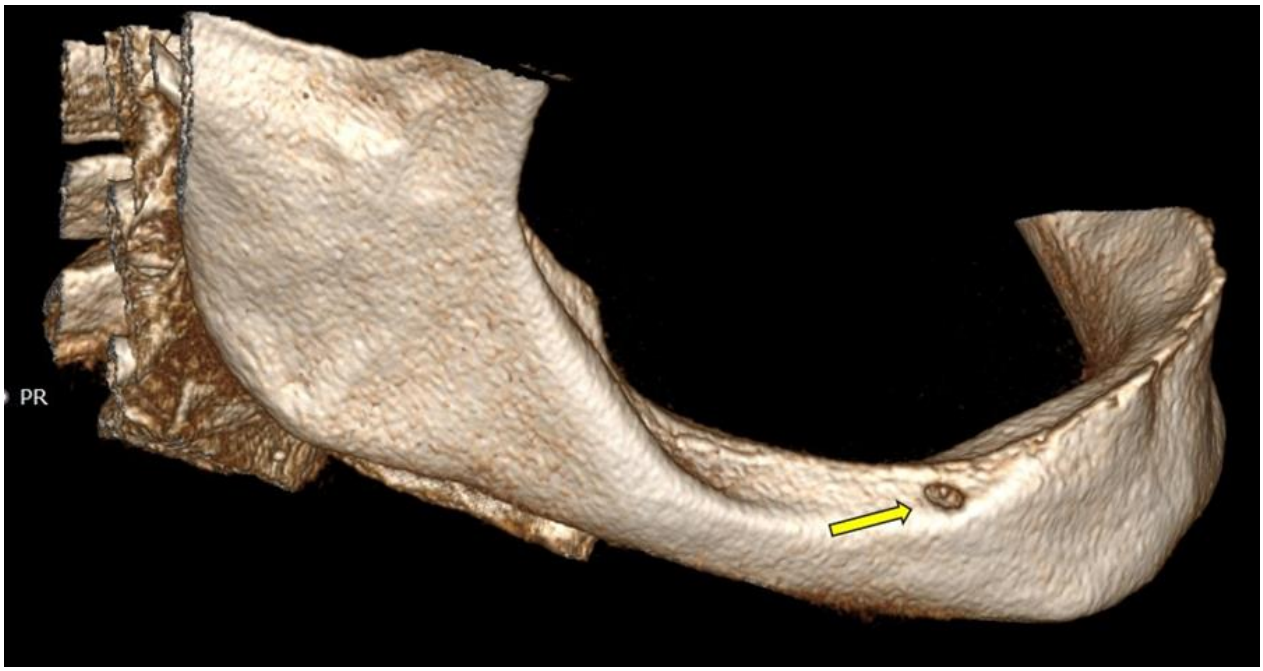

Figure 1B. 3D reconstruction of right mental foramen

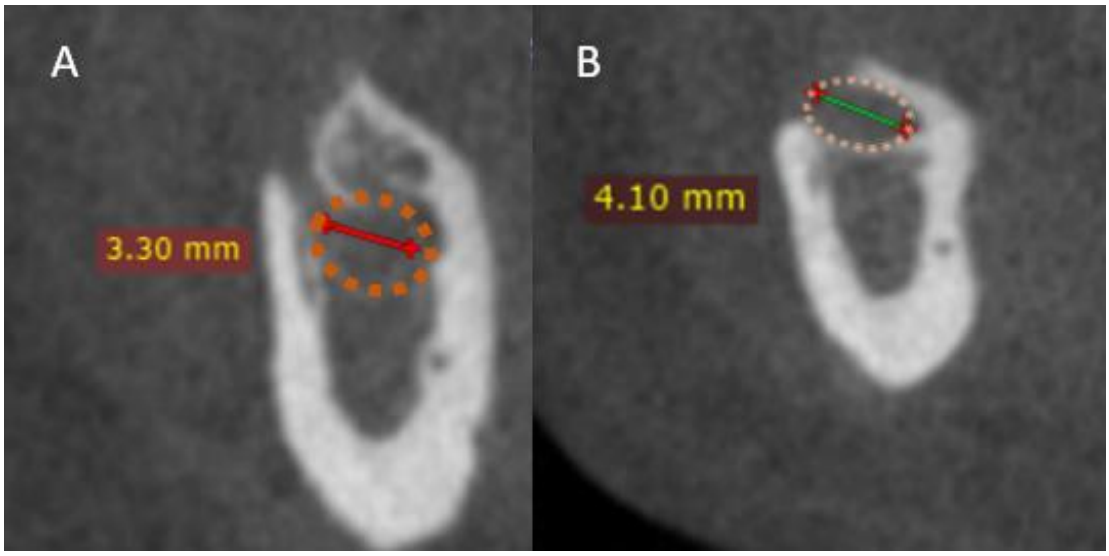

Figure 2. The large diameters of the mental nerve (Left side A, Right side B)

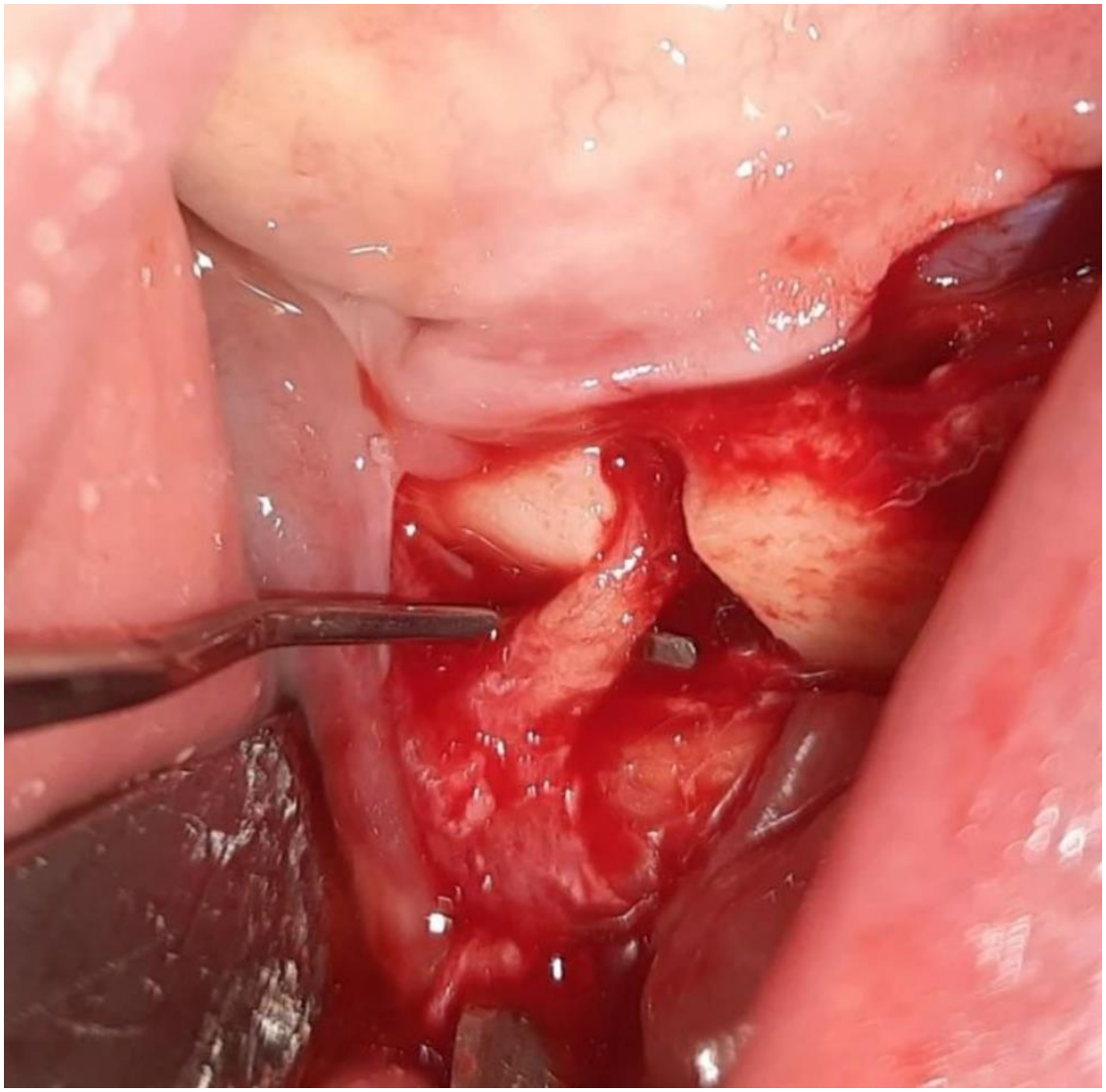

Figure 3. Retraction of mental nerve and performing a submental osteotomy.

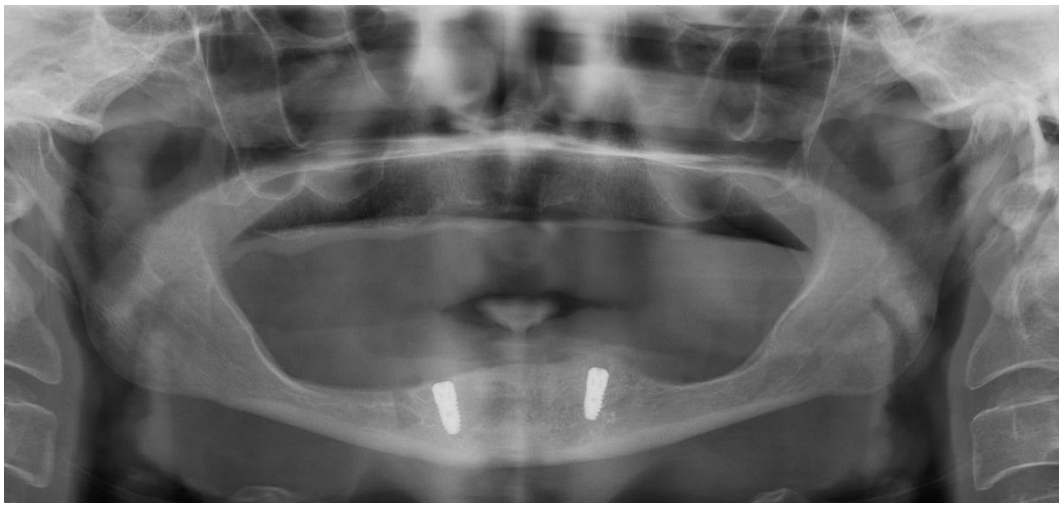

Figure 4. After the transposition, the lower placement of the mental nerve and osteotomy line can be observed.

DISCUSSION

Nerve transposition surgery is an essential step for both preprosthetic and therapeutic purposes, especially for severe cases of atrophic crests with a superiorly located mental foramen or hyperesthesia caused by removable prostheses (7). However, in such cases, surgical procedures may lead to nerve-related complications. Despite this, some authors advocate for vertical bone augmentation between the mental foramina rather than nerve transposition due to the high risk of nerve damage (2). The iliac crest is the preferred donor site for alveoplasty because of its accessibility and bone quantity (8). Considering her age and severe osteoporosis, we selected the nerve transposition for oral rehabilitation.

Our measurements of the mental foramen and the mental nerve on the right side of the mandible revealed relatively large dimensions, consistent with findings in the literature regarding mental nerve dimensions (9, 10). This facilitated the manipulation required for the transposition. Nerve tissue trauma is unavoidable when rotary instruments and burs are used to cut bones due to the high compression and temperature generated (11). The literature indicates that ultrasonic osteotomies exhibit high success rates in this procedure (11). When using piezosurgery, the benefits of atraumatic osteotomy, such as minimal harm to surrounding soft tissues, better visibility with reduced bleeding and enhanced irrigation are noteworthy (12). In vitro, Metzger et al. found that the piezoelectric device was more invasive to the bone but carried a lower risk of nerve damage than the traditional diamond bur (11). The use of a vibrating instrument tip at different ultrasonic frequencies allows for smaller osteotomies and helps preserve vascular-nerve bundles during nerve transposition (13). Disadvantages of this

method have been reported, including prolonged operative time and excessive aerosol formation (12). In our procedure, we employed piezosurgery to inferentially transpose the mental nerve trunk. We obtained a favourable outcome in relation to the neurosensory function of the mental nerve, with the recovery of hyperesthesia at the second month and paresthesia at the fourth month after the operation. Throughout the initial year of monitoring, the patient has been successfully using overdenture prosthetics, with no recurrent neurological issues and acceptable oral functions. Nerve regeneration after compression or mild crush injuries typically takes weeks to 6 months (14). If there is no sensory recovery within this period, a permanent nerve trunk interruption can be expected (15). Literature research suggests that placing implants simultaneously with nerve transposition is advantageous, allowing for better nerve visualization while preparing the fixture location and inserting it through the mental foramen and inferior cortex (6). But on the other hand, it's important to note that removing a section of the buccal cortex during the transposition procedure combined with the placement of multiple implants may compromise structural integrity and increase the risk of potential fractures (16, 17). Nevertheless conducting separate procedures for nerve transposition and implant placement does not offer any advantages and instead imposes an unnecessary second surgery, which could harm the patient (6).

CONCLUSION

Managing elderly patients with mental nerve hyperesthesia in the context of an extremely atrophic mandible poses a demanding and complex clinical challenge. This case report presents crucial insights into the considerations, surgical techniques and outcomes linked to the management of this condition. Prior to considering surgical intervention, a comprehensive assessment of age-related factors like changes in bone density, cognitive function, and overall health is essential. The choice to undergo surgical intervention should be based upon a thorough evaluation that takes into account the patient's medical record, ability to tolerate anesthesia and anticipated recovery outcomes (18). The surgeon must own adequate experience, anatomical proficiency and the necessary skills to manage intraoperative and postoperative complications effectively (18).

Ethics Committee Approval: The presented study is qualitative and consent was obtained by giving information about the study by one-to-one interviews with the subjects who agreed to participate. The study was carried out by paying attention to the Declaration of Helsinki.

Peer-review: Externally peer-reviewed

Author Contributions: Concept: UO, AF, Design: UO, AF, Data Collection and

Processing: UO, AF, Analysis and Interpretation: GA Writing: GA

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

Acknowledgements: The authors would like to thank the people who all nurses in this study.

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Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **March 2024; 10(1): 131-136**

CASE REPORT **DOI:** 10.19127/mbsjohs.1341920

A Sudden Complication: Electrocute-Induced Atrial Fibrillation

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Received: 12 August 2023, Accepted: 20 December 2023, Published online: 28 March 2024

Abstract

The most serious complications developing after an electric shock are cardiac arrhythmias, skin lesions, and multiple organ injuries after a fall from heights. Although mortality due to high-voltage electric shocks is higher, low-voltage electrical shocks can cause cardiac complications. Of the cardiac complications due to electric shock, myocardial necrosis, and ventricular arrhythmias are more common. Although rarer than ventricular arrhythmias, supraventricular arrhythmias can also occur. However, the mechanism of developing arrhythmias after electric shocks cannot be completely explained. In this present case report, AF with rapid ventricular response which developed after a 380-volt electrical shock in a 42-year-old male patient with no risk factors for AF will be discussed.

Keywords: Arrhythmia, Atrial Fibrillation, Electrocute

Suggested Citation: Uranbey Ö, Ayrancı F. Surgical Management of an Elderly Patient with Mental Nerve Hyperesthesia: A Case Report Mid Blac Sea Journal of Health Sci, 2024;10(1):131-136.

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INTRODUCTION

Today, the number of patients admitted to emergency services due to electrical shocks is increasing. In the United States, 17 thousand people a year are admitted to emergency services due to electric shocks, and about 500 to 1000 of them lose their lives due to complications. (1) Deaths occurring in the early stages are usually due to ventricular fibrillation.

(2) Although mortality due to high-voltage electric shocks is higher, low-voltage electrical shocks can cause cardiac complications (3).

The most serious complications developing after an electric shock are cardiac, skin lesions, and multiple organ injuries after a fall from heights (4). Of the cardiac complications due to electric shock, myocardial necrosis, and ventricular arrhythmias are more common. Although rarer than ventricular arrhythmias, supraventricular arrhythmias can also occur (5). However, the mechanism of developing arrhythmias after electric shocks cannot be completely explained (6).

Atrial fibrillation (AF) after electrical shock is a rare case. In a study performed with 182 patients who developed complications after an electric shock, AF was reported only in two of the patients. The risk of developing AF in low-voltage electric shocks is even lower. AF is the most common chronic cardiac arrhythmia. Its incidence increases with age. Among the other known risk factors are hypertension (HT), heart valve diseases, heart failure, ischemic heart disease, pulmonary embolism, and thyrotoxicosis (3).

In this present case report, AF with rapid ventricular response which developed after a 380-volt electrical shock in a 42-year-old male patient with no risk factors for AF will be discussed.

CASE

A 42-year-old man who worked in a factory was brought to the emergency room by ambulance after he got a 380-volt electric shock from the power cable. The patient who lost consciousness for a short time and fell to the ground when he got the electric shock recovered his consciousness while he was transported in the ambulance. After the initial intervention, the patient was given oxygen support and monitored.

The patient described pain at the junction of the left 12th costa and midclavicular line. He also had palpitations. The physical examination of the patient who had no cardiac risk, did not use any substance, never drank alcohol or smoked, and had no previous palpitation complaints revealed a heart rate of 163 beats per minute and a blood pressure of 130 / 90mmHg. His oxygen saturation level was 98%. A second-degree burn was observed on the second and third fingers of his right hand where he was exposed to an electrical current (Figure 1A). The exit wound (0.5x0.5cm) was at the junction of the left 12th costa and midclavicular line. No extra sounds were heard on auscultation during the cardiovascular system examination. Heartbeats were considered arrhythmic. The patient's electrocardiogram (ECG) demonstrated atrial fibrillation (AF) with a rapid ventricular response rate was 163 beats per minute (Figure 1B). Because the patient was hemodynamically stable, electrical

cardioversion was not considered first. In the emergency room, he was intravenously (IV) administered 25 mg diltiazem twice at an interval of 30 minutes. Thirty minutes after the second administration of diltiazem, the patient's heart rhythm was considered atrial fibrillation. However, his heart rate dropped to 144 beats per minute. The patient was transferred to the coronary intensive care and his medical follow-up continued there.

The patient's cardiac enzymes, hemogram, and biochemistry tests were taken. To rule out multiple organ traumas, postero-anterior chest X-ray, thoraco-abdominal, and cerebral computed tomography imaging were taken. His blood test results showed complete blood count, kidney functions, electrolytes, troponin, and myoglobin levels within normal limits. The patient's posteroanterior chest X-ray and computed tomography revealed no pathological findings. The patient who did not recover sinus rhythm within two hours in the intensive care unit started on amiodarone infusion (1 gr in 24 hours). In addition, enoxaparin at a 0,6mg/kg dose was administered subcutaneously (2x1). At the third hour of amiodarone infusion, the patient recovered the sinus rhythm (Figure 1C). His vital signs were stable. Cardiac enzymes checked three times at three-hour intervals were negative.

The patient's echocardiographic evaluation revealed that the left ventricular diameter and wall motions were normal, the ejection fraction (EF) was 60%, the first-degree mitral and aortic insufficiency was present, and the size of the right atrium and ventricle were in normal limits.

During the follow-up, the patient remained in sinus rhythm. 24-hour troponin and thyroid function tests were within normal limits. The patient whose Chadsvasc score was 0 was not given anticoagulant therapy. On the second day of his hospitalization, the patient was prescribed diltiazem tablets (90 mg,1x1) and then discharged.

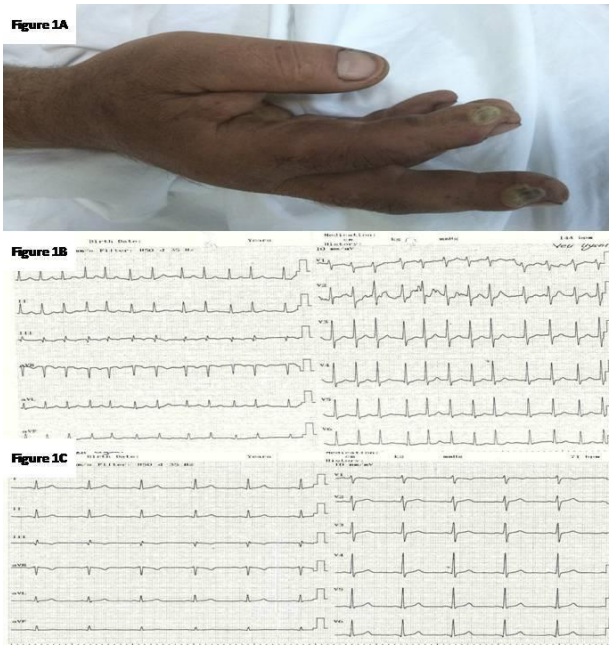

Figure 1A: right hand where he was exposed to an electrical current 1B: electrocardiogram (ECG) demonstrated atrial fibrillation, Figure 1C: sinus rhythm

DISCUSSION

The heart is one of the organs most vulnerable to electric shocks. Although the exact mechanism is not known, the reason for the heart to be vulnerable to electric shocks is that blood, a very good conductor of electricity, continuously circulates in the chambers of the

heart and the heart has a widespread neural network (5,7).

Among the electric shock-related cardiac complications are myocardial infarction, left ventricular dysfunction, cardiac rupture, and arrhythmias. Although electric shocks frequently lead to ST-segment changes and sinus tachycardia, among the other arrhythmias are ventricular extrasystoles, ventricular tachycardia, ventricular fibrillation, atrial tachycardia, atrial fibrillation, atrioventricular block. (8) Although arrhythmias, as in our case, usually occur within the first day after the electric shock, they may occur within the first few days as well (9).

The majority of sudden deaths due to electric shocks are caused by asystole and ventricular fibrillation. While ventricular fibrillation is common in low-voltage electrical injuries, asystole is more common in high-voltage injuries. In low-voltage electrical injuries, the rate of cardiac side effects is lower (1).

Atrial fibrillation due to electric shocks is a rare condition (10). According to studies in the literature, while the occurrence of high-voltage electric shock-related AF is more likely, low-voltage electric shock-related AF is rare. As in our case, electric shocks require a multidisciplinary approach (8). Detection of internal organ traumas should be started as soon as the patient is admitted to the emergency room. Although indications for cardiac monitoring due to electric shocks cannot be fully explained, if the patient demonstrates such symptoms as loss of consciousness, abnormal ECG, high voltage exposure, and if the patient has cardiac disease history, particularly a history of cardiac arrhythmias, it is recommended to monitor the patient for 24 hours (10).

Because AF after an electrical injury is a rare case, there are no clear guidelines on managing AF. While electrical cardioversion is recommended for hemodynamically unstable patients, different approaches have been reported for hemodynamically stable patients, like our case.

Zihni et al. reported that in their case, the patient who developed AF after an electric shock spontaneously recovered sinus rhythm within 24 hours after he was intravenously administered 5 mg metoprolol to control heart rate. Because they could not recover the patient's sinus rhythm with 150 mg flecainide and amiodarone infusion within 24 hours, Alex and Mark returned the patient to sinus rhythm with the electrical cardioversion method. Because their patient was hemodynamically unstable, Akdemir et al. reported that they preferred electrical cardioversion as the first choice. In their patient, Ercan et al. managed to control heart rate with intravenously administered digoxin, and the patient spontaneously returned to the sinus rhythm. In their case, Mitrakrishn et al. reported that the patient spontaneously returned to the sinus

rhythm 6 hours after they managed to control heart rate with intravenously administered atenolol.

In our case, because the patient had the symptoms of loss of consciousness and abnormal ECG findings (AF with rapid ventricular response), he was closely monitored. Because he was hemodynamically stable, he was intravenously (IV) administered diltiazem twice at an interval of 30 minutes in the emergency room.

The patient's heart rate dropped from 163 beats per minute to 144 beats per minute.

Because the patient did not return to sinus rhythm spontaneously during the two-hour follow-up in the intensive care unit, amiodarone infusion was started. The patient returned to the sinus rhythm 3 hours later and remained in the sinus rhythm during the 24-hour monitoring.

CONCLUSION

Our case showed that although the patient had no risk factor for AF, he was exposed to low voltage, and AF after the electric shock is not common, he developed AF. In the management of AF, electrical cardioversion should be the first choice in hemodynamically unstable patients. However, there is no consensus on the treatment of hemodynamically stable patients. On the other hand, in cases reported, heart rate control was often established, patients spontaneously returned to sinus rhythm, and thus aggressive interventions were not needed.

Ethics Committee Approval: The presented study is qualitative and consent was obtained by giving information about the study by one-to-one interviews with the subjects who agreed to participate. The study was carried out by paying attention to the Declaration of Helsinki.

Peer-review: Externally peer-reviewed

Author Contributions: Concept: UO, AF, Design: UO, AF, Data Collection and Processing: UO, AF, Analysis and Interpretation: GA Writing: GA

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: The authors declared that this study has not received no financial support.

Acknowledgements: The authors would like to thank the people who all nurses in this study.

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