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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

Aims and Scope

Middle Black Sea Journal of Health Science is an international journal that publishes original clinical and scientific research. Middle Black Sea Journal of Health Science, published by Ordu University, publishes basic innovations in health education, case reports, reviews, letters to the editor, case reports and research articles.

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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The publication language of the journal is English. The journal is published every three months, in February, May, August and November, and four volumes are completed.

Middle Black Sea Journal of Health Science - adheres to the standards of publication ethics in health science research, Higher Education Council's Scientific Research and Publication Ethics Directive, Committee on Publication Ethics (COPE), Directory of Open Access Journals (DOAJ), Open Access Scholarly Publishers It also adopts the ethical publishing principles published by the Association (OASPA) and the World Association of Medical Editors (WAME).

No fee is charged from the authors for the evaluation and publication of the article.

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Middle Black Sea Journal of Health Science - adheres to the standards of publication ethics in health science researches, Higher Education Council's Scientific Research and Publication Ethics Directive, Committee on Publication Ethics (COPE), Directory of Open Access Journals (DOAJ), Open Access Scholarly Publishers It also adopts the ethical publishing principles published by the Association (OASPA) and the World Association of Medical Editors (WAME); The address for the principles expressed under the Principles of Transparency and Best Practice in Scholarly Publishing is given below.

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• The research should be planned in a way that does not put the participants at risk.

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-Only articles uploaded to the journal's system are evaluated. Studies sent via e-mail are not considered.

- All submitted studies go through pre-evaluation, language editor, statistical editor and referee evaluation processes. The evaluation process is carried out by the editor of the journal.

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• Decides that the work is not suitable for the journal and declines the work.

• Resend the work to the responsible author for corrections.

• The study sends to the language editor and can request a correction.

• The study is evaluated by sending it to a statistics advisor. After this evaluation, the author may ask for a correction.

• Can direct the article to the referees and initiate the referee evaluation process.

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The similarity rate of the articles should be made over iThenticate and should be at most 20%, excluding the "References" section.

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An approval of research protocols by an ethical committee in accordance with international agreements (Helsinki Declaration of 1975, revised 2002 - available at http://www.vma.net/e/policy/b3.htm, "Guide for the care and use of laboratory animals - www.nap.edu/catalog/5140.html/) is required for experimental, clinical and drug studies. A form stating that the patients have been informed about the study and consents have been obtained from the patients is also required for experimental, clinical and drug studies. All submissions must be accompanied by a letter that states that all authors have approved the publication of the paper in the Middle Black Sea Journal of Health Science.

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Middle Black Sea Journal of Health Science

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[2]Second Author's Institution, e -mail, orcid no

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Name, address, telephone (including the mobile phone number) and fax numbers, and email address of the corresponding author,

Ethics Committee Approval: Ethics committee approval was received for this study from ……. Clinical Research Ethics Committee of …… University (No…….).

Author Contributions: Concept: …….., Design: …….., Literature search:……..... Data Collection and Processing: ……..., Analysis and Interpretation:……, Writing - …….

Acknowledgements:

Conflict of Interest:

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Note: Kongress participation……..

In the article sent, the sections that should be below are listed.

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1. Abstract Page: The first page should include abstracts written English, and key words. The abstract of Original Articles should be structured with subheadings (Objective, Methods, Results, and Conclusion) (average 200-400 word).

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6. Discussion: Extensive citations and discussion of published literature should be being used.

7. Conclusion: In this section, the results obtained from the article should be written.

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Examples: Hypotension is one of the most common and critical problems in hemodialysis patients (1,2).

References

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Unpublished data, submitted manuscripts, or personal communications should be cited within the text only. Personal communications should be documented by a letter of permission.

All items in the list of references should be cited in the text and, conversely, all references cited in the text must be presented in the list.

The abbreviations of journal titles should conform to those adopted by the List of Serial Title Word Abbreviations, CIEPS/ISDS, Paris, 1985 (ISBN 2-904938-02-8).

Journal titles should be abbreviated in accordance with the journal abbreviations in Index Medicus/ MEDLINE/PubMed.

For citation of references with one to six authors, the names of all authors should be included, and for the articles with more than six authors, “et al.” should be written after typing the six names. The surnames of authors should be written exactly, and the initials of their names should be indicated with capital letter without any punctuation mark.

Please use the following style for references:

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Levine WC, Pope V, Bhoomkar A, Tambe P, Lewis JS, Zaidi AA, et al. Increase in endocervical CD4 lymphocytes among women with nonulcerative sexually transmitted diseases. J Infect Dis. 1998;177(1):167–174.

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.

Book with a Single Author: Fleiss JL. Statistical Methods for Rates and Proportions. Second Edition. New York: John Wiley and Sons; 1981. p. 105-32.

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

Thesis: Erakinci G. Searching for antibodies against parasites in donors. Izmir: Ege University Health Sciences Institute. 1997.

Article in Electronic Format: Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis (serial online) l995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: http:/ www.cdc.gov/ncidodlElD/cid.htm.

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Revisions: Authors should mark the changes they made on the main text in color while submitting their article revision files. The responses to the referees should be specified in a separate Word file. Revised articles should be sent to the journal within one month following the decision letter. If the revised version of the article is not uploaded within the specified time, the revision option may be canceled. If the authors need additional time for revision, they are required to submit their extension requests to the journal before the end of one month.

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The similarity rate of the articles should be done through iThenticate and should be at most 20% excluding the "References" part.

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The studies submitted to the Journal are accepted in Original research, Short papers, Case report, Review articles,

a) Original research: Prospective, retrospective and all kinds of experimental studies

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

References (most 40)

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

b) Short papers: Prospective, retrospective and all kinds of experimental studies

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

References (most 20)

Whole text should not exceed 2700 words except for resources and English summary.

c) Case Report: They are rarely seen articles which differs in diagnosis and treatment. They should be supported by enough photographs and diagrams.

Structure

Title

Abstract (average 100-300 word)

Key words

Introduction

Case report

Discussion

Conclusion

Acknowledgements

References (most 20)

Whole text should not exceed 2200 words except for resources and English summary.

d) Review articles

Structure

Title

Abstract (average 200-400 word)

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

NOVEMBER 2024 **VOLUME 10** **ISSUE 4**

CONTENTS

EDITORIAL

Dear Readers

As we bid farewell to another year, we take great joy and pride in advancing together on our journey of science and knowledge. This past year has been a productive one, marked by scientific discoveries and academic achievements. Through the diligent efforts of our authors, the unrelenting curiosity of researchers, and the unwavering interest of our readers, we have shared this success as a collective endeavor.

Every article we published throughout the year has taken us one step further into the boundless horizons of science. These valuable contributions, spanning various disciplines, have opened new doors not only in the scientific community but also for everyone striving to build a better future. We share the excitement of our authors, the meticulous dedication they have shown in their research, and the pride in the outcomes they have achieved.

We extend our heartfelt thanks to everyone who accompanied us on this journey, whether through their efforts, writings, ideas, or inspiration. Your unwavering commitment to science and knowledge continues to drive us toward greater goals with each passing year.

We are grateful to have you with us. Here's to meeting again in many more years filled with new successes!

Wishing you scientific days ahead!

Prof. Dr. Ülkü KARAMAN

Editor

Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **November 2024; 10(4): 293-308**

ORGINAL ARTICLE **DOI:** 10.19127/mbsjohs.1486980

Investigation on the Effect of Age and Gender Variables on Sars-Cov-2 in Persons Applying to a Hospital in Istanbul

Devran Şener[1(ID)], Zeynep Kolören[1(ID)], Ülkü Karaman[2(ID)], Yeliz Kaşko Arıcı[3(ID)]

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Received: 24 May 2024, Accepted: 25 October 2024, Published online: 30 November 2024

Abstract

Objective: The study was planned based on the demographic characteristics (age and gender) of 36704 people who applied to a hospital in the Istanbul European region with the suspicion of COVID-19.

Method: Nasopharyngeal and oropharyngeal swab samples were taken from people who applied to the hospital between November 2020 and March 2021, and the detection of the SARS-CoV-2 virus was made by RT-qPCR technique. The data were evaluated with chi-square analysis and SPSS 28 statistical program was used in all calculations. Using the COVID-19 data in the first, middle, and last five days of the specified months, observing the course of the pandemic in this period was desired.

Results: It was found that the most COVID-19 PCR test was performed in November 2020 with 13380 (36.4%) cases and 2347 of the cases were detected as positive. It was observed that 4231 (11.5%) of the total cases (36704) were positive in all of the mentioned months. The highest number of positive cases is between the ages of 20-39 with 1995 people (47.1%). The following 1442 (34.8%) cases were reported to be between the ages of 40-59. While the distribution of COVID-19-positivepatients by age groups in November 2020 did not differ significantly between men and women, significant differences were found in December. The distribution of Covid-19 COVID-19 positive patients by age groups in 2020 and 2021 showed a significant difference. While the proportion of patients aged 0-9, 20-39, and over 60 was higher in 2020, the proportion of patients aged 10-19 and 40-59 was higher in 2021.

Conclusion: The effect of age and gender factors in the pandemic triage of individuals during the pandemic period when they were exposed to the COVID-19 epidemic was investigated retrospectively. No application has been made to harm the private information of the patients. The study is thought to contribute to detecting the SARS-CoV-2 virus, detecting pandemics and epidemics, and managing treatment, especially depending on age and gender.

Keyword: COVID-19, RT-qPCR, SARS-CoV-2, viral diagnosis, pandemic

Suggested Citation Sener D, Koloren Z, Karaman U, Kasko Arici Y. Investigation on the effect of age and gender variables on SARS-CoV-2 in persons applying to a hospital in Istanbul. Mid Blac Sea Journal of Health Sci, 2024;10(4):293-308

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INTRODUCTION

The first cases of pneumonia of unknown cause were encountered in Wuhan city of China's Hubei province in December 2019. A new coronavirus, different from the previous ones, was detected in samples obtained from cases on January 12, 2020. By genetic sequence analysis, it was determined that the epidemic was of viral origin. This virus has been determined to be severe acute respiratory syndrome coronavirus 2 (Severe Acute Respiratory Syndrome Coronavirus 2; SARS-CoV-2), also known as the new coronavirus 2019-nCoV. The disease was later identified as COVID-19. This situation caused WHO to declare pneumonia an epidemic disease on January 30, 2020 (1, 2). COVID-19 is a respiratory disease with a very high level of transmission caused by SARS-CoV-2 (3). The diagnosis of COVID-19 in Turkey was first announced on March 11, 2020, and the first death due to COVID-19 was announced by the Ministry of Health of the Republic of Turkey on March 15, 2020. Education in primary secondary and high schools and universities was suspended as of March 16, 2020, and classes continued via the internet and television (4). COVID-19 is a disease caused by an RNA virus that can be transmitted to humans and animals and occurs as a result of infection in the respiratory system (5). Coranaviruses (CoV) are a large family of viruses that cause deadly diseases such as MERS-CoV and SARS-CoV. SARS-CoV-2 is similar to bat coronavirus (BatCoV), SARS-CoV, and MERS-CoV, which emerged in 2012. These three related viruses, which are the source of diseases, belong to the Beta coronavirus genus, which is the causative agent of disease in humans (6).

The current diagnostic test to detect COVID-19 is real-time, Reverse-Transcription Polymerase Chain Reaction (RT-PCR). Although there are still problems in the tests used in the diagnosis of the disease, case information is updated in every period of the epidemic and efforts are made to control it, especially with the early diagnosis and isolation of patients identified as superspreaders. Many laboratory diagnostic methods, potential drugs and vaccine studies have been conducted for the diagnosis and treatment of the SARS-CoV-2 virus, which threatens humanity and is the source of COVID-19 (8, 9).

This study is a retrospective study and aimed to detect the SARS-CoV-2 virus using the RT-qPCR technique, based on the ages and gender

of people who applied to a private hospital in Istanbul between November 2020 and March 2021. It was intended to observe the course of the pandemic in these periods by using COVID-19 data from the first, middle and last 5 days of the specified months. This study aimed to investigate the effect of individuals' age and gender factors in pandemic triage on the disease during the pandemic days when we were exposed to the COVID-19 epidemic (10). It also seeks answers to two basic questions;

1) Does the age factor affect COVID-19 disease?

2) What is the effect of the gender factor on the SARS-CoV-2 virus in humans?

It aimed to observe the status of age and gender factors in the disease with the data obtained from the study and to contribute to subsequent COVID-19 studies.

METHODS

The study is retrospective and includes data from the first, middle, and last five days of the November 2020 and March 2021 periods. It encompasses individuals who sought hospital care for suspected COVID-19, those who underwent PCR tests for domestic and international travel, individuals who had PCR tests for pre-operative screening, those who were required to undergo compulsory COVID-19 tests by their workplaces, and those who needed PCR tests for entry to concerts, entertainment events, and football competitions. The data of individuals who underwent medical tests and compulsory PCR tests during the specified period were utilized. Approval for conducting the study was obtained from the Scientific Research Platform of the Ministry of Health of the Republic of Turkey (Form No: Devran ŞENER-2021-04-29T08_13_10). Furthermore, the study's content was reviewed and approved by the Ordu University Clinical Research Ethics Committee (Decision No: 2021/237).

Sample Collection and Transfer

Swabs and nasopharyngeal (from the back of the nose and throat) and oropharyngeal (from the epithelial cells in the throat and pharynx) swab samples were collected from individuals who wished to undergo COVID-19 PCR testing. The collected samples were brought to the laboratory in a Bio-speedy vNAT transfer tube (Cat. No.: BS-NA-513-100) containing 2 mL of viral nucleic acid extractor and a protective fluid. Thanks to the vNAT viral nucleic acid buffer (Cat. No.: BS-NA-510) in the transfer tube, viral samples could be used directly for RT-qPCR without the need for additional extraction. In addition, the infectivity of viral samples transferred in this manner became inactive within 5 minutes. Swab samples were stored at +2-8 °C and no freeze-thawing was performed.

RT-qPCR Preparation Stage

The preliminary preparation phase was carried out in a second-class biosafety cabinet in a sterile room. At this stage, the samples coming to the laboratory with the vNAT transfer tube are sorted according to their emergency status (time of arrival to the laboratory, why they were taken, barcode colors). One study included 94 patients. One negative control in each run; a positive control in case of contamination; It was used for reagent stability control. In this study, the biospeedy SARS CoV-2 Double Gene RT-qPCR Kit of the Bioeksen brand was used. By following the kit protocol, patient samples were processed in the Bio-Rad brand CFX96 Touch PCR device with 2X Prime Script Mix at 52°C for 1 cycle, 95°C for 1 cycle, 95°C for 1 cycle; With CVD Oligo Mix, 12 cycles at 67°C -56°C and 35 cycles at 85°C and 55°C, respectively, were completed and FAM and HEX channels were read.

Post PCR Step and Analysis

Interpretation of results was performed according to the kit protocol. In each study, the relative fluorescence unit (RFU) was set at 200 RFU and was considered the threshold value. First, the positive and negative controls must function correctly for the test to be considered valid. In the well containing the positive control, the FAM and HEX channels should give a sigmoidal curve. The result of a positive patient should show a sigmoidal curve above the 200 RFU threshold in the FAM and HEX channels, just as in the positive control analysis.

In addition, the result is considered positive if there is a sigmoidal curve above the threshold value in the FAM channel, even if there is no radiation in the HEX channel. In the analysis of negative results, the HEX channel should have a sigmoidal curve above the threshold of 200 RFU and the FAM channel should have no radiation.

Table 1. Interpretation of the results and conclusion determination

Orf1ab+N (Fam)	**Rnase P (Hex)**	**Interpretation**	**Result**
Positive	Positive	SARS-CoV-2 RNA detected The result is valid	It is reported as positive
Positive	Negative	SARS-CoV-2 RNA detected The result is valid	It is reported as positive
Negative	Positive	S SARS-CoV-2 RNA detected The result is valid	It is reported as negative
Negative	Negative	(Sampling/inhibition problematic) The result is invalid	The same sample is run again and if the problem persists, a new sample is requested.

The study is considered valid if the positive and negative controls functioned correctly. If HEX and FAM channels do not emit in any well of a valid assay, the assay is repeated in that well. In the first stage, the test is repeated with the same sample, but if the HEX and FAM channels do

not emit light in the second study, a new swab sample is requested from the patient. The situations used in the interpretation of the results and the events leading to the conclusion are shown in Table 1.

Statistical analysis

Data are expressed as numbers and percentages. Data were evaluated with chi-square analysis. In chi-square analysis, Pearson or Likelihood ratio chi-square values were calculated as appropriate. All calculations were made with the SPSS 28 statistical program. A 5% statistical significance level was taken into account in calculations and interpretations.

RESULTS

The distribution of patients admitted to the hospital with suspicion of COVID-19 by age group and gender in each year and month is given in Table 2 and Figure 1. According to the chi-square test, there is no significant relationship between age groups and gender in November 2020 ($p<0.001$; $\chi2=20.877$). While the proportion of female patients is high in patients aged 60 and over, the proportion of male patients is higher in other age groups. In December 2020, there is no significant relationship between age groups and gender ($p=0.470$; $\chi2=3.553$). In 2021, the female-male ratios showed significant differences according to age groups in January ($p=0.022$), February ($p<0.001$) and March ($p=0.020$). In every three months, the rate of male patients in the 40-59 group is higher than the rate of female patients in other age groups.

The distribution of positive patients by age group and gender in each year and month is given in Table 3 and Figure 2. In November 2020, the distribution of COVI-19 positive patients according to age groups did not differ significantly between men and women ($p=0.163$; $\chi2=6.526$). In December, the distribution of Covid-19 positive patients according to age groups showed a significant difference between men and women ($p=0.032$; $\chi2=10.595$). The distribution differed according to age groups in male and female patients. In the 0-9 age group, the rate of women (3.2%) is higher than the rate of men (0.8%). Similarly, among those aged 60 and over, the rate of women (13.4%) is higher than the rate of men (9.7%). In other age groups, the rate of male patients is higher than the rate of female patients.

The distribution of negative patients by age group and gender in each year and month is given in Table 4 and Figure 3. In November 2020, the distribution of Covid-19 negative patients according to age groups showed a significant difference between male and female patients ($p = 0.003$; $\chi2 = 16.196$). In the 0-9 age group, the rate of men (1.7%) is higher than the rate of women (1.6%). Similarly, among those aged 20-39 and 40-59, the rate of men (53.2% and 31.5%, respectively) is higher than the rate

of women (52.6% and 29.8%, respectively). Among those aged 10-19 and those aged 60 and over, the rate of women (5.7% and 10.2%, respectively) is higher than the rate of men (5.5% and 8.1%, respectively). In December 2020, the distribution of Covid-19 negative patients according to age groups did not differ significantly between male and female patients ($p=0.626$; $\chi2=2.607$).

The change in age distribution of Covid Positive patients over the years is given in Table 5. The distribution of positive patients across age groups showed a significant difference in 2020 and 2021 ($p<0.001$; $\chi2=26.346$). While the proportion of patients aged 0-9 years, 20-39 years of age and over 60 years of age is higher in 2020, the proportion of patients in the 10-19 and 40-59 age groups is higher in 2021.

The change in age distribution of Covid Negative patients over the years is given in Table 6. The distribution of negative patients across age groups showed a significant difference in 2020 and 2021 ($p<0.001$; $\chi2=90.703$). While the rate of patients aged 20-39 and over 60 years old was higher in 2020, the proportion of patients aged 0-9 years, 10-19 years old and 40-59 years old is higher in 2021. Figure 4 shows the distribution of total positive, total negative and total number of cases according to age groups.

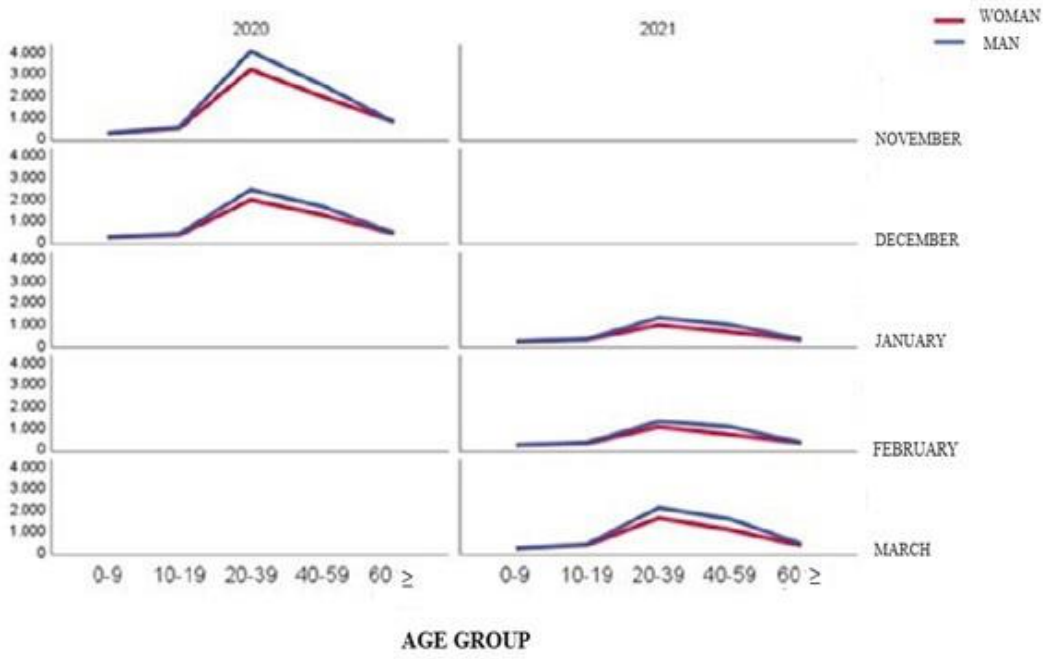

Figure 1. Distribution of patients in the study by years, months, age groups and gender

Table 2. Distribution of patients in the study by age group and gender in each year and month

Year	Month			Gender				Total		χ^2	p
				Woman		Man					
				n	%	n	%	n	%		
2020	November	Age Group	0-9	97	45.3	117	54.7	214	100.0	20,877	**<0.001**
			10-19	346	46.0	406	54.0	752	100.0		
			20-39	3066	44.0	3909	56.0	6975	100.0		
			40-59	1809	43.5	2354	56.5	4163	100.0		
			60 ≥	642	50.3	634	49.7	1276	100.0		
		Total		5960	44.5	7420	55.5	13380	100.0		
	December	Age Group	0-9	80	44.9	98	55.1	178	100.0	3,553	0.470
			10-19	193	43.6	250	56.4	443	100.0		
			20-39	1827	44.4	2291	55.6	4118	100.0		
			40-59	1135	42.7	1523	57.3	2658	100.0		
			60 ≥	255	46.5	293	53.5	548	100.0		
		Total		3490	43.9	4455	56.1	7945	100.0		
2021	Jonuary	Age Group	0-9	54	44.3	68	55.7	122	100.0	11.440	**0.022**
			10-19	151	46.2	176	53.8	327	100.0		
			20-39	834	41.8	1162	58.2	1996	100.0		
			40-59	513	37.9	841	62.1	1354	100.0		
			60 ≥	136	44.3	171	55.7	307	100.0		
		Total		1688	41.1	2418	58.9	4106	100.0		
	February	Age Group	0-9	68	45.3	82	54.7	150	100.0	24.810	**<0.001**
			10-19	229	45.9	270	54.1	499	100.0		
			20-39	1485	43.1	1958	56.9	3443	100.0		
			40-59	938	39.5	1437	60.5	2375	100.0		
			60 ≥	208	42.3	284	57.7	492	100.0		
		Total		2928	42.1	4031	57.9	6959	100.0		
	March	Age Group	0-9	58	48.7	61	51.3	119	100.0	11.707	**0.020**
			10-19	133	43.0	176	57.0	309	100.0		
			20-39	915	43.9	1169	56.1	2084	100.0		
			40-59	551	37.4	921	62.6	1472	100.0		
			60 ≥	162	49.1	168	50.9	330	100.0		
		Total		1819	42.2	2495	57.8	4314	100.0		

χ^2: Pearson Chi-Square Test

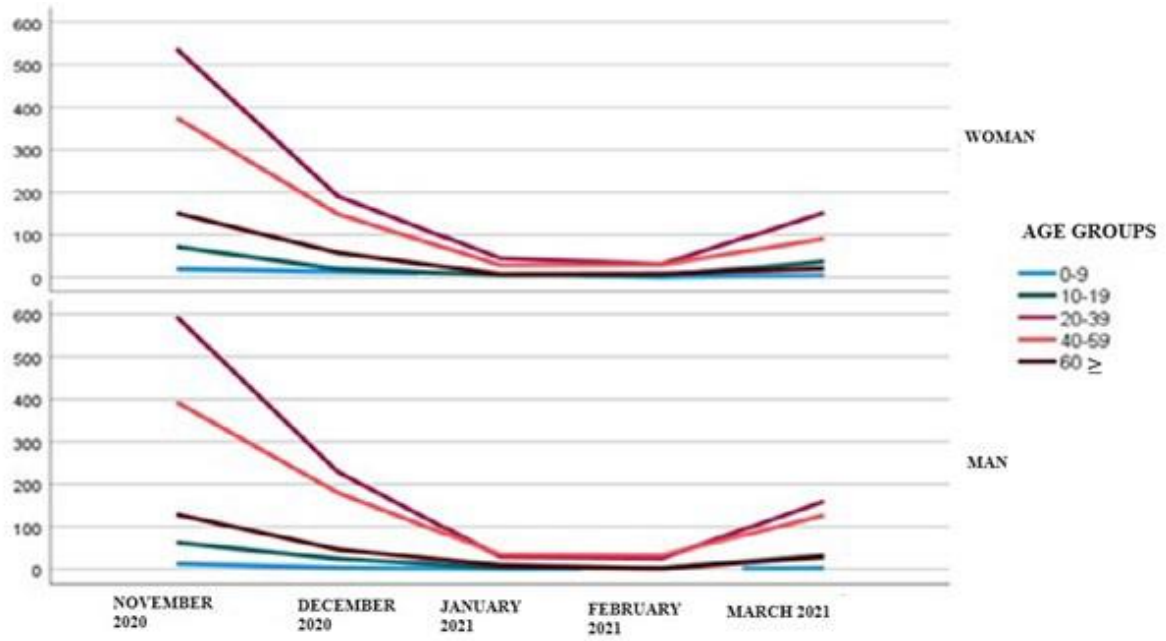

Figure 2. Distribution of covid positive patients by years, months, age groups and gender

Table 3. Distribution of positive patients by age group and gender in each year and month

				Gender							
				Woman		Man		Total		χ^2	p
Year	**Month**			**n**	**%**	**n**	**%**	**n**	**%**		
2020	November	Age Group	0-9	20	1.7	13	1.1	33	1.4	6,526	0,163
			10-19	72	6.2	63	5.3	135	5.8		
			20-39	537	46.5	594	49.8	1131	48.2		
			40-59	375	32.5	393	33.0	768	32.7		
			60 ≥	151	13.1	129	10.8	280	11.9		
		Total		1155	100.0	1192	100.0	2347	100.0		
	December	Age Group	0-9	14	3.2	4	0.8	18	2.0	10.595	**0.032**
			10-19	20	4.6	25	5.2	45	4.9		
			20-39	191	44.2	229	47.2	420	45.8		
			40-59	149	34.5	180	37.1	329	35.9		
			60 ≥	58	13.4	47	9.7	105	11.5		
		Total		432	100.0	485	100.0	917	100.0		
2021	Jonuary	Age Group	0-9	0	0.0	1	1.3	1	0.6	5.214	0.266
			10-19	6	6.8	4	5.0	10	6.0		
			20-39	45	51.1	30	37.5	75	44.6		
			40-59	29	33.0	35	43.8	64	38.1		
			60 ≥	8	9.1	10	12.5	18	10.7		
		Total		88	100.0	80	100.0	168	100.0		
	February	Age Group	0-9	1	1.3	0	0.0	1	0.7	6.262	0.180
			10-19	5	6.6	3	4.7	8	5.7		
			20-39	31	40.8	26	40.6	57	40.7		
			40-59	30	39.5	33	51.6	63	45.0		
			60 ≥	9	11.8	2	3.1	11	7.9		
		Total		76	100.0	64	100.0	140	100.0		
	March	Age Group	0-9	6	2.0	3	0.9	9	1.4	5.636	0.228
			10-19	37	12.1	33	9.4	70	10.6		
			20-39	152	48.7	160	51.3	312	47.3		
			40-59	91	29.6	127	36.1	218	33.1		
			60 ≥	21	6.8	29	8.2	50	7.6		
		Total		307	100.0	352	100.0	659	100.0		

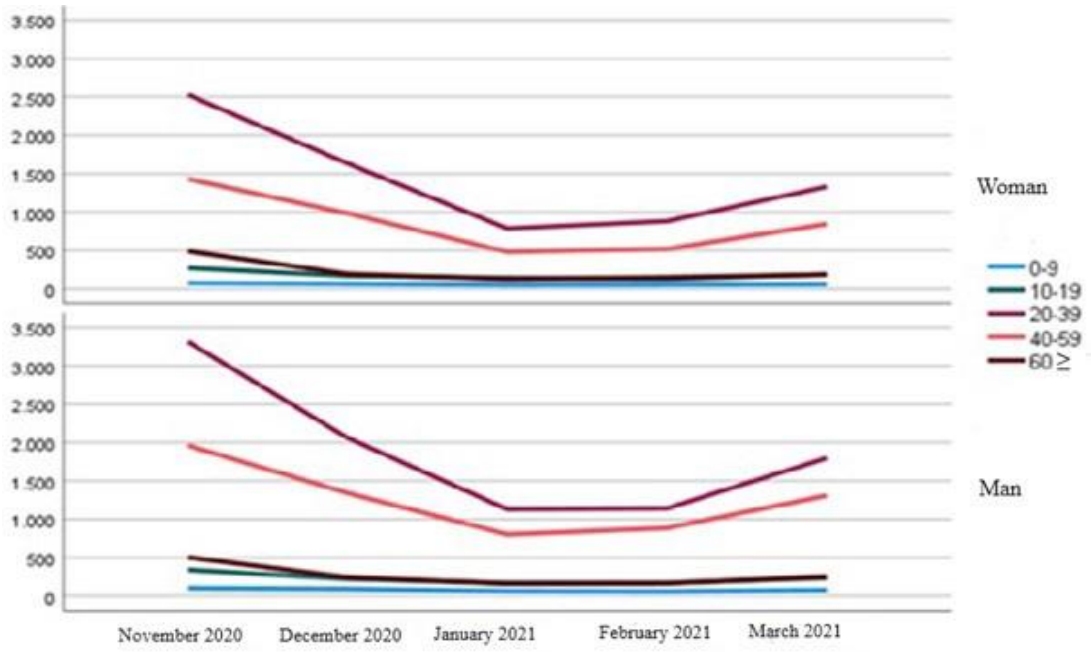

Figure 3. Distribution of positive patients by age group and gender in each year and month

Table 4. Distribution of negative patients by age group and gender in each year and month

Year	Month			Gender				Total		χ^2	p
				Woman		Woman					
				n	%	n	%	N	%		
2020	November	Age Group	0-9	77	1.6	104	1.7	181	1.6	16,196	**0.003**
			10-19	274	5.7	343	5.5	617	5.6		
			20-39	2529	5.6	3315	53.2	5844	53.0		
			40-59	1434	29.8	1961	31.5	3395	30.8		
			60 ≥	491	10.2	505	8.1	996	9.0		
		Total		4805	100.0	6228	100.0	11033	100.0		
	December	Age Group	0-9	66	2.2	94	2.4	160	2.3	2.607	0.626
			10-19	173	5.7	225	5.7	398	5.7		
			20-39	1636	53.5	2062	51.9	3698	52.6		
			40-59	986	32.2	1343	33.8	2329	33.1		
			60 ≥	197	6.4	246	6.2	443	6.3		
		Total		3058	100.0	3970	100.0	7028	100.0		
2021	Jonuary	Age Group	0-9	54	3.4	67	2.9	121	3.1	11.171	**0.025**
			10-19	145	9.1	172	7.4	317	8.0		
			20-39	789	49.3	1132	48.4	1921	48.8		
			40-59	484	30.3	806	34.5	1290	32.8		
			60 ≥	128	8.0	161	6.9	289	7.3		
		Total		1600	100.0	2338	100.0	3938	100.0		
	February	Age Group	0-9	57	3.3	61	2.5	118	2.8	23.309	**<0.001**
			10-19	128	7.3	173	7.1	301	7.2		
			20-39	884	50.7	1143	47.0	2027	48.6		
			40-59	521	29.9	888	36.5	1409	33.8		
			60 ≥	153	8.8	166	6.8	319	7.6		
		Total		1743	100.0	2431	100.0	4174	100.0		
	March	Age Group	0-9	62	2.4	79	2.1	141	2.2	8.229	0.084
			10-19	192	7.3	237	6.4	429	6.8		
			20-39	1333	50.9	1798	48.9	3131	49.7		
			40-59	847	32.3	1310	35.6	2157	34.2		
			60 ≥	187	7.1	255	6.9	442	7.0		
		Total		2621	100.0	3679	100.0	6300	100.0		

χ^2: Pearson Chi-Square Test

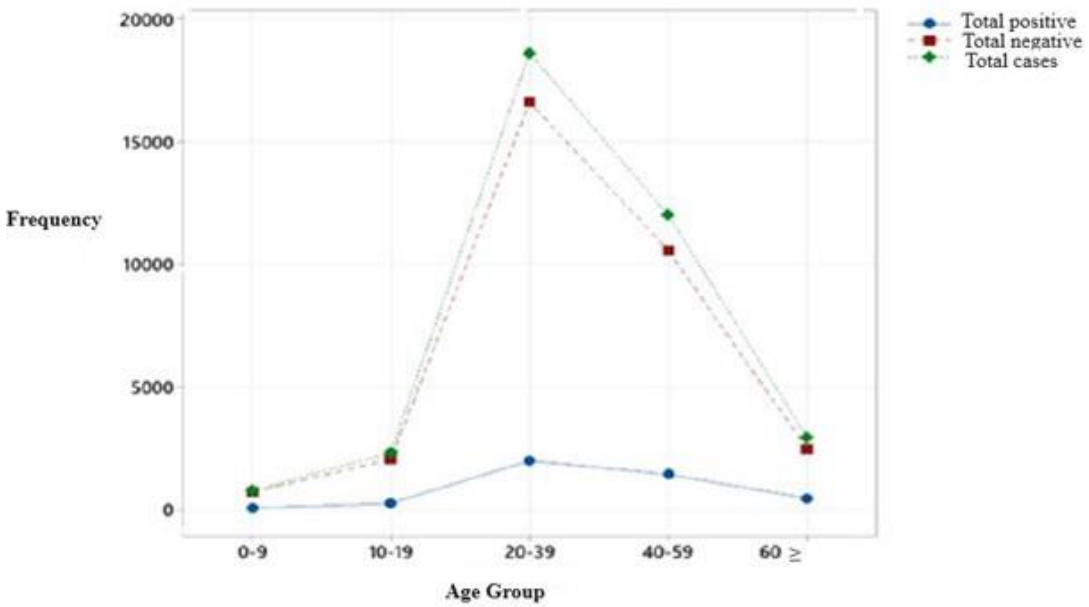

Figure 4. Distribution of total positive, total negative and total number of cases by age groups

Table 5. Change in age distribution of covid positive patients by years

		Year							
		2020		2021		Total		χ^2	p
		n	%	n	%	n	%		
Age Group	0-9	51	1.6	11	1.1	62	1.5	26.346	**<0.001**
	10-19	180	5.5	88	9.1	268	6.3		
	20-39	1551	47.5	444	45.9	1995	47.2		
	40-59	1097	33.6	345	35.7	1442	34.1		
	60 ≥	385	11.8	79	8.2	464	11.0		
Total		3264	100.0	967	100.0	4231	100.0		

χ^2: Pearson Chi-Square Test

Table 6. Change in age distribution of covid-negative patients by years

		Year				Total			
		2020		2021				χ^2	p
		n	%	n	%	n	%		
Age Group	0-9	341	1.9	380	2.6	721.0	2.2	90.703	**<0.001**
	10-19	1015	5.6	1047	7.3	2062.0	6.3		
	20-39	9542	52.8	7079	49.1	16621.0	51.2		
	40-59	5724	31.7	4856	33.7	10580.0	32.6		
	60 ≥	1439	8.0	1050	7.3	2489.0	7.7		
Total		18061	100.0	14412	100.0	32473.0	100.0		

χ^2: Pearson Chi-Square Test

DISCUSSION

The PCR test was positive for 442 of 3377 cases, in which the effect of age, gender and demographic data on COVID-19 was examined between 18 March and 24 April 2020. When the data of positive people were evaluated, it was reported that gender did not directly affect the risk of contracting COVID-19, as the male/female ratio was almost the same. In the same study, the rate of people under the age of 18 contracting COVID-19 was 2.7%, while the rate of people aged 65 and over was 29.7% (11). In our study, according to the Chi-square test, there is no significant relationship between age groups and gender in November 2020 ($p<0.001$; $\chi2=20.877$). While the proportion of female patients is high in patients aged 60 and over, the proportion of male patients is higher in other age groups. In December 2020, there is no significant relationship between age groups and gender ($p=0.470$; $\chi2=3.553$).

Data of confirmed COVID-19 patients in a research hospital in Izmir were examined retrospectively. On May 15, 2020, the early period of the pandemic, 49 (10.2) of 480 COVID-19 patients were healthcare workers. 37 (75.5%) of the healthcare workers were women and their ages ranged between 23-59 (12). In our study, no specific study was conducted for professions, but in November and December 2020, 1252 (15.9%) of 7837 female COVID-19 suspects between the ages of 20-60 were found to be COVID-19 positive.

The course of COVID-19 disease in young children under five years of age was studied, and its demographic and clinical characteristics

were evaluated. In total, they were able to establish an age distribution for 1135 of 1214 COVID-19 cases. They reported 596 (53%) of 1135 cases as under one year of age (infant), and 5 of the infant cases were in newborn status (13). In our study, while the total number of cases in children under 10 years of agein 2020 and 2021 was 783, 62 of them were COVID-19 positive. Among theCOVID-19 positive patients under the age of 10 years, 21 (33.9%) are boys and 41 (62.1%) are girls.

There were 69 cases in the COVID-19 study in Lu'an, China, between January 22, 2020 and February 18, 2020. In the study, 44 of the total cases were male and 25 were female patients. It has been reported that the age range varies between 10 months and 78 years and the highest number of cases is in the 20-49 age group with 68.1% (14). In our study, a total of 21325 cases were reached in 2020. Of the total cases, 11875 (55.6%) are male and 9450 (44.4%) are female patients. While the presented study had an age range of 0 to over 65 years, the most cases were observed in the 20-39 age range with 11093 (52%) cases.

Another study in China between January 16, 2020 and February 8, 2020 reported that 1208 (56.6%) of 2135 pediatric COVID-19 cases were male. It was reported that children are sensitive to COVID-19, but gender does not contain significant differences (15). Similarly, in our study, there was no significant relationship between age groups and gender in November 2020 ($p<0.001$; $\chi2=20.877$). It has been determined that the proportion of female patients is higher in patients aged 60 and over, but the proportion of male patients is higher in other age groups.

A retrospective study was conducted from data of 544 patients at Wuhan University. Demographic characteristics of the patients were used. 107 of 544 cases have been discharged. While 88 of those discharged recovered, 19 died. It reported that 19 deaths were in the 64-81 age range and 16 were men. At the end of the study, it was reported that the period of 7-13 days from the onset of COVID-19 is very critical and age and gender are risk factors (16). In our study, the distribution of COVID-19 negative patients according to age groups in November 2020 showed a significant difference between male and female patients ($p = 0.003$; $\chi2 = 16.196$). In the 0-9 age group, the rate of men (1.7%) is higher than the rate of women (1.6%). Similarly, among those aged 20-39 and 40-59, the rate of men (53.2% and 31.5%, respectively) is higher than the rate of women (52.6% and 29.8%, respectively). Among those aged 10-19 and those aged 60 and over, the rate of women (5.7% and 10.2%, respectively) is higher than the rate of men (5.5% and 8.1%, respectively).

The study conducted in China's Hubei Province examined the epidemiological and clinical characteristics of COVID-19 patients. While 262 of the 276 COVID-19 patients hospitalized

experienced the disease with mild symptoms, it was reported that the condition of 14 patients was serious. In the study, the rate of patients over the age of 60 who had a severe disease course was 78.6%, while the rate of those with a milder course was 18.7% (17). In our study, the total number of COVID-19 cases was recorded as 36704 in 2020 and 2021. The number of cases in people over 60 years of age is 2683 (7.3%). The period with the highest number of cases in people over the age of 60 was November 2020. While 464 (17.2%) of 2683 cases are COVID-19 positive, 2219 (82.8%) are negative. When positive patients are examined, 217 (46.7%) are male and 247 (53.2%) are female.

CONCLUSION

In the presented study, the number of people admitted to the hospital with suspicion of COVID-19 between November-December 2020 and January-February-March 2021 is 36704. Applications in the first five, middle five and last five days of each month are evaluated. The period with the highest number of applications was November 2020 with 13380 (36.4%) cases. The period with the highest number of positive cases was November 2020, with 2347 positive cases. Of the positive cases, 1192 (50.7%) are male and 1155 (49.3%) are female. in November 2020 with 1131 (48.2%) cases, in December 2020 with 420 (45.8%) cases, in January 2021 with 75 (44.6%) cases, and in March 2021 with 312 (47%) cases. ,3) The age range of 20-39 is the age range with the highest number of positive cases. In February 2021, the highest number of positive cases were seen in the 40-59 age group, with 63 (45%) cases.

The distribution of positive patients by age groups in 2020 and 2021 showed a significant difference ($p<0.001$; $\chi2=26.346$). While the proportion of patients in the 0-9 age range, 20-39 age range and over 60 years of age is higher in 2020, the proportion of patients in the 10-19 and 40-59 age groups is higher in 2021.

Looking at both years, the total number of cases over the age of 60 is 2683 (7.3%). The period with the highest number of cases in people over the age of 60 was November 2020. While 464 (17.2%) of 2683 cases are COVID-19 positive, 2219 (82.8%) are negative. When positive patients are examined, 217 (46.7%) are male and 247 (53.2%) are female.

There is no significant relationship between age groups and gender as of November 2020 ($p<0.001$; $\chi2=20.877$). It has been determined that the proportion of female patients is higher in patients aged 60 and over, but the proportion of male patients is higher in other age groups.

The distribution of negative patients across age groups showed a significant difference in 2020 and 2021 ($p<0.001$; $\chi2=90.703$). While the proportion of patients aged 20-39 and over 60 years of age was higher in 2020, the proportion

of patients aged 0-9, 10-19 and 40-59 was higher in 2021.

In November and December 2020, 1252 (15.9%) of 7837 female COVID-19 suspects between the ages of 20-60 were COVID-19 positive. While the total number of male patients between the ages of 20-60 is 6263, 987 (15.7%) are COVID-19 positive.

Between November 2020 and March 2021, 330 (10.6%) of the total 3113 cases in people aged 19 and under were positive. Of the positive cases, 149 (45.1%) are men and 181 (54.8%) are women.

The total number of people admitted to hospital with suspicion of COVID-19 between January 2021 and February 2021 is 11065. Of the total cases, 6449 (58.2%) are male and 4616 (41.7%) are female patients. While the month with the most cases is February (6959 cases), the month with the most positive cases is January (168 positive cases). Total positive cases were 308 (2.7%) in January and February. Of the positive cases, 144 (46.7%) are male and 106 (53.2%) are female patients. While the age range with the highest number of positive cases in January was 20-39 (75 positive cases), in February it was 40-59 age range (63 positive cases).

The number of people admitted to hospital with suspicion of COVID-19 in March 2021 is 4314. Of the total cases, 2495 (57.8%) are men and 1819 (42.2%) are women. The age range with the highest number of cases is the 20-39 age range with 2084 cases. The second highest number of cases is in the 40-59 age group with 1472 cases. 659 (15.27%) of the total cases are positive. Of the 312 cases between the ages of 20-39, 160 (51.3%) are men and 152 (48.3%) are women. Among the 218 positive cases, the number of male patients in the 40-59 age range is 127 (58.2%), while the number of female patients is 91 (41.7%).

Detecting the SARS-CoV-2 virus using a sensitive and reliable method such as RT-qPCR in all data obtained is thought to be important in detecting potential pandemics and epidemics, facilitating the approach to clinical pictures related to this virus, and especially in the case of managing treatment depending on age and gender.

Limitations of the Research

The research was limited to people who applied to a hospital in Istanbul. Therefore, the research results cannot be generalized to the entire population in Turkey.

Ethics Committee Approval: Approval for this study was obtained from the Ordu University Non-Interventional Research Ethics Committee (Decision No: 2021/237).

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Assessment of Patients Who Apply to the Family Medicine Outpatient Clinic to Obtain A Medical Report

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Abstract

Objective: Medical reports are crucial in Family Medicine. However, many legal issues remain unresolved. Unnecessary examination requests cause significant costs, labor loss for physicians, and affect occupational safety. This study aimed to evaluate the age, gender, and occupational distribution of individuals applying to the Family Medicine Outpatient Clinic for driver's license, employment, marriage, diaper, and medication reports, and to examine the relationship between the requested examinations and reports.

Method: This single center and retrospective study were conducted with individuals who applied to the Family Medicine Outpatient Clinic of a tertiary hospital between 01.01.2014-01.01.2015 to obtain driver's license, employment, health, marriage, diaper and medication reports. Data were collected by retrospective file screening method. The requested hemogram and biochemical tests, ELISA tests (Hbs Ag, Anti-Hbs, Anti-HIV, Anti-HCV), Venereal Disease Research Laboratory (VDRL), thalassemia screening, nasal and throat cultures, and chest radiography results for the relevant report were reviewed. The examinations requested according to the age and gender and report type data of the people were recorded.

Results: The mean age of 3673 individuals included in the study was 35.45 and 52.7% (n=1936) of them were male. It was observed that the most applications were made in September. Medical reports were mostly requested prior to employment (%76). Essential hypertension (%34) was the most common drug report diagnosis, and urinary incontinence (%32) was the main reason for diaper reports. Among those screened for pre-employment and marriage reports, 4% (n=10) were positive for Hepatitis B surface antigen (HbSAg)and Hepatitis B Surface Antibody (AntiHbs). 9% of those who applied for a marriage report were positive for thalassemia. Chest x-ray and nose, throat, stool cultures were common tests for employment reports. Staph aureus was found in 7.9% of nasal cultures.

Conclusion: Standardizing all medical reports, especially pre-employment health reports, will alleviate the burden on family medicine physicians and ensure proper legal procedures. By preventing unnecessary medical examinations, physician workforce loss and healthcare costs must be minimized. In this context, the Ministry of Health needs to coordinate with institutions and organizations

Keyword: Employment, family medicine, home care, marriage, medical reports

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INTRODUCTION

Health reports aim to provide information about the health status of the person and to take precautions by identifying possible risks. In our country, a health report can be issued in various situations. Family physicians play an important role in issuing various reports. Family physicians are authorized to issue many different types of health reports to closely monitor health conditions. (1)

For example, before starting work, various tests are requested from people depending on the type of job they will work in and a health report can be issued. Employment reports are necessary to determine the health risks of the employee and to protect occupational health. World Health Organization (WHO) and International Labour Organization (ILO) have defined the purpose of occupational health as physical, mental and social well-being and prevention of health risks arising from working conditions. Porteur examination provides the detection of persons carrying the infectious agent. In the food sector, hygiene and sanitation training is required instead of this examination. (2)

Reports stating that people have no contagious diseases or blood diseases before marriage are submitted to the relevant institutions. Marriage reports require blood group, Hepatitis B-C, syphilis, Human Immunodeficiency Virus (HIV) and thalassemia tests, while chest radiography is requested for tuberculosis. (3)

In recent years, both newborn screening and carrier testing for Spinal Muscular Atrophy (SMA) have been conducted in our country. Infants identified with genetic mutations through heel prick blood samples are referred to higher-level facilities for follow-up and treatment purposes. The premarital screening program initiated in December 2021 aims to identify and raise awareness among carrier couples. Screening for carrier status can also be applied to couples who are currently married and considering having children, as well as to the parents of infants diagnosed with the disease during newborn screening. (4)

Reports can be created for medications, foods and medical products for chronic diseases that are used regularly by patients. Medication reports determine long-term medication use for chronic diseases. Since the Health Implementation Communiqué is constantly updated, reports should also be up-to-date. Diaper report determines the use of diapers for patients without bladder or rectal control. (5)

Also to obtain or renew a driver's license, a medical report along with various examinations is required. Unnecessary or non-targeted laboratory tests can increase costs in healthcare while causing patients to experience undue anxiety and waste time. When these tests are performed without a direct connection to the patient's complaints or clinical condition, they can produce irrelevant results and misleading findings. Additionally, these tests can lead to unnecessary treatment processes, complicating the patient's healthcare journey. It is crucial for healthcare professionals to understand the true needs of patients and recommend only necessary tests, as this approach is essential for improving the effectiveness of healthcare services. This not only enhances patient safety but also ensures more efficient use of healthcare resources. (6)

The aim of the study is to evaluate these reports through analysis results and examination data and aims to protect individual and social health.

METHODS

Study Design

This was a single center and retrospective study. Individuals who applied to the Family Medicine Outpatient Clinic of a tertiary hospital between 01.01.2014-01.01.2015 to obtain driver's license, employment, health, marriage, diaper and medication reports were included in the study. Data was collected by retrospective file screening method.

Sample Selection Criteria

Patients who presented to our outpatient clinic to obtain the specified reports between 01/01/2014 and 01/01/2015 were included. In the retrospective review, individuals with incomplete data were excluded from the study.

Data Collection

The sociodemographic and medical characteristics of the individuals were recorded in the Descriptive Information Form prepared by us. Data was collected by retrospective file screening method. The requested hemogram and biochemical tests for the relevant report, Elisa tests (Hbs Ag, Anti Hbs, Anti HIV, Anti HCV), thalassemia screening test, stool, nasal and throat cultures, and chest X-ray results were reviewed. The data of examinations requested according to the required report type were recorded. Laboratory reference ranges were determined as the ranges used by the laboratory of our hospital.

Statistical analysis

IBM SPSS 16.0 (SPSS, Inc., Chicago, Illinois) program was used for statistical analysis.

Descriptive statistical methods (mean, standard deviation, median, and frequency) were used to evaluate the study data.The distribution of the variables was checked using the Kolmogorov-Smirnov test. For the analysis of quantitative data, independent sample t-tests and Mann-Whitney U tests were used. For the analysis of qualitative data, the chi-square test was used. The level of significance was set at $p<0.05$.

RESULTS

This study was conducted with 3673 individuals. The majority of the study group (52.7%; n=1936) were male. The mean age of the study group was 35.45±19.9 years and ranged between 15 and 105 years. When the applications made to the polyclinic to obtain a report were evaluated, it was seen that the majority (76%; n = 2769) was a report given for pre-employment The distribution of sociodemographic characteristics and report types of the study group is given in Table 1.

The most common diagnosis in medication reports was essential hypertension with 34% (n=114), followed by diabetes (19%; n=64) and hyperlipidemia (17%; n=56). The most common reason for diaper reports (32%; n=180) was urinary incontinence.

The distribution of AntiHbS and HbSAg results by gender and age group of the study group were given in the Table 2. AntiHbs was requested from 450 individuals from all types of reports. 176 individuals who applied for a marriage report were requested, 87.5% (n=154) were negative, 12.5% (n=22) were positive. 33% (n=88) were positive for AntiHbs in employment reports (Table 2).

75.4% (n=2769) of the study group consisted of those who applied to receive a pre-employment report Most of the patients who applied for pre-employment health report were negative for HbSAg (96%; n=257). Among those who applied for a marriage report, 99,1% were HbSAg negative (n=175). HbSAg was most frequently positive in the 41-64 age group (45.5%; n=5). 11% (n=19) of the AntiHbs requested for the marriage report were positive.

The ages of the applicants ranged between 15-64 years and the relationship between the age group of the applicants.HCV, HIV and VDRL were asked from all 176 applicants for pre-marital health report and all of them were found to be "negative".

Hemoglobin variant analysis was requested from 26.7% (n=47) of those who applied for a pre-marital health report. Thalassemia positivity was 9.1% (n=4). 1 person was thalassaemia intermedia and 3 people were thalassemia carriers. Hemoglobin was requested from 44.3% (n=78) of the individuals who applied for a marriage certificate and haemoglobin value was found to be below the

reference value (13u/L) in 12.5% (n=22) of them.

The relationship between ALT, AST, Vitamin B12, Haemoglobin and the employment report . Vitamin B12 was found to be low (<197 pg/ml) in 46% (n=13) of the patients.

When evaluated the tests requested for the health report for employment, the most requested test was chest X-ray with 12% (n:333). Throat, nose, stool culture and stool microscopy constituted 21.56% (n=597) of the requested tests. The second most requested test was HbSAg (11%; n=167). Urinary tract infection was detected in 33% (n=21) of the complete urine tests requested in the medical reports.

Among throat culture, stool culture and microscopy and nasal culture, nasal culture was the most frequently requested one (33.82% n=226). Staph aureus was found in 7.9% (n=18) of the nasal cultures. Figure 2 shows the distribution of the cultures requested in the health reports.

Table 1. Distribution of sociodemographic characteristics and report types of the study group

Sociodemographic Characteristics	n	%
Gender		
Female	1737	47.3
Male	1936	52.7
Age Groups		
<18 years	155	4.2
18-40 years	2606	71.0
41-64 years	511	13.9
≥ 65 years	401	10.9
Distribution of report types		
Pre-employment	2769	75.4
Medication	307	
Diaper	229	
Driving	178	
Marriage	176	
Sports		

Data presented as n (%).

Table 2. Distribution of AntiHbS and HbSAg results by gender and age group.

Variables	AntiHbS (+)	AntiHbS(-)	HbSAg (+)	HbSAg (-)
Gender	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Female	75 (%4,3)	143 (%8,2)		
Male	79 (%4,1)	153 (%7.9)		
p	0,869[a]		0.078[a]	
Age Groups				
<18 years	3 (%1,9)	9 (%5,8)		
18-40 years	138 (%5,3)	245 (%9,4)		
41-64 years	13 (%2,5)	40 (%7,8)		
≥ 65 years	0	2 (%0,5)		
p	0,001[b]*		0.001[b]*	

Data presented as n (%). [a]Mann Whitney U Test [b]Kruskal Wallis Test *p<0.05

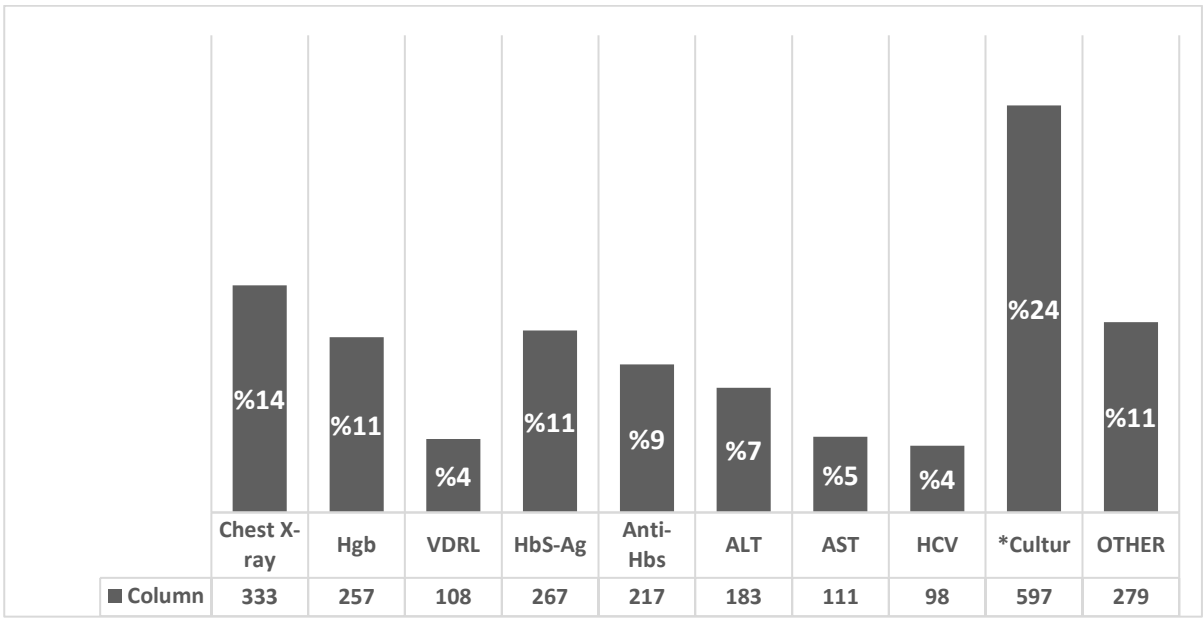

Figure 1. Distribution of requested tests in pre-employment health reports-2; (* Throat, nasal, stool culture, and stool microscopy)

DISCUSSION

Our study evaluated the applications made to the outpatient clinic for obtaining rmedical reports, and it was observed that the majority (%76; n=2769) of the study group consisted of health reports given for pre-employment.

Chronic infection with the hepatitis B virus (HBV) poses a significant global health challenge, impacting approximately 257 to 291 million individuals across the globe. This condition is linked to considerable health complications, including liver cirrhosis and hepatocellular carcinoma, leading to notable morbidity and mortality rates. (7) Turkey has an intermediate endemicity for HBsAg seropositivity (%2-8). In the TURKHEP study, approximately 1,200,000 individuals including blood donors were investigated nationwide, and the average HBsAg frequency was found to be 6.11%. (8)

HBsAg seroclearance rates in adults with chronic HBV infection are 1.02% annually, with higher rates in those with lower baseline HBV DNA levels and HBsAg levels.(9)In our study, HBsAg positivity was found to be 4% (n=10) in pre-employment health reports. The higher prevalence of HBsAg positivity in portors in our study may be attributed to the smaller number of evaluated individuals compared to other studies.

In a study conducted by Yıldırım et al. in 2015, a HBsAg positivity rate of 2.8% was detected in individuals applying for marriage reports at a tertiary hospital (10).

When evaluating Anti-HBs positivity according to age groups, it was most commonly observed in the age group under 20 .Although our study is not primarily a prevalence study, we found

HBsAg positivity of 1% in marriage reports and 4% in pre-employment health reports. This difference in HBsAg results between marriage and pre-employment health reports may be

attributed to the higher age average of those obtaining pre-employment health reports, the increase in exposure with age considering the Hepatitis B vaccination program has been implemented since 1998, and the increasing number of individuals without immunity. (8)

In our study, the rate of anti-HBs positivity was found to be 11% (n=19) in marriage reports and 33% (n=88) in pre-employment health reports, which is consistent with previous studies. According to the results of our study, we believe that the Hepatitis B vaccination program is important, and we anticipate that the rate of anti-HBs positive individuals will increase with the appropriate implementation of the vaccination program in future studies.When evaluating anti-HBsAg positivity by age groups, it was most common at 5.3% (n=138) in the 18-40 age group in our study. This difference can be explained by the majority of individuals included in our study being in the 18-40 age group. We believe that the effective implementation of the Hepatitis B vaccination program by the Ministry of Health and the inclusion of Hepatitis B vaccine in the expanded immunization program since 1998 will lead to a decrease in the anti-HBs positive age range in future studies. (11)

The prevalence of HCV infection worldwide is estimated to be 71 million people with chronic hepatitis C infection, with genotype1 being the most common8. (12) In a study conducted by Özer TT et al. in 2011, no anti-HCV positivity was found in premarital screening tests. (13) Similarly, in individuals applying for marriage reports at Istanbul Medeniyet University Göztepe Training and Research Hospital in 2015, no cases of Anti-HCV and VDRL positivity were detected, while Anti-HIV positivity was found in 2 individuals (10).In our study, no anti-HCV positivity was detected, which is consistent with the results of previous studies. We attribute the absence of HIV-positive individuals among those applying for marriage health reports in our study to the reluctance of HIV-positive individuals to apply for pre-employment health reports due to the fear of disclosure of their condition and the possibility of not being accepted for employment due to the required tests.

The Turkish Hemoglobinopathy Council evaluated the screening results of a total of 377,339 healthy individuals in 16 high-risk cities where hemoglobinopathies are common, and the prevalence of thalassemia carrier status was found to be 4.3% in these regions.(14) In our study, 26.7% (n=47) of individuals applying for marriage reported requesting hemoglobin variant analysis, and thalassemia carrier status was detected in 6.75% (n=3) of these individuals. Although some studies differ,

the similarity of our results to most studies may be due to the variation in abnormal hemoglobins according to ethnic structure and region. Further studies are needed to determine the exact cause.

Turkey is a country with a moderate tuberculosis (TB) frequency, with an incidence of over 20 per 100,000. (15) In our study, chest X-rays were requested from 176 individuals applying for marriage reports and 333 individuals applying for pre-employment health reports. No specific lesions suggestive of tuberculosis were found. This can be attributed to the small number of individuals included in the study, the higher socio-cultural level of the individuals, and the fact that chest X-rays alone may not be sufficient for diagnosis, as well as the fact that the individuals may not have applied for reports at the time of illness.

In the study Positivity rates of examined six-year rotavirus, adenovirus, and fecal parasite tests were 7.7% for rotavirus, 2.3% for adenovirus, and 16.8% for parasite analysis. (16) In our study,stool cultures and stool microscopy were performed on 131 and 65 individuals, respectively, and no parasites were detected. This may be due to the high socioeconomic status of the population studied and the fact that the tests were performed on individuals before they started working, before exposure.

İnci et al. To work in the food industry among 971 people who applied for a health report, Methicillin Resistant Staphylococcus aureus (MRSA) was found in 35 (3.6%) individuals in their nasal cultures. Methicillin Sensitive Staphylococcus aureus (MSSA) was found positive in 2 (0.2%) people. (17). In our study, nasal cultures were obtained from 226 individuals and throat cultures from 193 individuals. No growth was observed in throat cultures. Staph. Aureus colonization was observed in 18 individuals (7.9%) in nasal cultures. The lower rate of Staph. aureus carriage in our study compared to the general population may be due to the insufficient number of individuals included in the study and the fact that the tests were performed before individuals started working, when the risk of exposure was lower. We believe that these figures will be higher in follow-up examinations performed by occupational physicians after individuals start working, as the risk of exposure to the pathogen increases.

In our study, urinalysis was requested from 63 individuals applying for pre-employment health reports, and urinary tract infection was detected in 33% of them (n=22). Of these, 10 were male and 12 were female. The high rate of urinary tract infection in our study may be due to contamination.

All ages anemia prevalence was 22.8% (95% CI: 22.6–23.1) globally in 2019, a decrease from 27.0% (26.7–27.2) in 1990. While prevalence decreased over this time, total cases of anemia increased from 1.42 (1.41–1.43)

billion in 1990 to 1.74 (1.72–1.76) billion in 2019. (18) In our study, 15.6% (n=40) of 257 individuals applying for pre-employment health reports had anemia, with 60% (n=24) of them being women. Our findings are similar to previous studies, and we attribute the higher prevalence of anemia in women to societal factors.

In a study conducted by Öztürk et al. 623 reports of 446 people whose medication reports were renewed or issued for the first time were examined. At least one antihypertensive medication report was issued for 79.37% (n=354) of the patients, and an oral antidiabetic medication report was issued for 14.57% (n= 65). (19) In our study, the most commonly used diagnosis in medication reports was Essential Hypertension (34%, n=114), followed by DM (19%, n=19), and Hyperlipidemia (17%, n=56). The most common diagnosis in diaper reports was urinary incontinence (32%, n=180). Our results are similar to previous studies, and we believe that more studies are needed in this regard.

In the study conducted by Kılıç et al., the rate of requesting laboratory examinations decreased to the 30% range, and laboratory examinations were mostly requested for port of health. Out of 17 physicians requesting laboratory examinations, 12 stated that they requested them for port of health examinations. Additionally, three physicians requested complete blood count, two physicians requested chest X-ray, and one each requested full urinalysis and EKG. (20) In our study, when we evaluated the tests requested for pre-employment health reports, chest X-ray was the most commonly requested test (12%, n=333). Throat, nasal, stool cultures, and stool microscopy constituted 21.56% (n=597) of the tests requested. However, when the cultures were evaluated separately, the rates decreased, so HBsAg was the second most requested test (11%, n=267). The difference between the two studies may be due to the larger number of individuals included in our study and the fact that many tests are now requested by the employer instead of the physician, leading to the ordering of many unnecessary tests.

Kılıç et al. also found that the distribution of reports given in health centers varied by month, with the fewest reports issued in February (127 cases) and the most in September (530 cases). Similarly, in our study, the fewest reports were issued in February (n=305, 6%) and the most in September (n=573, 11%). (20) The similarity in results between the two studies may be explained by the fact that more individuals graduate from school and start working in September.

Study limitations

The main limitation of our study is that the study sample was drawn from a single center outpatient clinic and may limit the generalizability of the results to a broader population.

CONCLUSION

In summary, it is crucial to tailor medical examinations required for employment to the specific occupational hazards and requirements. Unnecessary tests not only increase the burden on both the healthcare system and individuals but also contribute to economic losses. Physical examination and medical history should be the primary focus before employment. Adequate training and counseling should be provided to prospective employees, and medical reports should only be issued if individuals are deemed suitable for the job. It's essential that requested tests are relevant to the tasks at hand, as unnecessary testing not only misuses healthcare resources but also results in a loss of workforce productivity for physicians. Moreover, employers and institutions should be educated about the sufficiency of physical examinations and medical history in diagnosing most occupational diseases, with laboratory methods employed only in suspicious cases.

Furthermore, it's crucial to maintain an adequate number of occupational health physicians and safety experts in workplaces and implement effective health inspection mechanisms. For marriage-related health reports, they should be seen as an opportunity to provide counseling on emerging infectious diseases and genetically inherited conditions, ensuring that prospective spouses are educated about potential risks, disease outcomes, and prevention methods. Primary care physicians play a crucial role in this regard. However, there is a need to evaluate whether the collected data are utilized for database creation, treatment planning, and monitoring, as this could lead to significant resource wastage. Therefore, it's imperative for the Ministry of Health to establish necessary connections with institutions, standardize all medical reports, particularly employment health reports, and establish legal frameworks that alleviate the significant burden and responsibility placed on primary care physicians.

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Evaluation of Vitamin B12 deficiency Anemia in Geriatric Patients

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Abstract

Objective: In our study, we aimed to evaluate vitamin B12 deficiency anemia, macrocytosis rate and vitamin B12 values in patients over 65 years of age and compare them with those under 65 years of age groups.

Method: Retrospectively, A total of 8062 patients, 1213 over the age of 65 and 6849 under the age of 65, admitted between March 2019 and March 2024 were included in the study. The patients' hemoglobin, hematocrit, Mean corpuscular volume (MCV), White blood cell (WBC), Red cell distribution width (RDW), Platelet (PLT) values and vitamin B12 levels were examined. Patients were divided into two groups as age of 65 and over (geriatrics) and age below 65 (young-adults), and each group were divided into two groups in terms of anemia. Groups and subgropus were compared with each other.

Results: While the ratio of vitamin B12 deficiency anemia in geriatrics was 20.2%, in young-adults it was 8.3%. No difference was observed in vitamin B12 levels in terms of gender in both age groups significantly. With the roc analyses the cut-off value for vitamin B12 causing anemia in elderly patients was 327 pg/mL (AUC: 0.602, p≤0.001) with a sensitivity of 94.3% and specificity of 34.2%.

Conclusion: The fact that vitamin B12 levels that cause anemia in elderly patients are higher than in young-adult patients made us think that the usual limit values may need to be reconsiderated in geriatric population

Keyword: Elderly, geriatrics, vitamin B12, anemia, MCV

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INTRODUCTION

Anemia is defined as a decrease in hemoglobin (Hb) concentration as a result of a decrease in erythrocyte mass. (1). The lower limit value is 12gr/dl for women and 13.5gr/dl for men. Studies show that this gap between men and women closes with age (2). Anemia is categorised in various ways depending on the etiological factors. Classification according to mean corpuscular volume (MCV) is one of the most frequently used classification systems. Anemias are divided into 3 subgroups according to MCV value: macrocytic, microcytic and normocytic.

Elderly population or geriatric population is defined as those aged 65 and over (3). Conditions such as physiological changes related to aging, increased prevalence of chronical diseases, changes in fluid intake, nutritional status and lifestyle and polypharmacy causes complexity in the interpretation of laboratory results in elderly patients (4). Recently, the view that laboratory results of elderly patients should be interpreted from a different perspective than those of adult patients has become widespread (4-6).

Vitamin B12 deficiency, which is one of the main causes of macrocytic anemias in the elderly population, however the diagnosis is sometimes missed because the symptoms it causes can be confused with cognitive and physiological symptoms related to aging. (7). The cut-off values determined for vitamin B12 deficiency vary in studies (8). In the diagnosis of vitamin B12 deficiency, it is based on the measurement of metabolic indicators such as homocysteine and methylmalonic acid after demonstrating that the serum vitamin B12 level is less than 200 pg/mL (148 pmol/L) (9,10).

Macrocytic anemia is expected in vitamin B12 deficiency (11,12). In some publications, increased MCV is accepted above 100 fL, while in others 96 fL and above is accepted (13). However, studies showing that not all patients with vitamin B12 deficiency develop macrocytic anemia are also available in the literature (14). These studies were generally performed in the adult population and levels specific to elderly patients were not studied. In our study, we aimed to evaluate and compare vitamin B12 deficiency, macrocytosis rate, and vitamin B12 values that develop anemia differently for both age groups.

METHODS

Study Population

After the approval of ethics committee patients who applied to the Internal Medicine and Geriatrics outpatient clinic of Turgut Özal Medical Center between March 2019 and March 2024 with the diagnoses of "anemia" and "general examination" were retrospectively examined. Among the observations, those with the following diseases were excluded from the study:

- Chronic Kidney Disease

- Chronic liver disease

- History of liver or kidney transplantation

- Chronic obstructive pulmonary disease

- Cancer

- Inflammatory bowel disease

- Alzheimer's

- Rheumatoid arthritis

The files of patients diagnosed with diabetes were examined and patients using metformin were excluded from the study. Among patients diagnosed with anemia, those with iron deficiency anemia were excluded from the study. When patients with missing datas were excluded from the study; A total of 8062 patients, 1213 with the age of 65 and over and 6849 under the age of 65, were included in the study.

The patients were divided into two groups: under 65 years of age and aged 65 and over. Each age group was divided into two subgroups: those with anemia and those without anemia.

Anemia was diagnosed as follows.

Hb < 12 mg/dL in female patients

Hb < 13.5 mg/dL in male patients (2).

MCV value > 96 fL was considered high (13).

Laboratory evaluation

The patients' hemoglobin, hematocrit, MCV, White blood cell (WBC), Red cell distribution width (RDW), Platelet (PLT) values and vitamin B12 levels were examined. For the complete blood count (CBC) panel, blood samples were collected in dipotassium EDTA tubes and measured on the SYSMEX XN 1000 Haematology Analyser (Sysmex Corporation, Kobe, Japan). Vitamin B12 measurements were made on a Beckman Coulter UniCel DxI 800 (CA, USA) autoanalyzer. Results were reported as pg/L for vitamin B12.

Statistical analysis

Data were analysed using SPSS version 25.0 (IBM SPSS Statistics, IBM Corporation, Armonk, New York, USA) and continuous variables were expressed as mean ± standard deviation. Normality was confirmed via the Shapiro-Wilk test. Student t-test was used to compare normally distributed data and Mann-Whitney u test was used to compare non-normally distributed data. ROC analysis was performed to estimate the optimal cut-off value of vitamin B12 for the occurrence of anemia in both groups. P value < 0.05 was considered statistically significant.

This study was a case-control study that was designed according to the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guide.

RESULTS

Patients were divided into two groups: under 65 years of age (young-adults) and 65 aged and over (geriatrics). Then, both age groups were

divided into 2 subgroups: those with anemia and those without anemia. The laboratory values of the groups are given in Table 1 as mean ± SD. Accordingly, there was a significant difference in vitamin B12, WBC, Hb, HCT MCV, PLT and RDW values between the subgroups under 65 years of age (p≤0.001). When geriatric patients are divided into 2 subgroups, there was a significant difference in terms of age, vitamin B12, Hb, HCT MCV and RDW values (p≤0.001).

While the ratio of vitamin B12 deficiency anemia in geriatric patients was 20.2%, the ratio of anemia in young-adults was 8.3%.

When looking at whether there were differences in vitamin B12 levels in the subgroups in terms of gender; it was observed that there was no significant difference in both the age groups (Table 2).

While the rate of increased MCV was 3.8% in patients under 65 years of age, this rate increased to 4.9% in patients with vitamin B12 deficiency anemia. While the rate of increased MCV was 15.1% in geriatric patients, this rate increased to 29.1% in patients with vitamin B12 deficiency anemia.

The ROC analyses examined vitamin B12 levels causing anemia in patients under and over 65 years of age. The cut-off value for vitamin B12 causing anemia in geriatric patients was 327 pg/mL (AUC: 0.602, p≤0.001) with a sensitivity of 94.3% and specificity of 34.2% (Figure 1). The cut-off value for vitamin B12 in patients under 65 years of age was 222 pg/mL with 76.03% sensitivity and 55.18% specificity (AUC: 0.694, p≤0.001) (Figure 2).

Table 1. Laboratory values of age groups in terms of anemia

	Age ≥ 65			**Age < 65**		
	Anemia + (n:245) (%20.2)	**Anemia – (n:968) (%79.8)**	***p***	**Anemia + (n:569) (%8.3)**	**Anemia – (n:6280) (%91.7)**	***p***
Age (year)	75 ± 6	72 ± 6	**≤0.001**	39 ± 12	38 ± 13	0.124
Vitamin B12 (pg/dL)	220 ± 87	298 ± 166	**≤0.001**	197 ± 109	282 ± 152	**≤0.001**
WBC (103u/L)	8.4 ± 17.6	7.5 ±2.1	0.143	7.0 ± 2.1	7.4 ± 1.9	**≤0.001**
Hb (g/dL)	11.08 ± 1.18	14.00 ± 1.21	**≤0.001**	11.25 ± 0.76	17.34 ±1.41	**≤0.001**
Htc (%)	35.42 ± 3.85	43.36 ± 3.49	**≤0.001**	35.34 ±2.36	43.91 ±3.78	**≤0.001**
MCV (fL)	90.84 ± 6.73	89.14 ± 5.43	**≤0.001**	85.49 ±4.75	87.63 ±3.761	**≤0.001**
PLT (103u/L)	272.19 ± 102.23	263.05 ± 68.49	0.095	294.74 ±81.62	274.54 ± 64.47	**≤0.001**
RDW (%)	14.66 ± 1.84	13.56 ± 1.17	**≤0.001**	14.79 ± 1.84	13.12 ± 1.06	**≤0.001**

WBC: White Blood Cell, Hb: Hemoglobin, Htc: Haematocrit, MCV: Mean Corpucular Volume, PLT:Platelet, RDW: Red cell Distribution Width

Table 2. Vitamin B12 levels of age groups in terms of anemia

	Vitamin B12 levels (pg/dL) Age ≥ 65			**Vitamin B12 levels (pg/dL) Age < 65**		
	Female	**Male**	***p***	**Female**	**Male**	***p***
Anemia +	213 ± 87 (n:162)	232 ± 87 (n:83)	≤0.099	196 ± 104 (n:519)	215 ± 150 (n:50)	0.240
Anemia -	*296 ± 163* (n:619)	302 ± 171 (n:349)	0.571	283 ± 151 (n:4109)	281 ± 152 (n:2171)	0.580

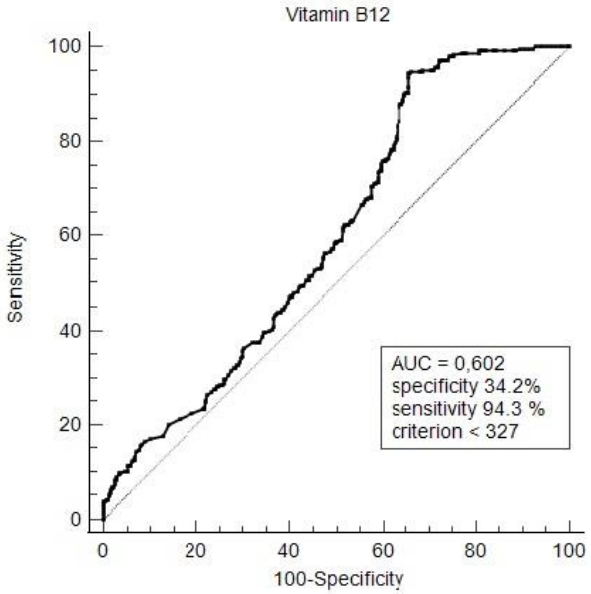

Figure 1. Vitamin B12 cut-off value causing anemia in the over 65 age group

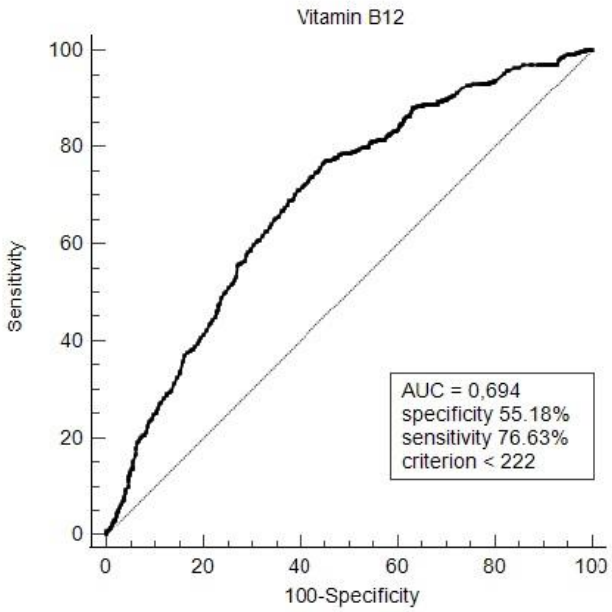

Figure 2. Vitamin B12 cut-off value causing anemia in the below 65 age group

DISCUSSION

The research study aimed to investigate and compare the prevalence of vitamin B12 insufficiency, the incidence of macrocytosis, and the particular vitamin B12 levels that result in anaemia in two different age groups, with a view to comparing younger individuals with older patients. The purpose of this study was to find any age-related variations in the manifestation and impact of vitamin B12 deficiency on hematological parameters, with an emphasis on the development of anemia and cellular features such macrocytosis.

We found that there was no significant difference in WBC and PLT values between the subgroups in geriatric patients. We thought the reason might be the physiological decline in platelet and leukocyte production with age (15).

The incidence of vitamin B12 deficiency anemia in patients over the age of 65 varying between 12% and 40% in the literature (16). The rate in our study was 20.2%. While this variability may be due to the effects of the number of patients, population and environmental factors, we think that the main reason is the difference in the cut-off value taken in each study.

We found that gender did not affect the development of vitamin B12 anemia in either age groups. There are several studies in the literature investigating the effects of gender on the development of anemia. (17,18). In these studies, the rate of anemia was found to be lower in elderly men than in elderly women (19).

Another finding of our study was that the MCV values were higher in the geriatric patients than in the patient group under 65 years of age. The MCV gradually increases with age, and in the 40-80 age group, women typically have lower MCV's than men (20,21). We also observed that the rate of increased MCV levels in patients under 65 years aged to be 3.8%. It is thought that MCV elevation is around 2.5% in the healthy population (22). In Turkey, this rate is estimated to be between 1.7-5% (23). Finding of our study was consistent with data in both national and international publications. We observed that the rate of MCV elevation without vitamin B 12 deficiency was 15.1% in the geriatric patient group. This was a higher rate than reported in previous studies (24). The main reason for this difference may be that malnutrition rates are higher in the region where our study was conducted. In addition, the possibility of concomitant folate deficiency could also explain this high rate. In our study, we observed that the cut-off value for vitamin B12 to cause anemia in people under 65 years of age was 222 pg/mL. For people 65 aged and over, this value was 327 pg/mL. While the accepted cut-off for low vitamin B12 in the literature is 200 pg/mL in past studies, more recent studies mention that even at levels of 350 pg/mL may be symptomatic (25,26). The

reason why higher levels of vitamin B12 cause anemia in the elderly may be due to poor functioning of peripheral blood cells as a result of a decline in the quality of bone marrow production, or it may be due to a decline in absorption with age, with higher levels of vitamin B12 reaching fewer target tissues.

Our study has some limitations. The first of these is that our study is retrospective. Another limitation is that metabolites such as homocysteine, methylmalonic acid and cobalamin levels were not measured in vitamin B12 deficiency diagnose. In addition, one of the limitations is that the patients' alcohol use status was not reviewed. Another limitation is that folate levels, another cause of macrocytic anemia, were not assessed in all patients.

CONCLUSION

Vitamin B12 levels change with age. The fact that vitamin B12 levels that cause anemia in elderly patients are higher than in young-adult patients made us think that the usual limit values may need to be increased, especially in the evaluation of patients aged 65 and over. We think that further studies are needed to enlighten the literature on this subject.

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The Association Between Facet Joint Tropism and Lumbar Disc Herniation

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Abstract

Objective: Facet joint tropism is thought to be associated with lumbar disc herniation (LDH), but this relationship has not been fully established. The aim of this study was to investigate the relationship between facet joint tropism and LDH in patients (25-30 years old and body-mass index 28-30 kg/m²) using computed tomography (CT) and lumbar magnetic resonance imaging (MRI).

Method: Facet joint angles were measured on lumbar MRI and CT images of 24 male patients with left-sided LDH; 16 patients with right-sided LDH. Facet joint angle was measured by calculating the angle of the facet joints with the vertebral sagittal line in axial sections parallel to the end plate plane. Patients with trauma, rheumatic and oncologic diseases, additional lumbar or spinal and systemic diseases, patients with far lateral, foraminal and central lumbar disc herniations were excluded.

Results: The mean left facet joint angle was 44,56º+/-11,29° and the mean right facet joint angle was 41,2º+/-11,27° in 24 patients with left-sided LDH. In 16 patients with right-sided LDH, the mean right facet joint angle was 45,87º +/-16,41°and the mean left facet joint angle was 42,74º+/-12,54°.

Conclusion: In the statistical evaluation, no significant correlation was found between LDH and facet joint angle, but in the numerical analysis, it was observed that the left facet joint angle was larger in patients with left-sided LDH and the right facet joint angle was larger in patients with right-sided LDH.

Keyword: Facet Tropism, Lumbar Disc Herniation, Degeneration

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INTRODUCTION

Many biomechanical studies have been conducted to define degenerative spine diseases better. The triad of the intervertebral disc and both facet joints in that segment is called the three-joint complex (1). This tripartite structure transmits the load on the spine to the lower segments. In cases of degeneration of the three joint complexes, the load transfer distribution of the spine is impaired. Disruption of homogeneity and disproportionality in load transfer may lead to lumbar disc herniation and facet joint abnormalities. There is strong evidence to support that the three-joint complex is the unit of biomechanical function (2,3).

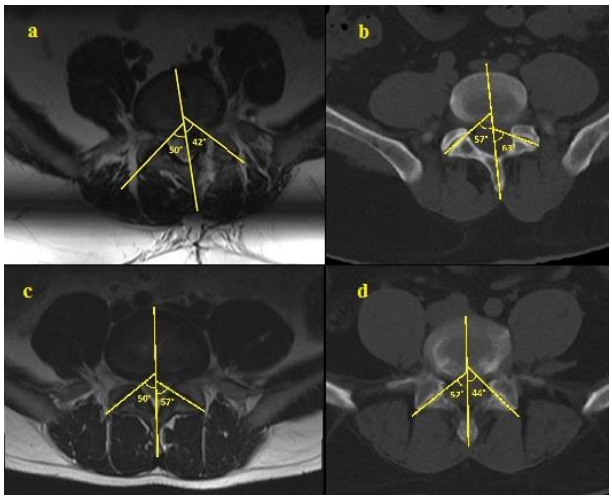
The facet joints stabilize the motion segments of the spine flexion, extension, and rotation movements and protect the intervertebral disc from excessive torsion. The facet joints create a homogeneous and symmetrical resistance against the load transmission on the spine and the stress caused by various movements. Facet joint orientation abnormalities and asymmetry cause asymmetric distribution of this stress in the zygapophysial tissues and intervertebral disc. Therefore, facet joint pathologies may be associated with many diseases of the spine. The average angle of the facet joints at the same level as the sagittal axis in the axial plane is called facet joint orientation. The difference between the two facet joint angles of the same segment is called facet joint tropism. (4). The facet joints limit the rotational stress on the intervertebral disc and thus protect the intervertebral disc from rotational forces

(5). It has been suggested that this protection may be impaired due to facet tropism, and LDH may develop in association with annulus fibrosus damage on the impaired side. (6-8).

The facet joint orientation changes from the thoracic spine to the lumbar level. This is a determinant of joint movement. While there is a high resistance to rotation at the upper lumbar and lower thoracic levels, the resistance to flexion and extension is less than at the lower lumbar levels. Due to the natural lordotic alignment of the lumbar spine and the increased load on the spine at the lower lumbar levels, the risk of developing listhesis is increased compared to the upper levels. Therefore, to protect against listhesis, there should be more resistance in flexion and extension movements at the lower lumbar levels. Thus, the facet joints are orientated to be more resistant to flexion and extension in the lower lumbar region, allowing more rotational movements. Facet tropism is mostly seen in elderly patients. The incidence of facet tropism greater than 10 degrees varies between 14-28%. In some studies, it has been reported that facet tropism is often at the L4-5 level and is associated with bulging. (9). This is thought to be caused by the biomechanical properties of the L4-5 level.

METHODS

The patients included in the study were male patients aged between 25-30 years with a mean body-mass index of 28-30 kg/m² and no comorbidities. The reason for these criteria was to rule out age and weight-related degenerative processes. Facet joint angles were measured from lumbar MRI and CT images of 24 patients with left-sided LDH and 16 patients with right-sided LDH, totaling 40 patients. Among the left LDH patients, 18 were L4-L5 disc herniations, 5 were L5-S1 disc herniations, and 1 was L3-L4 disc herniation. In right LDH patients, 14 were L4-L5 disc herniations, and 2 were L5-S1 disc herniations. The angle between the line passing through the posterolateral and anteromedial ends of the facet joint space on axial sections parallel to the end plate plane and the line drawn from the center of the spinous process to the center of the anterior face of the vertebral corpus was measured as the facet joint angle (picture 1).



Picture 1. Facet joint angle

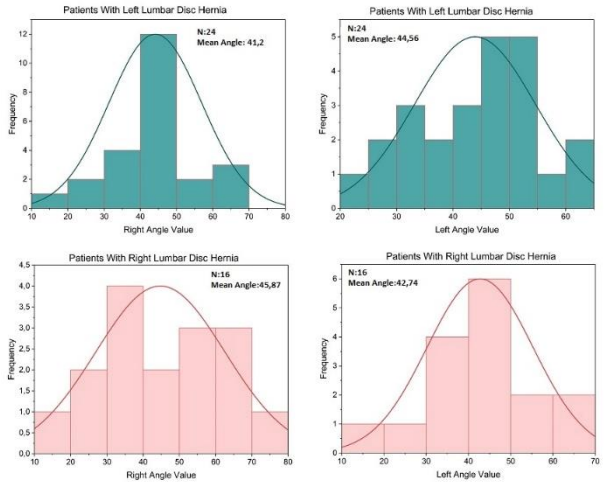
The measured angles were named as right and left angles. Patients were classified as right and left LDH. Patients with far lateral, foraminal, and central LDH were not included in the study. Facet joint orientation was calculated by averaging the angle of both facet joints at the same level as the sagittal axis on an axial section. Facet joint tropism was measured by taking the absolute value of the difference between the two facet joint angles on an axial section. A herniated disc was defined as a disc material that exceeds the limits of the vertebral body and thus causes displacement of the epidural fat, the tectal sac, and the spinal nerve root. (9). The intervertebral discs of the patients with smoothly circumscribed nucleus pulposus and no annulus fibrosus defect on lumbar MRI T2 sequence sections were considered normal.

To minimize age- and weight-related degenerative processes and hormonal factors, male patients aged 25-30 years were included in the study. Trauma, rheumatic, and oncological conditions, patients with additional lumbar or spinal disease, and patients with systemic diseases were excluded. The data obtained were analyzed statistically by the Pearson correlation test.

RESULTS

In our study, the mean left facet joint angle was 44.56° +/- 11.29° in 24 patients with left LDH. In this patient group, the right facet joint angle was 41.2° +/- 11.27º. In 16 patients with right LDH, the mean right facet joint angle was

45.87° +/- 16.41° and the mean left facet joint angle was 42.74° +/- 12.54° (Graphic 1).



Graphic 1. The mean right facet joint angle and left facet joint angle

In patients with left LDH, the minimum left facet angle value was 22.50° and the maximum angle value was 62.40°; the minimum right facet angle value was 13.30°, and the maximum angle value was 63.20°. In patients with right LDH, the minimum right facet angle value was 23.70° and maximum 74.40°, while the minimum left facet angle value was 16.70° and maximum 67°.

Patients' facet troponism differences were analyzed. Four of 18 patients with left L4-5-disc herniation had a difference between 5°-10°, and 3 had a difference >10°. 1 patient with left L5-S1 disc herniation had a difference between 5°-10° and 2 had a difference >10°. Four patients with right L4-L5 disc herniation had a difference between 5°-10°, and three patients had >10°. In 1 patient with right L5-S1 disc herniation, the facet trophisis angle difference was >10°.

In patients with left LDH, the left facet angle was 3.3° +/- 9.7° greater than the right facet angle, while in patients with right LDH, the right facet angle was 3.1 +/- 9.4° greater than the left facet angle. Since the data we obtained showed a homogenous distribution (Graph 2), a Pearson correlation test was performed. In the Pearson correlation test, p:0.04791 was found in the evaluation of facet tropism in left LDH patients, and p:0.004455 for the assessment of facet tropism in right LDH patients. r correlation coefficient was found as r:0.9834 in the evaluation of left LDH facet tropism and r:0.9827 for the assessment of right LDH facet tropism.

In the light of these data, no statistically significant correlation was found between the location of the lumbar disc herniation and facet tropism since p>0.01 in the statistical evaluation of facet tropism in the right and left LDH patients, but in right LDH patients, the right facet angle was larger than the left facet angle, and there was a strong positive correlation between them (r:09827). Similarly, it was observed that the left facet angle was larger than the right facet angle in left-sided LDH patients, and there was a strong positive correlation between them (r:0.9834). In the study, the mean score of the Emotion Expression Scale of the study group before the training was 18.1 and the mean score of the

control group was 18.9; the mean score of the Stigma Scale of the study group after the training was 12.70.

DISCUSSION

Lumbar disc herniation is a common cause of low back pain and radicular pain in the lower extremities. (10-13). Although many studies are showing the relationship between facet joint tropism and lumbar disc herniation (14-17), There have also been publications suggesting that there is no relationship (4,18-20).

6% of the vertical load in the lumbar region is carried by the facet joints (21). The biomechanical nature of facet joints is that they are symmetrical. The facet joints protect the intervertebral disc from stress due to excessive rotation, and increased sagittal orientation means decreased resistance to the development of forward listhesis. Therefore, sagittal misalignment of the joint has been reported to cause listhesis (22). Due to lumbar lordosis, the downward force at the lower lumbar levels, with the effect of gravity, creates a shear force toward the anterior part of the spine. Especially the L5-S1 facet joints are a natural protective mechanism against the increase in rotation and shear forces in the lumbar regions. When an organ with this function is symmetrical, a homogeneous resistance is realized. Abnormalities such as symmetry disruption cause asymmetry in resistance and protection.

The angle difference between facet joints at the same level is usually less than 5°. Different values between 5° and 10° have been reported to define facet tropism. In one study, the prevalence of facet tropism was reported as 42% at the L4-5 level and 50% at the L5-S1 level (2). However, there are also studies showing that facet joint tropism is most common at the L4-5 level (23). In most studies, the incidence of facet tropism in the lumbar spine ranges between 40-70%, and the most commonly affected level is reported to be L4-5.

When the angle differences of facet tropism were analyzed in our study, it was observed between 5°-10° in 5 patients with left LDH and above 10° in 5 patients. In 41,6% of patients with left LDH, facet tropism was found.

Facet tropism angle differences were 5°-10° in 4 patients with Right LDH and >10° in 4 patients. In 50% of patients with right LDH, facet tropism was found.

It is known that facet joints have different functions at different lumbar levels. The facet joints have a more sagittal orientation for flexion and extension ability, which is greater in the upper lumbar region (24). Thus, the upper lumbar region becomes more resistant to rotational movements. Lower lumbar levels are more prone to spondylolisthesis due to the load on the spine and lordosis in normal sagittal alignment. The facet joints in the lower lumbar levels have a more coronal orientation than the upper levels, which provides a natural

protection against spondylolisthesis by creating resistance against flexion and extension. (24). Studies reporting a correlation between sagittal orientated facet joints and spondylolisthesis at lower lumbar levels support this explanation. (25). Due to the more coronal orientation, these segments have more rotational mobility than the upper lumbar segments. (24).

Distortions in the normal facet joint orientation values of the upper and lower lumbar region may be related to the development of same-sided LDH. For example, it has been reported that the facet joints in the upper lumbar levels, which are expected to have a more sagittal orientation, have a more coronal angle than their normal range, which is related to the formation of a same-sided LDH.

In a study investigating the relationship between facet joint variations and spinal instability, it was reported that in patients with facet joint asymmetry, coronally orientated facet joints were less resistant to forces that would disrupt spinal stability. (26). It has been stated that in patients with facet joint tropism, spondylolisthesis in the direction of the facet joint with a more coronal orientation will increase the stress on the intervertebral disc on the same side.

(26). Another reason for this strain is that the intervertebral disc is subjected to rotation load towards the coronally orientated facet in patients with facet tropism.

When evaluating the relationship between lumbar disc herniation and facet joint tropism, it should be kept in mind that degenerative changes may cause herniation in adults. In adolescents, familial predisposition, trauma, obesity, and scoliosis should be taken into consideration. (27). It has been reported that disc degeneration starting in the 2nd decade of life becomes more pronounced in the presence of facet tropism.

The clinical importance of the orientation and symmetry of the facet joints is still not fully understood. Initially, it was argued that there was a significant relationship between facet joint tropism and lumbar disc herniation, but as clinical studies increased, contradictory results led to the questioning of this relationship. (18). In a systematic review and meta-analysis of

many recently published studies, it was reported that the L4-L5 facet joint angle ranged from 30° ± 11° to 47.9° ± 4.8° in the normal group. (28). In the same study, it was concluded that there was no significant relationship between lumbar disc herniation and facet joint tropism and between the side of disc herniation and facet joint orientation. (29). In the presence of facet tropism, it is thought that the intervertebral disc cannot effectively resist shear forces.

In another study involving patients aged 60-80 years and investigating facet joints at L3-4, L4-5, and L5-S1 levels, a positive correlation was found between facet joint osteoarthritis,

ligamentum flavum thickness, and facet tropism. (30). The conflicting results of studies investigating the relationship of facet tropism with degenerative spondylolisthesis, intervertebral disc disease, and other degenerative diseases may be due to the lack of a generally accepted method for measuring facet tropism. Asymmetrical disruption of the protective and restrictive resistance in spinal movements is blamed for the association of facet tropism with spondylolisthesis, osteoarthritis, and other degenerative changes (30).

Some studies have indicated that facet joint tropism is a natural feature of the lumbar spine. It is important to remember that degenerative changes can cause many spinal problems, including facet joint tropism. It is possible that a study investigating the relationship between facet joint tropism and lumbar disc herniation, in which patients of different ages are classified as young, middle-aged, and elderly, may yield different results. This may be the reason why conflicting results about facet joint tropism have been reported.

In our study, the mean left facet joint angle was 44.56° +/- 11.29°, and the mean right facet joint angle was 41.2° +/- 11.27º in patients with left lumbar disc herniation. In patients with right lumbar disc herniation, the mean right facet joint angle was 45.87° +/- 16.41°, and

the mean left facet joint angle was 42.74° +/- 12.54° (Graph 1). Statistically, no significant relationship was found between lumbar disc herniation and facet joint angle. However, when examined numerically, it was observed that the left facet joint angle was larger in patients with left lumbar disc herniation, and the right facet joint angle was larger in patients with right lumbar disc herniation.

CONCLUSION

The results of this study are consistent with many studies in literature. Statistical analysis showed that there was no significant relationship between facet joint tropism and lumbar disc herniation. However, it was found that the facet joint angle on the same side with LDH was greater than the facet joint angle on the other side. In this study, since we examined young male patients aged 25-30 years with a body-mass index of 28-32 kg/m², we tried to minimize the contribution of hormonal factors, age, and weight criteria to degeneration and to emphasize the effect of facet tropism in the formation of lumbar disc herniation.

It is important to determine the standard measurement method and normal value ranges for facet joint angles. Large-sample, comprehensive, and multicentre studies conducted for this purpose will guide future researchers investigating the contribution of facet joint tropism to the formation of lumbar disc herniation.

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The Effectiveness of Physical Therapy and Rehabilitation Approaches in Low Back Pain on Pain Severity and Disability; A Systematic Review

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Abstract

The objective of this study was to review the efficacy of physical therapy and rehabilitation approaches for low back pain, focusing on pain intensity and disability.

A survey of the literature was done in PubMed and Web of Science databases up to January 30, 2024. English studies were required, using keywords: “low back pain,” “pain intensity,” “pain severity,” “disability,” and “physical therapy.” Pain intensity was measured using the Visual Analog Scale and Numeric Rating Scale, including the 11-point Pain Intensity Numerical Rating Scale. Disability was assessed using Activities of Daily Living, Instrumental Activities of Daily Living scales, Roland Morris Disability Questionnaire, and Oswestry Disability Index. Seven studies met the inclusion criteria from 665 initial records. Interventions included osteopathic manipulative treatment, core muscle exercise with interferential current, cognitive functional therapy, dry cupping therapy, high-intensity machine-based core muscle resistance training,heat therapy, transcutaneous electrical nerve stimulation, pelvic traction, Reiki, dynamic muscular stabilization technique, and McGill Big 3. Sample sizes ranged from 30 to 1090 participants. Interferential current combined with core muscle exercises significantly reduced pain intensity compared to each method alone, though not statistically significant ($p > 0.05$). The high-intensity machine-based core muscle resistance training program group had greater pain relief ($P<.001$) and reduced disability ($P=.002$) compared to online integrated multidisciplinary therapy. No significant differences were found between dynamic muscular stabilization technique and McGill Big 3 groups ($p >0.05$). Dry cupping did not outperform sham cupping. Cognitive functional therapy reduced absenteeism in the first two years but not later. Reiki showed significant improvement in pain and Activities of Daily Living compared to drug therapy, but not to physiotherapy. Physical therapy interventions effectively alleviate symptoms and enhance results for low back pain. However, variability in interventions and outcome measures necessitates cautious interpretation. Further research with standardized protocols is essential to understand the effectiveness and optimal duration of physical therapy for Low Back Pain.

Keyword: low back pain; pain intensity; pain severity; disability; physical therapy

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INTRODUCTION

The term "low back pain" (LBP) refers to many types of pain, including nociceptive pain, neuropathic (radicular) pain that travels down the legs, and nociplastic pain on occasion, which is frequently classified as non-specific low back pain and is brought on by an exaggeration of pain in the central nervous system. These pain subtypes often overlap; for instance, a patient presenting with back pain due to a ruptured disc may concurrently experience radicular pain along with other diffuse symptoms, which are not necessarily correlated with pathoanatomical referral patterns (1).

In many parts of the world, the main reason for activity restriction and productivity loss is low back discomfort (2), and it has a significant financial impact on people, families, communities, businesses, and governments (3, 4). It is hypothesized that a considerable portion of the psychological factors associated with pain and disability stem from maladaptive beliefs concerning low back pain (5). For instance, prevailing perceptions regarding the vulnerability of the back and the necessity for its protection have been associated with heightened levels of fear related to pain and avoidance behaviors (6). The perspectives of healthcare professionals are particularly significant to consider, as research has indicated that they influence patients' attitudes and pose challenges to the implementation of standards for low back pain (7). Physiotherapists are among the medical practitioners who spend the most time with patients and are most responsible for educating them about lower back pain (8). Therefore, further investigation into the perceptions of physiotherapists regarding low back pain is warranted, given the critical priority of employing evidence-based knowledge in low back pain care (9).

There are various approaches to treating low back pain (10). Pharmacologic therapy includes nonsteroidal anti-inflammatory drugs (NSAIDs), opiates, muscle relaxants, and over-the-counter drugs such as acetaminophen or ibuprofen (11). In addition, there are nonpharmacologic treatments such osteopathic manipulative treatment (OMT), exercise therapy, behavioral therapy, acupuncture, and physical therapy. The treatment of low back pain may also involve more intrusive

procedures such as epidural, facet, and steroid injections (12).

This study's primary goal was to evaluate the effectiveness of physical therapy and rehabilitation techniques for treating low back pain, as well as how they affect the degree of pain and disability.

The PRISMA checklist and guidelines for preferred elements to report on in systematic reviews and meta-analyses (PRISMA) were utilized in this work to conduct the systematic review (Fig.1)

Review Issue

The review question was developed using the PICOS framework (Participants, Intervention, Comparison, Outcome, Study design). “Do physical therapy and rehabilitation approaches improve the intensity of pain intensity, pain severity and disability in patients with low back pain?” (P: Patients with low back pain; I: Techniques used in physical treatment and rehabilitation. C: Group of comparison (healthy or placebo); O: Intensity and severity of pain and disability; S: This systematic review examines randomized controlled trials comparing the impact of physical therapy and rehabilitation techniques on low back pain severity, pain intensity, and disability.)

Search Approach

A comprehensive analysis of the literature covering the time from the databases' creation to January 30, 2024, was conducted using the databases PubMed and Web of Science. English language studies were mandatory. The search approach made use of particular keywords, which are; “low back pain” and “pain intensity” and “pain severity” and “disability” and “physical therapy”. The data required for the study began to be collected on March 10, 2024.

Eligibility Criteria

We evaluated human randomized controlled trials (RCTs) among patients at least 18 years and older diagnosed with low back pain, including non-specific, acute, and chronic cases, for inclusion in this systematic review. A number of materials were excluded from consideration: research on animals, studies on minors under the age of 18, abstracts, individual cases or series, letters to the editor, published articles in journals without peer review, retrospective-prospective cohort studies, case-control research, review articles, conference proceedings, theses, dissertations, and studies on conditions other than low back pain.

Selection of Studies

There were two steps in the study selection process. First, using the pre-established inclusion and exclusion criteria, the research articles that were found through the literature search were filtered according to their titles and abstracts. All of the remaining papers' texts were then evaluated in order to decide if they might be included in the review.

Evaluation of Methodological Accuracy

A methodological quality scale, available at https://pedro.org.au/, was used to evaluate the included RCTs using the Physiotherapy Evidence Database (PEDro). Ten items make up the PEDro scale, and each has a binary response that can be either YES (positive rating) or NO (negative rating) (Table.1). The quality rating is based on the total score on the scale, where a score of less than 4 signifies poor quality, a score of 4-5 signifies acceptable quality, a score of 6–8 signifies good quality, and a score of 9–11 signifies exceptional quality (13).

Seven RCTs were determined to be eligible for narrative review after our inclusion criteria were applied to a total of 665 data that were first screened for this systematic review. Every study that was included was written in English. The PRISMA flowchart graphic (Fig. 1) illustrates the research selection process and gives a visual depiction of the procedure. The chosen studies differed in terms of the interventions, length of treatment, sample size, recruitment country, study methodology, and outcome measures.

The included trials examined various ways to use physical therapy and rehabilitation with the purpose of rehabilitating people with low back pain. These studies evaluated the following specific interventions: osteopathic manipulative treatment (14) (OMT), a core muscle exercise and interferential current (15) (IFC), cognitive functional therapy (16) (CFT), dry cupping therapy (17), a high-intensity machine-based core muscle resistance training program (18) (C-IPU), transcutaneous electrical nerve stimulation, heat therapy, pelvic traction and Reiki (19), dynamic muscular stabilization technique (DMST) and transcutaneous electrical nerve stimulation (20) (TENS). Between 30 and 1090 patients made up the sample sizes in each of the study's many arms. However, in most of the studies included in the review, the gender density of the participants was not specified. Table 1 provides a comprehensive overview of the study features, detailing the interventions employed, sample sizes, the countries where the studies were conducted, and the treatment durations.

These studies evaluated a range of outcomes and used various scales to measure the effectiveness of physical therapy and rehabilitation methods. Various scales were used in the research to determine the intensity of low back pain. Two studies used the Visual Analog Scale (VAS) to measure pain intensity (15,19), while the remaining studies preferred the Numeric Rating Scale (NRS)(14,16,17,18,20). Among the studies that used the NRS, one preferred (14) the 11-question version known as the 11-point Pain Intensity Numerical Rating Scale (PI-NRS).

Only one study (19), measured disabilities related to low back pain using the assessment instruments for gauging Activities of Daily

Living (ADL) and Instrumental Activities of Daily Living (IADL) scales, while two studies (14,20) used the Roland Morris Disability Questionnaire (RMDQ) . The remaining four studies utilized the Oswestry Disability Index (ODI) to assess disability in low back pain (15,16,17,18).

Core Muscle Exercises

Core muscle exercises aim to boost the function of local stabilizing muscles, such as the transversus abdominis and lumbar multifidus, setting them apart from traditional exercise methods (21,22). Three studies utilized core muscle exercises as a treatment (15,18,20). One of these, conducted by Zuo et al. (15), aimed to investigate the effects of combining IFC with specific core muscle exercises versus using each method alone. The study included three groups: one receiving both core muscle exercises and IFC (Control Group, n = 19), one receiving only core muscle exercises (Exercise Group, n = 19), and one receiving only IFC (Interferential Group, n = 15). All groups underwent therapy sessions five times a week for a duration of 12 weeks. The main outcomes assessed were pain intensity, ODI score, and SF-12 health-related quality of life scores. Following the 12-week intervention, significant enhancements were observed in all health parameters across the three groups. Notably, the control group (CG) demonstrated a notably greater decrease in pain intensity compared to both the exercise group (EG) ($p = 0.013$) and interferential group (IG) ($p = 0.000$) groups. Although core muscle function parameters notably improved in both the CG and EG groups by the study's end, between these two groups, there were no statistically significant differences ($p > 0.05$).

In-Clinic and Web-Based Multidisciplinary Spinal Treatment Programs

Raiszadeh et al. compared the results of in-clinic and web-based exercise-centered multidisciplinary spinal treatment programs provided via an integrated practice unit (IPU)(18). To achieve this, they divided a total of 1022 participants into two groups: one received the in-clinic IPU (C-IPU) model (n=927) and the other received online integrated multidisciplinary therapy (O-IPU) (n=95). The C-IPU program consisted of an intense core muscle resistance training regimen utilizing machines, whereas the O-IPU program entailed core strengthening exercises directed by a therapist and conducted at home through a web-based platform. The study measured changes in LBP symptom severity using the NRS and disability using the ODI. The C-IPU group experienced higher pain alleviation ($p<0.001$) and decreased disability ($p=0.002$) compared to the O-IPU group. Conversely, the O-IPU group demonstrated more significant enhancements in the Patient-Specific Functional Scale. ($p<0.001$).

Core Stability Exercises

Chan et al., examined two core stability methods, the progressive Dynamic Muscular Stabilization Training (DMST) and the traditional McGill Big 3 (MB3), aiming to rehabilitate nonspecific chronic low back pain (20). Thirty patients underwent these treatments alongside standard pain management. The evaluated outcomes encompassed pain severity during movement, standing, and sitting, functional disability, trunk endurance, lumbopelvic control, and body balance. Assessments occurred at baseline, the 3rd week, and the 6th week. No significant differences were found between the DMST and MB3 groups across all outcomes ($p > 0.05$). In summary, both the progressive DMST and conventional MB3 core stability exercise programs proved effective for rehabilitating nonspecific chronic low back pain.

Core stability exercise programs are recognized as essential in physical therapy for chronic LBP. Nonetheless, it remains uncertain whether progressive or conventional core stability programs are more effective. Research frequently combines core stabilization exercises with electrotherapy (23-25).

Considering the results of these three studies on low back pain, more research is needed in the literature to definitively conclude that core stability exercises are an effective and advanced treatment option for LBP.

Cupping Therapy

In recent years, cupping therapy has gained popularity among treatments for LBP to improve pain and disability levels. To investigate the effectiveness of this treatment modality, Almeida Silva et al., conducted a study with ninety participants suffering from chronic non-specific LBP (17). The experimental group, consisting of 45 participants, received dry cupping therapy, with cups placed bilaterally aligned with the L1 to L5 vertebrae, while the control group, also comprising 45 participants, received sham cupping therapy. These treatments were given weekly for 8 weeks, with evaluations conducted before and after the initial session, as well as after 4 and 8 weeks of treatment. The primary outcome assessed was pain intensity, measured using a numerical pain scale during rest, brisk walking, and trunk flexion.

The research findings indicated that dry cupping therapy didn't show superiority over sham cupping in enhancing pain levels, physical function, mobility, quality of life, psychological symptoms, or medication usage among individuals with nonspecific chronic LBP ($p>0,05$) (17).

CFT

CFT is an innovative, individual-focused behavioral intervention designed to address various aspects of non-specific chronic LBP. This approach integrates a functional

behavioral aspect aimed at normalizing challenging favorable postures and movements while discouraging behaviors associated with pain, alongside cognitive reconceptualization of non-specific chronic LBP (26). Clinical trials involving CFT have shown promising results (27-29). Consequently, Van Hoof et al. conducted a case-series pilot study involving 33 nurses with persistent LBP (16). In the initial baseline phase (A), no interventions were administered, and outcome measures were gathered twice, with a six-month interval between assessments (A1 and A2). Subsequently, in phase B, participants underwent a 14-week personalized CFT intervention. Following this, in phase C (another non-intervention phase), outcomes were evaluated immediately after the intervention and at 3, 6, 9, 12, and 36 months post-intervention. The primary outcomes were LBP-related work absenteeism, pain intensity (NRS), and disability (ODI).

The results showed that absence from work due to low back pain notably decreased during the initial ($p=0.005$) and second years ($p=0.045$) following the CFT intervention, although this reduction was not sustained in the third and fourth years. Disability levels showed a significant decrease quickly following the intervention and at 3, 9, and 12 months post-intervention ($p<0.001$). Pain intensity also significantly decreased soon after the intervention ($p<0.001$) and at 3 ($p<0.001$), 9 ($p=0.005$), and 12 months post-intervention ($p=0.007$).

However, the study noted a limitation in the absence of a control group, emphasizing the need for high-quality randomized controlled trials to thoroughly assess the effectiveness of CFT.

Reiki

Reiki has gained approval from the National Center for Complementary and Alternative Medicine as a method for pain relief and is classified as a biofield treatment (30). Reiki works by balancing and aligning the energy chakras and auras, thereby promoting health (31). Energy therapists employ either direct touch or distance healing to realign the energy fields of individuals, promoting recovery on physical, emotional, mental, and spiritual levels (32). Reiki energy therapy has been utilized to address various physical, emotional, and psychological conditions, including hypertension, pain, headaches, mood disorders, anxiety, osteoarthritis, wound healing, and sleep disturbances (33). The utilization of complementary therapies for chronic pain management is increasing, with Reiki being one such therapy. Jahantiqh et al. conducted a study to compare the efficacy of distance Reiki compared to physiotherapy in alleviating lower back pain and improving ADL in patients with intervertebral disc herniation (IDVH) (19). Sixty patients with IDVH were randomly divided into three groups: Reiki, physiotherapy,

and drug therapy. The severity of pain and ADL were evaluated before and after the intervention using the VAS for pain and the ADL-Instrumental ADL questionnaire.

The research revealed a notable contrast in pain intensity and enhancement in ADL between the Reiki and drug therapy groups. Nevertheless, there wasn't a significant distinction observed between the Reiki and physiotherapy groups concerning pain management (p=0.44) and enhancement of ADL (p=0.29).

While there was no significant difference in the improvement of daily activities between the Reiki and physiotherapy groups, the Reiki group exhibited a notable difference compared to the drug therapy group. Specifically, Reiki was more effective in improving activities compared to drug therapy. Furthermore, pain relief was greater in the Reiki group compared to both the physiotherapy and drug therapy groups, suggesting that Reiki is more effective in pain management and enhancing daily activities in patients with IVDH (19).

OMT

In OMT, a variety of manual techniques are typically used. These treatments may include visceral technique, soft tissue stretching, spinal manipulation, resisted isometric "muscle energy" stretches, or the prescription of exercises. OMT can be applied to different bodily parts and tissues, sometimes far from the problematic area and depending on the practitioner's clinical judgment. Treatment is characterized by a holistic approach to the patient (34,35). The first systematic review of OMT for LBP was published by Licciardone et al. (36), who found that OMT significantly decreased LBP. Supporting this outcome, research by Cooley et al. (14) observed reductions in pain and disability when OMT was applied in conjunction with Standart Care Treatment (SCT) in patients with LBP. Both the RMDQ and PI-NRS indicated that pain reduction was similar in both groups after four months. This study highlighted that OMT is an effective non-drug approach for alleviating pain in patients with chronic LBP. Fundamentally, OMT addresses biomechanical problems (somatic dysfunctions), which in chronic LBP can encompass issues with the innominate bones, sacrum, lumbar spine, and functional leg length discrepancies. The study also noted limitations, such as the limited number of patients treated with OMT and the small pool of patients with low back pain who did not receive OMT for comparison.

All of these findings indicate that physical therapy interventions can effectively alleviate symptoms and enhance outcomes in low back pain. However, caution is necessary when interpreting the results due to differences in the interventions and outcome measures utilized across various studies. The limited number of studies employing recommended outcome measures according to international guidelines

Table1. Characteristics of included studies.

Reference,year	***Country***	***Disease diagnosis***	***Groups***	***Intervention duration***	***Outcome measures***
Cooley et al (14).,2021	USA	CLBP	Standart Care Group (n=75) Standart Care+Osteopathic Manipulative Treatment (n=71)	Both groups received 4 months of treatment	Pain; (PI-NRS) (p>0,05). Disability; (RMDQ) (p>0,05).
Zuo et al.(15),2024	China	Non-specific CLBP	One combining core muscle exercise with IFC (CG, n = 19), another with just core muscle exercise (EG, n = 19) and a third with only IFC (IG, n = 15)	All groups recieved 5 times a week for 12 weeks treatment.	Pain;(VAS) (p<0.05), Disability; (ODI) (p>0,05),
Van Hoof et. Al(16), 2020)	Belgium	CLBP or PLBP for more than 3 months.	Phase A;(no intervention), Phase B; (an individualized CFT intervention for 14 weeks), Phase C;(no intervention). Phases applied with 33 nurses.	CFT sessions; The initial session lasted 60 minutes, while each of the subsequent eight individual follow-up sessions lasted approximately 30 minutes.	Pain; (NRS) (p<0.05), Disability; (ODI) (p<0.05).
Almeida Silva et al.(17), 2021	Brazil	Non-specific CLBP	EG; dry cupping therapy, (n = 45), CG; sham cupping therapy, (n = 45)	EG; Once a week for 8 weeks, each session lasting 10 minutes. CG; Once a week for 8 weeks, each session lasting 10 minutes.	Pain;(NRS) (p>0,05), Disability; (ODI) (p>0,05).
Raiszadeh et al.(18), 2021	*USA*	*Any kind of LBP*	In-clinic program;(n=927), Web based program;(n=95)	C-IPU; Resistance training for the core muscles using a high-intensity machine program, O-IPU; With a web-based platform, therapist-directed at-home core strengthening activities. One session per week for 12 weeks.	Pain; (NRS)(p<0.05), Disability; (ODI)(p<0.05).
Jahantiqh et al.(19), 2018	*Iran*	*LBP with intervertebral disc hernia*	Reiki Group;(n=20), Physiotherapy Group; (n=20), Drug Therapy Group;(n=20)	Reiki Group; three daily, 15-minute distant energy healing sessions for a week, Physiotherapy Group; lasting 60 to 90 minutes, conducted 7 to 10 times over the course of a week, involved heat therapy, transcutaneous electrical nerve stimulation, pelvic traction, and physical exercises. , Drug Therapy Group; 75 mg capsule of Indomethacin and a 500 mg tablet of methocarbamol every 8 hours daily for a week,as well as other two groups.	Pain; (VAS) (p>0,05), Disability (ADL-IADL) (p>0,05).
Chan et al.(20), 2020	Malaysia	Non-specific CLBP	Dynamic Muscular Stabilization Technique (DMST) Group; (n=15), McGill big 3 (MGB3) Group; (n=15)	DMST group; progressive DMST training, heat treatment using hydro collator (15 min), TENS(10 min). MGB3 group; conventional core stability training, heat treatment using hydro collator (15 min), TENS(10 min). 6 weeks duration.	Pain; (NPRS) (p > 0.05), Disability; (RMDQ) (p > 0.05)

Chronic Low Back Pain (CLBP), İnterferentisl Current (IFC), The 11 Point Paint Intesity Numerical Rating Scale (PI-NRS)(NRS), Rolland Morris Disability Questionnaire (RMDQ), Oswestry Disability Index (ODI), Numerical Rating Scale (NRS), CG; Control Group, EG: Experimental Group, Cognitive Functional Therapy (CFT), Clinic-Based Multidisciplinary Therapy in an In tegrated Practice Unit (C-IPU), Online Integrated Multidisciplinary Therapy (O-IPU), Assessment Tools to Evaluate Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), Dynamic Muscular Stabilization Tecnique (DMST), McGill Big 3 (MGB3), Transcutenous Electrical Nerve Stimulation (TENS)

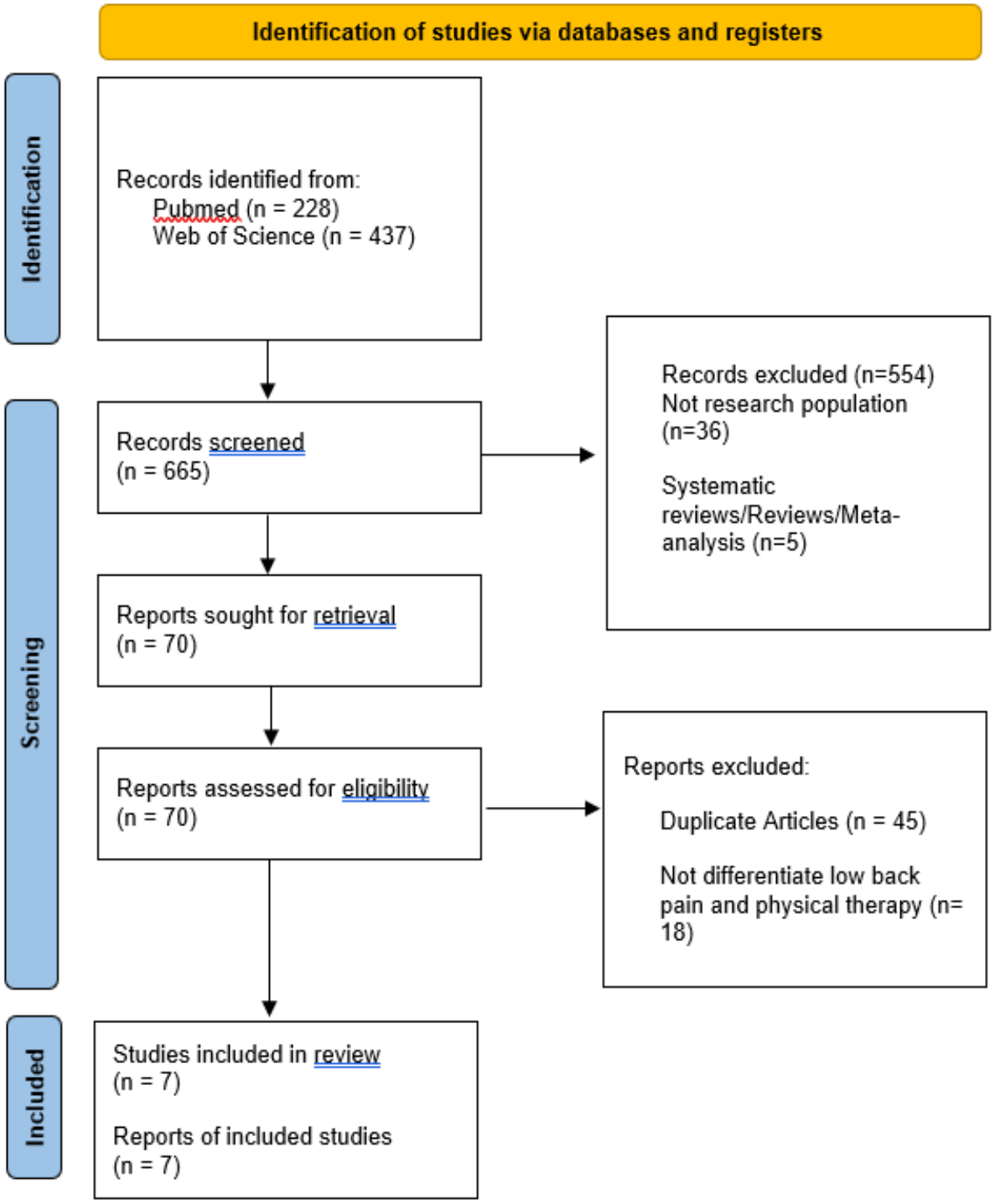

Figure 1. The study's PRISMA flowchart diagram.

Table 2. methodological evaluation of the studies' quality.

Author, year	1	2	3	4	5	6	7	8	9	10	11	Total
*Cooley et al.(14),*2021	**YES**	NO	**YES**	**YES**	NO	NO	NO	**YES**	**YES**	**YES**	**YES**	7
*Zuo et al.(15),*2024	**YES**	**YES**	NO	**YES**	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**	8
Van Hoof et.al(16), 2020	**YES**	NO	NO	NO	NO	NO	NO	**YES**	**YES**	**YES**	**YES**	5
Almeida Silva et al.(17), 2021	**YES**	**YES**	**YES**	**YES**	**YES**	NO	**YES**	**YES**	**YES**	**YES**	**YES**	10
Raiszadeh et al.(18), 2021	**YES**	NO	NO	NO	NO	NO	NO	**YES**	**YES**	**YES**	**YES**	5
Jahantiqh et al.(19), 2018	**YES**	**YES**	NO	**YES**	NO	NO	NO	**YES**	**YES**	**YES**	**YES**	7
Chan et al.(20), 2020	**YES**	**YES**	**YES**	**YES**	NO	NO	**YES**	**YES**	**YES**	**YES**	**YES**	9

Take note that the presence of the item is indicated by "YES." "NO" indicates that the item is not present.
1. Specified eligibility requirements were provided.
2. The individuals were divided into groups at random (in a crossover trial, the subjects were randomly assigned to receive treatments regardless of order).
3. Allocative information was hidden.
4. The most significant prognostic factors were similar among the groups at baseline.
5. Every subject was blinded.
6. Every therapist who delivered the therapy was blinded.
7: Blinding was applied to all assessors who measured at least one significant outcome.
8: When the participants were first split into groups, measurements were obtained for more than 85% of the significant outcomes.
9: All subjects for whom outcome measures were available were assigned to the treatment or control condition; if this was not the case, the "intention to treat" technique was used to analyze data for at least one significant outcome.
10: The results of statistical comparisons between groups are reported for at least one significant outcome.
11: The study provides both point estimates and measurements of variability for at least one significant outcome.

underscores the importance of future research aligning with these standards. Ensuring uniformity in outcome measures will enhance the ability to compare and apply study results broadly, thus aiding in stronger evidence synthesis and informed clinical choices. Additional research employing standardized protocols and consistent outcome measures is crucial for gaining deeper insights into the effectiveness and ideal duration of physical therapy interventions for low back pain

CONLUSION

This systematic review underscores the limited evidence regarding the effectiveness of physical therapy and rehabilitation approaches in alleviating pain severity and disability associated with low back pain. The studies analyzed employed a variety of intervention methods, including techniques such as IFC, CFT, C-IPU, DMST, MGB3, TENS, heat therapy, and osteopathic manipulative treatment. While these interventions generally yielded better outcomes compared to control groups, the variability in the outcome measures used across the studies complicates direct comparisons. To strengthen the evidence base, future research should prioritize the standardization of outcome measures and the implementation of high-quality clinical trials.

Limitations

Limited studies: The systematic review identified only seven studies that fulfilled the

inclusion criteria, indicating a lack of extensive investigation on the topic. This limitation could hinder the broader applicability and reliability of the findings.

Heterogeneity among studies: Variability existed in the study designs, sample sizes, interventions, treatment durations, and outcome assessments across the included studies. This heterogeneity may lead to fluctuating results, posing challenges in drawing definitive conclusions.

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