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CASE REPORT

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Ankara Yıldırım Beyazıt University Yenimahalle Training and Research Hospital, Clinic of Geriatrics, Ankara, Turkey
drokhacettepe@hotmail.com

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ACU University, Medical Faculty, Kadıköy Acıbadem Hospital, Department of Geriatrics, İstanbul, Turkey

Mustafa Kemal Kılıç, MD
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Hasan Öztin, MD
Erzurum Regional Training and Research Hospital, Clinic of Geriatrics, Erzurum, Turkey
dr.hasanoztin@gmail.com

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İlker Taşçı, MD
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Mustafa Ender Terzioğlu, MD
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Ankara University, Medical Faculty, Department of Geriatrics, Ankara, Turkey

Pınar Tosun Taşar, MD
Erzurum Atatürk University Faculty of Medicine, Department of Geriatrics, Erzurum, Turkey
pinar.tosun@gmail.com

Burcu Balam Yavuz, MD
Hacettepe University, Medical Faculty, Department of Geriatrics, Ankara, Turkey

Dilek Gogas Yavuz, MD
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Publisher Contact
Address: Molla Gürani Mah. Kaçamak Sk. No: 21/1 34093 İstanbul, Turkey
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Academic Geriatrics Society
Güven Çarşısı Enez Sok. 2/176 Altındağ - Ankara, Turkey
info@ejgg.org

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About us

European Journal of Geriatrics and Gerontology is the official open access scientific publication organ of the Academic Association of Geriatrics. It is a double peer-reviewed journal published quarterly in April, August and December.

The target audience of the journal includes physicians working in the fields of geriatrics and gerontology and all other health professionals who are interested in these topics.

The editorial processes of the journal are shaped in accordance with the guidelines of the international organizations such as the International Council of Medical Journal Editors (ICMJE) (http://www.icmje.org) and the Committee on Publication Ethics (COPE) (http://publicationethics.org).

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Address for Correspondence

Zeynel Abidin Öztürk

Gaziantep Üniversitesi Tıp Fakültesi, Geriatri Bilim Dalı, Gaziantep, Turkey

E-mail: zaodr@yahoo.com.tr

Issuing Body

Galenos Yayınevi Tic. Ltd. Şti.

Molla Gürani Mah. Kaçamak Sok. No: 21, 34093, Fındıkzade, İstanbul, Turkiye

Phone: +90 212 621 99 25

Fax: +90 212 621 99 27

E-mail: info@galenos.com.tr

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European Journal of Geriatrics and Gerontology does not charge any fee for article submission or processing. Also manuscript writers are not paid by any means for their manuscripts.

The journal should be abbreviated as "Eur J Geriatr Gerontol" when referenced.

The European Journal of Geriatrics and Gerontology accepts invited review articles, research articles, brief reports, case reports, letters to the editor, and images that are relevant to the scope of geriatrics and gerontology, on the condition that they have not been previously published elsewhere. Basic science manuscripts, such as randomized, cohort, cross-sectional, and case control studies, are given preference. All manuscripts are subject to editorial revision to ensure they conform to the style adopted by the journal. There is a double blind kind of reviewing system.

The Editorial Policies and General Guidelines for manuscript preparation specified below are based on "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations)" by the International Committee of Medical Journal Editors (2013, archived at http://www.icmje.org).

Editorial Process

Following receiving of each manuscript, a checklist is completed by the Editorial Assistant. The Editorial Assistant checks that each manuscript contains all required components and adheres to the author guidelines, after which time it will be forwarded to the Editor in Chief. Following the Editor in Chief's evaluation, each manuscript is forwarded to the Associate Editor, who in turn assigns reviewers. Generally, all manuscripts will be reviewed by at least three reviewers selected by the Associate Editor, based on their relevant expertise. Associate editor could be assigned as a reviewer along with the reviewers. After the reviewing process, all manuscripts are evaluated in the Editorial Board Meeting.

European Journal of Geriatrics and Gerontology's editor and Editorial Board members are active researchers. It is possible that they would desire to submit their manuscript to European Journal of Geriatrics and Gerontology. This may be creating a conflict of interest. These manuscripts will not be evaluated by the submitting editor(s). The review process will be managed and decisions made by editor-in-chief who will act independently. In some situation, this process will be overseen by an outside independent expert in reviewing submissions from editors.

Preparation of Manuscript

Manuscripts should be prepared according to ICMJE guidelines (http://www.icmje.org).

Original manuscripts require a structured abstract. Label each section of the structured abstract with the appropriate subheading (Objective, Materials and Methods, Results, and Conclusion). Case reports require short unstructured abstracts. Letters to the editor do not require an abstract. Research or project support should be acknowledged as a footnote on the title page.

Technical and other assistance should be provided on the title page.

Title Page

Title: The title should provide important information regarding the manuscript's content.

The title page should include the authors' names, degrees, and institutional/professional affiliations, a short title, abbreviations, keywords, financial disclosure statement, and conflict of interest statement. If a manuscript includes authors from more than one institution, each author's name should be followed by a superscript number that corresponds to their institution, which is listed separately. Please provide contact information for the corresponding author, including name, e-mail address, and telephone and fax numbers.

Running Head: The running head should not be more than 40 characters, including spaces, and should be located at the bottom of the title page.

Word Count: A word count for the manuscript, excluding abstract, acknowledgments, figure and table legends, and references, should be provided not exceed 3000 words. The word count for an abstract should be not exceed 300 words.

Conflict of Interest Statement: To prevent potential conflicts of interest from being overlooked, this statement must be included in each manuscript. In case there are conflicts of interest, every author should complete the ICMJE general declaration form, which can be obtained at: http://www.icmje.org/coi_disclosure.pdf

Abstract and Keywords: The second page should include an abstract that does not exceed 300 words. Moreover, as various electronic databases integrate only abstracts into their index, important findings should be presented in the abstract.

Abstract

Objective: The abstract should state the objective (the purpose of the study and hypothesis) and summarize the rationale for the study.

Materials and Methods: Important methods should be written respectively.

Results: Important findings and results should be provided here.

Conclusion: The study's new and important findings should be highlighted and interpreted.

Other types of manuscripts, such as case reports, reviews and others will be published according to uniform requirements. Provide at least 3 keywords below the abstract to assist indexers. Use terms from the Index Medicus Medical Subject Headings List (for randomized studies a CONSORT abstract should be provided (http://www.consort-statement.org).

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Original Articles

Original articles should have the following sections;

Introduction: The introduction should include an overview of the relevant literature presented in summary form (one page), and whatever remains interesting, unique, problematic, relevant, or unknown about the topic must be specified. The introduction should conclude with the rationale for the study, its design, and its objective(s).

Materials and Methods: Clearly describe the selection of observational or experimental participants, such as patients, laboratory animals, and controls, including inclusion and exclusion criteria and a description of the source population. Identify the methods and procedures in sufficient detail to allow other researchers to reproduce your results. Provide references to established methods (including statistical methods), provide references to brief modified methods, and provide the rationale for using them and an evaluation of their limitations. Identify all drugs and chemicals used, including generic names, doses, and routes of administration. The section should include only information that was available at the time the plan or protocol for the study was devised on STROBE (http://www.strobe-statement.org).

Statistics: Describe the statistical methods used in enough detail to enable a knowledgeable reader with access to the original data to verify the reported results. Statistically important data should be given in the text, tables and figures. Provide details about randomization, describe treatment complications, provide the number of observations, and specify all computer programs used.

Results: Present your results in logical sequence in the text, tables, and figures. Do not present all the data provided in the tables and/or figures in the text; emphasize and/or summarize only important findings, results, and observations in the text. For clinical studies provide the number of samples, cases, and controls included in the study. Discrepancies between the planned number and obtained number of participants should be explained. Comparisons, and statistically important values (i.e. p value and confidence interval) should be provided.

Discussion: This section should include a discussion of the data. New and important findings/results, and the conclusions they lead to should be emphasized. Link the conclusions with the goals of the study, but avoid unqualified statements and conclusions not completely supported by the data. Do not repeat the findings/results in detail; important findings/results should be compared with those of similar studies in the literature, along with a summarization. In other words, similarities or differences in the obtained findings/results with those previously reported should be discussed.

Study Limitations: Limitations of the study should be detailed. In addition, an evaluation of the implications of the obtained findings/results for future research should be outlined.

Conclusion: The conclusion of the study should be highlighted.

References

Cite references in the text, tables, and figures with numbers in parentheses. Number references consecutively according to the order in which they first appear in the text. Journal titles should be abbreviated according to the style used in Index Medicus (consult List of Journals Indexed in Index Medicus). Include among the references any paper accepted, but not yet published, designating the journal and followed by, in press. Authors are solely responsible for the accuracy of all references.

Examples of References:

1. List All Authors

Bonanni E, Tognoni G, Maestri M, Salvati N, Fabbrini M, Borghetti D, DiCoscio E, Choub A, Sposito R, Pagni C, Iudice A, Murri L. Sleep disturbancesin elderly subjects: an epidemiological survey in an Italian district. ActaNeurol Scand 2010;122:389-397.

2. Organization as Author

American Geriatrics Society 2015 Updated Beers Criteria Expert panel. American geriatrics society 2015 updated Beer criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2015;63: 2227-2246.

3. Complete Book

Ham RJ, Sloane PD, Warshaw GA, Potter JF, Flaherty E. Ham's primary care geriatrics : a case-based approach, 6th ed. Philadelphia, Elsevier/Saunders, 2014.

4. Chapter in Book

BG Katzung. Special Aspects of Geriatric Pharmacology, In:Bertram G. Katzung,Susan B. Masters, Anthony J. Trevor (Eds). Basic and Clinical Pharmacology. 10th edition, Lange, Mc Graw Hill, USA 2007, pp 983-90.

5. Abstract

Reichenbach S, Dieppe P, Nuesch E, Williams S, Villiger PM, Juni P. Association of bone attrition with knee pain, stiffness and disability; a cross sectional study. Ann Rheum Dis 2011;70:293-8. (abstract).

6. Letter to the Editor

Rovner B. The Role of the Annals of Geriatric Medicine and Research as a Platform for Validating Smart Healthcare Devices for Older Adults. Ann Geriatr. 2017;21:215-216.

7. Supplement

Garfinkel D. The tsunami in 21st century healthcare: The age-related vicious circle of co-morbidity - multiple symptoms - over-diagnosis - over treatment - polypharmacy [abstract]. J Nutr Health Aging 2013;17(Suppl 1):224-227.

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Case Reports

Case reports should be structured as follows:

Abstract: An unstructured abstract that summarizes the case.

Introduction: A brief introduction (recommended length: 1-2 paragraphs).

Case Presentation: This section describes the case in detail, including the initial diagnosis and outcome.

Discussion: This section should include a brief review of the relevant literature and how the presented case furthers our understanding to the disease process.

Review Articles

Reviews should include a conclusion, in which a new hypothesis or study about the subject may be posited. Do not publish methods for literature search or level of evidence. Authors who will prepare review articles should already have published research articles on the relevant subject. There should be a maximum of two authors for review articles.

Images in Geriatrics and Gerontology

Authors can submit for consideration an illustration and photos that is interesting, instructive, and visually attractive, along with a few lines of explanatory text and references. No abstract, discussion or conclusion are required but please include a brief title.

Letters to the Editor

Letters can include no more than 600 words of text, 10 references, and 1 figure or table. No abstract is required, but please include a brief title.

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Tables, Graphics, Figures, and Images

Tables: Supply each table on a separate file. Number tables according to the order in which they appear in the text, and supply a brief caption for each. Give each column a short or abbreviated heading. Write explanatory statistical measures of variation, such as standard deviation or standard error of mean. Be sure that each table is cited in the text.

Figures: Figures should be professionally drawn and/or photographed. Authors should number figures according to the order in which they appear in the text. Figures include graphs, charts, photographs, and illustrations. Each figure should be accompanied by a legend that does not exceed 50 words. Use abbreviations only if they have been introduced in the text. Authors are also required to provide the level of magnification for histological slides. Explain the internal scale and identify the staining method used. Figures should be submitted as separate files, not in the text file. High-resolution image files are not preferred for initial submission as the file sizes may be too large. The total file size of the PDF for peer review should not exceed 5 MB.

Article Type	Abstract (words)	Document (words) (excluding references)	References	Total Tables and Figures
Original Articles	300	3000	50	5
Review Articles	300	3500	75	5
Invited Review Article	300	3500	75	5
Case Reports	100	1000	15	2
Images	None	500	10	2
Letters to the Editor	None	600	10	1
Editorial Comment	None	1500	20	2

Authorship

Each author should have participated sufficiently in the work to assume public responsibility for the content. Any portion of a manuscript that is critical to its main conclusions must be the responsibility of at least 1 author.

Contributor's Statement

All submissions should contain a contributor's statement page. Each manuscript should contain substantial contributions to idea and design, acquisition of data, or analysis and interpretation of findings. All persons designated as an author should qualify for authorship, and all those that qualify should be listed. Each author should have participated sufficiently in the work to take responsibility for appropriate portions of the text.

Acknowledgments

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When reporting experiments conducted with humans indicate that the procedures were in accordance with ethical standards set forth by the committee that oversees human experimentation. Approval of research protocols by the relevant ethics committee, in accordance with international agreements (Helsinki Declaration of 1975, revised 2013 available at http://www.wma.net/e/policy/b3.html "Guide for the Care and use of Laboratory Animals" www.nap.edu/catalog/5140.html), is required for all experimental, clinical, and drug studies. Studies performed on human require ethics committee certificate including approval number. It also should be indicated in the "Materials and Methods" section. Patient names, initials, and hospital identification numbers should not be used. Manuscripts reporting the results of experimental investigations conducted with humans must state that the study protocol received institutional review board approval and that the participants provided informed consent.

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EDITORIAL

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Putting Sarcopenia at the Forefront of Clinical Practice

Gülistan Bahat[1], Alfonso Cruz-Jentoft[2]

[1]İstanbul University Faculty of Medicine, Department of Internal Medicine, Division of Geriatrics, İstanbul, Turkey
[2]Ramón y Cajal University Hospital, Clinic of Geriatrics, Madrid, Spain

Sarcopenia is becoming one of the major hot topics in the care of older persons. In recent years, many different international consensus groups have proposed different consensus definitions (1-4). Among them, the European Working Group on Sarcopenia in Older People (EWGSOP) consensus definition, which was published on 2010, comes forward as being the most cited and recognized definition in the literature. In the late 2018, considering the accumulating scientific evidence and experience in applying sarcopenia in clinical practice, an update was deemed necessary and EWGSOP published the revised consensus on definition and diagnosis of sarcopenia (EWGSOP2) (5). The major stated aim of this document is to try to foster the introduction of sarcopenia in usual clinical practice.

EWGSOP2 aims to increase consistency of research designs, clinical diagnoses and consequently the care for people with sarcopenia. As a rapid view, sarcopenia is considered as a muscle disease (muscle failure) rooted in adverse muscle changes that occur and accumulate across the lifetime. EWGSOP2 focuses on low muscle strength as a key characteristic of sarcopenia. It suggests detection of low muscle quantity and quality to confirm the sarcopenia diagnosis, and identifies poor physical performance as indicative of severe sarcopenia. Accordingly, EWGSOP2 updated the clinical algorithm to be used for sarcopenia case finding, assessment, confirmation and severity determination (Figure). Lastly, EWGSOP2 provided clear cut-off points for measurements of variables that identify and characterise sarcopenia when available.

In clinical practice, EWGSOP2 advises using the SARC-F screening questionnaire to find individuals with probable sarcopenia. Use of grip strength and chair stand measures are advised to identify low muscle strength. To generate evidence that confirms muscle of low quantity or quality, evaluation of muscle by dual-energy X-ray absorptiometry (DXA) and bio-electrical impedance analysis (BIA) methods in usual clinical care, and by DXA, MRI or CT in research and in specialty care for individuals at high

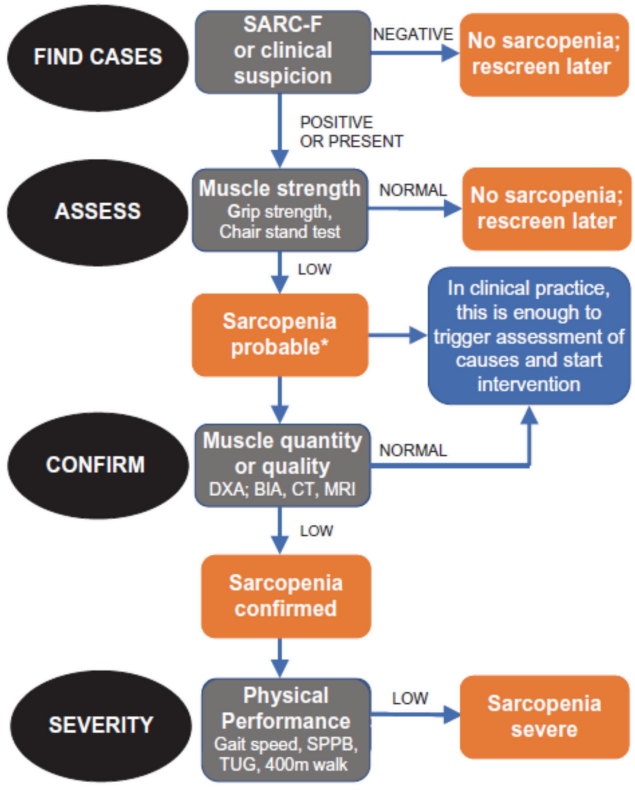

Figure. EWGSOP2 algorithm for case-finding, making a diagnosis and quantifying severity of sarcopenia in practice.

*Consider other reasons for low muscle strength (e.g. depression, sroke, balance disorders, peripheral vascular disorders).

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Address for Correspondence: Gülistan Bahat, İstanbul University Faculty of Medicine, Department of Internal Medicine, Division of Geriatrics, İstanbul, Turkey
Phone: +90 212 414 20 00-33204 **E-mail:** gbahatozturk@yahoo.com **ORCID:** orcid.org/0000-0001-5343-9795
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risk of adverse outcomes are recommended. The recommended measures of physical performance are SPPB, TUG and 400-m walk; these tests are advised to assess the severity of sarcopenia.

Some questions may arise during the application of the EWGSOP2 definition in clinical practice. We may propose some answers to these questions.

1) Should I always use the SARC-F to find individuals with probable sarcopenia?

As noted in the consensus paper, in clinical practice, case finding should start when a patient reports symptoms or signs of sarcopenia (i.e. falling, feeling weak, slow walking speed, difficulty rising from a chair or weight loss/muscle wasting). In such cases, further testing for sarcopenia is recommended and there is no need to use any screening questionnaire. EWGSOP2 recommends use of the SARC-F questionnaire (6,7) as a way to elicit self-reports from patients on signs that are characteristic of sarcopenia and as a formal approach. Therefore, in clinical practice one should not feel be obliged to use SARC-F, except with screening purposes in high risk populations. Any symptom that may be related to sarcopenia should prompt the physician to look and assess for sarcopenia.

2) Is it necessary to measure both the hand grip strength and chair stand test in the same patient in case measurement is possible?

It is not necessary to use both hand grip strength and chair stand test for sarcopenia assessment. If the clinician can assess grip strength reliably, that is the reference to diagnose sarcopenia, to be consistent. It is advisable to use the chair stand test only when grip strength is unavailable or impractical.

3) If I cannot measure dominant hand grip strength, should I measure grip strength in the non-dominant hand or change to the chair stand test?

As hand grip is the preferred muscle strength measure, it is advisable to measure it in the non-dominant hand, before using the alternative test.

4) EWGSOP2 recommended some specific cut-offs but also recommended to use the normative data of the population when available. Cut-offs for total skeletal muscle mass and handgrip strength have been published for Turkish population. Which cut-offs shall I use?

This is particularly important in Turkish studies and it seems some uncertainty is present up to now in this regard. Cut-offs for total skeletal muscle mass and hand grip strength have been published for Turkish population (8).

Cut-off points depend on the measurement method and on the availability of reference studies in the particular populations. It has been observed that disputes over cut-off points have hampered research and development for sarcopenia field due to lack of study consistency up to EWGSOP2 consensus. That is why EWGSOP2 has opted to provide recommendations for cut-off points. These cut-offs were aimed to be simple and rounded figures so that they can be handled and implemented easily in clinical practice. Previously, the Asian Working Group on Sarcopenia developed a EWGSOP-based consensus that specified cut-off points for diagnostic variables (9). This approach proved to be very useful for implementation of sarcopenia care. Therefore, rather than the Turkish population specific cut-offs, we would suggest using the recommended cut-offs also for appendicular skeletal muscle mass and hand grip strength in the Turkish population. However, there is an important point here. EWGSOP2 recommended cut-offs only for the appendicular skeletal muscle mass, not the total skeletal muscle mass. Turkish reference study proposed cut-offs for total skeletal muscle mass. Many research centres do not have access to DXA and therefore may use total skeletal muscle mass assessed by BIA. Therefore, if a clinician assesses total skeletal muscle mass, not the appendicular muscle mass, then he/she can use documented Turkish total skeletal muscle mass index thresholds as 9.2 kg/m^2 and 7.4 kg/m^2 in males and females respectively. These figures are for skeletal muscle mass adjusted (indexed by) height^2 (m^2). Low skeletal muscle mass index cut-offs have also been published for total skeletal muscle mass adjusted by body mass index or weight in Turkish population (10,11). Last point is that, one can use these recommended total or appendicular skeletal muscle mass thresholds when the skeletal muscle mass is assessed either by DXA or BIA.

Sarcopenia is linked with adverse outcomes and can improve with exercise and nutrition interventions. (12) However, it is usually not detected, diagnosed or treated in usual clinical practice. Time has come when research on sarcopenia has to be transferred to patient care.

Ethics

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: G.B., A.C.J., Design: G.B., A.C.J., Data Collection or Processing: G.B., A.C.J., Analysis or Interpretation: G.B., A.C.J., Literature Search: G.B., A.C.J., Writing: G.B., A.C.J.

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ORIGINAL RESEARCH

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Perceptions of Healthcare Services Students on Older Peoples and Ageing

Sinan Yenal[1], Kerziban Yenal[2]

[1]Dokuz Eylül University, Vocational School of Healthcare Services, Department of Ambulance and Emergency Services, İzmir, Turkey
[2]European University of Lefke, School of Healthcare Sciences, Department of Nursing, Lefke, Cyprus/Republic of Turkish

Abstract

Objective: This study was conducted to evaluate the perception of older people and ageing among students of a Vocational School of Healthcare Services.

Materials and Methods: This descriptive research was conducted on students receiving education in a vocational school of health services during the 2018-2019 academic year. Data were collected using the attitudes toward aging and elderliness scale. Moreover, an additional form was prepared to evaluate the personal information about the students.

Results: The study was conducted on 669 students. The mean total attitudes toward aging and elderliness scale score was 2.86±0.6. When all the subscale scores of the attitudes toward aging and elderliness scale were examined, the lowest score was in the perception of the difficulty accepting old age (2.78±0.79), whereas the highest score was in the perception of the difficulty coping with life (3.19±0.73). Gender, presence of a person aged ≥65 years in the family and having lived with an older person in the same house at a certain period in life did not have an effect on the perception of old age and ageing.

Conclusion: The results of this study showed that students of the Vocational School of Healthcare Services had an average level of perception regarding ageing and old age. Considering the rapidly ageing population worldwide, it is important to help and guide healthcare technicians develop positive perceptions about older people.

Keywords: Ageing, elderly, perception, student

Introduction

A rapidly ageing of the population and changes in the family structure are hot debates in the modern world. This phenomenon underlined the importance of services being provided to the older people. Old age involves living with social relationships in a social environment. The boosted health problems with ageing increase the demand of the elderly population for healthcare services (1). Older people become sick more often, have to live with more chronic diseases or disorders, are challenged by multiple health problems at the same time and are, thus, more frequently admitted to healthcare centres and stay longer at the hospitals (2).

The Vocational School of Healthcare Services (VSHS) in Turkey is a four semester pre-university school incorporation with the medical faculty. In the VSHS there are 27 different active programs (3-5).

Students studying healthcare services provide services to people from every age group during their professional life, their opinions regarding old age and ageing are important (1). Because the vocational school of higher education students will be a part of the healthcare team in the future, developing a more affirmative, respectful and tolerant behaviour and attitude towards older people and ageing will be more beneficial in providing healthcare services (6).

This study was conducted to evaluate the perceptions of students of the VSHS on older people and ageing.

Address for Correspondence: Sinan Yenal, Dokuz Eylül University, Healthcare Services Vocational School, Department of Ambulance and Emergency Services, İzmir, Turkey
E-mail: sinan.yenal@deu.edu.tr **ORCID:** orcid.org/0000-0001-9352-5938
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Materials and Methods

This descriptive research was conducted on students studying in Dokuz Eylül University VSHS during the 2018-2019 academic year. This study was conducted on seven different program students: Paramedic program, Medical documentation and secretariat program, Medical laboratory program, Opticianry program, Medical imaging program, Anaesthesia program and Radiotherapy program. No specific method for sample selection was conducted, and the entire student population was aimed to be enrolled in the analysis. Students who rejected to participate in the study, those who had ceased the school temporarily on the date of the research, those who could not be reached in the school on the date of research and those aged <18 years were excluded. Thus, the study was completed by reaching 669 (57.4%) of 1,164 students who comprised the study population. Figure 1 shows the derivation of the sample used in this study.

Data were collected using the Attitude scale toward aging and elderliness (ASTAE), the validity and reliability study of which was conducted by Otrar (7). This is a self-administered, 5-point Likert-type scale containing four subscales and 45 items. The "difficulty of accepting elderliness" subscale comprises 12 items, the "social exhaustion perception" subscale comprises 15 items, the "difficulty of coping with life" subscale comprises 10 items and the "negative image" subscale comprises eight items. The total score in each subscale is calculated by dividing the sum of all items to the total number of items in the subscale. A higher score in a particular subscale is interpreted as an increase in the characteristic that names the subscale. Higher total scale scores indicate negative attitudes in general, whereas lower total scale scores indicate positive attitudes and perception towards old age (7).

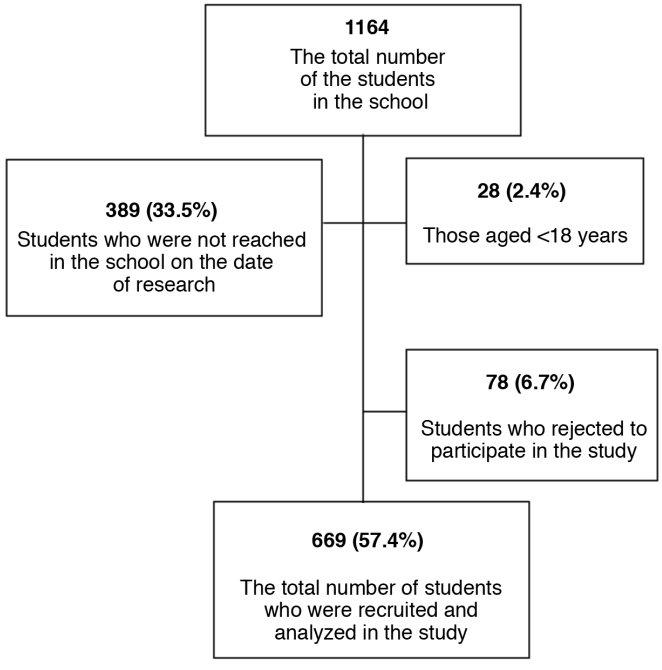

Figure 1. Flowchart showing the derivation of the sample used in this study.

Further, an additional form was prepared to evaluate the personal information of students. This form was used to collect data such as age, gender, monthly income of the family, the presence of a person aged ≥65 years in the family and the state and duration of living in the same house with a person aged ≥65 years.

Data were collected inside the classroom during the hours when students did not have a lecture in October 2018. They were given 10-15 min to fill in the measurement tools, and the filled forms were then collected by the researcher. All students provided informed consent before participation. This study was approved by the Dokuz Eylül University Non-interventional Research Ethics Committee (approval no: 2018: 26-02).

Statistics

Data were evaluated using SPSS for Windows 18.0 software package. Independent samples t-test was used to compare ASTAE scores with gender, the presence of a person aged ≥65 years in the family and duration of living in the same house with a person aged ≥65 years.

Results

Of the participating students, 67.3% were females. The mean age of the students was 19.4±2.1 years. Further, 44.3% of the students had middle income. Among the students, 48.1% of responded "yes" to the question "is there anyone at or above the age of 65 alive in your family?" and 52.6% of the students responded "yes" to the question "did you live in the same house with an older person?"

The total scale and subscale scores of students are presented in Table 1. The lowest score was noted in subscale 2 (social exhaustion perception), and the highest score was noted in subscale 3 (perception of coping with life).

The comparison of the total scale and subscale scores of students according to gender are presented in Table 2. Male and female students achieved similar total scale and subscale scores related to the perception of old age.

The effect of the presence of a person aged ≥65 years in the family on the perception of ageing and old age is presented in

Table 1. Total scale and subscale scores of students (n=669)

	$\bar{X}$	S
Subscale 1 (difficulty of accepting elderliness)	2.78	0.79
Subscale 2 (social exhaustion perception)	2.72	0.58
Subscale 3 (difficulty of coping with life)	3.19	0.73
Subscale 4 (negative image)	2.84	0.66
Total	2.86	0.60

Table 3. There was no statistically significant difference between the groups when students were compared according to their ASTAE scores.

The effect of having lived in the same house with a person aged ≥65 years on the perception of old age and ageing is shown in Table 4. Having lived in the same house with a person aged ≥65 years did not have a significant effect on the perception of old age.

Discussion

This study has been one of the largest studies evaluating the perceptions of university students about ageing and elderliness. Of the participating students, 52% reported that they lived in the same house with an older person for some time in their lives. This rate was 44% in a study of nursing students conducted by Aşiret et al. (8), 41% in a study of VSHS students performed by Yetiş and Gürbüz (1), 45% in a study of social services students reported by Ceylan and Öksüz (9), and 55% in a study of nursing students conducted by Altay and Aydın (10) In another study, Alquwez et al. (11) reported that 17% of the Saudi Arabia nursing students lived together with older peoples at home. The results of the present research were in general consistent with those of other studies reported in Turkey.

In the analysis of ASTAE scores of the 669 students, the total scale and subscale scores indicated that students have a moderate level of perception regarding old age. In a study on university students performed by Dinçer et al. (12), students were found to have, in general, a positive attitude towards the older people. In different studies conducted on nursing and elder care students, students were shown to generally have a positive attitude towards the older people (1,8,13). In a study written by Altay and Aydın (10), students exhibited a positive attitude towards older people discrimination. In a study by Yerli (14), no statistically significant difference was found between positive and negative attitudes of elder care students towards old age, although positive thoughts were more prominent. In a study on nursing students reported by Kulakçı (15), 64% of students responded that they would find it difficult to accept

Table 2. Comparison of the total scale and subscale scores of students according to gender

	Female (n=448) $\bar{X} \pm S$	Male (n=218) $\bar{X} \pm S$	t	p
Subscale 1 (difficulty of accepting elderliness)	2.78±0.76	2.75±0.87	-0.42	0.67
Subscale 2 (social exhaustion perception)	2.71±0.54	2.73±0.66	0.37	0.71
Subscale 3 (difficulty of coping with life)	3.22±0.67	3.12±0.84	-1.53	0.12
Subscale 4 (negative image)	2.84±0.63	2.83±0.75	-0.12	0.91
Total	2.86±0.55	2.84±0.69	-0.45	0.65

Table 3. Comparison of the total scale and subscale scores of students according to the presence of a person aged ≥65 years in the family

	Presence of a person aged ≥65 years in the family			
	Yes (n=322) $\bar{X} \pm S$	No (n=347) $\bar{X} \pm S$	t	p
Subscale 1 (difficulty of accepting elderliness)	2.76±0.78	2.78±0.80	-0.32	0.74
Subscale 2 (social exhaustion perception)	2.71±0.58	2.73±0.58	-0.42	0.67
Subscale 3 (difficulty of coping with life)	3.20±0.72	3.18±0.74	0.24	0.80
Subscale 4 (negative image)	2.83±0.67	2.85±0.66	-0.39	0.69
Total	2.85±0.60	2.86±0.60	-0.27	0.78

Table 4. Comparison of the total scale and subscale scores of students according to living in the same house with a person aged ≥65 years

	Living in the same house with a person aged ≥65 years			
	Yes (n=352) $\bar{X} \pm S$	No (n=317) $\bar{X} \pm S$	t	p
Subscale 1 (difficulty of accepting elderliness)	2.74±0.81	2.80±0.78	-0.92	0.35
Subscale 2 (social exhaustion perception)	2.71±0.60	2.72±0.56	-0.32	0.74
Subscale 3 (difficulty of coping with life)	3.21±0.75	3.16±0.71	0.85	0.39
Subscale 4 (negative image)	2.81±0.68	2.87±0.64	-1.14	0.25
Total	2.85±0.62	2.87±0.58	-0.42	0.67

old age. In the same study, ageing was noted to be regarded as a social problem. Hsu et al. (16) the nurse students in China were shown to have positive attitudes toward older people. Ridgway et al. (17) reported that 75% of participants among the British nursing students had moderately positive attitudes towards older people when the programme began, at the programme end this had increased to 98%. Alquwez et al. (11) cited that the nursing students that have a near contact to the grandparents, have also positive attitudes toward older peoples. Wilson et al. (18) wrote that the medical studens had moderately positive attitudes towards older people. Cheong et al. (19) demonstrated that the medical students in Singapore have a positive attitude towards the older people. Results of the present study are consistent with those of other studies.

There was no statistically significant difference between female and male students in terms of their total scale and subscale scores reflecting their perception regarding old age. In studies conducted on nursing students, elder care students and social services students in Turkey and in different countries, the effects of gender on the perception about old people were analysed. These studies noted that gender has no effect on the perception about older people (20-22). In a study by Şahin (23), gender was shown to have no effect on the attitude towards older people discrimination among university students. Alquwez et al. (11) demonstrated that gender have no effect attitude towards older people. Cheong et al. (19) reported also that gender have no effect attitude towards older people. Liu et al. (24) found on medical students also that gender have no effect attitude towards older people too. Only Hweidi and Al-Obeisat (25) reported that among the nurse students in Jordan that the gender has different attitude towards older people. In a study on final-year students of the Social Services Department of the New South Wales University in Wales conducted by Heycox and Hughes (26), although the attitude of students towards the older people was reported to be moderate, female students had more favourable attitude towards the older people than male students. Results of the present study are consistent with those of other studies.

The presence of a person aged ≥65 years in the family and having lived with an older person in the same house during a certain period of life had no significant effect on the perception about ageing and old age. Living with an older person had no effect on the perception of old age and ageing in a study by Abreu and Caldevilla (20) that compared students who live with an older person with those who do not live. Having lived with an older person was shown to have no effect on the total score in elderly discrimination in a study by Altay and Aydın (10). In the study by Aşiret et al. (8), having lived with an older person was shown to have no effect on the attitude towards the older people. In a study by Ceylan and Öksüz (9), no significant difference was found among the participating students in terms of living in the same house with an older person or people. In a study on nursing students conducted by Lambrinou et al. (27) to evaluate the attitudes of students towards the older people in Greece, having an older person in the family and living together with an older person was shown to not affect the attitudes of students towards the older people. Kim et al. (28) pointed out in a research from South Korea that the living together with older people had no effect on attitude towards older people. Results of the present study are also in accord with those of similar studies.

According to the results of the present study, VSHS students have a moderate level of perception about ageing and old age. It was considered that the students have not yet developed either a positive or negative perception about old age because the majority of students were at the beginning of their lives and had not yet started their professional careers. Having yet to enter the adulthood period of their lives may have directed them to be concerned more about the responsibilities of an adult, such as finding a job, starting a job, choosing a partner and serving in the army, instead of thinking about old age.

Study Limitations

This study has several limitations. First of all, it has been conducted only on students in VSHS, therefore, the results could not be generalised for the whole population but the new generation are in close contact with social media over the world. In addition, young age of the participants may have also caused them to view ageing as a too-distant-future.

Conclusion

Students being indecisive about old people and their inexperience may have affected the moderate level of perception about ageing among them in the present study. Considering the rapidly ageing population in Turkey as well as worldwide, it is important that healthcare technicians develop positive perceptions about old age and ageing. Therefore, it is important to include lectures on ageing in the syllabus for healthcare technicians. This will enable students in the young adulthood stage of their lives to provide more effective care after graduation to the older people who are at the final stage of their lives.

Ethics

Ethics Committee Approval: This study was approved by the Dokuz Eylül University Non-interventional Research Ethics Committee (approval no: 2018: 26-02).

Informed Consent: Informed consent was obtained from the patients.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: S.Y., Design: K.Y., Data Collection or Processing: S.Y., Analysis or Interpretation: K.Y., Literature Search: S.Y., Writing: S.Y.

Conflict of Interest: No conflict of interest was declared by the authors.

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ORIGINAL RESEARCH

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What is Geriatrics? Geriatrics or Older Adults Health and Diseases?

İbrahim Halil Türkbeyler[1], Zeynel Abidin Öztürk[2], Mehmet Göl[3], Azer Abiyev[4], Bünyamin Kaya[4], Selman Atakur[4], Mehmet Öz[4]

[1]Dr. Ersin Arslan Training and Research Hospital, Clinic of Internal Medicine, Division of Geriatrics, Gaziantep, Turkey
[2]Gaziantep University Faculty of Medicine, Department of Internal Medicine, Division of Geriatric Medicine, Gaziantep, Turkey
[3]Gaziantep University Faculty of Medicine, Department of Physiology, Gaziantep, Turkey
[4]Gaziantep University Faculty of Medicine, Department of Internal Medicine, Gaziantep, Turkey

Abstract

Objective: To determine awareness of "geriatrics" among elderly patients and reveal which expression is preferred, ''older adults's health and diseases'' or ''geriatrics'' as a term.

Materials and Methods: This study was conducted with 479 patients, admitted to a university hospital. Each participant was asked to respond to 11 questions.

Results: The mean age of the participants was 39.30±15.30 years, 40.7% of them were men. Twenty-eight percent stated that they knew what the geriatrics was. Only 13.2% of them satisfactorily defined it. Nine-point-six percent of them stated that they were thinking geriatrics was an illness, 2.3% -a brand name of a drug, 0.6% - a TV cliff-hanger, 0.6% -a car brand, 0.4% -a city, 0.4% -a country name, 0.4% -one of the organs in the body and 0.4% -a film star. After explaining the "geriatrics" to the patients who did not know or could not know the correct meaning, 75.4% of all patients declared that the 'older adult's health and diseases' was more favorable to describe geriatric medicine.

Conclusion: The patients had a low awareness level about geriatrics. Most of the patients preferred to use the term ''older adult's health and diseases'' instead of, ''geriatrics''. If we used ''older adult's health and diseases' more frequently in conjunction with ''geriatrics'' over the course of public disclosure efforts, we could get a better public awareness of geriatrics.

Keywords: Geriatrics, older adult, health, diseases

Introduction

Older adults' population has been steadily increasing in percentage during recent decades. It is also estimated that Turkey will be among those countries characterized as having a huge older adults' population as high as more than 10% by the United Nations (1). Advances in treatment of diseases and public health in the last century has led to a spectacular increase in life expectancy, a decrease in the birth rate, alterations in age pyramids and a prognosticative increase in ratio of older adults' population worldwide (2).

Geriatrics refers to a branch of medicine focusing on management of health status and treatment of diseases in the older adults' population. In fact, it is referred to as science of the elderliness and regarded to aim at presenting comprehensive doctrines to promote well-being of older adults (3). As for the geriatrics in medicine, it is a discipline which is interested in maintaining of a high quality of life in the old age without being detached from the society, protection and enhancement of current health and functional status and providing effective therapeutic applications based on multidimensional assessments (4).

A geriatrics center clinic is available in a limited number of healthcare institutions in Turkey. There are a total of 41 different centers, private and public, in Turkey; 11 in İstanbul and Ankara, two in each of İzmir, Adana, Gaziantep, Kayseri, Erzurum, Bursa,

Address for Correspondence: İbrahim Halil Türkbeyler, Dr. Ersin Arslan Training and Research Hospital, Clinic of Internal Medicine, Division of Geriatrics, Gaziantep, Turkey
E-mail: ihturkbeyler@gmail.com **ORCID:** orcid.org/0000-0001-6588-5645
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Antalya, Konya, Mersin, Diyarbakır, Eskişehir, Malatya, Isparta and Kırıkkale. It is a genuine requisite to make the geriatrics clinics, serve for protection, promotion of health status and treatment of the older adults only in a limited number of institutions, more familiar and accessible in society.

In this study, awareness level of the patients about the geriatrics and how much of the patients prefer to use the statement of the (like analogy existing between the title of the ''pediatrics'' and the statement of the ''child health and diseases'') 'older adult's health and diseases' instead of the ''geriatrics'' for designation of the department were investigated.

Materials and Methods

Selection of the Participating Patients

This study, as a descriptive and cross-sectional survey, was conducted between January to November in 2015. The study population consisted of the patients admitted to the internal medicine outpatient clinics of Gaziantep University Medical Faculty Hospital. A total of randomly selected 479 patients were involved. Initially, each patient individually was asked whether he willingly wanted to participate in the survey or not. Each patient who was called and accepted to participate in the study was included in the study. Ethical approval was obtained from Ethics Committee of the Gaziantep University Medical Faculty Hospital (approval no: 02/04/2013-134). All the participant patients consented.

Questionnaire Form

The questionnaire form was composed of two parts. In the first part, there were eight questions posed to inquire about gender, age, educational status, occupation, monthly income, marital status, residence and chronic diseases (diabetes mellitus, hypertension, hyperlipidemia, chronic infectious diseases, oncological and neurological diseases etc.). The patients were categorized into three groups which were low-, middle- or high-incomers. The patients with a monthly income lower than minimum wage were defined as having low-income level, those with a monthly income level up to a double minimum wage were appraised as being in a middle-income level range and the patients who had even more monthly income were classified as high-income earners. In the second part, all patients were asked the question of "what is geriatrics?" The meaning of ''geriatrics'', literally a branch of medical science deals with older adult's health and diseases, was explained to patients who declared that they knew what the ''geriatrics'' was, but indeed who misknew it. Next, the question, "to designate the department, which of the following would you like to use, ''older adult's health and diseases'' as a statement or ''geriatrics' as a title?" was posed to each patient.

Statistics

The resultant data was analyzed with SPSS 20.0 (SPSS Inc., Chicago, Illinois, USA) software. The descriptive statistics were presented as mean ± standard deviation (SD). Independent two sample groups were compared to each other by using the Student's t-test. The chi-squared test was applied to analyze categorical variables. Two sided values of $p<0.05$ were considered of statistically significance.

Results

The mean age of the patients in the survey was 39.3±15.3 and 59.3% (n=284) of them were women. While 31.4% (n=150) had a bachelor's degree, 12.4% (n=59) were illiterate. Eighty-nine point four percent (n=428) of the patients were living in a city and 39.4% (n=189) in a low-income level range. The most common diseases were diabetes mellitus (33.2%), hypertension (25.1%) and hyperlipidemia (13.4%) respectively. The detailed socio-demographic attributes were depicted in Table 1.

Twenty-eight percent (n=134) of the patients were declared that they knew what the ''geriatrics'' is. However, only 13.2% (n=63) of them satisfactorily defined the geriatrics as a medical department dealing with older adult's health and diseases. But then, it was corroborated that the remaining had some wrong information about the geriatrics. Nine-point-six (n=46) of them were considering the geriatrics as an illness, 2.3% (n=11) as a brand name of a drug, 0.6% (n=3) as a cliffhanger on tv, 0.6% (n=3) as a car brand, 0.4% (n=2) as a city, 0.4% (n=2) as a country name, 0.4% (n=2) as being one of the organs in the body and 0.4% (n=2) as a film star (Table 2). Where the patients who properly told the meaning of the ''geriatrics'' (13.2%), acquired the knowledge about it from was also explored. 52.3% (n=33) asserted that they had first acquainted with the ''geriatrics'' in hospitals, 17.4% (n=11) through relatives, 6.3% (n=4) through media and as to the remaining 24% (n=15), they declared other options as a source of knowledge.

When the patients were classified according to the educational level, the awareness level about the geriatrics was conspicuously the highest in two groups, the bachelor's degree and high school graduate, respectively 21.3% and 14.3% of whom properly knew exact meaning of the geriatrics. The higher educational level among the patients in the survey, the more sophisticated awareness about the geriatrics was encountered ($p<0.015$). When the patients were classified according to the occupation, the awareness level about the geriatrics was conspicuously the highest in two groups, the officers and the students, respectively 19.6% and 18.9% of whom properly knew exact meaning of the ''geriatrics'' ($p<0.036$). There was also a significant difference in terms of awareness level between the patients having at least one chronic disease or not ($p<0.05$). A higher awareness level was observed among the patients in a high-income level

range (p<0.001). There was no marked difference according the gender (p>0.05) (Table 3).

After explaining what the "geriatrics" is to the patients who were not able to approximate the correct meaning or had never heard of it before, which of the following they would prefer to use for designation of the department, the descriptive statement of the "older adult's health and diseases" or the title of the "geriatrics", was asked to all patients. While 24.6% (n=118) of them preferred to use the title, 75.4% (n=361) preferred the statement. It was also detected that the higher the level of income among the patients, the more frequently they preferred to use the title (p=0.046). There was no marked difference in terms of preference, the statement or the title, when the patient groups compared to each other according to educational level, occupation or residence (p>0.05).

Discussion

The geriatrics, as a discipline, should be made more familiar in society and prevalent in health institutions to improve health status of the older adults. In this survey study, 86.8% of the patients did not know what the geriatrics is. After the "geriatrics" was elucidated to patients who had some wrong convictions about it or did not know it at all, which one they would like to use for designation of the geriatric departments, the statement of the "older adult's health and diseases" or the title of the "geriatrics" was asked to the patients and it was seen that most patients (75.4%) chose to use the statement.

The "geriatrics", as a term, was reproduced from the "geronte", a group of mature men over the 60 years, who formed the legislative assembly (Gerousia) of Athens. French physicians had antecedently put the phrase "gerocomie"—a term used to imply the requirement of imaginative facilities for older adults—into the medical jargon that corresponds to the institutions in where the older adults could be adequately cared for and treated (5). One of the first articles about the geriatric medicine was "Diseases of Advanced Life", published in 1849 by George Day (6,7). In 1881, Charcot was the first physician to set forth that the geriatric medicine should be a medical specialty, based upon his observations of a residential aged care facility in Paris (8).

Notwithstanding those olden consideration we mentioned; it was only able to be plausible to conceive of a modern geriatrics following launching of the word "geriatrics" by Nascher (9). Nascher (9) was born in Vienna, 1863. He became a pharmacist in 1882 and was qualified as a medical doctor by New York University in 1885. Nascher (9) published two articles covering a prospectively brand-new view regarding the aging and age-related diseases in New York Medical Journal in 1909. He exactly composed, "geriatrics, from geras, old age and iatrikos, relating to the physician, is a term I would suggest as an addition to our vocabulary to cover the same field that is covered in old age that is covered by the term pediatrics in childhood, to emphasize

Table 1. Socio-demographic attributes of the patients

	n=479
Age	39.30±15.30
Gender (%)	
Female/Male	59.3/40.7
Educational level (%)	
Uneducated	12.6 (n=60)
Primary school graduate	26.5 (n=127)
Secondary school graduate	7.7 (n=37)
High school graduate	21.9 (n=105)
University	31.3 (n=150)
Occupation (%)	
Unemployed	4 (n=19)
Farmer	4 (n=19)
Retiree	9 (n=43)
Self-employment	25.7 (n=123)
Officer	27.5 (n=132)
Student	29.8 (n=143)
Residence (%)	
Urban	89.4 (n=428)
Rural	10.6 (n=51)
Presence of any chronic disease (%)	40.3 (n=193)
How much percent of the patients accurately know the geriatrics? (%)	13.2 (n=63)

Table 2. Answers to the question, what is the geriatrics?

	n=479
Do you know what the "geriatrics" is?	
Yes	28% (n=134)
Elderly Health and Diseases	13.2% (n=63) (answer correctly)
Incorrect answer	14.8% (n=71)
Division of the remaining patients who said that they knew the meaning but couldn't know the correct meaning	
An illness	9.6% (n=46)
A brand name of a drug	2.3% (n=11)
A cliffhanger on tv	0.6% (n=3)
A car brand	0.6% (n=3)
A city	0.4% (n=2)
A country	0.4% (n=2)
One of the organs in the body	0.4% (n=2)
A film star	0.4% (n=2)

the necessity of considering senility and its disease apart from maturity and to assign it a separate place in medicine." in 1909. As a contribution to the terminology, he suggested that the term "geriatrics" would be used to represent "medicine branch dealing with diseases and care of older adults", as in the case of "pediatrics" representing "medicine branch dealing with childhood diseases and health". He referred to the term "pediatrics", previously assigned one, meaning the medicine of the childhood, and offered to use the term "geriatrics" in an identical manner.

In the last century, both the geriatrics and gerontology disciplines increased and made significant progresses particularly in the last 10-20 year period of the century. The geriatrics clinics have been serving yet in only a few university hospitals or healthcare institutions in our country. Although much more clinics than we now have are urgently required to adequately reach the older adults in need, supply ample amount of medical cases for education of medical students and health care professionals and train the staff to be employed in geriatrics clinics or services, it is gladsome that new geriatric departments and clinics under auspices of the internal medicine departments are slowly but surely sprouting around the country day by day.

Table 3. The frequency of correct answer to the question, what is the geriatrics? and socio-economic attributes

How much percent properly know the geriatrics?	(%) (n=63)	p
Education		
Uneducated	3.2 (n=2)	p=0.015
Primary school	5.5 (n=7)	
Secondary school	13.5 (n=5)	
High school	14.3 (n=15)	
University	21.3 (n=32)	
Occupation		
Self-employment	4.9 (n=6)	p=0.036
Unemployed	5.3 (n=1)	
Retiree	7 (n=3)	
Officer	18.9 (n=25)	
Student	19.6 (n=28)	
Income level		
Low	8.7 (n=18)	p>0.05
Middle	10 (n=22)	
High	36.5 (n=23)	
Residence		
Urban	13.1 (n=56)	p>0.05
Rural	13.7 (n=7)	

The physicians, specialized in any branch of medicine, obviously will encounter older adult patients in the future because of structural alterations in population pyramids. Evaluation, examination, follow-up or nursing of the older adults requires certain exclusive aspects of medical knowledge and skills which are supposed to have been gorgeously grasped by the physicians or any other health care professionals occupying with the older adults (10). Therefore, it is considered that relaying of those medical aspects to the medical students help us conquer the common fear of examining older adults, overcome the difficulties and reduce mistakes in patient diagnosis and treatment. Implantation of a "geriatric insight" into the medical education would also encourage young doctors to become a geriatrist.

Also, the geriatrics, as a discipline, should be made more familiar in society and prevalent in health institutions to improve health status of the older adults. In this survey study, 86.3% of the patients did not know what the geriatrics is. In one of the previous studies, Kızılarslanoğlu et al. (11) determined the level of awareness about the geriatrics at 11.6%, which is close to the level we reached in our survey. After the "geriatrics" was elucidated to patients who had some wrong convictions about it or did not know it at all, which one they would like to use for designation of the geriatric departments, the statement of the "older adult's health and diseases" or the title of the "geriatrics" was asked to the patients and it was seen that most patients (75.4%) chose to use the statement. The preferences of the patients did not differ according to the educational level, occupational status or residence of the patients. However, the higher income level, the more frequently encountered preference was the title of the "geriatrics".

A key strength of this study is; before our study only one study. Kızılarslanoğlu et al. (11) determined the awareness level about the geriatrics. Another strong aspect of its design is its large sample size.

Conclusion

A very low awareness level about the geriatrics among the patients was encountered in our survey. In addition, most of the patients preferred to use the statement, "older adult's health and diseases" instead of the title, the "geriatrics". As it is formerly mentioned, Nascher (9) suggested that the title of the "geriatrics" should be used for discipline dealing with older adult's health and diseases, like analogy existing between the title of the "pediatrics" and the statement of the "child health and diseases". In our country, awareness level about the geriatrics is very low in society regardless of age, gender or educational level. Even though the "geriatrics" as a title, defining the department is used internationally, it has not accomplished to have been very well-known in Turkey, through recent years. So, it might be

more plausible to use the descriptive statement, ''older adults health and diseases'' in conjunction with the title ''geriatrics'' as it is the case for ''child health and diseases'' which has used to take part in medical jargon since many years, instead of or in conjunction with the title ''pediatrics''. To say the least, if we used that descriptive statement more frequently in conjunction with the title over the course of public disclosure efforts, we would get a better awareness of society about geriatrics in society.

Ethics

Ethics Committee Approval: Ethical approval was obtained from Ethics Committee of the Gaziantep University Medical Faculty Hospital (approval no: 02/04/2013-134).

Informed Consent: Informed consent was obtained all of the patients.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: Z.A.Ö., Design: Z.A.Ö., Data Collection or Processing: A.A., Analysis or Interpretation: İ.H.T., Literature Search: M.Ö., Writing: M.G.

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ORIGINAL RESEARCH

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Polypharmacy and Related Factors in Geriatric Outpatients

Pınar Küçükdağlı

İstanbul University İstanbul Faculty of Medicine, Department of Internal Medicine, Division of Geriatrics, İstanbul, Turkey

Abstract

Objective: The term "polypharmacy" is defined as the usage of multiple medications or more medications than are clinically indicated. Older people tend to have several chronic diseases and prescriptions for these conditions. Polypharmacy is associated with significant consequences such as adverse drug reactions, medication nonadherence, drug-drug and drug-disease interactions, and increased risk of geriatric syndromes. The purpose of the present study was to evaluate the relationship between polypharmacy and common geriatric syndromes.

Materials and Methods: Three-hundred individuals ≥60 years of age admitted to İstanbul Faculty of Medicine, Department of Geriatrics outpatient clinic between 2013-2016 were recruited to the study. Patients' data about the number of prescribed drugs, falls (in the preceding year), urinary incontinence, constipation, presence of malnutrition, sleep disorders and functionality were noted. Polypharmacy was defined as the usage of four or more medications.

Results: The study was consisted of 198 (66.8%) women and 102 (33.2%) men with mean age of 76.5±6.7 years. The prevalence of polypharmacy was 82.7%. Univariate and multivariate analysis were performed to examine the relationship between polypharmacy and other geriatric syndromes. In regression analysis, polypharmacy was found to be independently associated with sleep disorders [Odds ratio (OR): 2.21, 95% Confidence interval (CI): 1.15-4.24, p=0.016] and urinary incontinence (OR: 2.53, 95% CI: 1.21-5.27, p=0.013).

Conclusion: Polypharmacy is an important health problem among older adults, which is frequently associated with inappropriate medication use, increased risk of adverse drug reactions, and poor health outcomes. In this study, sleep disorders and urinary incontinence were found to be independently associated with polypharmacy. Clinicians should consider polypharmacy and related risks when prescribing medications for older adults.

Keywords: Polypharmacy, urinary incontinence, sleep disorders

Introduction

Polypharmacy, which is defined as the usage of multiple medications or more medications than clinically necessary, is a common health problem for older adults. Although there is no standard cut-off number of medications for the polypharmacy; it can be defined as the use of four or more medications (1).

Another definition is the administration of more medications than clinically indicated. Related to this definition, drugs not indicated for use, therapeutic duplications of medication should be considered as polypharmacy. Elderly population, represent nearly 42 million around the worldwide making up the 13.3% of total population, are receiving more than 50% of all prescribed medications.

The number of drugs increases in relation to the multiple chronic conditions; such as diabetes mellitus, hypertension, chronic obstructive disease and heart failure. Polypharmacy is often required and appropriate in these cases.

Impaired function of organs and systems; such as heart, kidney, liver and stomach and adverse effects of drug metabolism appear with advancing age. Due to the changes in pharmacokinetic and pharmacodynamics of many drugs, the risk of adverse drug reactions increases. Response to drugs due to drug absorption, body distribution, metabolism, excretion and changes in receptor level show differences in elderly individuals. The prevelance of polypharmacy in the literature, ranges 5% to 78%, in relation to different definitions (2-5). Polypharmacy generally occurs due to demographic and health factors, and access to healthcare.

Address for Correspondence: Pınar Küçükdağlı, İstanbul University Faculty of Medicine, Department of Internal Medicine, Division of Geriatrics, İstanbul, Turkey
Phone: +90 543 436 90 90 **E-mail:** pinarkucukdagli@hotmail.com **ORCID:** orcid.org/0000-0002-3632-8281
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Unfortunately, there are many negative outcomes; such as high expenses on healthcare, adverse drug events, drug-drug interactions, the increase at the risks of inappropriate medications, non-adherence to medication and geriatric syndromes associated with polypharmacy (6).

World Health Organization defined adverse drug events as "Unintended and undesired effects of a medication at a normal dose" and classified into five categories as adverse drug reaction, medication error, therapeutic failure, drug withdrawal and overdose (7-9).

In this study we aimed to examine the relationship between polypharmacy and common geriatric syndromes including falls, functionality, constipation, urinary incontinence, sleep disorders and malnutrition.

Materials and Methods

Three-hundred individuals ≥60 years of age admitted to İstanbul University Faculty of Medicine, Department of Geriatrics outpatient clinic between 2013-2016 were included to the study. Patients' data on admission about the number of prescribed drugs, falls (in the preceding year), urinary incontinence, constipation, presence of malnutrition, sleep disorders, and functionality were evaluated by a geriatrician. Polypharmacy was defined as the use of four and more medications. Malnutrition was assessed by MNA-sf.

Presence of urinary incontinence, was defined as the unintentional loss of urine in the preceding year. Katz et al. (10) activities of daily living (ADL) scores and Lawton instrumental ADL (IADL) scores (11) were used to assess functionality. Patients were asked whether they have difficulty in sleeping; falling or staying asleep through the night. Insomnia is defined by a positive response to either question (12). Rapid eye movement behavior disorder was defined as clinically violent behaviour occuring during the night: sleep talking, vivid dreams, shouting, screaming, hitting or punching.

Patients were questioned about the presence of whitnessed sleep apnea, snoring, sweating, excessive daytime sleepiness or whether they had received a diagnosis of obstructive sleep apnea before. A simple questionnaire was used to define restless legs syndome (13). For ADL scores patients who got 6 points considered as dependent; and who got 18 points as independent; for IADL scores patients who got 8 points considered as dependent, and 24 points represented total independency. Constipation was defined as symptom based; combination of fewer than 3 stools per week, hard or lumpy form of stool, difficult stool passage for more than 6 month (14). The study protocol was approved by the İstanbul University Faculty of Medicine Ethics Committee on June 28, 2018 (number: 956).

Statistics

Variables were assessed whether normally distributed or not. Normally distributed numerical variables were presented as mean ± standard deviation and non-normally (skewed) distributed variables were presented as median (minimum-maximum). Frequencies were used to present categorical variables. For two groups comparison we used independent Sample t-test or Mann-Whitney U test. Correlations between categorical variables were analyzed with chi-square test. Pearson's or Spearman's rho correlation tests were used to analyze the correlation of numerical parameters. P values less than 0.05 were accepted as statistically significant. We used Binary logistic regression models to investigate the relationship between variables and SPSS (statistical package for social sciences) version 21 program for statistical analysis.

Results

Among the three-hundred enrolled individuals, 198 (66%) were women and 102 (34%) were men. The mean age of the study population was 76.5±6.7 (median 77) years, the mean number of chronic diseases was 4.19±2.1 (median 4) and the mean number of medications was 7±2 (median 7). The prevelance of four and more drug use was 82.7%. The population of the study was tend to be more independent. The characteristics of study population are shown in Table 1.

Polypharmacy was found not to be associated with age or sex. Dependency in functionality (for ADL p=023/for IADL p=0.045), malnutrition (p<0.001), urinary incontinence (p=0.009), sleep disorders (p=0.021) and falls (p=0.028) were associated with polypharmacy.

In multivariate analysis, sleep disorders [Odds ratio (OR): 2.21, 95% Confidence interval (CI): 1.15-4.24, p=0.016] and urinary incontinence (OR: 2.53, 95% CI: 1.21-5.27, p=0.013) were independently associated with polypharmacy. Univariate and multivariate analysis' results are demonstrated in Table 2 and Table 3.

Discussion

The present study showed that, about 82% of patients have polypharmacy when we consider polypharmacy as the usage of four or more medications. The prevalence of polypharmacy varied between 5% and 78% in other studies reported from other countries (2-5). The heterogeneity in polypharmacy prevalence seems to be dependent on the development level of countries and the cut-off numbers of medications accepted as polypharmacy (6,15,16). In this study; polypharmacy was not associated with age or sex.

Polypharmacy was independently associated with sleep disorders and the presence of urinary incontinence.

Sleep disorders are common among older adults, because the aging process is associated with an increased risk of multimorbidity, polypharmacy, and psychosocial factors influencing sleep cycle. It is also associated with morbidity and mortality. In older adults using activating medications; insomnia symptoms are common. On the other hand, because of sedating medications, chronic illnesses or sleep apnea, patients may suffer from daytime drowsiness (17,18).

Several medications commonly used in older patients, have various effects on sleep periods through multiple mechanisms. Antihistamines, anticholinergics and anticonvulsants, opiates are known to cause daytime drowsiness. Medications can have activating or stimulating effects on older adults, such as pseudoephedrine, beta agonists, corticosteroids, antidepressants or methylphenidate. Antidepressants can worsen restless leg syndrome and periodic limb movement symptoms, while opiates or benzodiazepins are known to exacerbate sleep disordered breathing.

Polypharmacy causes insomnia with a cascade effect like; many medications in relation to sleep disturbance and as a result of more medications required and prescribed (19,20).

In a recent study, in 379 older patients, insomnia was found in 43% (n=163) and the mean number of medications was 9.2. No significant relation was found between insomnia and polypharmacy (21). In a study examining the association between the number and dosage of antipsychotic medications and sleep disorders, they found that the increased dosages of antipsychotics were associated with better sleep, although these medications were only associated with a relatively small amount of the variance in sleep quality.

Additionally, sleep complaints remained persistent in 70% of patients.

These results suggested that the use of antipsychotic medications have limited efficacy as a treatment option for sleep dysfunctions (22). In a recent study, aiming to evaluate the effects of the number of medications on the sleep periods, results showed that the number of medications had not effect on total sleep time but affected the sleep cycle negatively (23).

Urinary incontinence is one of the most common geriatric syndromes that is associated with the use of multiple medications and poor quality of life. Lower urinary tract symptoms increase with aging in both men and women, and constitute poor outcomes in older patients due to multiple medical and psychosocial conditions. Nuotio et al. (24) found that polypharmacy was associated with the increased risk of lower urinary tract symptoms in women aged 70 years or older.

Table 1. The characteristics of the study population

	Total	Polypharmacy	No Polypharmacy
Age (years)	76.5±6.7	78±5.8	77.4±6.6
Sex			
Female (%)	198 (66)	164 (82.2)	34 (17)
Male (%)	102 (34)	82 (80)	18 (17)
Disease (chronic)	4.2±2.1	4.6±1.83	7±1.9
Functionality (ADL/IADL)			
ADL			
0-6 (Dependent)	1 (0.3)	1 (0.3)	0 (0.0)
13-18 (Independent)	292 (97)	242 (80)	50 (17)
IADL			
0-8 (Dependent)	9 (0.3)	8 (0.2)	1 (0.3)
17-24 (Independent)	243 (81)	198 (66)	45 (15)
Nutrition (MNA-sf)			
0-7 (Malnutrition)	14 (4.6)	12 (4)	2 (0.6)
>11 (Normal)	223 (74)	179 (59)	44 (14)
Urinary incontinence	140 (47)	124 (42)	16 (5.4)
Falls	117 (39)	104 (34)	13 (4.3)
Constipation	77 (26)	68 (23)	9 (3)
Sleep disorders	141 (47)	124 (42)	17 (5.7)

"mean ± standart deviation, number (%)"
ADL: Activities of daily living, IADL: Instrumental activities of daily living, MNA-sf: Mini Nutritional Assessment short form

Table 2. Univariate analyses for the association of study variables and polypharmacy

	p	OR	CI 95%
Gender	1.0	1.03	0.55-1.93
Age	0.185	1.02	0.97-1.06
Falls	0.028	2.16	1.10-4.26
Urinary incontinence	0.009	2.34	1.23-4.44
Sleep disorders	0.021	2.14	1.14-4.03
Malnutrition	<0.001	0.78	0.64-0.95
Constipation	0.123	1.86	0.86-4.03
ADL	0.023	0.95	0.88-1.02
IADL	0.045	0.87	0.67-1.12

ADL: Activities of daily living, IADL: Instrumental activities of daily living, OR: Odds ratio, CI: Confidence interval

Table 3. Multivariate analysis for factors associated with polypharmacy

	p	OR	CI %95
Sleep disorders	0.016	2.217	1.157-4.248
Urinary incontinence	0.013	2.535	1.218-5.278

*Variables entered falls, malnutrition ADL, urinary incontinence, sleep disorders
ADL: Activities of daily living, OR: Odds ratio, CI: Confidence interval

Many drugs are known to increase the risk of urinary incontinence and exacerbate the urinary tract symptoms such as diuretics, angiotensin converting enzymes, anticholinergics, opiates and calcium channel blockers. Clinicians should perform a medication review to evaluate the specific types and the number of medications (25).

In a recent study, examining the relationship between other geriatric syndromes and urinary incontinence; they found that mobility decline, polypharmacy, and pain were associated with urinary incontinence in both men and women. Delirium and fecal incontinence were associated with urinary incontinence in men, and cognitive impairment was significantly associated with urinary incontinence in women (26).

In a study evaluating the frequency of drugs that can exacerbate incontinence, prevalence of polypharmacy and adverse drug events in female patients with overactive bladder; researchers showed that 57% of the patients were using at least one drug that could exacerbate urinary incontinence. The prevalence of polypharmacy was 38%, while 45% of the patients had drug-drug interactions that can disrupt the quality of life (27).

Study Limitations

The present study had some limitations. This is a retrospective study that contains no follow up data, and thus reveals no cause-effect relationship between polypharmacy and geriatric syndromes. The diagnosis of sleep disorders was based on a questionnaire and clinical suspicion; we did not any further evaluation. This study composed of community-dwelling outpatients' single center data; therefore the results can not be generalized.

However, this study also has some strengths. The total sample size was relatively large and patients were selected randomly from a large group of outpatients.

Conclusion

In this study, polypharmacy was independently associated with sleep disorders and urinary incontinence. These results indicated that patients, who suffered from sleep disorders and urinary incontinence, should be considered carefully in terms of the use of multiple medications. Healthcare practitioners should identify polypharmacy and patients at high risk for adverse outcomes associated with polypharmacy.

Ethics

Ethics Committee Approval: The study protocol was approved by the İstanbul University Faculty of Medicine Ethics Committee on June 28, 2018 (number: 956).

Informed Consent: This study is a retrospective study. Therefore, informed consent form was not taken.

Peer-review: Externally peer-reviewed.

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ORIGINAL RESEARCH

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Muscle Strength, Sarcopenia and Frailty Associations with Balance and Gait Parameters: A Cross-sectional Study

Mateu Serra-Prat, Elisabet Palomera

Consorci Sanitari del Maresme Research Unit, Mataró Hospital, Clinic of Geriatrics, Mataró, Spain

Abstract

Objective: While sarcopenia and frailty may lead to gait and balance impairments, their impact on these parameters is not well understood. To assess the relationship of some gait and balance parameters with sarcopenia and frailty in community-dwelling elderly people.

Materials and Methods: Observational cross-sectional study of community-dwelling people ≥70 years old. Frailty and sarcopenia were defined according to Fried criteria and the criteria of the European Working Group on Sarcopenia in Older People, respectively. Balance and gait assessments included the single-leg stand test, static posturography using a force platform and static and dynamic baropodometric studies of pressures from the soles of the feet.

Results: Sixty-two patients (mean age=78 years; 50% women) were recruited, 21% and 14% of whom were frail and with sarcopenia, respectively. Poor muscle strength, sarcopenia and frailty were associated with incapacity to stand on one foot for 5 seconds but not with instrumental balance assessments. Poor muscle strength and frailty were associated with longer support time, longer double support time, shorter gait and slower gait but were not associated with gait cadence. After adjusting for age and other possible confounders, the effect of frailty, but not the effect of poor muscle strength, on gait parameters disappeared. Frailty and falls were associated with a crude odds ratio of 3.4 (p=0.083).

Conclusion: Poor muscle strength and frailty are associated with incipient balance disorders (indicating an increased risk of falls), and with gait adaptations.

Keywords: Sarcopenia, frailty, muscle strength, balance, gait

Introduction

Walking is a typical aspect of daily living and probably the human activity with the highest impact on individual functional autonomy. This complex motor behaviour involves approximately 1000 muscles, 200 bones, 100 joints and the interaction of the motor, sensory and cognitive systems (1). In aged populations, walking performance decreases mainly due to muscle strength loss and adaptations such as shorter gait and greater gait width, which may define a senile walking pattern (2). The prevalence of gait alterations increases with age; while 15% of people aged 60 years present abnormal walking characteristics, this percentage increases to 80% in people aged 85 years and older (3). The postural system integrates afferent information from the ears, eyes and joints in the central nervous system (CNS) to elaborate a motor response that maintains body balance and avoids both standing and walking falls. Changes in the CNS, vestibular, visual and attention dysfunctions and loss of muscle strength with age have all been associated with balance impairments in aged populations (2,4,5). These gait and balance impairments may have severe consequences, including falls, fractures, immobility, disability or institutionalization, and may also indicate underlying diseases (6).

Loss of muscle mass and strength are closely associated with exhaustion, poor physical activity and slower gait speed, all of which are components of the frailty syndrome (7). Frailty has been defined as a state of increased vulnerability to stressors due to age-related declines in physiological reserves across neuromuscular, metabolic and immune systems (8). Balance and gait impairments may be an expression of frailty given the characteristic muscular weakness associated with this geriatric

Address for Correspondence: Mateu Serra-Prat, Consorci Sanitari del Maresme Research Unit, Mataró Hospital, Clinic of Geriatrics, Mataró, Spain
Phone: +34 93 741 77 30 **E-mail:** mserra@csdm.cat **ORCID:** orcid.org/0000-0002-6554-9913
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syndrome. Sarcopenia and frailty are suspected to play a role in the development of gait and balance impairments, but their impact on specific parameters is not well understood.

The aim of this study was to assess the relationship between certain gait/balance parameters and sarcopenia and frailty in community-dwelling elderly patients.

Materials and Methods

Design and Population

An observational cross-sectional study was performed. Study population included community-dwelling patients aged 70 years and older. Participants that fulfilled all selection criteria and gave their informed consent in writing were recruited from outpatients visiting the Hospital of Mataró (Barcelona, Spain) from January 2013 to January 2014. Candidates were excluded if they had anyone of the following clinical conditions: life expectancy less than 3 months, dementia, severe psychiatric disorders or an inability to stand and walk. This was considered a pilot study that sought to recruit 60 subjects. The study protocol was approved by the Local Ethics Committee (exp. CEIC CSdM 49/13).

Sarcopenia and Frailty Definitions

Patients were classified as frail if they met three or more of the following five criteria (7): unintentional weight loss, exhaustion, low physical activity, slow walking speed and poor grip strength. Sarcopenia was defined according to European Working Group on Sarcopenia in Older People [EWGSOP) criteria (9): a decrease in muscle mass (< mean-1 standard deviation of the reference population] accompanied by a decrease in walking speed (≤0.8 m/s) or in muscle grip strength (17 kg for women and 30 kg for men). Muscle mass was assessed by bioimpedance analysis (Bioelectrical Impedance Analyser, EFG3 Electofluidgraph, Akern SRL), which determines fat mass, lean mass and muscle mass in kilogrammes and as a percentage of total body weight. Used as a measure of muscle strength was hand grip, assessed by a handheld JAMA dynamometer. Of three measurements made for each participant the highest value was used for this study. Patients were also asked directly about the numbers of falls experienced by them in the last 3 months.

Balance and Gait Assessments

The one-legged standing (OLS) test was used to assess whether a patient was capable of standing on one foot without help for 5 seconds. Static posturography was assessed using a force platform (Accugait, AMTI), which records displacement of the centre of pressures of the human body on the X, Y and Z axes. Postural balance was measured, while the subject stood on the platform, as the sweep area (SA) from the centre of pressures (in cm^2), for both eyes open and eyes closed (Romberg test). A baropodometric study assessed static and dynamic pressures of the soles of the feet (measured in N/cm^2), and gait and its different sub phases were evaluated, at speeds that were comfortable for the patients, using a baropodometric tape (Servís Medical, model WinFDM-T). The main static baropodometry measurements, expressed as percentages, were support with the left foot, support with the right foot, total support time, support by the forefoot and support by the hindfoot. The main dynamic baropodometry measurements included the following gait cycle values: support phase duration (seconds), step duration (seconds), step length (cm), cadence (steps/second) and walking speed (meters/second).

Other Study Variables

Other factors included age, sex, comorbidities (arthrosis, diabetes, ischemic heart disease, heart failure, stroke, chronic obstructive pulmonary disease -COPD-, chronic kidney failure, chronic liver disease, Parkinson disease, depression, etc.), chronic medication, functional capacity assessed using the Barthel index, timed up-and-go test, previous falls and gait speed. Information on comorbidities and medication was obtained from each patient's electronic medical record, and all other information was obtained directly from the patient by trained healthcare professionals.

Statistics

Continuous variables were described using means and standard deviations (SDs) and categorical variables were described using percentages. Comparisons between groups (frail vs non-frail, sarcopenic vs non-sarcopenic, and poor vs adequate muscle strength according to EWGSOP cut-off points) were made using the X^2 test or Fisher's exact test for categorical variables and the t-test or Mann-Whitney U test for numerical variables. Linear and logistic regression analyses assessed the effect of frailty and poor muscle strength on balance and gait parameters. Multivariate linear and logistic analyses were used to adjust the effect of frailty or poor muscle strength for age and other possible confounders (related with either frailty or poor muscle strength) on the corresponding dependent variable. Statistical significance was established as $p<0.05$.

Results

Recruited were 62 patients: 31 men and 31 women, mean age 77.9 (SD 7.5) years. These were classified as frail (n=13; 21.0%), pre-frail (n=26; 41.9%), and robust (n=23; 37.1%) and nine (14.5%) of them met criteria for a sarcopenia diagnosis. The main characteristics of the study sample are summarized in Table 1.

Sarcopenia was associated with age, stroke, body mass index, weight loss and poor physical exercise. On comparing patients

with and without sarcopenia, no significant differences were observed for balance parameters, except for the capacity to stand on one foot for 5 seconds (33.3 % vs 73.6%; p=0.012), nor were significant differences found for gait parameters, except for higher hindfoot pressure in both the right foot (17.0 vs 30.7 N/cm^2; p=0.010) and left foot (17.9 vs 31.1 N/cm^2; p=0.015). Among sarcopenic subjects, 77% were fallers, while this percentage was 53% in non-sarcopenic ones (p=0.275).

Frailty was associated with age, comorbidities such as COPD and heart failure, the use of psychiatric drugs and poor physical exercise. Table 2 compares the main balance and gait characteristics for frail and non-frail patients and for patients with poor and adequate muscle strength (according to EWGSOP criteria). Regarding balance parameters, although no significant differences were observed in SA between the frailty and muscle strength groups, significant differences were observed in the capacity to stand on one foot for 5 seconds. Regarding gait parameters, frailty and poor muscle strength were both associated with longer support time on both feet, longer double support, shorter gait length and slower gait speed, but not with gait cadence. The association of frailty with gait parameters disappeared once adjustments were made for age and other possible confounders, but the association of poor muscle strength persisted after adjustments (see Table 3). Although frailty and falls were associated with both a crude and adjusted odds ratio (OR) >3, this relationship did not achieve statistical significance.

Table 1. Main sample characteristics

Age in years, mean (SD)	78.1 (7.4)
Sex (% women)	50%
Comorbidities	
Anxiety	24.2%
Depression	32.3%
Cancer	12.9%
Chronic renal failure	9.7%
Chronic liver disease	1.6%
Arthrosis or rheumatism	72.6%
Chronic bronchitis or COPD	17.7%
Asthma	3.2%
Diabetes	24.2%
Hypertension	54.8%
Stroke	9.7%
Ischemic heart disease	14.5%
Heart failure	24.2%
Cardiac arrhythmias	25.8%
Cataracts	53.2%
Deafness	29.0%
Dizziness	11.3%
Fallers	21.0%
Falls (n)	0.41 (0.88)
Outdoor walking device users	37.1%
Outdoor life	91.9%
Outdoor walking (min/day)	34.8 (29.7)
Barthel index	96.9 (9.34)
Body mass index	
Men	28.0 (5.3)
Women	28.9 (5.9)
Hand grip (kg)	
Men	28.9 (8.3)
Women	17.2 (6.0)

COPD: Chronic obstructive pulmonary disease, SD: Standard deviation

Discussion

Our findings indicate that poor muscle strength and frailty are associated with some altered balance and gait parameters, especially capacity to stand on one foot for 5 seconds, support time when walking, gait length and gait speed. However, differences in fall prevalence between frail and non-frail patients and between patients with poor and adequate muscle strength were not statistically significant.

Regarding balance, poor muscle strength, sarcopenia and frailty were all associated with incapacity to stand on one foot for 5 seconds. However, there were no significant associations between these clinical conditions and instrumental assessments of balance obtained by posturography. This apparent disagreement between clinical and instrumental assessments of balance—which has also been reported by other authors (10,11)—would seem to indicate that elderly patients with sarcopenia or frailty syndrome may be able to maintain balance in the usual two-foot standing position but may have difficulties to maintain balance in more complex situations—including walking—that require balancing on a single foot. The fact that frailty was strongly related to the OLS test even when adjusted for age would point to incipient balance impairment and an increased risk of falls. This adjusted relationship was not statistically significant in the case of poor muscle strength, which can be considered an incipient phase in frailty. Balance is a complex body function influenced by multiple factors (neurological, visual, vestibular and muscular), and its preservation is essential to prevent falls (2). The cross-sectional design of our study does not allow causal relationships to be established between frailty and balance impairment, both closely related and mutually influenced. Some authors suggest that the OLS test could be used as a practical marker of frailty in community-dwelling elderly people (12). We are the opinion that balance impairment is a consequence of frailty,

but this is a hypothesis that requires support from further longitudinal and prospective research. If balance impairment is a consequence of frailty, then preventing frailty would be a useful way to avoid balance impairment, falls and their consequences.

In relation to gait parameters, sarcopenia was only associated with higher hindfoot pressure. As far as we are aware, this is the first time this association has been described and this—possibly casual—finding is not easy to interpret. However, it may point to a relative decrease in take-off force by the contralateral forefoot in patients with sarcopenia. As for poor muscle strength and frailty, in our study these were consistently associated with different temporal and spatial gait parameters. In frail patients, support time for both feet and double support time were longer and single-foot balance time was shorter. These results, which corroborate those reported by other authors (13-15), point to a compensatory mechanism aimed at ensuring walking stability and safety. Age itself is also reported to produce similar effects (16). When the effect of frailty on support time was adjusted for age, the effect was very close to statistical significance. Other authors have reported other compensatory mechanisms in spatial gait parameters in frail patients, including an increase in the support base and in gait width (14,17). Our analysis of spatial gait parameters pointed to a shorter gait in frail patients and in patients with poor muscle strength. Few studies have established a direct relationship between frailty and gait length, but our finding is consistent with other reported

Table 2. Main balance and walking characteristics for frail and non-frail patients and for patients with poor and adequate muscle strength

	Frailty			Poor muscle strength*		
	Yes (n=13)	No (n=49)	p	Yes (n=32)	No (n=30)	p
Balance						
Sweep area (cm²) Romberg open eyes	4.07 (2.93)	2.78 (2.09)	0.114	3.11 (2.39)	2.96 (2.27)	0.588
Sweep area (cm²) Romberg closed eyes	6.82 (6.09)	4.69 (7.09)	0.068	5.55 (7.87)	4.66 (5.86)	0.569
Unable to stand on 1 foot for 5 seconds (%)	10 (76.9%)	10 (20.4%)	<0.001	14 (43.8%)	6 (20.0%)	0.046
Walking (baropodometric study)						
% of support time (right foot)	74.7 (2.7)	72.0 (3.1)	0.025	73.6 (3.2)	71.2 (2.8)	0.007
% of support time (left foot)	75.2 (3.2)	71.7 (3.4)	0.017	73.5 (3.4)	71.1 (3.4)	0.013
Gait cadence (step/min)	90.6 (19.5)	92.4 (19.0)	0.944	88.4 (17.6)	95.6 (19.6)	0.212
Gait length (cm)	35.4 (9.1)	49.1 (13.8)	0.008	42.1 (11.5)	51.9 (14.7)	0.010
Gait speed (m/s)	0.25 (0)	0.37 (0.25)	0.002	0.30 (0.08)	0.40 (0.11)	0.001
Falls in the previous 3 months						
Fallers (%)	10 (76.9%)	24 (49.9%)	0.072	19 (59.4%)	15 (50.0%)	0.459

* hand grip: women <18 kg and men <30 kg

Table 3. Effect of frailty and poor muscle strength on falls, balance parameters and walking parameters (bivariate and multivariate analyses)

	Frailty		Poor muscle strength*	
Linear regression analysis	**Unadjusted beta (p)**	**Adjusted beta (p)**	**Unadjusted beta (p)**	**Adjusted beta (p)**
Sweep area (cm²) Romberg open eyes	1.28 (0.085)	-	0.156 (0.794)	-0.65[d] (0.321)
Sweep area (cm²) Romberg closed eyes	2.13 (0.343)	-2.11[a] (0.349)	0.881 (0.623)	-1.33[a] (0.429)
Gait cadence (step/min)	-1.75 (0.811)	-2.30[b] (0.772)	-7.11 (0.161)	-7.68[b] (0.145)
Gait length (cm)	**-13.7 (0.009)**	-9.13[a] (0.096)	**-9.75 (0.008)**	-7.21[a] (0.051)
Gait speed (m/s)	**-0.12 (0.005)**	-0.07[a] (0.100)	**-0.10 (<0.001)**	**-0.07[a] (0.007)**
% of support time (right foot)	**2.75 (0.024)**	2.31[c] (0.059)	**2.41 (0.004)**	**2.13[c] (0.012)**
% of support time (left foot)	**3.42 (0.011)**	2.10[a] (0.121)	**2.41 (0.010)**	1.59[a] (0.081)
Logistic regression analysis	**Unadjusted OR (p)**	**Adjusted OR (p)**	**Unadjusted OR (p)**	
Unable to stand on 1 foot for 5 seconds	**12.5 (0.001)**	**6.41[b] (0.022)**	3.12 (0.050)	1.84[b] (0.345)
Faller	3.47 (0.083)	3.12[a] (0.152)	1.46 (0.459)	1.25[b] (0.682)

* hand grip: women <18 kg; men <30 kg; [a]adjusted for age and use of psychiatric drugs; [b]adjusted for age; [c]adjusted for use of psychiatric drugs; [d]adjusted for age and hours of physical exercise/week
OR: Odds ratio

results on differences in gait length between fallers and non-fallers (6,15). A systematic review, moreover, indicates that decreased gait length is a typical feature of ageing (1). Even after adjustment for age, we observed a clinically relevant and statistically significant association between frailty and gait length.

Our study also showed that frailty was associated with previous falls, for a crude OR=3.5 (p=0.083) and an adjusted OR=3.1 (p=0.152). The magnitude of the association and its nearness to statistical significance would suggest that the lack of statistical significance is due to low statistical power resulting from a small sample size. Several studies have investigated frailty as a risk factor for falls, reporting diverse and not always conclusive results. A meta-analysis that pooled the results of 11 prospective studies concluded that frailty is a significant predictor of future falls among community-dwelling older people, especially men; and an observational study in 324 community-dwelling elderly people pointed to a strong relationship between muscle strength and falls in both men and women (18,19). However, in our study poor muscle strength was not found to be associated with falls, whether because of a lack of statistical power or because of the strength cut-off point used.

Study Limitations

Regarding limitations of our study, the first one, as already mentioned, is the small sample size, which compromises the power to detect statistically significant relationships or differences between groups. Secondly, we cannot assume that the study sample is representative of the general population aged 70 years and older because only outpatients were recruited. Although this lack of representativeness did not allow sarcopenia or frailty prevalence to be established, it did allow a comparison of balance and gait parameters between sarcopenia and frailty groups. Thirdly, the sarcopenia and frailty groups were not homogeneous in terms of age, a factor associated with balance and gait parameters. The multivariate analysis was accordingly adjusted for age as a possible confounder. Finally, the cross-sectional design did not allow causal relationships to be established between sarcopenia and frailty on the one hand, and on the other hand, balance, gait and falls, in relation to which we suggest that prospective studies are required.

Conclusion

Poor muscle strength and frailty are associated with incipient balance disorders and with walking adaptations aimed at gaining stability that result in slower gait. While these findings would suggest that poor muscle strength and frailty are risk factors for falls in aged populations, further prospective and well-powered studies are necessary to provide more conclusive evidence.

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Ethics

Ethics Committee Approval: The study protocol was approved by Consorci Sanitari del Maresme Research Unit, Mataró Hospital, Clinic of Geriatrics, Mataró, Spain, the Local Ethics Committee (exp. CEIC CSdM 49/13).

Informed Consent: Participants that fulfilled all selection criteria and gave their informed consent in writing were recruited from outpatients visiting the Hospital of Mataró (Barcelona, Spain) from January 2013 to January 2014.

Peer-review: Internally and externally peer-reviewed.

Authorship Contributions

Concept: M.S.P., Design: M.S.P., Data Collection or Processing: E.P., Analysis or Interpretation: E.P., Literature Search: M.S.P., Writing: M.S.P.,

Conflict of Interest: All authors declare that they have no conflict of interest in this study.

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CASE REPORT

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A Challenging Hypoactive Delirium Case with Multiple Etiological Considerations

Tuğba Erdoğan[1], Gülistan Bahat[1], Birkan İlhan[2], Mehmet Akif Karan[1]

[1]İstanbul University İstanbul Faculty of Medicine, Department of Internal Medicine, Division of Geriatrics, İstanbul, Turkey
[2]Dr. Ersin Arslan Training and Research Hospital, Clinic of Internal Medicine, Division of Geriatrics, Gaziantep, Turkey

Abstract

Delirium is a common clinical syndrome characterized by disturbed consciousness, cognitive function or perception. It is associated with poor outcomes, unless prevented and treated urgently. Hypoactive delirium is more common and is associated with poor prognosis because it is less frequently recognized. Typically, the causes of delirium are multifactorial. The aim of this case report was to draw attention to the fact that both hypoactive delirium itself and, more importantly, the underlying multiple causes may be overlooked in older adults.

Keywords: Delirium, hypoactive delirium, older adults

Introduction

Delirium is a common geriatric syndrome affecting many older patients not only admitted into acute medical wards but also in the community. Delirium is defined as a non-specific organic brain syndrome in which disturbances of consciousness is associated with attention, perception, memory, psychomotor-activation, mood, and disturbances in sleep-wake cycle. Although delirium is the most common mental state disorder, it is overlooked by clinicians. It remains unrecognized in about 60% of older adults (1). Although many clinicians suggest that patients with delirium are agitated, hyperactive delirium represents only 25% of the cases (2). The hypoactive delirium is more common than hyperactive delirium and is also associated with poor prognosis as it is potentially less frequently recognized or dismissed (3). Herein, we present a geriatric patient with multiple factors causing hypoactive delirium.

Case presentation

Eighty-eight year old female patient was admitted to the İstanbul University Hospital, Clinic of Geriatrics with the symptoms of somnolence, and deterioration of general condition. The patient had a history of diabetes mellitus, hypertension, depression and atrial fibrillation. She had an ischemic cerebrovascular accident in 2012, and in 2015. She was admitted to cardiology department with the symptom of syncope in 2015, and a pacemaker was implanted after the detection of 14 seconds lasting pause on the monitorization device. She has no dementia or mild cognitive impairment before admission to the hospital. While she was active and independent in activities of daily living and living with her caregiver and, for the last 1 month there was a decrease in her interest towards her surroundings and sleepiness. Her complaints were loss of appetite, and cough after fluid intake and thus there was a decrease in fluid intake. The comprehensive geriatric evaluation revealed that she had urinary and fecal incontinence for a week, and had a malnutrition risk, and she had no falls. Her prescribed daily medicines were amiodarone 200 mg 1x1, repaglinide 1 mg 2x 1/2, losartan 50 mg 1x1, rivaroxaban 15 mg 1x1, escitalopram 10 mg 1x1, and pantoprazole 1x1.

On physical examination, disorientation in time, place and person were detected. Eyes were spontaneously closed and open with audible stimulus, as in previous examinations muscle strength was 2/5 in the right lower extremity and 3/5 in the right upper extremity. Crepitant rales were detected in the left

Address for Correspondence: Tuğba Erdoğan, İstanbul University İstanbul Faculty of Medicine, Department of Internal Medicine, Division of Geriatrics, İstanbul, Turkey
Phone: +90 212 414 20 00 **E-mail:** tubaobekli@hotmail.com **ORCID:** orcid.org/0000-0001-8690-0189
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lung. We reviewed the possible factors that may have caused delirium in our case. The examinations were planned based on differential diagnoses.

Laboratory tests at hospital admission were Hb=9.5 g/dL, Hct=30%, MCV=79 fl, Leukocyte=8700 mm^3, Neutrophil=6500/mm^3, Lymphocyte=1600/mm^3, Platelet=314000/mm^3, Glu=139 mg/dL, HbA1c=5.8%, Urea=68 mg/dL, Cre=1.4 mg/dL (Baseline serum creatinin=1.0 mg/dL), GFR (CKD-EPI)=33.46 mL/min, Na=134 mmol/L, K=5 mmol/L, Ca=8.9 mg/dL, Alb=3.45 mg/dL, P=3.2 mg/dL, CRP=69 mg/L (0-5), Sedim=60 mm/hr, Fe=17, TIBC=228, Ferritin=120 ng/mL, TSH=3.17 mIU/L. Electrocardiogram showed no significant abnormalitiy, Pulmonary infiltrates were observed in the left lower lobe on Chest radiography.

Hypoactive delirium was diagnosed using the Confusion assessment method. Predisposing factors for delirium were considered as older age, polypharmacy, frailty determined by FRAIL scale, and aspiration pneumonia, dehydration and acute renal failure were considered as the precipitating factors. Antibiotherapy was administered for aspiration pneumonia. Fluid replacement therapy was started for dehydration-associated acute kidney injury. Oral antidiabetic medication was discontinued because the oral intake was poor, and the blood glucose levels were lower at follow-up. Parenteral feeding started. A decrease was detected in acute phase reactants, and the creatine levels reached to baseline value in the second day of the treatment. However, no regression was detected in the hypoactive delirium status. To exclude cranial pathologies cranial computed tomography was performed. A hypodense effusion view consistent with chronic subdural hemorrhage on the left fronto-parieto-occipital area with a diameter of 3.5 cm on the widest area was detected (Figure 1). Approximately 13 mm shifts to the right were detected in the midline structures. 31x49 mm hypodense area was detected in the right temporoparietal area (right MCA irrigation area). Emergent surgery was recommended. Subdural hematoma drainage was performed through a burr hole. The general condition improved after surgery. The orientation in time, place and person returned to normal. She had a better appetite, and oral intake improved.

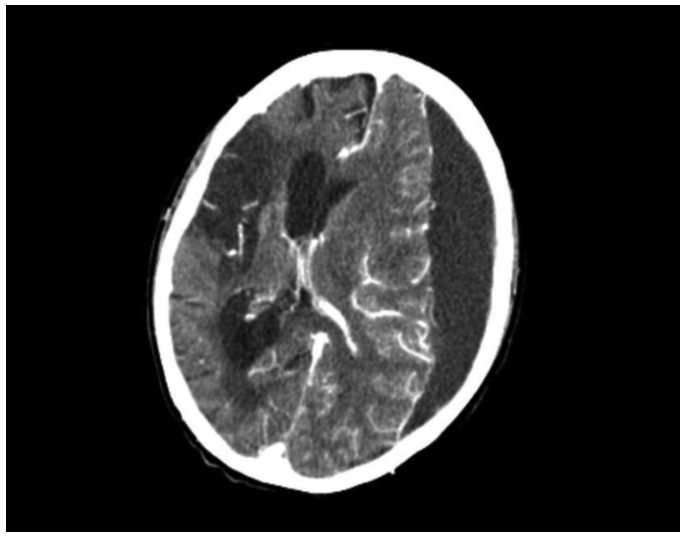

Figure 1. A hypodense effusion view consistent with chronic subdural hemorrhage on the left fronto-parieto-occipital area with a diameter of 3.5 cm on the widest area

Discussion

The available data for the incidence and prevalence of delirium varied. Studies showed that 14% to 24% of older adults will have delirium on admission to hospital and up to 56% will develop delirium during their hospital stay (4). The prevalence of delirium in the community is 1-2% among the general population aged over 55 years, and up to 14% in those over 85 years. The incidence among nursing home residents surpasses 60% (5). The index of suspicion in older adults should be higher, unlike in younger people, a symptom in older adults may have multiple causes. Delirium is also known to be typically multifactorial (4). Clinicians investigating the underlying cause of delirium must be aware of the possibility of occult or atypical presentations of many diseases in older adults. Risk factors for delirium are classified in two groups as the predisposing and precipitating factors. Older age, dementia, depression, functional disabilities, polypharmacy, malnutrition, frailty, poor vision and hearing, laboratory abnormalities and a high burden of coexisting conditions are the common predisposing factors. The most commonly reported precipitating factors are the drugs (especially sedative hypnotic agents, anticholinergic agents, steroids and antibiotics), surgery, pain, constipation, fecal impaction, urinary retention, immobilization, infections, acute illness, and acute exacerbation of chronic illness. As in our case, there are so many factors that can cause delirium. We might consider that escitalopram may have caused hyponatremia, amiodarone may have caused hypothyroidism or hyperthyroidism and rivaroxaban may have caused bleeding. Another point that should be considered in delirium is infections in older adults. The first symptom may be delirium before the emergence of the localizing symptoms in the older adults. Another factor that can cause delirium is the metabolic disorders such as acute renal failure, and electrolyte imbalances due to decreased appetite, and fluid intake. The patient with a history of diabetes may have developed delirium due to possible hypoglycemia or hyperglycemia. Finally, central nervous system pathologies such as cerebrovascular ischemia or bleeding may have caused delirium.

Conclusion

We presented a geriatric patient with multiple factors causing hypoactive delirium. As seen in our case, delirium is typically

multifactorial. It should be noted that, both hypoactive delirium and, more importantly, many underlying causes may be overlooked in older adults. All possible predisposing and precipitating factors should be reviewed and promptly intervened in patients diagnosed with delirium.

Ethics

Informed Consent: Informed consent was obtained from the patient.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: M.A.K., Design: G.B., Data Collection or Processing: T.E., B.İ., Analysis or Interpretation: G.B., Literature Search: T.E., M.A.K., Writing: T.E., G.B.

Conflict of Interest: No conflict of interest was declared by the authors.

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