ETHICAL ISSUES IN GERIATRIC CARE

Butranova OI[1] ✉, Ushkalova EA[1], Zyryanov SK[1,2]

[1] Peoples' Friendship University of Russia (RUDN University), Moscow, Russia

[2] Municipal Clinical Hospital No. 24 of Healthcare Department of Moscow, Moscow, Russia

Increased life expectancy along with an increasing share of elderly and senile patients in the structure of the population make the tasks of longer healthy life expectancy pressing. A set of activities aimed at optimization of management of patients within the framework of gerontological practice should include elimination and prevention of diagnostic and therapeutic errors. The basic risk factors of medical errors include high heterogeneity of elderly and senile patients, overburdened healthcare system, polypharmacy, including due to parallel prescription of drugs to the same patient by multiple medical professionals, concomitant diseases, and high comorbidity, measured by the Charlson Comorbidity Index. Mismanagement of elderly patients can result both from underestimated severity of the patient's conditions, and from hyperdiagnostics. Typical errors of pharmacotherapy include use of potentially inappropriate medications, potential prescribing omissions, simultaneous prescription of drugs with high risk of clinically significant interactions, incorrect selection of dosage without taking into account the renal failure, which is associated with high risk of toxic effects. Affordability of medical aid for an elderly patient is another important social aspect influencing the patient's quality of life. As far as basic ethical principles of management of elderly and senile patients go, it is necessary to respect independence, well-being and justice for the patients regarding possible obtaining of qualitative medical aid as compared with other age groups.

Keywords: elderly and senile patients, medical errors, polypharmacy, accessibility of medical aid, ethical principles

Author contribution: Butranova OI — literature analysis, collection, analysis and writing the text for publication; Ushkalova EA — research planning, literature analysis; Zyryanov SK — data analysis and interpretation.

✉ **Correspondence should be addressed:** Olga I. Butranova
ul. Miklukho-Maklaya, 6, Moscow, 117198, Russia; butranova-oi@rudn.ru

Received: 30.01.2023 **Accepted:** 22.02.2023 **Published online:** 30.03.2023

DOI: 10.24075/medet.2023.004

ПАЦИЕНТЫ ПОЖИЛОГО И СТАРЧЕСКОГО ВОЗРАСТА В КЛИНИЧЕСКОЙ ПРАКТИКЕ: ЭТИЧЕСКИЕ ПРОБЛЕМЫ

О. И. Бутранова[1] ✉, Е. А. Ушкалова[1], С. К. Зырянов[1,2]

[1] Российский университет дружбы народов (РУДН), Москва, Россия

[2] Городская клиническая больница № 24 Департамента здравоохранения города Москвы, Москва, Россия

Рост средней продолжительности жизни наряду с возрастанием доли пациентов пожилого и старческого возраста в структуре населения делают актуальными задачи по увеличению продолжительности здоровой жизни. Комплекс мероприятий, направленный на оптимизацию ведения пациентов в рамках геронтологической практики, должен включать устранение и профилактику диагностических и терапевтических ошибок. Основные факторы риска врачебных ошибок — высокая гетерогенность популяции пациентов пожилого и старческого возраста, перегруженность системы здравоохранения, полипрагмазия, в том числе вследствие параллельного назначения препаратов одному пациенту врачами различных специальностей, наличие сопутствующих заболеваний, высокие значения индекса коморбидности Чарлсона. Неверная тактика ведения пожилых пациентов может быть следствием как недооценки тяжести состояния пациента, так и гипердиагностики. Типичные ошибки фармакотерапии включают применение потенциально не рекомендованных ЛС (ПНЛС), потенциально упущенные назначения ЛС (ПУНЛС), одновременное назначение ЛС, вступающих в клинически значимые взаимодействия между собой, неправильный выбор дозы, часто без учета нарушения функции почек, что сопряжено с высоким риском возникновения токсических эффектов. Доступность медицинской помощи пожилому пациенту является еще одним важным социальным аспектом, влияющим на качество жизни пациентов. С позиций основных этических принципов ведения пациентов пожилого и старческого возраста можно отметить необходимость обеспечения уважения автономности пациентов, их благополучия и справедливости в плане возможности получения качественной медицинской помощи в сравнении с другими возрастными группами.

Ключевые слова: пациенты пожилого и старческого возраста, врачебные ошибки, полипрагмазия, доступность медицинской помощи, этические принципы

Вклад авторов: О. И. Бутранова — анализ литературы, сбор, анализ, написание текста публикации; Е. А. Ушкалова — планирование исследования, анализ литературы; С. К. Зырянов — анализ, интерпретация данных.

✉ **Автор для корреспонденции:** Ольга Игоревна Бутранова
ул. Миклухо-Маклая, д. 6, г. Москва, 117198, Россия; butranova-oi@rudn.ru

Статья поступила: 30.01.2023 **Статья принята к печати:** 22.02.2023 **Опубликована онлайн:** 30.03.2023

DOI: 10.24075/medet.2023.004

Global changes in the way of life, achievements of modern medicine, higher quality of medical aid and its accessibility resulted in an increased life expectancy and rise in the proportion of senile persons in the population. During the past century, life expectancy doubled almost twice [1]. In North American and European countries, including Russia, percentage of the elderly was increased owing to the trend towards lower fertility. As a result, the current demographic situation was characterized by the unprecedented ageing of the population. In 2019, every 11th person in the world was elder than 65 years. According to prognosis, the group will include every 6th person by 2050 [2]. In Europe, more than a quarter of population (190 bln.) have already reached the age of over 60 [3], whereas percentage of the Russians elder than 65 in 2021 amounted to 15.8% [4].

Unlike the total life duration, healthy life duration is growing at a much slower pace [5]. Death is preceded by even a longer period of morbidity and multimorbidity [6]. If the median of life expectancy constitutes 71.4 years globally and 76.8 years in Europe [7], the median of healthy life amounted to 63.1 and 68 years, respectively [8]. The observed demographic processes contribute to a significant growth of percentage of the elderly both within the primary link of rendering medical aid, and among hospitalized patients.

Elderly and senile patients differ from the younger ones by involutionary functional and morphological changes in various organs and systems, mainly by a chronic course of diseases, their atypical clinical signs, geriatric syndromes, comorbidity and social and mental misadaptation. In this respect, standard principles and recommendations related to diagnostics and treatment can be unacceptable for this category of patients. This is confirmed by numerous diagnostic and therapeutic problems found among the elderly and senile patients in real medical practice.

DIAGNOSTIC AND THERAPEUTIC ERRORS IN GERIATRICS

In countries with high economic income, medical errors are the third leading cause of death among patients of any age; in the USA, they annually lead to 250,000 of lethal outcomes (9.5% of all deaths) [9]. Meanwhile, many mistakes, including the ones leading to lethal outcomes, are observed among elderly and senile patients [10]. In a prospective observational trial with 803 patients (mean age of 48.34+9.4 years) it has been shown that the main risk factors of medical errors included age older than 60 years, overburden of the healthcare system (≥20 patients per one hour), ≥5 of administered medicines, presence of concomitant diseases, Charlson comorbidity index and administration of the same drugs by several doctors [11]. In accordance with other trials, every other doctor who prescribes a drug to a geriatric patient is associated with an increased risk of adverse reactions approximately by 30% [12].

Within the age group, diagnostic errors equally include both underestimated severity condition, and hyperdiagnostics; this results in improper selection of medical tactics and negative treatment outcomes [13]. Typical errors of pharmacotherapy include use of potentially inappropriate medications, potential prescribing omissions, simultaneous prescription of drugs with high risk of clinically significant interactions, incorrect selection of dosage without taking into account the renal failure, which is associated with high risk of toxic (and primarily nephrotoxic) effects. All these mistakes decrease effectiveness and/or safety of pharmacotherapy among elderly and senile patients [14].

Medical errors are mainly due to high heterogeneity of elderly population. They become higher in number as soon as their age is increased. Thus, the prevalence of potentially not recommended drugs varies from 30 to 61.9% [15–18] among the elderly and from 79.3% to 85.1% [19, 20] among those who are older than 80 years. The potentially missed prescriptions of drugs are found in more than a half of the elderly [21] and in 81.4% of senile patients [19]. According to some trials, potentially missed prescriptions of drugs are more commonly found among females. For instance, in a trial involving 440 women (mean age of 75,75±6,56 years), potentially missed prescriptions of drugs were found in 98.3% of cases [22].

An important factor leading to diagnostic and therapeutic errors includes disturbance of cognitive functions among elderly patients. In a systematic review of 80 trials, it has been established that the prevalence of cognitive disturbances among the elderly varies from 5.1% to 41% (median is 19.0%), whereas the incidence calculated based on analysis of 11 trials varies from 22 to 76.8 per 1,000 person years (53.97 per 1,000 person years in average) [23].

Influence of cognitive disorders on diagnostics was due to the fact that a patient with dementia can't estimate his/her condition objectively, forgets or fails to notice the symptoms, including the ones that reveal a potentially life-threatening clinical situation. It has been shown in the trials that patients even with moderate cognitive impairment (MCI) do not obtain the necessary aid that corresponds to the real severity of their condition. For instance, presence of MCI in patients who had myocardial infarction is associated with a lesser rate of catheterization of the heart (50% among patients with MCI vs 77% of patients without MCI; $p < 0.001$), coronary revascularization (29% vs 63%; $p < 0.001$) and cardiac rehabilitation (9% vs 22%; $p = 0.001$) [24].

Hypodiagnostics due to the presence of cognitive disturbances in a patient is referred to typical medical errors, especially the ones made by those who work at intensive care units. Interviews of physicians show that the priority is given to the assessment of the current status of the patient, physical and laboratory examination, whereas shortage of time, observed in case of severe condition of the patient, does not allow to use special questionnaires to determine the degree of disturbed cognitive functions [25]. A patient's cognitive sphere is more commonly assessed based on the data obtained from the relatives; diagnostic tests are applied more rarely; patients are sent to be consulted by specialists even more rarely [25]. The mentioned approaches lead to iatrogenic diagnostic and, as a consequence, therapeutic errors.

The degree of disturbed cognitive functions determines the borders within which the patient can show independence while taking decisions as far as treatment goes. The doctor has to determine the borders during the primary interview and examination. If the patient does not have the required active legal capacity, the doctor must decide who can or must sign an informed consent form instead of the patient. Another ethical problem, which results from assessment of the patient's independence, consists in the possibility of obtaining outpatient treatment, especially if the patient lives alone or with other legally incompetent family members.

It should be noted that staying with the persons who suffer from dementia leads to worsened health of their caregivers, especially when the care is provided by spouses of the same age [26]. In particular, spouses of patients with cognitive disturbances have an increased risk of depression, disturbed nutrition [27] and pain [28]. Thus, they should be reviewed as 'a priority group in healthcare' and obtain a complex social, economic and medical aid [28].

ACCESSIBILITY OF MEDICAL AID FOR AN ELDERLY PATIENT

An ethical aspect in the social dimension requires individual attention: can an elderly or senile patient get a proper access to medical aid? The issue is simultaneously related to several spheres: a patient's ability to reach a healthcare institution, readiness of a medical institution to give specialized aid and care to a patient with senile asthenia and cognitive disturbances, financial abilities of a patient to pay for diagnostics, treatment and rehabilitation. Research of accessibility of medical aid for elderly patients in Israel has shown that it was impossible to obtain medical aid for 20.5% to 40.9% of patients [29]. The reasons why patients of different age groups couldn't be consulted by a specialist are presented in table.

Table. Accessibility of medical aid for patients of different age groups (modified from [29])

Parameter	65–70 y. o.	76–89 y. o.	>90 y. o.	General population
Having difficulties in visiting specialists, n (%)	105 (20.5)	138 (29.5)	108 (40.9)	351 (28.2)
Economic difficulties in visiting specialists, n (%)	23 (22.8)	15 (11.2)	9 (8.4)	47 (13.7)
Gave up visiting specialists due to economic difficulties, n (%)	19 (3.7)	18 (3.8)	9 (3.4)	46 (3.7)
Mobility difficulties in visiting specialists, n (%)	28 (27.7)	76 (56.7)	88 (82.2)	192 (56.1)
Transportation difficulties in visiting specialists, n (%)	13 (12.9)	25 (18.7)	36 (33.6)	74 (21.6)
Needed more visits to specialists but could not get appointments	26 (4.6)	15 (4.4)	10 (8.2)	41 (5.1)

In the Table it is shown that the most significant barrier for patients of any age group is the decreased mobility, which is a bright manifestation of senile asthenia in daily life.

Special attention should be given to assessment of how mental health of an elderly patient influences accessibility of medical aid. An Australian research (4,967 patients older than 55 years) has shown that mental disorders significantly increase the risk of daily discrimination of elderly patients, especially in healthcare [30]. The risk of improper care in patients with mental disorders was 2–3 times higher than in their peers without mental problems.

ETHICAL RECOMMENDATIONS FOR ELDERLY PATIENT MANAGEMENT

By interpreting the basic ethical principles of management of elderly and senile patients, it is necessary to respect independence of patients, their well-being and justice regarding the possibility of obtaining qualitative medical aid as compared with other age groups. Doctor-patient relationships are essential for successful data collection, diagnostics and and choosing of a treatment plan. A doctor and a patient need to build up partnership relations with a high level of trust and confidentiality. Communication with an elderly patient should include explanation of treatment objectives and actions required to achieve the objectives. A doctor should honestly and in plain language explain the prognosis and outcomes expected when patients obtain or do not obtain treatment. In case of unfavorable prognosis, for instance, in oncological diseases, the issue should be treated on an individual basis taking into account mental characteristics of the patient, cognitive abilities, educational level and other factors that can influence perception of similar information.

Cognitive abilities of an elderly patient should possibly be estimated using specialized tests and with involvement of specialists, if necessary. While taking a decision about getting medical aid on the outpatient or hospital basis, it is necessary to consider not just the data about the patient's competence, but also whether he/she stays with other people who can take care of the patient and control treatment adherence. It is essential to assess health of caregivers, especially the ones who provide care for patients with severe somatic diseases (for instance, cancer, cardiac insufficiency), mental disturbances and mental deficiency. They should be provided adequate medical aid as well, if needed.

Decreased quality of medical aid given to an elderly patient, especially the one with cognitive disorders, can result from a lack of time for full communication and necessary examination, which is both an ethical, administrative and institutional issue. With rapid population ageing, certain standards should be reviewed (time spent on examination of one patient, number of doctors and nurses at outpatient medical institutions and hospitals). Healthcare institutions should currently be elderly patient-oriented.

With limited healthcare resources, the principle of equity in medical care given to elderly patients is commonly not followed. To overcome the barrier, the patient should be given care and observation at specialized therapeutic institutions, gerontological centers, it is also necessary to attract additional employees, including caregivers. It is desirable to have a constant treating physician who is aware of clinical, social and demographic characteristics of the patient and who managed to establish a contact with him or her.

References

1. Crimmins EM. Lifespan and Healthspan: Past, Present, and Promise. Gerontologist. 2015; 55 (6): 901–911. DOI:10.1093/geront/gnv130
2. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects 2019: Highlights. Paper No. ST/ESA/SER.A/423, 2019. New York: United Nations.
3. Krivanek TJ, Gale SA, McFeeley BM, Nicastri CM, Daffner KR. Promoting Successful Cognitive Aging: A Ten-Year Update. J Alzheimers Dis. 2021; 81 (3): 871–920. DOI: 10.3233/JAD-201462
4. Available from URL: https://rosstat.gov.ru/storage/mediabank/Bul_chislen_nasel-pv_01-01-2021.pdf
5. Flatt T, Partridge L. Horizons in the evolution of aging. BMC Biol. 2018 Aug 20; 16 (1): 93. DOI: 10.1186/s12915-018-0562-z
6. Tetzlaff J, Muschik D, Epping J, Eberhard S, Geyer S. Expansion or compression of multimorbidity? 10-year development of life years spent in multimorbidity based on health insurance claims data of Lower Saxony, Germany. Int J Public Health. 2017 Jul; 62 (6): 679–686. DOI: 10.1007/s00038-017-0962-9
7. European Commision, Horizon 2020. https://ec.europa.eu/programmes/horizon2020
8. WHO, World Health Statistics, 2016. European Commision, Horizon 2020.
9. Makary MA, Daniel M. Medical error — the third leading cause of death in the US. BMJ. 2016; 353: i2139. DOI: 10.1136/bmj.i2139
10. Linden-Lahti C, Takala A, Holmström AR, Airaksinen M. What Severe Medication Errors Reported to Health Care Supervisory Authority Tell About Medication Safety?. J Patient Saf. 2021; 17 (8): e1179-e1185. DOI: 10.1097/PTS.0000000000000914
11. Rasool MF, Rehman AU, Imran I, et al. Risk Factors Associated With Medication Errors Among Patients Suffering From Chronic Disorders. Front Public Health. 2020; 8: 531038. Published 2020 Nov 19. DOI:10.3389/fpubh.2020.531038
12. Pretorius RW, Gataric G, Swedlund SK, Miller JR. Reducing the risk of adverse drug events in older adults. Am Fam Physician. 2013 Mar 1; 87 (5): 331–6. PMID: 23547549
13. Skinner TR, Scott IA, Martin JH. Diagnostic errors in older patients: a systematic review of incidence and potential causes in seven prevalent diseases. Int J Gen Med. 2016; 9: 137–146. Published 2016 May 20. DOI:10.2147/IJGM.S96741

14. Schoenenberger AW, Stuck AE. Inappropriate drug use among older persons: is it time for action? Age Ageing. 2014; 43 (6): 737–739. DOI:10.1093/ageing/afu140
15. Tao L, Qu X, Gao H, Zhai J, Zhang Y, Song Y. Polypharmacy and potentially inappropriate medications among elderly patients in the geriatric department at a single-center in China: A retrospective cross-sectional study. Medicine (Baltimore). 2021 Oct 22; 100 (42): e27494. DOI: 10.1097/MD.0000000000027494.
16. Alsaad SM, AlEraij S, Alsaad AM, AlSaif HI, Bawazeer G. Potentially Inappropriate Medications among Elderly with Frailty in a Tertiary Care Academic Medical Centre in Saudi Arabia. Healthcare (Basel). 2022 Jul 31; 10 (8): 1440. DOI: 10.3390/healthcare10081440.
17. Sharma R, Bansal P, Garg R, Ranjan R, Kumar R, Arora M. Prevalence of potentially inappropriate medication and its correlates in elderly hospitalized patients: A cross-sectional study based on Beers criteria. J Family Community Med. 2020 Sep–Dec; 27 (3): 200–207. DOI: 10.4103/jfcm.JFCM_175_20.
18. Varga S, Alcusky M, Keith SW, et al. Hospitalization rates during potentially inappropriate medication use in a large population-based cohort of older adults. Br J Clin Pharmacol. 2017; 83 (11): 2572–2580. DOI:10.1111/bcp.13365
19. Candeias C, Gama J, Rodrigues M, Falcão A, Alves G. Potentially Inappropriate Medications and Potential Prescribing Omissions in Elderly Patients Receiving Post-Acute and Long-Term Care: Application of Screening Tool of Older People's Prescriptions/ Screening Tool to Alert to Right Treatment Criteria. Front Pharmacol. 2021 Oct 19; 12: 747523. DOI: 10.3389/fphar.2021.747523.
20. Caçador C, Teixeira-Lemos E, Oliveira J, Pinheiro J, Teixeira-Lemos L, Ramos F. The Prevalence of Polypharmacy and Potentially Inappropriate Medications and Its Relationship with Cognitive Status in Portuguese Institutionalized Older Adults: A Cross-Sectional Study. Int J Environ Res Public Health. 2022 Feb 24; 19 (5): 2637. DOI: 10.3390/ijerph19052637
21. Hanna V, Chahine B, Al Souheil F. Under-prescription of medications in older adults according to START criteria: A cross-sectional study in Lebanon. Health Sci Rep. 2022; 5 (5): e759. Published 2022 Aug 8. DOI:10.1002/hsr2.7529
22. Kelleci Çakır B, Kızılarslanoğlu MC, Kılıç MK, et al. Assessment of the Appropriateness of Prescriptions in a Geriatric Outpatient Clinic. Turk J Pharm Sci. 2022; 19 (1): 54–62. DOI:10.4274/tjps.galenos.2021.77010
23. Pais R, Ruano L, P Carvalho O, Barros H. Global Cognitive Impairment Prevalence and Incidence in Community Dwelling Older Adults-A Systematic Review. Geriatrics (Basel). 2020; 5 (4): 84. Published 2020 Oct 27. DOI:10.3390/geriatrics5040084
24. Levine DA, Langa KM, Galecki A, et al. Mild Cognitive Impairment and Receipt of Treatments for Acute Myocardial Infarction in Older Adults. J Gen Intern Med. 2020; 35 (1): 28–35. DOI:10.1007/s11606-019-05155-8
25. Blair EM, Zahuranec DB, Forman J, et al. Physician Diagnosis and Knowledge of Mild Cognitive Impairment. J Alzheimers Dis. 2022; 85 (1): 273–282. DOI:10.3233/JAD-210565
26. Potier F, Degryse JM, Bihin B, Debacq-Chainiaux F, Charlet-Renard C, Martens H, de Saint-Hubert M. Health and frailty among older spousal caregivers: an observational cohort study in Belgium. BMC Geriatr. 2018 Nov 26; 18 (1): 291. DOI: 10.1186/s12877-018-0980-3
27. Jeon SY, Kim JL. Caregiving for a Spouse with Cognitive Impairment: Effects on Nutrition and Other Lifestyle Factors. J Alzheimers Dis. 2021; 84 (3): 995–1003. DOI:10.3233/JAD-210694
28. Barbosa F, Delerue Matos A, Voss G, Costa P. Spousal Care and Pain Among the Population Aged 65 Years and Older: A European Analysis. Front Med (Lausanne). 2021 May 11; 8: 602276. DOI: 10.3389/fmed.2021.602276
29. Iecovich E, Carmel S. Differences in accessibility, affordability, and availability (AAA) of medical specialists among three age-groups of elderly people in Israel. J Aging Health. 2009; 21 (5): 776–797. DOI:10.1177/0898264309333322
30. Temple JB, Brijnath B, Enticott J, Utomo A, Williams R, Kelaher M. Discrimination reported by older adults living with mental health conditions: types, contexts and association with healthcare barriers. Soc Psychiatry Psychiatr Epidemiol. 2021; 56 (6): 1003–1014. DOI:10.1007/s00127-020-01914-9

Литература

1. Crimmins EM. Lifespan and Healthspan: Past, Present, and Promise. Gerontologist. 2015; 55 (6): 901–911. DOI:10.1093/geront/gnv130
2. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects 2019: Highlights. Paper No. ST/ESA/SER.A/423, 2019. New York: United Nations.
3. Krivanek TJ, Gale SA, McFeeley BM, Nicastri CM, Daffner KR. Promoting Successful Cognitive Aging: A Ten-Year Update. J Alzheimers Dis. 2021; 81 (3): 871–920. DOI: 10.3233/JAD-201462
4. Available from URL: https://rosstat.gov.ru/storage/mediabank/Bul_chislen_nasel-pv_01-01-2021.pdf
5. Flatt T, Partridge L. Horizons in the evolution of aging. BMC Biol. 2018 Aug 20; 16 (1): 93. DOI: 10.1186/s12915-018-0562-z
6. Tetzlaff J, Muschik D, Epping J, Eberhard S, Geyer S. Expansion or compression of multimorbidity? 10-year development of life years spent in multimorbidity based on health insurance claims data of Lower Saxony, Germany. Int J Public Health. 2017 Jul; 62 (6): 679–686. DOI: 10.1007/s00038-017-0962-9
7. European Commision, Horizon 2020. https://ec.europa.eu/programmes/horizon2020
8. WHO, World Health Statistics, 2016. European Commision, Horizon 2020.
9. Makary MA, Daniel M. Medical error — the third leading cause of death in the US. BMJ. 2016; 353: i2139. DOI: 10.1136/bmj.i2139
10. Linden-Lahti C, Takala A, Holmström AR, Airaksinen M. What Severe Medication Errors Reported to Health Care Supervisory Authority Tell About Medication Safety?. J Patient Saf. 2021; 17 (8): e1179-e1185. DOI: 10.1097/PTS.0000000000000914
11. Rasool MF, Rehman AU, Imran I, et al. Risk Factors Associated With Medication Errors Among Patients Suffering From Chronic Disorders. Front Public Health. 2020; 8: 531038. Published 2020 Nov 19. DOI:10.3389/fpubh.2020.531038
12. Pretorius RW, Gataric G, Swedlund SK, Miller JR. Reducing the risk of adverse drug events in older adults. Am Fam Physician. 2013 Mar 1; 87 (5): 331–6. PMID: 23547549
13. Skinner TR, Scott IA, Martin JH. Diagnostic errors in older patients: a systematic review of incidence and potential causes in seven prevalent diseases. Int J Gen Med. 2016; 9: 137–146. Published 2016 May 20. DOI:10.2147/IJGM.S96741
14. Schoenenberger AW, Stuck AE. Inappropriate drug use among older persons: is it time for action?. Age Ageing. 2014; 43 (6): 737–739. DOI:10.1093/ageing/afu140
15. Tao L, Qu X, Gao H, Zhai J, Zhang Y, Song Y. Polypharmacy and potentially inappropriate medications among elderly patients in the geriatric department at a single-center in China: A retrospective cross-sectional study. Medicine (Baltimore). 2021 Oct 22; 100 (42): e27494. DOI: 10.1097/MD.0000000000027494.
16. Alsaad SM, AlEraij S, Alsaad AM, AlSaif HI, Bawazeer G. Potentially Inappropriate Medications among Elderly with Frailty in a Tertiary Care Academic Medical Centre in Saudi Arabia. Healthcare (Basel). 2022 Jul 31; 10 (8): 1440. DOI: 10.3390/healthcare10081440.
17. Sharma R, Bansal P, Garg R, Ranjan R, Kumar R, Arora M. Prevalence of potentially inappropriate medication and its correlates in elderly hospitalized patients: A cross-sectional study based on Beers criteria. J Family Community Med. 2020 Sep–Dec; 27 (3): 200–207. DOI: 10.4103/jfcm.JFCM_175_20.
18. Varga S, Alcusky M, Keith SW, et al. Hospitalization rates during potentially inappropriate medication use in a large population-based cohort of older adults. Br J Clin Pharmacol. 2017; 83 (11): 2572–2580. DOI:10.1111/bcp.13365

19. Candeias C, Gama J, Rodrigues M, Falcão A, Alves G. Potentially Inappropriate Medications and Potential Prescribing Omissions in Elderly Patients Receiving Post-Acute and Long-Term Care: Application of Screening Tool of Older People's Prescriptions/ Screening Tool to Alert to Right Treatment Criteria. Front Pharmacol. 2021 Oct 19; 12: 747523. DOI: 10.3389/ fphar.2021.747523.
20. Caçador C, Teixeira-Lemos E, Oliveira J, Pinheiro J, Teixeira-Lemos L, Ramos F. The Prevalence of Polypharmacy and Potentially Inappropriate Medications and Its Relationship with Cognitive Status in Portuguese Institutionalized Older Adults: A Cross-Sectional Study. Int J Environ Res Public Health. 2022 Feb 24; 19 (5): 2637. DOI: 10.3390/ijerph19052637
21. Hanna V, Chahine B, Al Souheil F. Under-prescription of medications in older adults according to START criteria: A cross-sectional study in Lebanon. Health Sci Rep. 2022; 5 (5): e759. Published 2022 Aug 8. DOI:10.1002/hsr2.7529
22. Kelleci Çakır B, Kızılarslanoğlu MC, Kılıç MK, et al. Assessment of the Appropriateness of Prescriptions in a Geriatric Outpatient Clinic. Turk J Pharm Sci. 2022; 19 (1): 54–62. DOI:10.4274/tjps. galenos.2021.77010
23. Pais R, Ruano L, P Carvalho O, Barros H. Global Cognitive Impairment Prevalence and Incidence in Community Dwelling Older Adults-A Systematic Review. Geriatrics (Basel). 2020; 5 (4): 84. Published 2020 Oct 27. DOI:10.3390/geriatrics5040084
24. Levine DA, Langa KM, Galecki A, et al. Mild Cognitive Impairment and Receipt of Treatments for Acute Myocardial Infarction in Older Adults. J Gen Intern Med. 2020; 35 (1): 28–35. DOI:10.1007/ s11606-019-05155-8
25. Blair EM, Zahuranec DB, Forman J, et al. Physician Diagnosis and Knowledge of Mild Cognitive Impairment. J Alzheimers Dis. 2022; 85 (1): 273–282. DOI:10.3233/JAD-210565
26. Potier F, Degryse JM, Bihin B, Debacq-Chainiaux F, Charlet-Renard C, Martens H, de Saint-Hubert M. Health and frailty among older spousal caregivers: an observational cohort study in Belgium. BMC Geriatr. 2018 Nov 26; 18 (1): 291. DOI: 10.1186/s12877-018-0980-3
27. Jeon SY, Kim JL. Caregiving for a Spouse with Cognitive Impairment: Effects on Nutrition and Other Lifestyle Factors. J Alzheimers Dis. 2021; 84 (3): 995–1003. DOI:10.3233/ JAD-210694
28. Barbosa F, Delerue Matos A, Voss G, Costa P. Spousal Care and Pain Among the Population Aged 65 Years and Older: A European Analysis. Front Med (Lausanne). 2021 May 11; 8: 602276. DOI: 10.3389/fmed.2021.602276
29. Iecovich E, Carmel S. Differences in accessibility, affordability, and availability (AAA) of medical specialists among three age-groups of elderly people in Israel. J Aging Health. 2009; 21 (5): 776–797. DOI:10.1177/0898264309333322
30. Temple JB, Brijnath B, Enticott J, Utomo A, Williams R, Kelaher M. Discrimination reported by older adults living with mental health conditions: types, contexts and association with healthcare barriers. Soc Psychiatry Psychiatr Epidemiol. 2021; 56 (6): 1003–1014. DOI:10.1007/s00127-020-01914-9