BMC Public Health

RESEARCH

Open Access

Socioeconomic inequalities in meeting the needs of the elderly in western Iran

Sediqheh Mafakheri[1], Fatemeh Mansouri-Shad[1], Parvin Cheraghi[2,3], Qhadir Nouri[4] and Zahra Cheraghi[1,5*]

Abstract

Objective The increasing demographic shift toward an aging population in Iran highlights the urgent need to understand how socioeconomic inequalities affect the ability of older individuals to access essential resources and services. This study examined socioeconomic inequalities in meeting the needs of older people in Hamadan, Iran.

Method This cross-sectional study was conducted on the 501 elderly people living in western Iran. Data collection was carried out from December 1, 2022 to March 31, 2023, among elderly individuals who were registered in the SIB (Unified Health System). system. Elderly were selected by stratified random sampling among 17 comprehensive urban health centers (CURHCs) in Hamadan province. The data collection process consisted of four sections, including: A demographic information questionnaire, the Abbreviated Mental Test (AMT) questionnaire to determine the absence of dementia, cognitive impairment and the Barthel Index questionnaire to measure functional independence status and 4) Camberwell Assessment of Need for the Elderly. Socio-economic inequalities were assessed using the concentration index and a decomposition approach, determining the contribution of each factor to the socio-economic inequality at 95% CI.

Results The concentration index for met needs was 0.15 (95% CI: 0.12, 0.19), indicating a concentration of met needs among the elderly with higher economic status. Subgroup analysis (with statistically significant results) revealed that the lowest levels of met needs were observed among illiterate people (53.09% vs. 92.11% ($p<0.001$)) and those with dyslipidemia (55.86% vs. 65.98, $p=0.050$). Education (60.38%) and economic status (25.32%) were the primary contributors to inequality in elderly individuals' met needs.

Conclusion The findings reveal significant disparities in meeting the needs of the elderly, particularly among the wealthy, the illiterate, and those with dyslipidemia. To address these issues, public health initiatives should focus on expanding education and providing economic support to disadvantaged older adults. In addition, personalized health care for those with chronic conditions is essential. Proposed solutions include training health care workers in geriatric care, developing community-based programs with home care, and creating economic support packages for low-income seniors.

Keywords Met-needs, Inequalities, Elderly, Iran

*Correspondence:
Zahra Cheraghi
z.cheraghi@umsha.ac.ir
[1]Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[2]Department of Public Health, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran
[3]Department of Gerontology, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
[4]Department of Epidemiology, Rafsanjan Medical Sciences University, Rafsanjan, Iran
[5]Modeling of Noncommunicable Diseases Research Center, Institute of Health Sciences and Technologies, Avicenna Health Research Institute, Hamadan University of Medical Sciences, Hamadan 65157835129, Iran

Introduction

The global population of individuals aged 60 and over is experiencing a rapid increase, with projections indicating that the number will surpass 2.1 billion by 2050, particularly in developing countries [1]. In Iran, demographic projections indicate that the population of individuals aged 60 and over will exceed 26 million by 2050 [2]. This growth presents a number of challenges for societies and healthcare systems, as a significant proportion of the healthcare and social care needs of older adults remain unmet [3, 4].

In the context of healthcare, the term "need" refers to health-related issues that must be identified and addressed [5]. When these issues remain unresolved, they give rise to unmet needs. A significant proportion of older adults are confronted with deficiencies in essential resources, including income and medication. Previous study conducted in Iran revealed that the most prevalent unmet needs among the elderly were related to benefits and physical health, whereas medication and addressing physical illnesses were commonly met [5].

As a consequence of the deterioration of health status that is typical of the aging process, older individuals typically require more sophisticated forms of healthcare, which may potentially lead to an exacerbation of pre-existing diseases. For instance the leading contributors to the disease burden experienced by the elderly population are cardiovascular diseases (30.3% of the total burden in individuals aged 60 years and older), malignant neoplasms (15.1%), chronic respiratory diseases (9.5%), musculoskeletal diseases (7.5%), and neurological and mental disorders (6.6%) [6]. The unmet health needs of a population can have a detrimental impact on the health outcomes of that population, particularly among those with a lower socioeconomic status (SES) [7–11].

Elderly individuals frequently encounter a multitude of unmet needs that encompass both health-related and non-health-related domains. Key health-related needs include access to medical care, management of chronic conditions, mental health support, and preventive services [12]. Mobility issues frequently lead to reliance on caregivers or assistive technologies. Non-health-related needs, such as social engagement, emotional support, and opportunities for meaningful activities, are also essential for maintaining a high quality of life [13]. Social isolation has been shown to exacerbate health concerns and mental well-being [14]. Addressing these diverse needs, including transportation, housing stability, financial security, and access to nutritious food, is crucial to enhance the overall health and quality of life for older adults [15].

The majority of existing studies focus on working-age populations. However, research indicates that older individuals with lower SES experience poorer health outcomes and higher vulnerability to chronic conditions [16]. The existing research on socioeconomic factors related to met and unmet needs among the elderly in Iran is limited, underscoring the necessity to identify the determinants of inequality in this demographic. Accordingly, this research aims to elucidate socioeconomic inequalities regarding the met needs of the elderly, employing methods such as the concentration index and decomposition approach to inform health policy and planning.

The concentration index measures inequality in health outcomes across socioeconomic groups, with values from −1 (maximum inequity) to +1 (maximum equity), where 0 represents perfect equality. The decomposition approach analyzes the contributions of factors like income and education to this inequality, helping to identify and target specific determinants to reduce health disparities [17].

The necessity of this study arises from the increasing demographic shift towards an aging population in western Iran (ranking as the third oldest province in the country), highlighting the urgent need to understand how socioeconomic inequalities affect older individuals' ability to access essential resources and services. Rare studies have been conducted on the current status of unmet needs among elderly individuals in the region, often overlooking the unique regional dynamics and cultural contexts of western Iran. This study closely examines the relationship between economic status, access to healthcare, and social support systems. The objective of our research is to provide actionable insights that can be used to formulate targeted interventions and policies. These insights are intended to address the specific challenges faced by the elderly population in this region, with the overarching goal of promoting more equitable outcomes in elder care. To this end, we employ advanced statistical methodologies, such as the concentration index and the decomposition approach, to explore the socioeconomic inequalities affecting the elderly in Hamadan, Iran. The study underscores the role of diverse socioeconomic factors in exacerbating the unmet needs of this demographic, thereby addressing a notable lacuna in extant Iranian research.

Traditional research in this area has focused on either general health outcomes or specific needs, without providing a comprehensive perspective on disparities. By focusing on regional dynamics and challenges, particularly the role of illiteracy and chronic health conditions, we aim to inform public health policy and advocate for targeted interventions to reduce educational and health disparities in elder care in Iran.

Method

We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines in preparing our report.

Study design and population

This cross-sectional study focused on the elderly population residing in Hamedan County, a city in western Iran. The study's participants were individuals aged 60 years and older who met the following eligibility criteria: First, participants had to be of Iranian nationality. Second, they had to be free of any diagnosis of dementia. Third, they had to demonstrate normal cognitive function, as evidenced by a score greater than 8 on the Abbreviated Mental Test (AMT) questionnaire [18].

Data collection took place from December 1, 2022, to March 31, 2023, targeting elderly individuals registered in the SIB system (Unified Health System). This study randomly selected participants aged 60 and older in proportion to the elderly population served by each comprehensive urban health center in Hamedan City.

The SIB system, also known as the Unified Health System, is an integrated healthcare framework designed to improve the delivery of health services across Iran. The system's primary objectives are to streamline the management of health resources, enhance accessibility to medical services, and promote equitable healthcare for all citizens. The system encompasses various components, including public health initiatives, insurance coverage, and hospital management, to ensure comprehensive care.

Sample size

To determine the sample size, the study conducted by Gholehzadeh et al. in 2019 [19], which reported a prevalence rate of unmet needs of 23%, was utilized. Using a type I error level of 0.05, a statistical power of 80%, and an acceptable error of 16%, a sample size of 500 was estimated. The choice of a 16% acceptable error margin in the sample size calculation allows for a balance between precision and practical considerations, particularly in studies where resources or access to participants are limited.

Data collection and variables

Data collection was carried out from December 1, 2022 to March 31, 2023, among elderly individuals who were registered in the SIB system (Unified Health System). This cross-sectional study included all individuals over the age of 60 who were randomly selected in proportion to the population of elderly individuals covered by each comprehensive urban health center in Hamedan city. Elderly were selected by stratified random sampling among 17 comprehensive urban health centers (CURHCs) in Hamadan province. Then, based on the sample size calculated for each district and using a table of random numbers between four and 10, CURHCs and health houses were selected.

The data collection process consisted of four sections, including: (1) a Demographic Information Questionnaire, (2) the AMT Questionnaire for identifying the absence of dementia and cognitive impairment, (3) and the Barthel Index Questionnaire for measuring functional independence status and 4) Camberwell Assessment of Need for the Elderly (CANE). The CANE questionnaire was utilized to identify and evaluate unmet needs among study participants. The CANE questionnaire facilitates a comprehensive assessment of the multidimensional needs of elderly individuals in the areas of social, psychological, physical health, and environmental needs.

Traditional research in this area has focused on either general health outcomes or specific needs, without providing a comprehensive perspective on disparities. By focusing on regional dynamics and challenges, particularly the role of illiteracy and chronic health conditions, we aim to inform public health policy and advocate for targeted interventions to reduce educational and health disparities in elderly care in Iran. The CANE questionnaire is administered through interviews with elderly individuals, their informal caregivers, and staff who provide formal services to the elderly, allowing for comparison of perspectives and identification of differences in opinions. The questionnaire consists of 24 sections, each divided into five parts. The first section of each is the primary focus of the questionnaire, with subsequent sections serving to elaborate or contextualize the questions of the first section. Two additional sections are devoted to informal caregivers. Ultimately, two scores are derived from the questionnaire: an unmet needs score and an overall score, the latter of which combines the met and unmet needs scores.

The development of this questionnaire was initially focused on elderly individuals experiencing mental disorders. Subsequent applications have expanded its scope to encompass behaviorally and psychologically healthy elderly individuals as well, and it has now been translated into thirteen languages. The present questionnaire is composed of 24 questions, each of which is subdivided into five components. The initial segment of each inquiry focuses on the primary objective of the questionnaire, encompassing the domains of fulfilled needs, unmet needs, and unknown needs. Scoring is based primarily on this initial section. The third and fourth parts of the questionnaire solicit responses from formal and informal caregivers, respectively, regarding the needs of the elderly. Two additional sections are dedicated to informal caregivers. Scores are assigned as follows: zero indicates no need, one indicates a fulfilled need, two indicates an unmet need, and nine indicates an unknown need. Two

scores are derived from the questionnaire: the score for unmet needs and the total score, which incorporates both fulfilled and unmet needs [5]. The questionnaire has demonstrated adequate validity and reliability in previous studies as well as in research conducted in Iran [20–22].

The Persian version of the short cognitive test has demonstrated good validity and reliability in assessing Iranian elderly individuals, effectively distinguishing between those with and without cognitive impairment. The AMT questionnaire is less influenced by the educational level of test takers and has been previously validated in Iran. The internal consistency of the Persian AMT is acceptable, with a Cronbach's alpha of 0.76, and its external consistency is also good, reflected by an interclass correlation coefficient of 0.89.

The AMT consists of 10 questions, each scored from 0 to 1, resulting in a maximum possible score of 10. It covers various domains, including orientation, memory, and language. Scores of 8 or higher indicate normal cognitive functioning, while lower scores suggest varying degrees of cognitive impairment, warranting further assessment or intervention [18].

Overall, it appears that the Persian short Cognitive Test is a valid and reliable tool for assessing cognitive function among elderly individuals in Iran [23].

The Barthel Scale is the most commonly used assessment tool due to its simplicity, sensitivity, accuracy, and ease of scoring. Psychometric studies have demonstrated its reliability, with a coefficient of 99% and an internal consistency measured by a Cronbach's alpha of 0.96. The scale consists of 10 questions, utilizing a scoring system of 15-10-5-0 to evaluate self-sufficiency in daily activities. It assigns a score ranging from 0 to 100, where a higher score indicates less limitation in performing these activities [24, 25].

Statistical analysis

The statistical analyses were conducted using Stata software, version 17, with a significance level of less than 0.05 and a 95% confidence interval. Descriptive statistics were employed to describe the study variables, and a simple logistic regression model was utilized to estimate the relationship between independent variables and the outcome (met needs). To ascertain whether socioeconomic inequalities exist with regard to the desired outcome, the concentration index was employed. In the event of existing inequalities, the contribution of determining factors to these inequalities will be identified through the use of a decomposition approach.

Wealth index

The wealth index (WI) was employed to evaluate economic status in accordance with household assets, including ownership of a home, a personal vehicle, a personal computer, a smartphone, a refrigerator, a television, a washing machine, a dishwasher, a vacuum cleaner, a microwave, and supplementary insurance. This was achieved through the application of principal components analysis (33, 34) and the subsequent categorization of the data into four groups. Concentration index.

To demonstrate the relative inequality in health, the Concentration Index (CI) was employed. The Concentration Index (CI) is a statistical tool that quantifies the degree of inequality related to assets within a given health variable. In order to calculate the Concentration Index (CI), it is necessary to have a measure of economic status. In this case, the wealth index is employed for this purpose. The Concentration Index (CI) is derived from the Concentration Curve (CC), which provides a comprehensive picture by showing the share of health outcomes based on the cumulative ratio of individuals in the population ranked from the poorest to the wealthiest. The Concentration Index (CI) is calculated by subtracting the area between the Concentration Curve (CC) and the 45-degree line (the line of equality) from the area under the CC.

The CI value is bounded between −1 and +1. A value of zero indicates that the distribution of health metrics is uniform across the population. A positive CI value indicates that health metrics are concentrated among the wealthier segment of the population, whereas a negative CI value suggests that health metrics are concentrated among the less affluent segment. The concentration index (CI) is calculated using the following formula:

$$\mathrm{CI} = \frac{2}{\mathrm{u}}\mathrm{cov}(\mathrm{h.r}) \tag{1}$$

h: the health variable, r: the cumulative percentage and u: the mean health level.

Decomposing socioeconomic inequality

The decomposition methodology for inequality analysis is a statistical technique that breaks down total inequality within a population into contributions from various factors, including income, education, occupation, and health status. A key model used in this analysis is the Oaxaca-Blinder decomposition, which distinguishes between differences in characteristics (like education) and differences in coefficients (such as wage rates for similarly educated individuals). Research on health disparities, including obesity rates, highlights that factors like unequal access to nutritious food and healthcare, along with variations in health behaviors, contribute significantly to these inequalities. This identification of key factors can guide policymakers in creating effective interventions. While the decomposition model has advantages, such as clarity and the ability to dissect different contributing factors, it

also faces drawbacks. It may rely on selected variables, leading to bias if significant contributors are missed or poorly measured. The model assumes linear relationships between variables, which can oversimplify complex socioeconomic interactions and ignore intra-household inequalities. Additionally, it may struggle to adapt to changing economic conditions and capture the temporal or structural factors affecting inequality over time, limiting its effectiveness in tracking inequality trends [17].

Table 1 Sociodemographic characteristics of the study participants

Variables	Number (%)	Met needs (%)	*p*-value
Gender			
Female	236 (47.11)	156 (66.38)	0.244
Male	265 (52.89)	162 (61.36)	
Age group			0.470
60–70 years old	316 (63.07)	195 (61.90)	
70–80 years old	147 (29.34)	99 (67.81)	
80–90 years old	38 (7.58)	24 (63.16)	
Marital Status			
Single	3 (0.6)	3 (100.0)	0.626
Married	367 (73.25)	232 (63.39)	
Divorced	6 (1.20)	4 (66.67)	
The Widow	125 (24.95)	79 (63.71)	
Education			
Illiterate	163 (32.53)	86 (53.09)	< 0.001
Elementary	193 (35.52)	126 (63.63)	
Middle-School	51 (10.18)	28 (54.90)	
High School	56 (11.18)	43 (76.79)	
Academic	38 (7.58)	35 (92.11)	
Socioeconomic Status			
Bad	84 (16.77)	54 (64.29)	0.511
Medium	336 (67.07)	208 (62.28)	
Good	81 (16.17)	56 (69.14)	
The Degree of Dependence			
Mild Dependency	10 (2.00)	5 (50.0)	0.362
Independent	491 (98.00)	313 (64.01)	
Cardiovascular diseases			0.329
No	389 (77.64)	251 (64.86)	
Yes	112 (22.36)	67 (59.82)	
Diabetes			0.453
No	353 (70.46)	220 (62.68)	
Yes	148 (29.54)	98 (66.22)	
Arthritis			0.147
No	451 (90.38)	292 (64.75)	
Yes	48 (9.58)	26 (54.17)	
Dyslipidemia			0.050
No	453 (90.42)	256 (65.98)	
Yes	48 (9.58)	62 (55.86)	
Hypertension			0.382
No	285 (56.89)	185 (65.37)	
Yes	216 (43.11)	133 (61.57)	
Occupation			0.201
Unemployed	41 (8.18)	171 (63.04)	
Employed	245 (48.9)	20 (48.78)	
Retired	199 (39.72)	127 (64.14)	

The health concentration index can be decomposed into the contribution of individual factors to income-related inequality, where each component reflects the sensitivity of health to that factor and the degree of income inequality associated with that factor [17].This method proposed by Van Doorslaer and Jones [17].

It is assumed that there is a linear regression model between the outcome variable y and the determining variables k (X_k):

$$y_i = \alpha + \Sigma_k B_k X_{ki} + \epsilon_i \quad (2)$$

In the above equation, i represents the individual or country, B_k is the regression coefficient, and ε is the error term in the equation. Considering the relationship between y_i and X_{ki} in Eq. 2, the concentration curve C for y can be expressed as follows:

$$C = \Sigma_k \left(\frac{B_k \widehat{X}_k}{u} \right) C_k + GC_\epsilon \Big/ u = C_{\widehat{y}} + \frac{B_k \widehat{X}_k}{u} \quad (3)$$

In the above equation, u is the mean of y, $\widehat{X}_k$is the mean of X_k, C_k is the concentration index (CI) for X_k, and finally GCε is the generalized concentration index for the error term (ε).

Equation 3 is constructed from two components, explained and unexplained. The first component, or the explained one, consists of two parts: elasticity and the concentration index for the determined variables. When all the variables in Eq. 3 are estimated, the role of each variable in inequality can be calculated by multiplying the elasticity of each determinant by the magnitude of its concentration index $\frac{\beta_k X_k}{u} \times C_k$.

Results

In the course of this study, 501 elderly individuals, comprising both males and females, were recruited. The participation rate was complete. The majority of the study population was male (52.89%), and the majority of the participants were married (73.25%). The mean age of the elderly participants was 67.96 ± 6.36 years. The majority (98%) of elderly was diagnosed as independent by Barthel index (Table 1).

The concentration index for met needs was 0.15 (95% CI: 0.12, 0.19), indicating a concentration of met needs among the elderly with higher economic status (Fig. 1).

Subgroup analysis revealed that the lowest levels of met need were observed among several demographic groups. Specifically, individuals who were male (64.36% vs. 66.38%, $p = 0.244$), aged 60–70 years (61.90% vs. 67.81%,

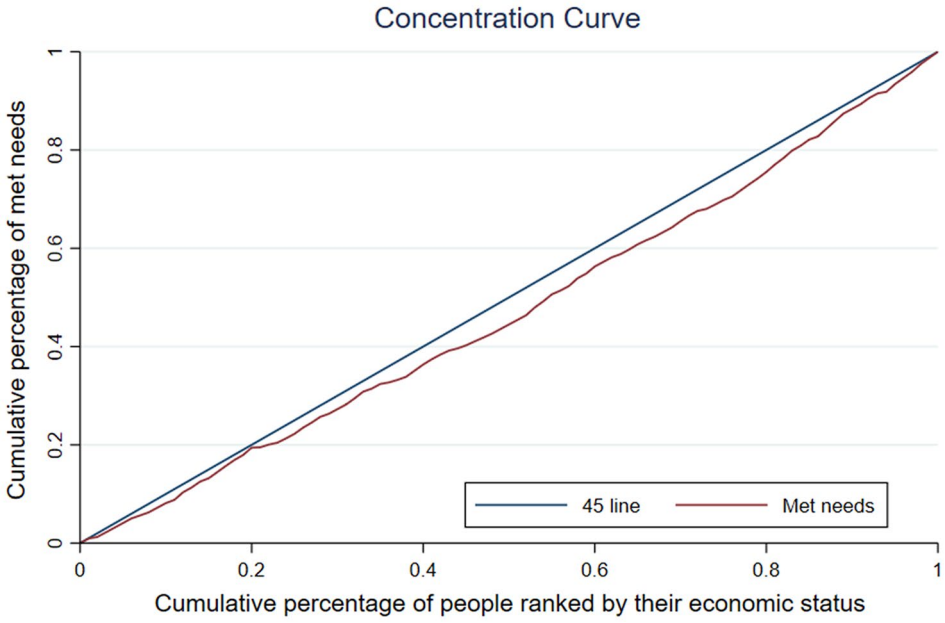

Fig. 1 Concentration curve of met needs among Iranian elderly

$p = 0.470$), married and widowed (vs. single, $p = 0.626$), illiterate (53. 09% vs. 92.11%, $p < 0.001$), middle and low SES status (64.29% and 62.28% vs. 69.14%, $p = 0.511$), independent (64.01 vs. 50.0%, $p = 0.362\%$), positive history of CVDs (59. 82% vs. 64.86%, $p = 0.329$), negative history of diabetes (62.68% vs. 62.22, $p = 0.453$), positive history of arthritis (54.17% vs. 64.75%, $p = 0.147$), positive history of dyslipidemia (55. 86% vs. 65.98%, $p = 0.050$), positive history of hypertension (61.57% vs. 65.37%, $p = 0.382$), not employed (48.78% vs. 64.14%, $p = 0.201$) (Table 1). The subgroup analysis revealed disparities in met need based on demographics. Illiterate individuals had the lowest met need, highlighting education's role in service access. Lower met need was also reported among men, older adults (60–70), married or widowed individuals, and those from middle and low socioeconomic backgrounds. While health conditions showed varied outcomes, they lacked significant differences in met need levels. Employment status also impacted met needs, especially for the unemployed. Overall, demographic and socioeconomic factors greatly influence access to and adequacy of services.

Also, the decomposition approach was employed to ascertain the proportion of determining factors in the observed inequities. The results indicated that education (60.38%) and economic status (25.32%) were the primary contributors to the inequalities in the met needs of the elderly (Table 2; Fig. 2).

Discussion

The aging of the population in the coming years will pose a serious challenge to the health and economy of the country. Given the highest burden of disease and cost of non-chronic and chronic diseases, the challenge has been to implement programs to empower the elderly, including training in self-care programs and strengthening and supporting family caregiving programs [26].

The concentration index values from our study reveal significant inequality in the distribution of resources or health outcomes, consistent with findings from similar studies around the world. In developed countries such as the United States and Canada, there are notable disparities in access to health care, especially among marginalized groups. In contrast, in developing regions such as sub-Saharan Africa and South Asia, disparities are often even greater due to factors such as poverty and inadequate health infrastructure [27]. Comparing our results with these international benchmarks helps us understand local disparities in the context of global trends in health equity. This analysis underscores the need for tailored regional strategies to address inequities and highlights the importance of a global perspective in health equity research for shared learning and solutions.

Iran's health care system is characterized by public services, with significant reliance on government-funded programs. However, cultural factors such as family dependency and traditional caregiving roles can create unique socioeconomic disparities in meeting the needs of the elderly. Unlike the U.S., where there is a strong emphasis on personal responsibility and private insurance, or sub-Saharan Africa, where access to healthcare

Table 2 Decomposition of concentration index (CI) of Met needs

Variables	Elasticity	Contribution	Total	Percent
Age group				0.0
70–80 years old	0.048	-0.000	0.000	
80–90 years old	0.005	-0.000		
Gender			-0.008	5.19
Female	0.189	-0.008		
Marital Status			-0.006	3.90
Married	-0.212	-0.006		
Occupation			0.004	2.60
Employed	0.014	0.000		
Retired	0.029	0.004		
Living Condition			0.005	3.25
With Wife	0.188	0.005		
With Children	-0.015	-0.000		
Number children			0.001	0.65
1–3 child	0.239	0.001		
4–5 child	0.234	-0.004		
> 5 child	0.129	0.004		
Education			0.093	**60.38**
Elementary	0.119	0.001		
High School	0.059	0.027		
Academic	0.096	0.065		
Wealth index			0.039	**25.32**
Wealth ^{2nd}	-0.018	0.003		
Wealth ^{3rd}	0.010	0.003		
Wealth ^{4th}	0.041	0.033		
Smoking status	-0.016	0.001	0.001	0.65
Hypertension	-0.038	0.001	0.001	0.65
Dyslipidemia	-0.056	0.003	0.003	1.95
CVDs	-0.017	0.001	0.001	0.65
Diabetes	0.042	-0.002	-0.002	1.30
Arthritis	-0.017	0.001	0.001	0.65

may be limited due to infrastructure challenges, Iran's social fabric places a heavy burden on families to care for elderly members. This can lead to disparities, with lower socioeconomic groups facing additional challenges: they may lack the financial resources to provide adequate care or access to quality health services. Thus, while inequalities exist in all three regions, the interplay of Iran's health care structure and cultural expectations highlights unique challenges for the elderly that are shaped by collective family responsibilities rather than systemic deficiencies or infrastructure barriers alone [28, 29].

Our study showed elderly men experience more unmet needs than elderly women, previous literature showed that due to a mix of social, psychological, and health factors. Societal norms often discourage men from seeking help, as masculinity is associated with self-reliance and stoicism [30]. As a result, men are less likely to share health or emotional issues, leading to underutilization of available services [31]. In contrast, women typically have stronger social networks and are more willing to seek assistance [31]. Additionally, elderly men often face more health complications, including chronic conditions that make self-care difficult. This reluctance to seek help, coupled with limited support and health challenges, contributes to higher unmet needs among elderly men [32].

The findings highlight that education and economic status are key factors contributing to inequality in meeting the needs of elderly individuals. Education accounts for 60.38% of the variance, while economic status represents 25.32%. This indicates that individuals with higher educational attainment are often better equipped to access resources and advocate for their needs, leading to more effective fulfillment of those needs. In contrast, economic limitations can restrict access to essential services, healthcare, and social support, worsening disparities among older adults. By implementing targeted educational programs and economic support initiatives, we can address these issues, reducing inequality and promoting well-being and quality of life for the elderly population. Numerous studies have shown that education significantly impacts health and well-being in older adults [33–35]. Also research consistently demonstrates that economic factors play a crucial role in the health and quality of life for older adults [36].

The present study presents empirical evidence of socioeconomic disparities in the adequacy of the elderly population's basic needs. To ascertain whether inequality exists, the concentration index was employed as the analytical tool. In instances where inequality is present, a decomposition approach was employed to ascertain the contribution of determining factors to the observed inequality. Individuals with higher levels of education and greater economic status were more likely to meet their basic needs.

The results indicated that education (60.38%) and economic status (25.32%) were the primary contributors to the inequalities in the met needs of the elderly. The results suggest that education plays a significant role in determining the met needs of older adults, with a substantial 60.38% of the variance attributed to educational factors. This suggests that higher levels of education may correlate with better access to resources and services that meet the needs of older adults. Similar studies are consistent with our findings. Economic status also emerged as an important factor, accounting for 25.32% of the observed disparities. This underscores the importance of financial stability in ensuring that older people can meet their basic needs, including health care, housing and social services [34, 37].

Taken together, these findings highlight the critical impact of both education and economic status on the well-being of older people, and suggest that interventions aimed at improving access to education and economic

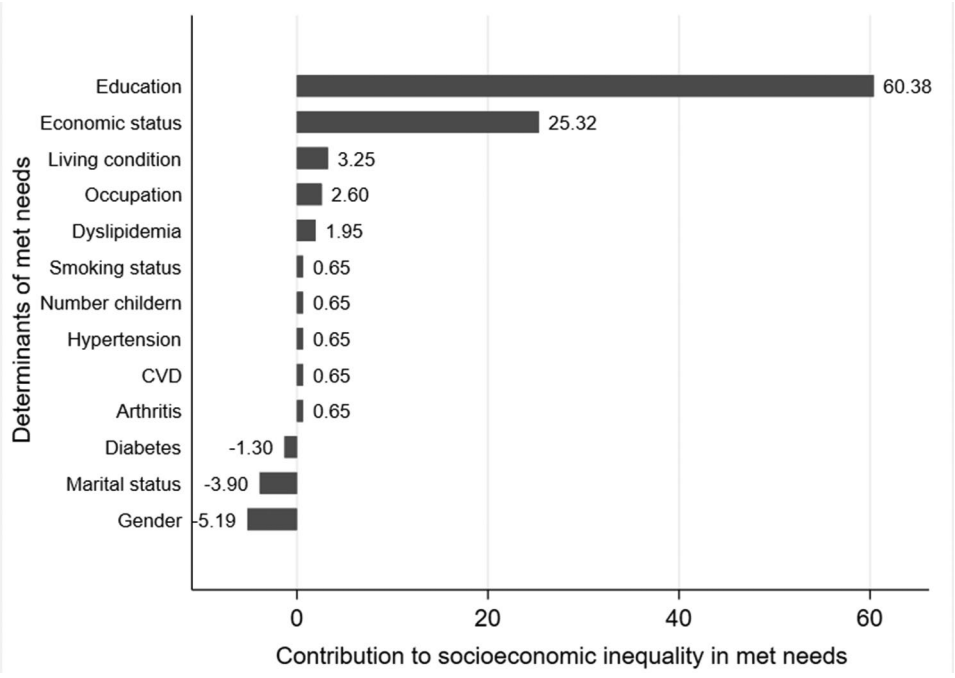

Fig. 2 The factors that contribute to socioeconomic inequality in met needs among Iranian elderly people

opportunities could be effective in reducing these inequalities.

The concentration index for met needs was positive, indicating that these needs are concentrated among elderly individuals with lower economic deprivation compared to those with higher economic deprivation. The results of the studies conducted are in alignment with our findings, including a Brazilian study that demonstrated that older adults with higher levels of education adhere to healthier diets, engage in more physical activity, and consume alcohol at a higher rate. Furthermore, they experience a reduced incidence of back pain, vision disorders, headaches, diabetes, and hypertension. The results also indicate the presence of social inequality with respect to various health indicators [38]. Another finding in Germany indicated that socially disadvantaged elderly individuals encounter greater obstacles to accessing healthcare services compared to those in more favorable social circumstances, with evidence of inequality in health during early retirement and late working age [39]. Similar results were observed in other studies conducted in the Middle East [40–42].

The prevalence of unmet needs among the elderly is associated with an increased risk of developing chronic diseases, which in turn places a greater burden on healthcare systems. Those with low incomes are particularly vulnerable to this increased risk [43]. The decomposition approach has gained considerable traction in the field of inequality studies, offering insights into the underlying factors driving inequality. Such information can be employed in the formulation of policies and the planning of healthcare services with a view to reducing inequalities.

The subgroup analysis revealed that the lowest levels of met needs, which indicate the greatest inequality, were observed among individuals aged 80 to 90, males, unemployed, illiterate people, as well as those with hypertension, dyslipidemia, cardiovascular disease (CVD), diabetes, and arthritis, all of whom exhibited high levels of unmet needs. The overall results of our study were consistent with several other studies [44–46].

Elderly who are unable to read and write encounter considerable obstacles that impede their ability to obtain essential healthcare and social services [47]. Their restricted literacy abilities can impede their ability to navigate systems designed for those with the capacity to read and write, resulting in missed appointments and misunderstandings regarding medication and support options [48]. Furthermore, this situation can result in social isolation and low self-esteem, as the individuals in question may experience difficulty in communicating their needs. Caregivers and service providers frequently fail to recognize the distinctive requirements of this demographic, presuming a fundamental level of literacy that may not be present [49]. As a result, the joint impact of illiteracy and age-related challenges can result in an insufficient recognition and addressing of their needs.

The unemployed elderly population encounters a unique set of challenges, including age-related biases in the job market, limited access to retraining opportunities,

and health issues that impede their ability to secure employment. Financial constraints resulting from prolonged unemployment contribute to elevated stress levels and diminished well-being, while social isolation can reduce the size and efficacy of their support networks [50, 51]. The current social safety nets frequently prove inadequate in meeting the needs of older adults, resulting in economic instability and a decline in quality of life. To address these challenges, it is essential to implement inclusive employment programs, enhance healthcare access, and develop robust social support systems tailored to the specific needs of the elderly.

The presence of chronic conditions (It occurs mostly in the last decade of life, for example, at the age of 60–70) in, including hypertension [52], dyslipidemia, cardiovascular disease, diabetes, and arthritis, was found to be associated with higher unmet needs [53]. This highlights the necessity of bespoke healthcare strategies to address the specific requirements of individuals with these conditions, as well as the importance of comprehensive management plans to guarantee that all patients receive appropriate care. It has been demonstrated that older adults suffering from chronic health issues encounter a multitude of unmet needs, which can be attributed to a variety of factors. These include, but are not limited to, their SES, access to healthcare, social isolation, and a paucity of adequate support systems [54]. Financial constraints impede their capacity to procure medications, while geographical barriers constrain access to healthcare services. Social isolation can intensify feelings of loneliness, which can in turn complicate the management of health conditions. The intricate nature of their conditions necessitates a unified approach to care. However, the fragmentation of healthcare systems frequently results in inadequate communication between providers, leading to treatment gaps. Furthermore, a dearth of awareness regarding available resources may impede their ability to seek assistance, ultimately leading to a decline in their quality of life [55].

Overall In Iran, significant inequalities in meeting the needs of the elderly population are perpetuated by health care infrastructure and cultural attitudes. The health care system has unequal access to services, particularly between urban and rural areas, and uneven quality due to underfunding and a lack of trained personnel [37, 56]. Limited availability of long-term care facilities and inadequate health insurance coverage exacerbate financial barriers to care. Culturally, the emphasis on family caregiving can lead to the neglect of professional health care, compounded by the stigma of seeking mental health support and negative perceptions of aging that undermine the respect and autonomy of older adults. A general lack of education about geriatric care and entrenched gender roles add to the challenges faced by caregivers, often women, who may be overwhelmed by their responsibilities [57]. Addressing these issues requires a multifaceted approach that focuses on improving the health care infrastructure, enhancing the quality of services, and challenging cultural attitudes to create a more supportive environment for elderly care in Iran.

Finally in Iran, socioeconomic inequalities have been shown to have a significant impact on the ability to meet the needs of the elderly. Cultural factors have been identified as playing a crucial role in shaping these disparities, which further exacerbate the challenges faced by elderly individuals. Additionally, cultural norms surrounding respect for elders have been found to pressure families to prioritize caregiving within the household, potentially neglecting professional and institutional assistance that could alleviate the caregiving burden [58].

Cultural factors in Iran strongly influence access to health care for the elderly and are shaped by family dynamics and gender roles. Traditionally, families bear collective responsibility for elder care, resulting in intergenerational living arrangements. However, this dependency can limit access to formal health care, especially in urban areas where youth migration isolates seniors. Women, who often serve as caregivers, may neglect their own health needs because of this role. In addition, social stigma associated with aging can marginalize older people's voices in health care decisions, creating further barriers to the comprehensive care they need [12, 59, 60]. Studies of a similar nature that have been carried out in African countries, including Nigeria and Uganda, have also yielded analogous results in this regard [61, 62].

Limitations

The study did not incorporate older adults who rely on unified care services at the main level of the country's healthcare system and are susceptible to vulnerability. Therefore, the study's findings can only be applied to older adults who visit healthcare centers.

Therefore, findings may only be relevant to older adults who actively visit healthcare centers. As a result, their applicability is limited to this specific population of older adults in Iran, excluding those in long-term care facilities. Another limitation of this study was the exclusion of institutionalized elderly populations, such as those residing in nursing homes, assisted living facilities, or other care institutions. Therefore, the generalizability of the results will be exclusively to elderly people referring to health centers. It is recommended that future studies consider assessing the needs of other groups of older adults, such as those in long-term care facilities, including nursing homes. Finally, the potential recall bias present in self-reported data would serve to dilute or strengthen the association, as is the case in any observational study.

Finally, due to the exclusion of elderly individuals not registered in the SIB system, our results may not accurately represent the entire elderly population in Western Iran. Those who are not registered may include economically disadvantaged individuals, those who lack awareness of the registration process, or those facing barriers to registration. This exclusion leaves out a significant demographic that could highlight the very inequalities we are investigating.

The study's limitations include the exclusion of older adults in unified care services and long-term care facilities, limiting the findings to those visiting healthcare centers. Future research should include these populations through outreach programs and focus on economically disadvantaged individuals to better understand inequalities among older adults in Iran. Addressing these limitations will enhance the generalizability and inclusivity of the findings.

Conclusions

The findings underscore the existence of considerable disparities in the fulfillment of the needs of the elderly, particularly among those with elevated economic standing, the unemployed, the illiterate, and those afflicted with chronic ailments. Education and economic status have been identified as key factors contributing to this disparity. To address these inequities, public health initiatives should prioritize the expansion of educational opportunities and the provision of economic support for disadvantaged older adults. Programs designed to enhance literacy and vocational training, coupled with targeted financial assistance and job opportunities, can serve to empower these individuals. Furthermore, it is imperative to prioritize the provision of tailored healthcare services for elderly individuals with chronic illnesses, thereby ensuring their access to comprehensive care. In conclusion, these measures have the potential to enhance equality in the provision of services to older adults and to improve their quality of life. In order to address the health needs of the elderly in Iran, a number of realistic solutions have been proposed within the framework of the healthcare system and social structures. These include the following: training and empowering healthcare personnel to enhance their knowledge and skills in the field of geriatric care; developing community-based care programs with home nursing services; and creating economic support packages (subsidies) for low-income seniors. Furthermore, the implementation of targeted economic support packages, including variable cash transfers contingent on income levels, subsidized healthcare, and housing assistance, is recommended to alleviate financial burdens.

Partnering with local NGOs to create support networks can foster community engagement and ensure sustainable support for vulnerable elderly populations. Establishing specialized centers for the elderly to provide counseling and treatment services, creating social networks to support seniors, promoting preventive and therapeutic programs, and using modern technology to facilitate access to health services are also among the proposals. The implementation of these programs requires the cooperation of governmental agencies, non-governmental organizations and the local community.

Acknowledgements
In this study, we would like to thank and appreciate all the participants from the city of Hamadan.

Author contributions
All authors reviewed the manuscrip.writing, review and editing S.M, Z.Ch.

Funding
This study was funded by the Vice-Chancellor of Research and Technology of the University of Hamadan University of Medical Sciences. The funders had no role in study design, data collection, and analysis, decision to publish, or manuscript preparation.

Data availability
Data available on request.

Declarations

Ethics approval and consent to participate
Informed consent was obtained in written form for literate elderly individuals and verbally for those who are illiterate. This Research performed in accordance with the Declaration of Helsinki and must have been approved by the Institutional Review Board and the Ethics Committee of Hamadan University of Medical Sciences, Hamadan, Iran, approved this study (IR.UMSHA.REC.1402.406, ID: 140206144766).

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Received: 8 December 2024 / Accepted: 29 April 2025
Published online: 15 May 2025

References

1. Naja S, Makhlouf M, Chehab MAH. An ageing world of the 21st century: a literature review. Int J Community Med Public Health. 2017;4(12):4363–9.
2. Parsa P, Rezapur-Shahkolai F, Araghchian M, Afshari M, Moradi A. Medical procedure problems from the viewpoint of elderly referrals to healthcare centers of Hamadan: A qualitative study. Iran J Ageing. 2017;12(2):146–55. https://doi.org/10.21859/sija-1202146.
3. Fang EF, Xie C, Schenkel JA, Wu C, Long Q, Cui H, et al. A research agenda for ageing in China in the 21st century: focusing on basic and translational research, long-term care, policy and social networks. Ageing Res Rev. 2020;64:101174. https://doi.org/10.1016/j.arr.2020.101174.
4. Hong L, editor. The influence of aging population on China's economy in the information society. 2010 2nd IEEE International Conference on Information Management and Engineering; 2010: IEEE.
5. Reynolds T, Thornicroft G, Abas M, Woods B, Hoe J, Leese M, et al. Camberwell assessment of need for the elderly (CANE): development, validity and reliability. Br J Psychiatry. 2000;176(5):444–52. https://doi.org/10.1017/9781911623373.012.
6. Prince MJ, Wu F, Guo Y, Robledo LMG, O'Donnell M, Sullivan R, et al. The burden of disease in older people and implications for health policy and

practice. Lancet. 2015;385(9967):549–62. https://doi.org/10.1016/s0140-6736(14)61347-7.
7. Marmot M, Wilkinson R. Social determinants of health. New York. USA: Oxford University Press; 2006.
8. Mackenbach JP, Stirbu I, Roskam A-JR, Schaap MM, Menvielle G, Leinsalu M, et al. Socioeconomic inequalities in health in 22 European countries. N Engl J Med. 2008;358(23):2468–81. https://doi.org/10.1016/s0084-3954(09)79288-7.
9. Chetty R, Stepner M, Abraham S, Lin S, Scuderi B, Turner N, et al. The association between income and life expectancy in the united States, 2001–2014. JAMA. 2016;315(16):1750–66. https://doi.org/10.1001/jama.2016.4226.
10. Marmot M. Health inequalities in the EU. Final report of a consortium. European Commission Directorate-General for Health and Consumers; 2013.
11. Lampert T, Kroll LE. Social differences in mortality and life expectancy. 2014.
12. Mansouri-Shad F, Cheraghi P, Mafakheri-Bashmaqh S, Nouri G, Cheraghi Z. Assessing Health-related needs and associated factors among the elderly in Hamadan City. Iran J Ageing.0-;https://doi.org/10.32598/sija.2024.1202.3
13. Younis NM, Ibrahim RM, Ahmed MM. Health problems related to quality of life among aging in Iraq. J Curr Med Res Opin. 2024;7(06):3015–24.
14. Thakur R, Banerjee A, Nikumb V. Health problems among the elderly: a cross. Sectional study. Annals Med Health Sci Res. 2013;3(1):19–25. https://doi.org/10.4103/2141-9248.109466.
15. Sadeghiyan F, Raei M, Hashemi M, Amiri M, Chaman R. Elderly and health problems: A cross sectional study in the shahroud Township. Iran J Ageing. 2011;6(2):0–. https://doi.org/10.15373/2249555x/may2014/159.
16. Baeten S, Van Ourti T, Van Doorslaer E. The socioeconomic health gradient across the life cycle: what role for selective mortality and institutionalization? Soc Sci Med. 2013;97:66–74. https://doi.org/10.1016/j.socscimed.2013.08.019.
17. Wagstaff A, O'Donnell O, Van Doorslaer E, Lindelow M. Analyzing health equity using household survey data: a guide to techniques and their implementation. World Bank; 2007.
18. JITAPUNKUL S, PILLAY I, EBRAHIM S. The abbreviated mental test: its use and validity. Age Ageing. 1991;20(5):332–6. https://doi.org/10.1093/ageing/20.5.332.
19. Gholizadeh S, Estaji Z, Akrami R, Ghanbari Moghaddam A. Health related needs of the elderly in Sabzevar City of Iran, 2019. J Gerontol. 2020;4(4):68–75. https://doi.org/10.29252/joge.4.3.68.
20. Fernandes L, Gonçalves-Pereira M, Leuschner A, Martins S, Sobral M, Azevedo LF, et al. Validation study of the Camberwell assessment of need for the elderly (CANE) in Portugal. Int Psychogeriatr. 2009;21(1):94–102.
21. Salehi R, Davatgaran K, Heidari M, Mostafaee N, Latifi M. The psychometric properties of the Persian version of the Camberwell assessment of needs (CANE) for Iranian elderly people with mental disorders. Iran J Ageing. 2018;13(2):168–81. https://doi.org/10.32598/sija.13.2.168.
22. Stein J, Luppa M, König H-H, Riedel-Heller SG. The German version of the Camberwell assessment of need for the elderly (CANE): evaluation of content validity and adaptation to the German-speaking context. Int Psychogeriatr. 2015;27(11):1919–26. https://doi.org/10.1017/s104161021500054x.
23. Bakhtiyari F, Foroughan M, Fakhrzadeh H, Nazari N, Najafi B, Alizadeh M, et al. Validation of the Persian version of abbreviated mental test (AMT) in elderly residents of Kahrizak charity foundation. Iran J Diabetes Metabolism. 2014;13(6):487–94.
24. Orrell M, Hancock G. CANE-Camberwell assessment of need for the elderly: A needs assessment for older mental health service users. Gaskell London; 2004.
25. Walters K, Iliffe S, Tai SS, Orrell M. Assessing needs from patient, carer and professional perspectives: the Camberwell assessment of need for elderly people in primary care. Age Ageing. 2000;29(6):505–10. https://doi.org/10.1093/ageing/29.6.505.
26. Cheraghi P, Cheraghi Z, Zanjari N. A survey of health services cost patterns in Iranian elderly: A systematic review. Pajouhan Sci J. 2019;17(3):1–7. https://doi.org/10.52547/psj.17.3.1.
27. Anyangwe SC, Mtonga C. Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa. Int J Environ Res Public Health. 2007;4(2):93–100. https://doi.org/10.3390/ijerph2007040002.
28. Aboutorabi A, Teli BD, Rezapour A, Ehsanzadeh SJ, Martini M, Behzadifar M. History of primary health care in Iran. J Prev Med Hyg. 2023;64(3):E367.
29. Olugbenga EO. Workable social health insurance systems in sub-Saharan Africa: insights from four countries. Afr Dev. 2017;42(1):147–75.
30. Olanrewaju FO, Ajayi LA, Loromeke E, Olanrewaju A, Allo T, Nwannebuife O. Masculinity and Men's health-seeking behaviour in Nigerian academia. Cogent Social Sci. 2019;5(1):1682111. https://doi.org/10.1080/23311886.2019.1682111.
31. Heaney CA, Israel BA. Social networks and social support. Health Behav Health Education: Theory Res Pract. 2008;4(1):189–210. https://doi.org/10.7326/0003-4819-116-4-350_1.
32. Rafal G, Gatto A, DeBate R. Mental health literacy, stigma, and help-seeking behaviors among male college students. J Am Coll Health. 2018;66(4):284–91. https://doi.org/10.1080/07448481.2018.1434780.
33. van Eijken M, Wensing M, de Konink M, Vernooy M, Zielhuis G, Lagro T, et al. Health education on self-management and seeking health care in older adults: a randomised trial. Patient Educ Couns. 2004;55(1):48–54. https://doi.org/10.1016/j.pec.2003.07.003.
34. Meeks S, Murrell SA. Contribution of education to health and life satisfaction in older adults mediated by negative affect. J Aging Health. 2001;13(1):92–119. https://doi.org/10.1177/089826430101300105.
35. Park Y-H, Song M, Cho B-l, Lim J-y, Song W, Kim S-h. The effects of an integrated health education and exercise program in community-dwelling older adults with hypertension: A randomized controlled trial. Patient Educ Couns. 2011;82(1):133–7. https://doi.org/10.1016/j.pec.2010.04.002.
36. Makai P, Brouwer WB, Koopmanschap MA, Stolk EA, Nieboer AP. Quality of life instruments for economic evaluations in health and social care for older people: a systematic review. Soc Sci Med. 2014;102:83–93. https://doi.org/10.1016/j.socscimed.2013.11.050.
37. Montazeri A, Goshtasebi A, Vahdaninia M. Educational inequalities in self-reported health in a general Iranian population. BMC Res Notes. 2008;1:1–6. https://doi.org/10.1186/1756-0500-1-50.
38. Barros MB, Francisco PM, Lima MG, César CL. Social inequalities in health among the elderly. Cadernos De Saude Publica. 2011;27(Suppl 2):S198–208. https://doi.org/10.1590/s0102-311x2011001400008.
39. Hoebel J, Rommel A, Schröder SL, Fuchs J, Nowossadeck E, Lampert T. Socioeconomic inequalities in health and perceived unmet needs for healthcare among the elderly in Germany. Int J Environ Res Public Health. 2017;14(10):1127. https://doi.org/10.3390/ijerph14101127.
40. Jomaa L, Hwalla N, Itani L, Chamieh MC, Mehio-Sibai A, Naja F. A Lebanese dietary pattern promotes better diet quality among older adults: findings from a National cross-sectional study. BMC Geriatr. 2016;16:1–11. https://doi.org/10.1186/s12877-016-0258-6.
41. Moradi-Lakeh M, El Bcheraoui C, Afshin A, Daoud F, AlMazroa MA, Al Saeedi M, et al. Diet in Saudi Arabia: findings from a nationally representative survey. Public Health Nutr. 2017;20(6):1075–81. Diet in Saudi Arabia: findings from a nationally representative survey.
42. Norouziasl R, Shab-Bidar S. Association of social capital and adherence to a mediterranean diet in adults living in Tehran: a cross-sectional study. BMC Public Health. 2024;24(1):2302. https://doi.org/10.1186/s12889-024-19830-x.
43. Krůtilová V. Unmet need for health care–a serious issue for European elderly? Procedia-Social Behav Sci. 2016;220:217–25. https://doi.org/10.1016/j.sbspro.2016.05.487.
44. Tang B, Li Z, Hu S, Xiong J. Economic implications of health care burden for elderly population. INQUIRY: J Health Care Organ Provis Financing. 2022;59:00469580221121511. https://doi.org/10.5034/inquiryjrnl_45.01.2.
45. Ponce NA, Hays RD, Cunningham WE. Linguistic disparities in health care access and health status among older adults. J Gen Intern Med. 2006;21(7):786–91. https://doi.org/10.1111/j.1525-1497.2006.00491.x.
46. Castaneda S, Vicente-Rabaneda EF, Garcia-Castaneda N, Prieto-Pena D, Dessein PH, Gonzalez-Gay MA. Unmet needs in the management of cardiovascular risk in inflammatory joint diseases. Expert Rev Clin Immunol. 2020;16(1):23–36. https://doi.org/10.1080/1744666x.2019.1699058.
47. Cheraghi P, Delbari A, Cheraghi Z, Karimi-Shahanjarini A, Zanjari N. Assessment of Met and unmet care needs in older adults without mental disorders using the Camberwell assessment of need for the elderly: A systematic review and Meta-analysis. J Res Health Sci. 2021;21(4):e00530. https://doi.org/10.34172/jrhs.2021.64.
48. Boscart V, McCleary L, Huson K, Sheiban L, Harvey K. Integrating gerontological competencies in Canadian health and social service education: an overview of trends, enablers, and challenges. Gerontol Geriatr Educ. 2017;38(1):17–46. https://doi.org/10.1080/02701960.2016.1230738.
49. Bee PE, Barnes P, Luker KA. A systematic review of informal caregivers' needs in providing home-based end-of-life care to people with cancer. J Clin Nurs. 2009;18(10):1379–93. https://doi.org/10.1111/j.1365-2702.2008.02405.x.
50. Kenny B, Rossiter I. Transitioning from unemployment to self-employment for over 50s. Int J Entrepreneurial Behav Res. 2018;24(1):234–55. https://doi.org/10.1108/ijebr-01-2017-0004.
51. Du Toit M, De Witte H, Van den Rothmann S. Contextual factors and the experience of unemployment: A review of qualitative studies. South Afr J

Economic Manage Sci. 2018;21(1):1–11. https://doi.org/10.4102/sajems.v21i1.2083.
52. Cheraghi P, Cheraghi Z, Bozorgmehr S. The prevalence and risk factors of osteoporosis among the elderly in Hamadan Province: A cross sectional study. Med J Islamic Repub Iran. 2018;32:111. https://doi.org/10.14196/mjiri.32.111.
53. Hoogendijk EO, Muntinga ME, van Leeuwen KM, Deeg DJ, Frijters DH, et al. Self-perceived Met and unmet care needs of frail older adults in primary care. Arch Gerontol Geriatr. 2014;58(1):37–42. https://doi.org/10.1016/j.archger.2013.09.001.
54. Cheraghi P, Mihandoost Yeganeh Z, Dosti Irani A, Sangestani M, Cheraghi Z, Khezeli M. J Geriatric Nurs. 2015;1(3):73–86. https://doi.org/10.18535/jmscr/v8i12.49.
55. Nicholson NR Jr. Social isolation in older adults: an evolutionary concept analysis. J Adv Nurs. 2009;65(6):1342–52. https://doi.org/10.1111/j.1365-2648.2008.04959.x.
56. Goharinezhad S, Maleki M, Baradaran HR, Ravaghi H. A qualitative study of the current situation of elderly care in Iran: what can we do for the future? Glob Health Action. 2016;9:32156; https://doi.org/10.3402/gha.v9.32156.
57. Rezaei N, Moghaddam SS, Farzadfar F, Larijani B. Social determinants of health inequity in Iran: a narrative review. J Diabetes Metabolic Disorders. 2023;22(1):5–12. https://doi.org/10.1007/s40200-022-01141-w.
58. Askarizad R, He J, Dastoum M. Gender disparity in public spaces of Iran: design for more inclusive cities. Cities. 2025;158:105651. https://doi.org/10.1016/j.cities.2024.105651.
59. Shamsikhani S, Ahmadi F, Kazemnejad A, Vaismoradi M. Typology of family support in home care for Iranian older people: a qualitative study. Int J Environ Res Public Health. 2021;18(12):6361. https://doi.org/10.3390/ijerph18126361.
60. Tajvar M, Arab M, Montazeri A. Determinants of health-related quality of life in elderly in Tehran, Iran. BMC Public Health. 2008;8:1–8. https://doi.org/10.1186/1471-2458-8-323.
61. Oppong C. Familial roles and social transformations:older men and women in Sub-Saharan Africa. Res Aging. 2006;28(6):654.– 68;https://doi.org/10.1177/0164027506291744.
62. Morgan R, Tetui M, Muhumuza Kananura R, Ekirapa-Kiracho E, George AS. Gender dynamics affecting maternal health and health care access and use in Uganda. Health Policy and Planning. 2017;32(suppl_5):v13-v21; https://doi.org/10.1093/heapol/czx011.

Publisher's note