

RESEARCH

Open Access



A systematic review and meta-analysis of unmet needs for healthcare and long-term care among older people

Md. Mizanur Rahman^{1*}, Megumi Rosenberg^{2†}, Gabriela Flores³, Nadia Parsell¹, Shamima Akter¹, Md Ashrafal Alam⁴, Md. Mahfuzur Rahman⁵ and Tessa Edejer³

Abstract

Background: The absolute number of older individuals needing medical care and long-term care (LTC) is increasing globally due to the growing ageing population. However, it is uncertain who and what proportion of the population has access to care. Therefore, a systematic review and meta-analysis of the prevalence and reasons for unmet needs for healthcare and long-term care among older people, 65 years old and above, across countries was conducted.

Methods: An information specialist performed a comprehensive search of four major databases (PubMed, EMBASE, Web of Science, and CINAHL) from inception to June 2020 without restrictions on language and date. We did random-effects meta-analysis to obtain pooled prevalence. We stratified the meta-analysis by reasons for unmet need categorized by barrier dimension (availability, accessibility, affordability, and acceptability), survey year, geographic location, and socio-demographic characteristics of the older individual.

Results: After screening 3912 articles, we included 101 studies published between 1996 and 2020. Of the 101 studies, 87 studies reported unmet healthcare needs and 14 studies reported unmet LTC needs. Overall, 10.4% (95% CI, 7.3–13.9) of the older population had unmet needs for healthcare. The common reasons for unmet healthcare needs were cost of treatment, lack of health facilities, lack of/conflicting time, health problem not viewed as serious, and mistrust/fear of provider. A significant variation in pooled prevalence of unmet healthcare needs due to cost was found by gender (male [10.9, 95% CI, 8.9–13.1] vs female [14.4, 95% CI, 11.8–17.3]), educational level (primary or less [13.3, 95% CI, 9.6–17.6] vs higher [7.5, 95% CI, 5.9–9.3]), self-reported health (poor [23.2, 95% CI, 18.8–27.8] vs good [4.4, 95% CI, 3.4–5.5]), insurance status (insured [9.0, 95% CI, 7.5–10.6] vs uninsured [27.7, 95% CI, 24.0–31.5]), and economic status of population (poorest [28.2, 95% CI, 14.1–44.9] vs richest [7.1, 95% CI, 3.8–11.3]). One in four (25.1, 95% CI, 17.1–34.2) older people had unmet needs in LTC. Rural residents had a higher prevalence of unmet needs in LTC compared to their urban counterparts.

Conclusion: With the population ageing globally, it is necessary to improve access to health care and LTC for older people. Ensuring affordability of health services, reducing geographical barriers, and improving acceptability, will be critical in reducing unmet need. Unmet needs for healthcare were concentrated in population with no education,

[†]Md. Mizanur Rahman and Megumi Rosenberg contributed equally to this work.

*Correspondence: mizanurrub78@gmail.com; mizanur.rahman@r.hit-u.ac.jp

¹ Hitotsubashi Institute for Advanced Study, Hitotsubashi University, Tokyo, Japan

Full list of author information is available at the end of the article



poor economic group, outpatient health facility user, and uninsured group. With education and economic-based inequalities at the forefront, all countries should focus on improving access to health services by reducing the burden related to healthcare costs.

Keywords: Unmet need, Long-term care, Barrier dimension, Older population, Systematic review, meta-analysis, Md. Mizanur Rahman and Megumi Rosenberg are jointly first author.

Background

Globally, the older population is rapidly growing, with the number of adults over 60 projected to double and that over 80 to triple from 2017 to 2050 [1]. In turn, the absolute number of older adults needing quality care will also increase [2–4]. Longitudinal studies tracking healthy ageing from 26 countries found that 71.4% of participants demonstrated stable and healthy ageing over a span of 10 years [5]. However, 25.2% of participants had stable but low health and 3.4% of participants experienced rapid deterioration in their health over time. As such, it is necessary to ensure all older people have access to quality and affordable social services, including healthcare and long-term care (LTC).

One method of measuring access to care is by estimating the proportion of the population that has unmet needs. An individual is categorized as having unmet needs if they are unable to access quality care when needed [6]. Unmet needs can arise for various reasons, including barriers related to the availability, affordability, accessibility, and acceptability of services [7]. Among older people, unmet needs for health services have been associated with adverse outcomes such as increased mortality [8] and depression [9]. While healthcare refers to medical services needed to promote, restore, or maintain health, LTC refers to assistance with activities of daily living (ADL), such as walking, eating, and bathing, and instrumental activities of daily living (IADL), such as cleaning and cooking [10]. LTC is necessary for the well-being and safety of older people with functional and/or cognitive impairments [11]. Unmet needs for LTC have been associated with increased risk of hospital admission [12], hospital readmission [13], emergency department admission for falls and injuries [14], and mortality [15]. Therefore, it is necessary to identify who is not accessing care and uncover the reasons why so that policies and interventions can be tailored to protect the health of older persons at risk.

Although there are many original studies that have examined unmet needs [16–33], to the best of our knowledge, there has been no systematic review and meta-analysis of unmet needs for healthcare or LTC among older people. Since there is great variability in prevalence and reasons for unmet healthcare needs across studies [15, 33–41], our main objective is to provide a pooled

estimate of unmet needs for healthcare among older people across countries and socio-demographic groups, as well as to identify the leading reasons for those unmet needs. In addition, our secondary objective is to estimate the proportion of unmet needs for LTC among the older population.

Methods

Literature search

We performed a systematic review and meta-analysis of observational studies assessing unmet healthcare needs. This study addressed several research questions such as What is the prevalence of unmet need for health care? What are its main drivers? How does it vary by age group, poverty status, gender and education level, geographic location (e.g. rural/urban), insurance scheme and other socio-economic status? Supply side factors (e.g. insurance scheme, availability of long-term care insurance, service location) and broader macroeconomic factors (e.g. country income group)? This study followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for reporting the manuscript [42]. An information specialist did a comprehensive literature search on June 24, 2020, for relevant articles published from inception to June 24, 2020, in the following databases: PubMed, Embase, Web of Science, and CINAHL. No date or language restrictions were applied during the database search. To identify the relevant papers, we combined with “AND” operators of three major topics: (forgone health care OR unmet needs) AND (barrier for healthcare OR long-term care) AND quantitative survey. Further searches for eligible studies were conducted by reviewing references within identified papers. The details of the search strategy are presented in the Appendix (Table S1–S4).

Inclusion and exclusion criteria

The inclusion criteria were an original article, use of household/community/facility level survey data, use of quantitative analysis, and reporting on outcomes on either forgone care or unmet needs related to healthcare or LTC. Countries at all income levels and all World Health Organization (WHO) regions were included in this study. We excluded qualitative studies, letters, case series, reviews, commentaries, and editorials. Studies

based on specific diseases or patient groups were also excluded. Following the study inclusion and exclusion criteria, two independent reviewers first screened the title and abstract (AS, RMM, AM, and RM), and then selected full texts. Any discrepancy among the reviewers during the two stages were resolved through discussions with RM, FG, and ET.

Quality assessment of methodology of the studies

The New-Castle Ottawa Scale (NOS) Tool was used to assess the study quality for observational studies. We classified the studies as of high, moderate, and low qualities, based on their total scores as follows: high if they scored ≥ 6 , moderate if they scored 4–5, and low if they scored 0–3. Two reviewers independently assessed the study quality, which were then cross-checked by two other authors. Any discrepancies found were resolved through discussion.

Data analysis

A pilot-tested data extraction form was used to collect information from the included articles. Extracted data included the first author's last name, study country, publication year, survey year, study design, sample size, age range, outcome variables, recall period of outcome variable, barrier framework, explanatory framework, and reasons for unmet needs. We recorded prevalence and event of unmet needs at the overall level and by strata, such as by age, gender, education, occupation, marital status, economic group, migrant status, type of health facilities used, insurance status, geographic location, and type of diseases. Furthermore, we compiled reasons for unmet needs when available. The data extraction form and detailed information of the extracted variables are presented in the Appendix (eMethod1).

The primary outcome of interest was unmet healthcare needs and the secondary outcome was unmet needs in LTC. We generally followed the definitions for unmet needs for healthcare or LTC used in the original studies [17, 22, 24, 43–45]. In addition, in the present study, we included foregone care, not receiving necessary care, delaying needed medical, dental, or pharmacy care in our definition of unmet healthcare needs. These terms were extracted from key papers and used to corroborate the search strategy used in identifying the original papers. Most studies referring to forgone healthcare measured it by asking questions such as, “Was there a time in the past year you needed a type of (health) care but did not get it? [19, 46–51] Likewise, studies referring to unmet needs for healthcare measured this by asking questions like, “During the past 12 months, was there ever a time when you felt that you needed health care but didn't receive it?” [30, 33, 38, 45, 52] Although the key word (unmet needs

and forgone care) is different, the question actually collects the same information. Therefore, forgone care was included in our definition of unmet healthcare needs. For similar reasons, non-receipt of needed care and delayed care were also included as unmet healthcare needs in our study. The reasons for unmet healthcare needs were derived from survey questions such as, “Thinking of the most recent time (that you didn't get care when you needed it), why didn't you get care?” [33, 38, 52]

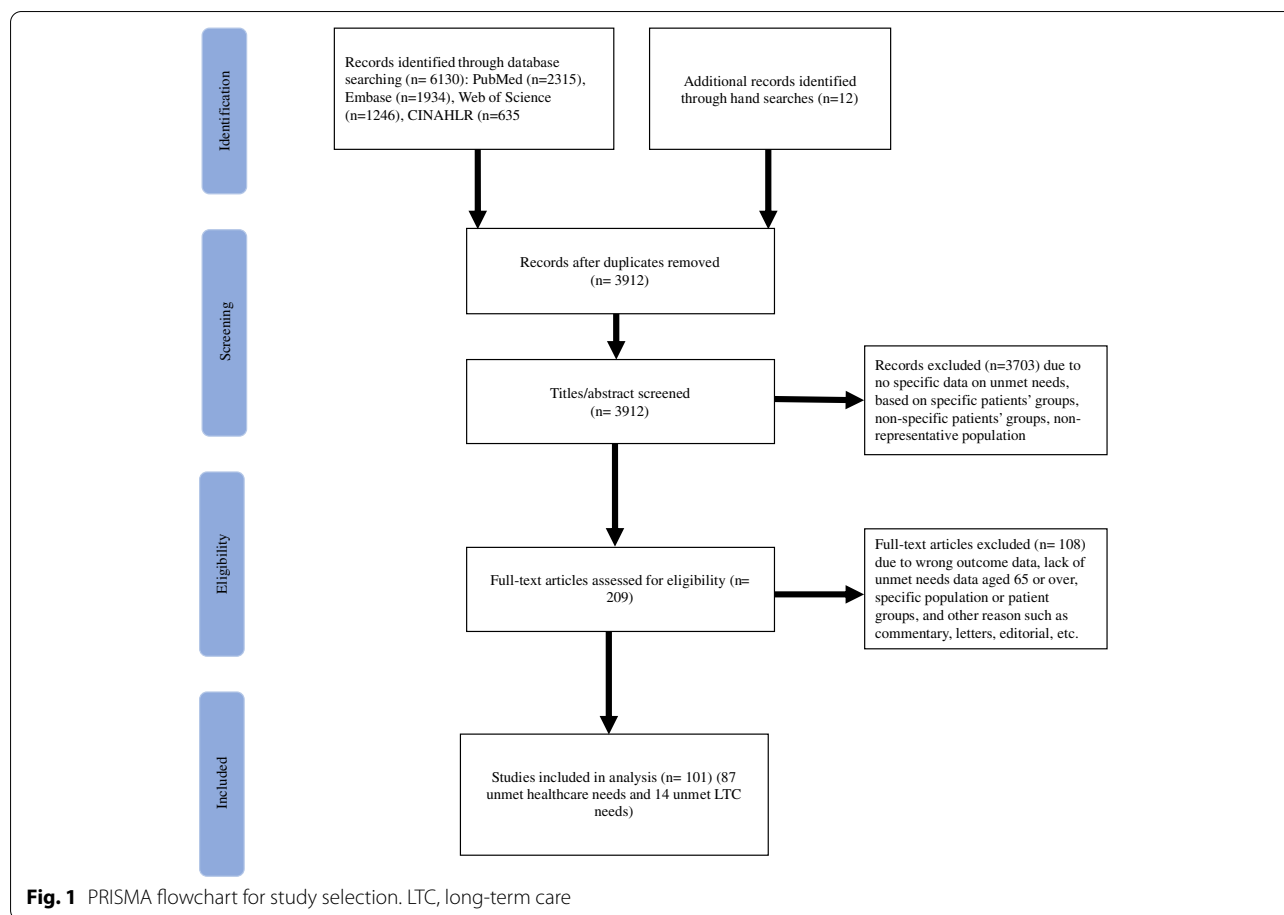
With regard to defining unmet needs for LTC, previous studies tend to define unmet needs for LTC among older people based on when a person has needs for assistance with ADL or IADL, but the assistance is unavailable, insufficient, or had to wait [14, 53]. The simplest way to define unmet need is to define the population with LTC needs and assess whether they received assistance. We followed the definition of unmet needs for LTC used in the original studies. Further information about how unmet needs in healthcare and LTC were operationalized in this study are presented in the Appendix (eMethod2).

We used prevalence estimates (i.e. proportion of the population with the outcome of interest) for the meta-analysis. When necessary, we calculated prevalence using the original study data provided in the publications. Fixed-effect or random effects meta-analysis was performed depending on the degree of heterogeneity. We used I^2 statistic to assess the level of statistical heterogeneity between the included studies. Based on previous studies, I^2 of < 50 indicated low heterogeneity, between 50 and 75% indicated moderate heterogeneity, and greater than 75% indicated high heterogeneity. We summarized the study-specific estimates using a random-effects model to obtain a pooled prevalence of unmet needs [54]. Furthermore, we summarized unmet needs for the following subgroups: the older population (age 65 and above) stratified by reason for unmet needs/barrier dimension, gender (male or female), level of education (primary or less, secondary or college, or higher), self-reported health status (poor/fair, good/average, or very good/excellent), type of illness (NCDs/chronic condition or depression symptoms), insurance enrollment status (insured or uninsured), level of income or socioeconomic status (by quintile, i.e., poorest, poorer, average, rich, or richest), place of residence (urban or rural), and survey year (≤ 2000 , 2001–2010, or 2011–2019). All analyses were performed using Stata version 16.1/MP (StataCorp, College Station, TX, USA).

Results

Study characteristics

The electronic databases identified 6130 articles. The grey literature search and review of relevant references identified 12 more articles. After removal of duplicates,



3912 articles were eligible for title and abstract screening, resulting in 209 articles that were extracted for full text review. After reviewing the full text, 101 articles were included in the systematic review and meta-analysis (Fig. 1). Of these, 87 studies reported unmet needs for healthcare among the older population, 65 years and older, as outcome variables and 14 studies focused only on unmet LTC needs. The included studies were conducted as early as 1996 and up to 2020. More than 90% of the studies were conducted in the United States of America (USA) and European countries and very few in the Asian and African regions. The study characteristics of the included papers are summarized in the Appendix (Table S5-S6). Most of the included studies were of high quality (Table S7-S10).

Prevalence estimate across different types of care

Table 1 shows the summary estimates of unmet needs for healthcare generally and, in cases where it was specified in the study, by type of care. In the summary analysis, the numerator was the total number of older individuals that had unmet needs and the denominator was the total

older population. On average, 10.0% of the included population had unmet healthcare needs due to any reason. Prevalence of unmet need differed by type of care in the older population: unmet need was highest for prescription/medications (15.0%, 4 studies) and the lowest for checkups/examinations (7.7%, 3 studies).

Reasons for unmet healthcare needs

We classified reasons for unmet needs for healthcare into four barrier dimensions: availability, accessibility, affordability, and acceptability. In this sub-group analysis, the numerator was the total number of individuals that reported a reason for unmet healthcare needs related to a specific barrier dimension and the denominator was the total number of individuals that reported unmet healthcare needs. Figure 2 presents the prevalence of unmet healthcare needs associated with each barrier dimension and the detailed reasons for unmet healthcare needs among the older population. Among the older people that reported unmet healthcare needs, the leading barrier dimension was for problems of affordability (31.7%, 4 studies), followed by acceptability (10.4%,

Table 1 Summary estimates of unmet needs for healthcare among older people, 65 years and older (N = 87 studies)

Unmet need for healthcare	No. of studies	Frequency of unmet needs population	Pooled prevalence (95% CI)
Overall (Type of care not specified)	73	5,494,058	10.0 (9.2–10.9)
By type of care (Only when specified)			
Unmet needs for medical care	4	1858	10.4 (7.3–13.9)
Unmet needs for dental care	6	2094	8.8 (5.6–12.7)
Unmet needs for checkup/examination	3	471	7.7 (4.8–11.2)
Unmet needs for prescription/medications	4	507	15.0 (10.5–20.0)

Note: In this summary estimate, numerator was total number of older population who reported unmet needs for healthcare and denominator was total number of older population

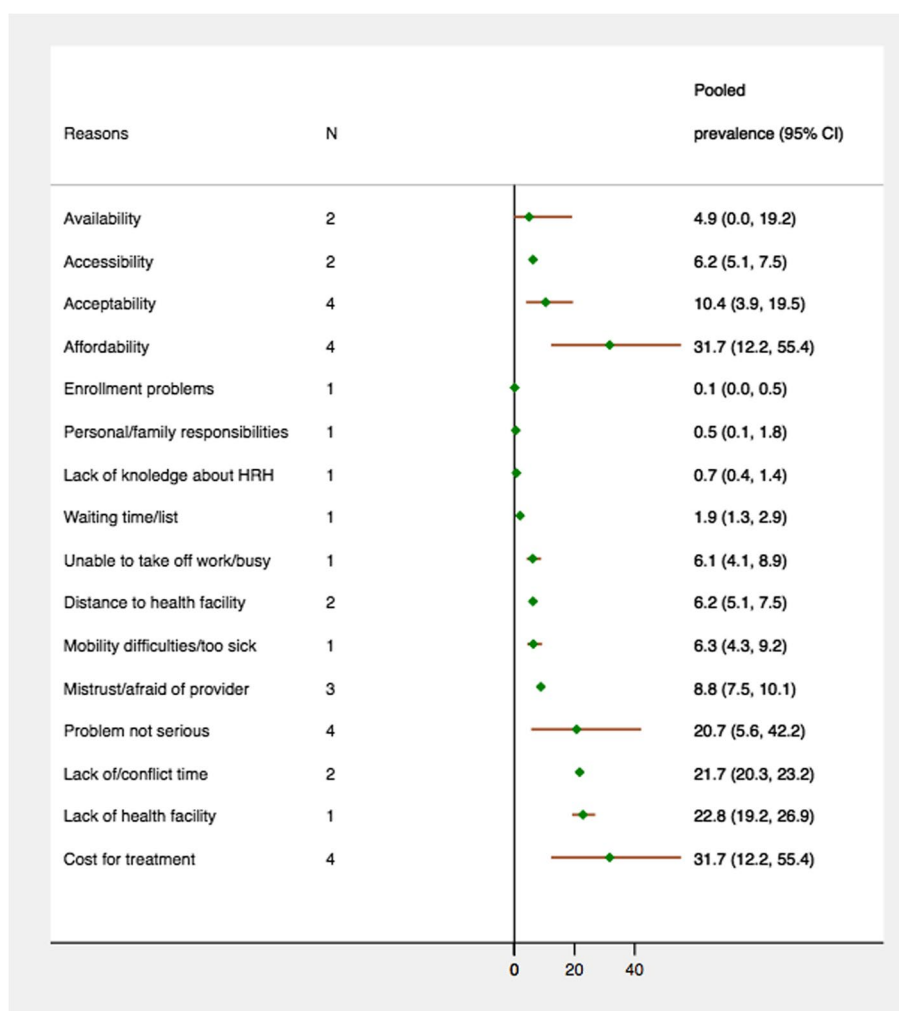


Fig. 2 Reason specific prevalence of unmet needs for healthcare among older people

4 studies), accessibility (6.2%, 2 studies) and availability (4.9%, 2 studies). In case of detailed reasons, the most commonly reported reasons for unmet healthcare need

were cost of treatment (31.7%, 4 studies), lack of health facilities (22.8%, 1 study), lack of/conflicting time (21.7%, 2 studies), health problem viewed as not serious (20.7%,

4 studies), mistrust/fear of providers (8.8%, 3 studies), mobility difficulties/too sick (6.3%, 1 study), distance to health facility (6.2%, 2 studies), and unable to take off work/busy (6.1%, 1 study).

Subgroup analysis by socio-demographic characteristics and survey year

Prevalence of unmet healthcare needs among older people differed significantly by socio-demographic characteristics (Table 2). Focusing on unmet healthcare needs due to cost-related reasons, which was the most

common, there were significant variations in prevalence by gender (male [10.9%] vs female [14.4%]), educational level (primary or less [13.3%] vs higher [7.5%]), self-reported health (poor [23.2%] vs good [4.4%]), insurance status (insured [9.0%] vs uninsured [27.7%]), and economic status of population (poorest [28.2%] vs richest [7.1%]). Rates of unmet needs for healthcare among older people significantly increased from 4.3% in studies conducted during 2001–2010 to 10.8% in studies conducted during 2011–2019. Almost similar pattern was found in case unmet healthcare needs due to any reasons. The details country-specific prevalence

Table 2 Unmet need for healthcare among the older population by selected variables and by reasons for the unmet need for healthcare

Characteristics	Due to any reason		Due to cost/economic reasons	
	No. of studies	Prevalence (95% CI)	No. of studies	Prevalence (95% CI)
Gender		(<i>p</i> = 0.8)		(<i>p</i> < 0.01)
Male	31	12.5 (7.1–19.2)	20	10.9 (8.9–13.1)
Female	31	13.6 (11.0–16.4)	22	14.4 (11.8–17.3)
Educational level		(<i>P</i> = 0.3)		(<i>p</i> < 0.01)
Primary or less	14	11.4 (9.0–14.1)	13	13.3 (9.6–17.6)
Secondary or college	18	12.3 (10.0–14.0)	11	12.2 (9.3–15.3)
Higher	12	14.5 (11.6–17.8)	13	7.5 (5.9–9.3)
Self-reported health		(<i>p</i> < 0.01)		(<i>p</i> < 0.01)
Poor/fair	16	20.2 (17.0–23.6)	9	23.2 (18.8–27.8)
Good/average	14	17.3 (10.9–24.8)	6	4.4 (3.4–5.5)
Very good/excellent	14	11.6 (9.7–13.7)	5	13.8 (8.7–19.8)
Type of illness		(<i>p</i> = 0.7)		(<i>p</i> = 0.8)
Have NCD/chronic condition	10	7.1 (5.8–8.5)	10	12.8 (7.9–18.8)
Have depression symptoms	6	6.2 (2.0–12.4)	7	13.6 (13.1–14.1)
Insurance status		(<i>P</i> = 0.3)		(<i>p</i> < 0.01)
Insured ^a	14	14.4 (9.5–20.0)	9	9.0 (7.5–10.6)
None	13	18.0 (14.8–21.4)	10	27.7 (24.0–31.5)
Income/SES group		(<i>p</i> < 0.01)		(<i>p</i> < 0.01)
Q1 (Poorest)	18	23.6 (19.3–28.3)	8	28.2 (14.1–44.9)
Q2	17	13.9 (10.4–17.9)	7	15.3 (8.6–23.4)
Q3	17	11.2 (6.6–16.9)	7	10.1 (5.6–15.8)
Q4	14	9.2 (6.8–11.8)	6	9.7 (4.6–16.4)
Q5 (Richest)	11	6.5 (5.0–8.1)	7	7.1 (3.8–11.3)
Residence		(<i>p</i> = 0.9)		(<i>p</i> = 0.3)
Urban	13	14.4 (11.5–17.6)	5	12.8 (9.0–17.2)
Rural	15	14.7 (11.2–18.6)	5	16.2 (11.8–21.2)
Survey year		(<i>p</i> < 0.01)		(<i>p</i> < 0.01)
≤ 2000	8	12.4 (7.8–17.8)	3	7.4 (3.2–13.2)
2001–2010	34	15.5 (12.1–19.2)	14	4.3 (3.1–5.8)
2011–2019	28	10.1 (8.3–11.9)	19	10.8 (9.9–11.8)

^a Type of insurance included public/private/other types

Note: In this stratified analysis, numerator was total number of older population who reported unmet needs for healthcare and denominator was total number of older population in each stratifier

of unmet healthcare needs among older people is presented in the supplemental Appendix (Fig. S1-S2).

Unmet LTC needs

Figure 3 presents the pooled prevalence of unmet needs for LTC among older people. On average, 25.1% of older people had unmet needs for LTC (13 studies). The prevalence of unmet need for care related to ADLs (23.8%) was higher than that related to IADLs (11.0%). Rural residents had a higher prevalence of unmet needs in LTC (51.1%, 4 studies) compared to their urban counterparts (48.0%, 4 studies).

Discussion

The main objective of this systematic review and meta-analysis was to estimate the prevalence of unmet needs for healthcare among the older population across socio-demographic groups and to understand the reasons for unmet needs. Furthermore, given the importance of LTC for the well-being of older individuals with physical and/or cognitive limitations and their family caregivers, we additionally estimated unmet needs for LTC.

On average, 10.0% of the included older population had unmet healthcare needs and this prevalence differed by type of care: unmet need was highest for prescription/medications (15.0%, 4 studies) and the lowest

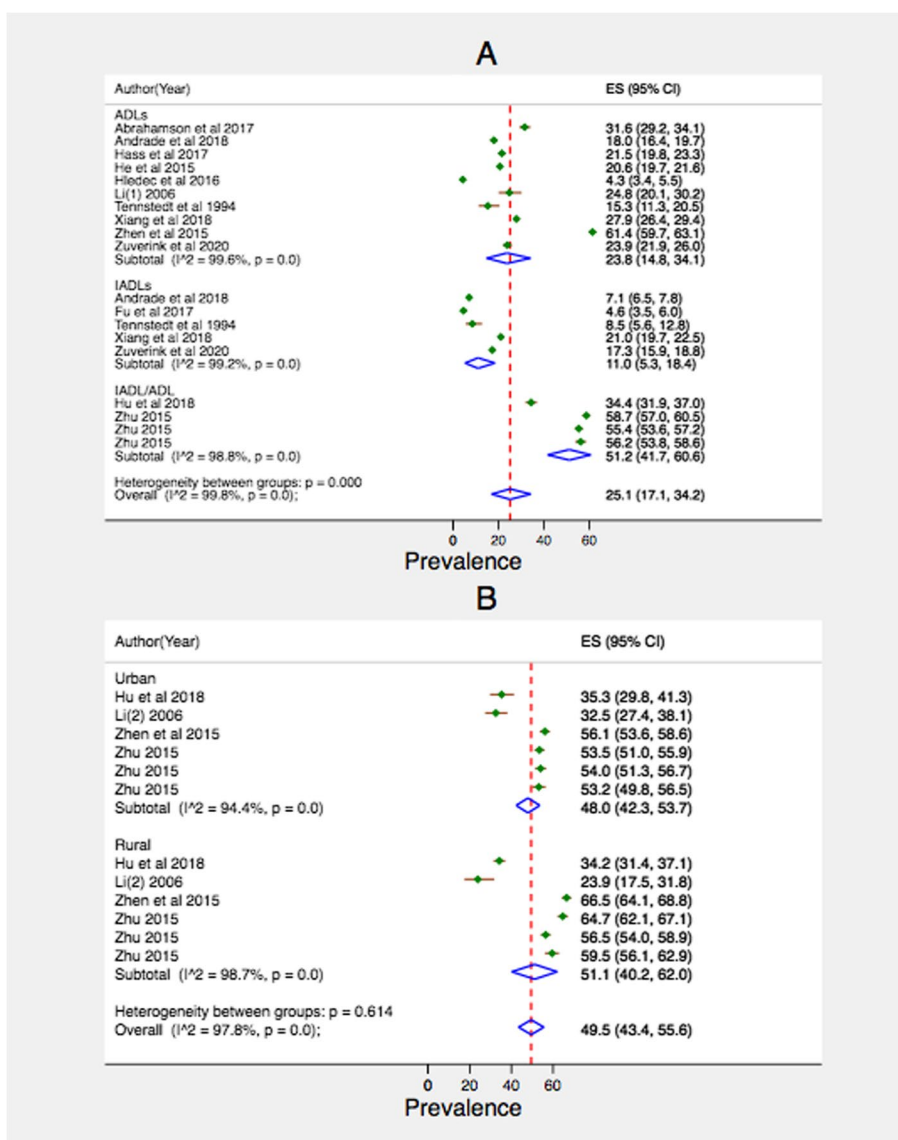


Fig. 3 Pooled prevalence of unmet long-term care needs among the older population. A, by health condition and overall; B, by place of residence

for checkups/examinations (7.7%, 3 studies). The study findings indicated that affordability-related problems, such as cost of treatment, were the most frequently reported reasons for unmet needs, with other major barriers including lack of health facilities, mistrust/fear of provider, and lack of time/conflicting time schedules. Moreover, a fifth of the total included population had unmet needs because they did not perceive their health concerns to be serious enough to warrant medical care.

Those who need the most care tend to have the least access since utilization of services is heavily influenced by socioeconomic factors [55]. Our results suggest that older people with poorer self-reported health, those with primary or less education, and those in the poorest quintile have higher unmet needs than their respective counterparts. Most often, disadvantaged groups have less access to healthcare and are more likely to be exposed to behavioral risk factors (i.e., tobacco, unhealthy foods, and alcohol) that result in poorer health outcomes [55, 56]. Additionally, our findings revealed that women report more unmet needs than men. Although women live longer than men, women spend more years living with disability and are more likely to be in poverty and report difficulties affording care [57]. Factors such as lower wages and less years in paid employment (due to role as primary caregiver) may result in less financial resources to pay for healthcare [58, 59].

In addition to increased need for medical care, most older adults will eventually need assistance for LTC as their physical and/or cognitive abilities start to decline. Overall, we found that a quarter of the older population had unmet LTC needs, with higher unmet needs for ADL than for IDL. Having unmet need for LTC, especially for ADL, can place older individuals in danger of injuries, falls, and death [14, 22]. Furthermore, the subgroup analysis found unmet needs for LTC to be higher in rural areas. While most LTC is provided by families, formal LTC may be limited in rural areas due to limited supply of skilled workers, community-based care, and institutional care services [60]. Globally, the need for formal (paid) LTC and government assistance to cover costs are rising [55]. Countries such as Sweden, the Netherlands, and Japan have been able to fund and provide comprehensive LTC through financing mechanisms such as general taxes and social insurance schemes (compulsory payments through payroll/income) [61]. As the demand for LTC is expected to sharply increase due to global population ageing, important lessons on how to finance and structure LTC can be drawn from such countries that have been adapting their health and social care systems to the changing needs of an aging population.

Strength and limitations

The use of comprehensive search techniques and validated systematic review methods, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline [42], strengthens our conclusions. We investigated the prevalence of unmet needs for healthcare in the general population and specifically among older people across countries, by socio-demographic groups, and over time. Furthermore, we used the appropriate statistical techniques to estimate pooled prevalence of unmet needs for healthcare and LTC and identified the leading reasons for unmet needs among the older population. We gave visibility to a critical dimension of unaffordability (unmet needs for financial reasons) but it is beyond the scope of this paper to study financial hardship arising from out-of-pocket payments (the other dimension of unaffordability) [62–65]. Despite these strengths, there are several limitations to this study. First, most of our included studies were from countries in Europe and the USA while only a few were from countries in Asia and Africa. Therefore, our findings are not inclusive of all countries in the world. Second, we were not able to perform detailed subgroup analysis for unmet needs for LTC due to lack of available data. Third, we found severe heterogeneity of prevalence in the included studies. To explain this heterogeneity, we conducted stratified analyses by survey year, sample size, and other participant level characteristics.

Conclusion

Although this study found a high level of heterogeneity in the prevalence of unmet needs among the older population across studies, our findings suggest that unmet needs for healthcare among older people are mainly due to cost of treatment, lack of health facilities, lack of/conflicting time, health problem not viewed as serious, and mistrust/fear of the provider. Prevalence of unmet needs are more prevalent among older people in disadvantaged population groups. Financial protection policies need to be strengthened in the studied countries to remove financial barriers to care and ensure equity in service coverage. This should consider older people's needs for chronic healthcare and LTC in the context of global population ageing. Based on the findings of this study, the following policy recommendations are as follows:

- Increase government expenditure on health, invest in compulsory social health insurance programs, and subsidize premiums for the disadvantaged population including poor, uninsured, and unemployed population.
- Invest in affordable and reliable transportation to health facilities for rural residents.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s13561-022-00398-4>.

Additional file 1: Table S1. PubMed search results (June 24, 2020). **Table S2.** EMBASE search results (June 24, 2020). **Table S3.** Web of Science search results (June 24, 2020). **Table S4.** CINAHL search results (June 24, 2020). **Table S5.** Background characteristics of the study ($N=87$). **Table S6.** Background characteristics of unmet long-term care needs study ($N=14$). **Table S7.** Quality assessment of the cross-sectional studies to unmet needs. **Table S8.** Quality assessment of the Cohort studies related to unmet needs. **Table S9.** Quality assessment of the Cross-sectional studies related to long-term care. **Table S10.** Quality assessment of the Cohort-sectional studies related to long-term care. **Figure S1.** Country-specific prevalence for forgone healthcare due to cost-related reasons among older people, 65 years and above. **Figure S2.** Unmet needs for healthcare among older people due to any reason by country.

Acknowledgements

Not applicable.

Authors' contributions

Rosenberg M, Rahman MM, Flores G, and Edejer T conceived of the study. Rahman MM, Alam A, Akter S, Rahman M performed the literature screening and data extraction. Rahman MM contributed to statistical analysis, and interpretation of data. Rahman MM and Nadia P wrote the first draft of the paper. Rosenberg M checked for consistency of the study. Rosenberg M, Flores G, and Edejer T revised it critically for important intellectual content. All authors have reviewed and approved the final manuscript.

Authors' information

Not applicable.

Funding

World Health Organization. The funder of the study had a role in concept development and design, data interpretation, and critical review of the report. The corresponding author had full access to all the data in the study.

Availability of data and materials

The is not publicly available. The corresponding author is fully responsible for data gathering.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

We declare no competing interests.

Author details

¹Hitotsubashi Institute for Advanced Study, Hitotsubashi University, Tokyo, Japan. ²Centre for Health Development, World Health Organization, Kobe, Japan. ³Department of Health Systems Governance and Financing, World Health Organization, Geneva, Switzerland. ⁴Department of Computational Diagnostic Radiology and Preventive Medicine, The University of Tokyo Hospital, Tokyo, Japan. ⁵Global Public Health Research Foundation, Dhaka, Bangladesh.

Received: 24 March 2022 Accepted: 19 September 2022
Published online: 09 December 2022

References

- Nations U. World population ageing 2017-highlights. New York: United Nations; 2017. Available from: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Highlights.pdf [cited 2021 Mar 3]. 2017
- Chongsuvivatwong V, Phua KH, Yap MT, et al. Health and health-care systems in Southeast Asia: diversity and transitions. *Lancet*. 2011;377(9763):429–37.
- Kingston A, Comas-Herrera A, Jagger C, project M. Forecasting the care needs of the older population in England over the next 20 years: estimates from the population ageing and care simulation (PACSim) modelling study. *Lancet Public Health*. 2018;3(9):e447–e55.
- Li L, Du T, Hu Y. The effect of population aging on healthcare expenditure from a healthcare demand perspective among different age groups: Evidence from Beijing City in the People's Republic of China. *Risk Manag Healthc Policy*. 2020;13:1403.
- Organization WH. Decade of healthy ageing: baseline report. 2020; (Licence: CC BY-NC-SA 3.0 IGO).
- Carr W, Wolfe S. Unmet needs as sociomedical indicators. *Int J Health Serv*. 1976;6:33–46.
- Tanahashi T. Health service coverage and its evaluation. *Bull World Health Organ*. 1978;56(2):295–303.
- Lindstrom C, Rosvall M, Lindstrom M. Unmet health-care needs and mortality: A prospective cohort study from southern Sweden. *Scand J Public Health*. 2020;48(3):267–74.
- Stein J, Liegert P, Dorow M, König H-H, Riedel-Heller SG. Unmet health care needs in old age and their association with depression—results of a population-representative survey. *J Affect Disord*. 2019;245:998–1006.
- OECD EaWHO. A System of Health Accounts 2022. Paris: Revised edition, OECD Publishing; 2017. <https://doi.org/10.1787/9789264270985-en>.
- Feder J, Komisar HL, Niefeld M. Long-term care in the United States: an overview. *Health Aff (Millwood)*. 2000;19(3):40–56.
- Kuzuya M, Hirakawa Y, Suzuki Y, et al. Association between unmet needs for medication support and all-cause hospitalization in community-dwelling disabled elderly people. *J Am Geriatr Soc*. 2008;56(5):881–6.
- DePalma G, Xu H, Covinsky KE, et al. Hospital readmission among older adults who return home with unmet need for ADL disability. *Gerontologist*. 2013;53(3):454–61.
- Hass Z, DePalma G, Craig BA, Xu H, Sands LP. Unmet need for help with activities of daily living disabilities and emergency department admissions among older medicare recipients. *The Gerontologist*. 2017;57(2):206–10.
- Zhen Z, Feng Q, Gu D. The impacts of unmet needs for long-term care on mortality among older adults in China. *J Disabil Policy Stud*. 2015;25(4):243–51.
- Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav*. 1995;36(1):1–10.
- Zhu. Unmet needs in long-term care and their associated factors among the oldest old in China. *BMC Geriatr*. 2015;15:46.
- Berridge C, Mor V. Disparities in the prevalence of unmet needs and their consequences among black and white older adults. *J Aging Health*. 2018;30(9):1427–49.
- Allen EM, Call KT, Beebe TJ, McAlpine DD, Johnson PJ. Barriers to care and health care utilization among the publicly insured. *Med Care*. 2017;55(3):207–14.
- Allin S, Grignon M, Le Grand J. Subjective unmet need and utilization of health care services in Canada: what are the equity implications? *Soc Sci Med*. 2010;70(3):465–72.
- Tennstedt S, McKinlay J, L K. Unmet need among disabled elders: a problem in access to community long term care? *Soc Sci Med*. 1994;38(7):915–24.
- He S, Craig BA, Xu H, et al. Unmet need for ADL assistance is associated with mortality among older adults with mild disability. *Ser A Biol Sci Med Sci*. 2015;70(9):1128–32.
- Andrade TB, FB A. Unmet need for assistance with activities of daily life among older adults in Brazil. *Rev Saude Publica*. 2018;52:75.
- Hass Z, DePalma G, Craig BA, Xu H, LP S. Unmet need for help with activities of daily living disabilities and emergency department admissions among older Medicare recipients. *Gerontologist*. 2017;57(2):206–10.

25. Stransky ML. Unmet needs for care and medications, cost as a reason for unmet needs, and unmet needs as a big problem, due to health-care provider (dis)continuity. *J Patient Exp*. 2018;5(4):258–66.
26. Casado BL, van Vulpden KS, SL D. Unmet needs for home and community-based services among frail older Americans and their caregivers. *J Aging Health*. 2011;23(3):529–53.
27. Ko H. Unmet healthcare needs and health status: panel evidence from Korea. *Health Policy*. 2016;120(6):646–53.
28. Choi NG, Dinitto DM, Choi BY. Unmet healthcare needs and healthcare access gaps among uninsured U.S. adults aged 50–64. *Int J Environ Res Public Health*. 2020;17(8).
29. Lee SY, Kim CW, Kang JH, Seo NK. Unmet healthcare needs depending on employment status. *Health Policy*. 2015;119(7):899–906.
30. Connolly S, Wren MA. Unmet healthcare needs in Ireland: analysis using the EU-SILC survey. *Health Policy*. 2017;121(4):434–41.
31. Hu B, Wang J. Unmet long-term care needs and depression: the double disadvantage of community-dwelling older people in rural China. *Health Soc Care Community*. 2019;27(1):126–38.
32. Fu Y, Guo Y, Bai X, Chui E. Factors associated with older people's long-term care needs: a case study adopting the expanded version of the Anderson model in China. *MC Geriatr*. 2017;17(1):38.
33. Cavalieri M. Geographical variation of unmet medical needs in Italy: a multivariate logistic regression analysis. *Int J Health Geogr*. 2013;12:27.
34. Bagshaw P, Bagshaw S, Frampton C, et al. Pilot study of methods for assessing unmet secondary health care need in New Zealand. *N Z Med J*. 2017;130(1452):23–38.
35. Bonfrer I, Gustafsson-Wright E. Health shocks, coping strategies and foregone healthcare among agricultural households in Kenya. *Global public health*. 2017;12(11):1369–90.
36. Calzón Fernández S, Fernández Ajuria A, Martín JJ, Murphy MJ. The impact of the economic crisis on unmet dental care needs in Spain. *J Epidemiol Community Health*. 2015;69(9):880–5.
37. Chae S, Lee Y, Kim J, Chun KH, Lee JK. Factors associated with perceived unmet dental care needs of older adults. *Geriatr Gerontol Int*. 2017;17(11):1936–42.
38. Chaupain-Guillot S, Guillot O. Health system characteristics and unmet care needs in Europe: an analysis based on EU-SILC data. *Health Econ*. 2014.
39. Cordasco KM, Mengeling MA, Yano EM, Washington DL. Health and health care access of rural women veterans: findings from the National Survey of women veterans. *J Rural Health*. 2016;32(4):397–406.
40. Marcin SP, Butler JR, Connelly LB. Unmet medical needs and health care accessibility in seven countries of Eastern Europe. 2014. (<https://mpr.ub.uni-muenchen.de/id/eprint/75619>).
41. Yu JW, Adams SH, Burns J, Brindis CD, Irwin CE Jr. Use of mental health counseling as adolescents become young adults. *J Adolesc Health*. 2008;43(3):268–76.
42. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7):e1000097.
43. Xiang X, An R, Heinemann A. Depression and unmet needs for assistance with daily activities among community-dwelling older adults. *Gerontologist*. 2018;58(3):428–37.
44. Reichard A, Stransky M, Phillips K, McClain M, Drum C. Prevalence and reasons for delaying and foregoing necessary care by the presence and type of disability among working-age adults. *Disabil Health J*. 2017;10(1):39–47.
45. Hwang J. Understanding reasons for unmet health care needs in Korea: what are health policy implications? *BMC Health Serv Res*. 2018;18(1):557.
46. Ford CA, Bearman PS, Moody J. Foregone health care among adolescents. *JAMA*. 1999;282(23):2227–34.
47. Guessous I, Gaspoz JMT, Theler JM, Wolff H. High prevalence of forgoing healthcare for economic reasons in Switzerland: a population-based study in a region with universal health insurance coverage. *Prev Med*. 2012;55(5):521–7.
48. Guessous I, Theler JM, Durosier Izart C, et al. Forgoing dental care for economic reasons in Switzerland: a six-year cross-sectional population-based study. *BMC Oral Health*. 2014;14:121.
49. Litwin H, Sapir EV. Foregone health care due to cost among older adults in European countries and in Israel. *Eur J Ageing*. 2009;6(3):167–76.
50. Lucevic A, Péntek M, Kringos D, et al. Unmet medical needs in ambulatory care in Hungary: forgone visits and medications from a representative population survey. *Eur J Health Econ*. 2019;20:71–8.
51. Wisk LE, Witt WP. Predictors of delayed or forgone needed health care for families with children. *Pediatrics*. 2012;130(6):1027–37.
52. Sibley LM, Glazier RH. Reasons for self-reported unmet healthcare needs in Canada: A population-based provincial comparison. *Healthcare Policy*. 2009;5(1):87–101.
53. Williams J, Lyons B, Rowland D. Unmet long-term care needs of elderly people in the community: a review of the literature. *Home Health Care Serv Q*. 1997;16(1–2):93–119.
54. DerSimonian R, Laird N. Meta-analysis in clinical trials control *Clin trials* 7: 177–188. Find this article online. 1986.
55. Organization WH. World report on ageing and health: world health Organization; 2015.
56. Allen L, Smith R, Simmons-Jones F, Roberts N, Honney R, Currie J. Addressing social determinants of noncommunicable diseases in primary care: a scoping review. *Eur J Public Health*. 2020;30(Supplement_5):ckaa1651131.
57. World Health Organization. Ageing and health. Geneva; 2018.
58. Manandhar M, Hawkes S, Buse K, Nosrati E, Magar V. Gender, health and the 2030 agenda for sustainable development. *Bull World Health Organ*. 2018;96(9):644–53.
59. Sakamoto H, Rahman M, Nomura S, et al. Japan health system review 2018.
60. Zhang L, Zeng Y, Wang L, Fang Y. Urban–Rural Differences in Long-Term Care Service Status and Needs Among Home-Based Elderly People in China. *Int J Environ Res Public Health*. 2020;17(5):1701.
61. Weiner J, Coe NB, Hoffman AK, Werner RM. Policy options for financing long-term care in the US. *Policy*. 2020;4:15–2020.
62. Organization WH. Global monitoring report on financial protection in health 2019. World Health Organization and International Bank for Reconstruction and Development / The World Bank; 2019. Licence: CC BY-NC-SA 3.0 IGO. 2020.
63. Thomson S, Cylus J, Evetovits T. Can people afford to pay for health care? New evidence on financial protection in Europe. *Eurohealth*. 2019;25(3):41–6.
64. WHO/PAHO. Health financing and financial protection in the Americas. http://www.who.int/health_financing/events/who_paho_uhc_day_2017_report_web.pdf?ua=1 2017.
65. Wang H, Torres LV, Travis P. Financial protection analysis in eight countries in the WHO South-East Asia region. *Bull World Health Organ*. 2018;96(9):610.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

