

Perceived unmet healthcare needs among older Europeans in the COVID-19 pandemic and beyond: the telemedicine solution

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Abstract

This study explores the determinants of unmet healthcare needs among older Europeans following the pandemic. Using data from the SHARE study involving 37,225 individuals aged 50 and above, we examine the barriers to healthcare access during the COVID-19 pandemic and the utilization of telemedicine. Approximately 15% of older adults reported unmet healthcare needs after the pandemic, while almost one in three utilized telemedicine during that period. Interestingly, those who used telehealth during the pandemic were more likely to report ongoing unmet healthcare needs. Persistent inequalities in healthcare access were observed for women, those living alone, individuals with financial challenges, and in poorer health. While telemedicine played an important role in enhancing healthcare access, its impact was limited, buffering only a part of unmet healthcare needs in the pandemic. Despite challenges in telemedicine adoption among older adults, it remains a promising tool for ensuring healthcare access in future emergencies.

Keywords: telemedicine, unmet healthcare needs, older adults, SHARE, COVID-19

1 INTRODUCTION

The COVID-19 pandemic compelled healthcare systems to adjust and implement a range of strategies, primarily following the guidelines of the World Health Organization (WHO, 2020). While these strategies helped slow the spread of the virus, they substantially scaled down and disrupted healthcare provision. More stringent containment and closure policies, leading to postponed or denied care and heightened concerns about infection, had an impact on healthcare accessibility, particularly among older adults (Powell, Bellin and Ehrlich, 2020; Smolić, Čipin and Medimurec, 2022). To mitigate restricted access and shortages in healthcare services, healthcare systems adopted the rapid integration of telemedicine (TM) as a strategy, enabling remote consultations, prescriptions, and medical services. Telemedicine can be defined as a healthcare approach that uses technology for patient communication and treatment delivery at a distance (WHO, 2010).

In this paper, TM is analysed in the context of healthcare access for older adults – a population group particularly affected by the pandemic (Barnay and Defebvre, 2023; Pentaris et al., 2020; Hoffmann and Wolf, 2021). Numerous studies have confirmed the importance of TM in improving access to healthcare, whether for young populations (Barbosa et al., 2021), disadvantaged individuals (Qian et al., 2022) or older adults (Hoffman, 2020; Kruse et al., 2020). TM played an important role in maintaining access to healthcare for older adults during the COVID-19 pandemic (Powell, Bellin and Ehrlich, 2020; Smolić, Blaževski and Fabijančić, 2022). However, the utilization of TM among this population group during the pandemic's early stages was not substantial (Frydman et al., 2022), and there were significant disparities in TM use based on patient age and other factors (Ortega et al., 2020; Cantor et al., 2021; Ng et al., 2022).

In order to address the shortage of in-depth studies that can provide a nuanced and accurate picture of TM adoption among older adults and its association with

unmet healthcare needs after the pandemic, we examine data from the multicountry and interdisciplinary Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan et al., 2013). Our research aims to investigate the factors contributing to perceived unmet healthcare needs in the wake of the pandemic, emphasising the association with TM utilization and the experience of unmet healthcare during the pandemic, as well as the effects of the pandemic. The specific objective of the paper is to explore the utilization of TM within the COVID-19 pandemic, focusing on people aged 50 and over from 27 European countries and Israel. We seek to understand how TM has been employed during the COVID-19 pandemic in different European countries. By investigating the use of TM among older adults in Europe, our study highlights the importance of remote healthcare delivery in improving healthcare access, especially in the aftermath of the initial and subsequent waves of the pandemic (Vinceti et al., 2021). Furthermore, our research addresses a crucial aspect of unmet healthcare needs during and after the COVID-19 pandemic using three rounds of the SHARE study – SHARE Corona Surveys (SCS) in 2020 and 2021 (Scherpenzeel et al., 2020) and regular SHARE Wave 9 in 2022. The overarching goal of this paper is to initiate discussions on whether TM can enhance healthcare access for older adults and strengthen health system preparedness for future health emergencies.

The structure of our paper from this point onward is as follows: We commence by reviewing relevant literature concerning TM and barriers to healthcare access for older adults. Following that, we provide an overview of data and research methods, and present our findings in the subsequent section. The paper closes with a discussion of results from a policy perspective and conclusion.

2 LITERATURE REVIEW

Unmet healthcare encompasses situations where individuals do not receive necessary healthcare due to barriers or personal choices (e.g., distance, financial reasons, fear of infection, lack of supply) (Chen and Hou, 2002; Smolić, Fabijančić and Blaževski, 2023). The unmet need for healthcare is also a frequently used outcome variable in health research (Ayanian et al., 2000), especially within the framework of declining health (Ko, 2016) and the rise in health inequalities (Arnault, Jusot and Renaud, 2022). Zavras et al. (2016) demonstrated that limited access to healthcare can have severe, long-lasting health consequences, impair the quality of life, lead to poorer health, and exacerbate health inequalities. In addition, many studies have indicated that the presence of unmet healthcare needs among older adults elevates the risk of mortality and morbidity (Alonso et al., 1997; Herr et al., 2014; Lindström, Rosvall and Lindström, 2020).

During the initial stages of the COVID-19 pandemic, access to healthcare was limited for many non-communicable diseases, as reported by the WHO (WHO, 2020). Access to chronic care has declined due to the diversion of medical specialists to urgent COVID-19 cases, with diseases like chronic obstructive pulmonary disease, diabetes, and hypertension being heavily impacted (Núñez, Sreeganga

and Ramaprasad, 2021). Multiple studies have uncovered concerning findings when investigating the impact of COVID-19 on healthcare services reduction (De Rosa et al., 2020; Thaler et al., 2020; Moynihan et al., 2021). Many studies have also explored the effects of the pandemic on older adults' healthcare access and unmet healthcare needs. They have shown that factors such as a poor economic situation, poor overall health status, and higher healthcare utilization were consistent predictors of unmet healthcare needs (Arnault, Jusot and Renaud, 2022; Smolić, Čipin and Međimurec, 2022). Furthermore, shelter-in-place orders – despite being an effective response to the COVID-19 pandemic for older people – negatively affected their healthcare access (Bailey et al., 2021). Also, income-related inequalities in access to healthcare were detected among older adults (González-Touya, Stoyanova and Urbanos-Garrido, 2021), while existing health disparities were exacerbated (Okonkwo et al., 2021).

As a result of the challenges in healthcare access during the pandemic, TM, among other strategies, emerged as a critical means to deliver regular care to individuals with chronic conditions, particularly those more susceptible to severe COVID-19 complications (Bashshur et al., 2020; Cantor et al., 2021; Núñez, Sreenganga and Ramaprasad, 2021). A framework for TM in outbreaks was developed in 2015, with an updated version for COVID-19, but many countries still lack regulatory frameworks for TM integration (Ohannessian, Duong and Odone, 2020).

TM has evolved with technological advancements, including live video and text messaging and – despite being present and caring for remote patients for decades – gained significant importance during the COVID-19 pandemic, allowing for continuity of care while maintaining social distancing and quarantine measures (Colbert, Venegas-Vera and Lerma, 2020; Monaghesh and Hajizadeh, 2020). The experiences of the general population with TM during the COVID-19 pandemic proved to be similar to those of traditional, in-person medical appointments (Isautier et al., 2020), and TM is recognized as an important tool that can enhance the delivery of healthcare services, increase healthcare accessibility in remote areas, and reduce healthcare expenses by preventing the aggravation of medical emergencies (Charles, 2000; Monaghesh and Hajizadeh, 2020; Wootton, 2001). However, regarding healthcare expenses, Bali (2018) argues that developing countries quickly adopted TM technology without adequate planning and strategy and that these nations have not witnessed significant success in cost reduction or improved healthcare accessibility compared with developed countries.

Simultaneously, during the initial wave of the COVID-19 pandemic, many older adults refrained from availing themselves of telehealth services (Choi et al., 2022). There are several reasons for that; for example, some frequently encountered barriers include issues related to technical literacy, a lack of willingness to use TM and cost concerns (Kruse et al., 2020). The study by Lebrasseur et al. (2021) showed that twice as many seniors chose in-person appointments over video consultations. Their research – which cannot be broadly generalized – also suggested that the adoption of TM was less common among individuals with lower levels of education, those without a spouse or partner, and those residing in non-metropolitan regions.

The analyses of the second Survey of Health, Ageing and Retirement in Europe (SHARE) Corona Survey, conducted by Smolić, Blaževski and Fabijančić (2022), showed that older individuals in poor health, dealing with multiple chronic illnesses or those who had been hospitalized recently or had delayed healthcare due to infection concerns, were more likely to embrace TM. Moreover, nations with reduced healthcare coverage and lower healthcare expenditures experienced a higher rate of TM utilization. In the US, approximately 84% of Medicare¹ beneficiaries aged 65 and over reported that their regular healthcare providers offered TM services during COVID-19, and among those offered the TM, 43% reported using TM services (Ng et al., 2022).

The application of TM brought about evident advantages for older adults during the pandemic. Older adults with specific vulnerabilities to COVID-19 (e.g., those with chronic illness) found that TM enabled them to maintain their engagement in medical practice through roles requiring minimal contact (Goldberg et al., 2021), while home telehealth visits enhanced their well-being and reduced the commuting time losses (Hawley et al., 2020). Findings by Chu et al. (2022) suggest that TM was crucial in helping older adults maintain access to health care during the pandemic; for example, they found that TM visits outnumbered in-person visits among older adults during the pandemic in Ontario, Canada. Kruse et al. (2020) reveal that telehealth interventions were associated with medical outcomes such as decreased psychological stress, increased autonomy, and enhanced cognitive ability. Bhatia et al. (2022) used an increase in TM utilization among older adults during the COVID-19 pandemic as an opportunity to learn from their experiences. While individuals in their study encountered difficulties with TM technology and preferred in-person care, they recognized the convenience of TM, reported satisfaction with primary care delivered through TM and expressed a desire for TM to remain accessible.

3 DATA AND METHODS

3.1 DATA

We use publicly available data from the first and the second SHARE Corona Survey (SCS) and preliminary data from regular SHARE Wave 9. The Survey of Health, Ageing and Retirement in Europe (SHARE) is a research infrastructure and cross-national panel survey collecting microdata on the health, social and economic status of individuals aged 50 and older in 28 European countries and Israel. Probability sampling methods were employed within countries, utilizing population registers to include noninstitutionalized adults aged 50 years or older and, if applicable, their partners. In the majority of countries, a multistage stratified sampling design was implemented (Börsch-Supan et al., 2013; Bergmann and Börsch-Supan, 2021). The SCS, created as a swift response within the broader SHARE study to comprehend the impacts of the COVID-19 pandemic, included a series of questions addressing various aspects of life affected by the pandemic, including, but not limited to, healthcare accessibility and the utilization of remote medical consultations. Data for the first SCS (SCS1) were collected through 20 to 25-minute telephone interviews (CATI) conducted between June and August 2020. Furthermore, participants who

¹ Government national health insurance program in the United States.

took part in the first SCS were reinterviewed during the second SCS (SCS2), which occurred between June and August 2021 (Scherpenzeel et al., 2020). With the most recently completed Wave 9 of the SHARE study, which was conducted from October 2021 to September 2022 via computer-assisted face-to-face interviews (CAPI), we gain insights into the lives of those individuals aged 50 years and older in the post-pandemic times, i.e. we gain valuable insights into the enduring effects of the COVID-19 pandemic on the lives of older adults.

We applied several sample restrictions to refine our data sets. Firstly, within the SHARE Wave 9 sample, we retained only those participants who completed their interviews in this specific wave while excluding those who were interviewed in nursing homes. Furthermore, we limited the sample to individuals aged 50 years and older, meaning that partners of respondents younger than 50 were excluded. Similar restrictions were applied to the SCS1 and SCS2 samples, with the additional criterion of excluding interviews conducted entirely by proxy respondents. Upon merging these three samples, retaining only those who participated in all mentioned waves and eliminating any missing values for all explanatory variables (around three percent), our final working sample comprised 37,225 observations from 27 European countries and Israel.

3.2 VARIABLES

3.2.1 Outcome variable

In order to present unmet healthcare needs in the aftermath of the pandemic – mainly during 2022 – we have constructed the outcome binary variable, which indicates whether respondents encountered limited access to healthcare due to unavailability or cost. The questions contributing to the construction of this outcome variable were asked during SHARE Wave 9. The outcome variable encompasses various aspects of healthcare for which respondents encountered limited access. These include general practitioner or specialist physician appointments, access to medication, dental or optical care, home care or paid home assistance, and other healthcare services. It should be noted that home care or paid assistance can also be regarded as a form of social care service.

3.2.2 Explanatory variables

To closely investigate the factors contributing to unmet healthcare needs, we employ a range of factors, for example, *predisposing factors* (gender, age, living arrangement, level of education), and *enabling factors* (area of residence, and financial situation of the household). We also incorporate *need factors*, e.g. various health-related variables such as self-reported health status (SRH), chronic or long-term illnesses, remote healthcare utilization, unmet healthcare needs during the pandemic, and the impact of COVID-19 on an individual.

Age categories for respondents are divided into three groups: those who are occupationally active (ages 50-64), young retirees (ages 65-79), and the oldest individuals (age 80+). Education levels are categorized as low, medium, or high based on the ISCED 2011 classification, derived from data in the regular SHARE waves.

Respondents' living arrangements are presented as "living alone" or "living with others". The area of residence is classified as either rural (rural areas or villages) or urban. Financial situations are self-reported by respondents as either satisfactory or unsatisfactory (making ends meet with or without difficulties).

In terms of health-related variables, we apply a binary variable for self-reported health (SRH) in Wave 9, categorized as "fair or poor" and "good and better", but we also control for the SRH of respondents before the pandemic. Additionally, we include an objective health status variable indicating whether respondents suffer from chronic or long-term illnesses. We also incorporate a binary variable denoting the utilization of remote medical consultations since the onset of the COVID-19 pandemic, extracted from SCS2. Three dummy variables are employed to determine if respondents: a) forwent medical treatment due to fear of COVID-19 infection, b) had scheduled medical treatment postponed by a doctor or medical facility, or c) had been denied after asking for an appointment for medical treatment during the pandemic. Furthermore, we construct a variable reflecting the impact of COVID-19, categorized into three groups: respondents who were not exposed (with no personal knowledge of anyone experiencing symptoms, testing positive, hospitalization, or death due to COVID-19, including respondent), those partially exposed (personally knowing someone with symptoms or a positive test, including respondent), and those severely exposed (personally knowing someone hospitalized including respondent, or deceased due to COVID-19). Finally, we introduce country controls using a set of country-specific dummy variables and healthcare system features (dominant model of healthcare system organisation, financing and regulatory framework for TM).

3.3 DATA ANALYSES

We performed descriptive analyses to gain more insight into the healthcare access constraints older adults experienced during and after the COVID-19 pandemic. Additionally, we investigated the utilization of TM (remote healthcare) during the pandemic and explored its potential role in addressing unmet healthcare needs. We then explored the differences between older adults who utilized TM and those who did not. Following the descriptive analyses, we developed a multivariable logistic regression model to assess our outcome variable. We use odds ratios to interpret our findings. In our study, the odds ratios indicate how the likelihood of experiencing limited access to healthcare changes with a one-unit increase in the explanatory variable while all other variables are kept constant.

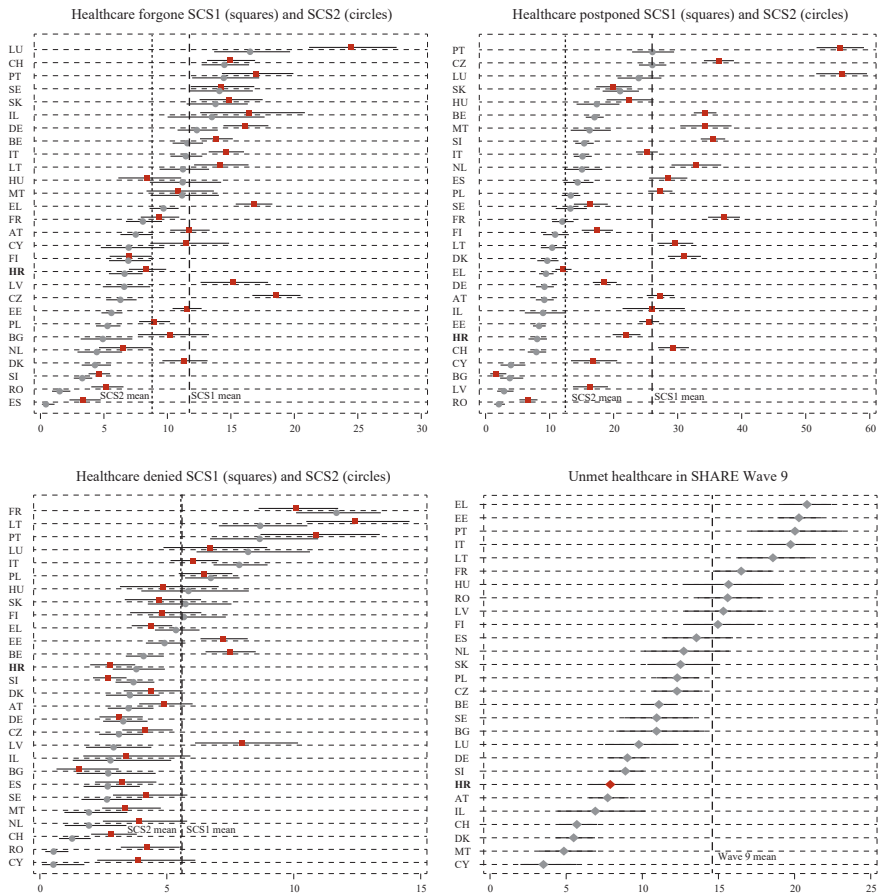
4 RESULTS

Figure 1 shows the weighted percentages of older adults who encountered barriers to accessing healthcare during (in SCS1 and SCS2) and after the COVID-19 pandemic (SHARE Wave 9). The reported percentages exhibited a wide range, from 3.4% (0.4%) of older adults who have forgone healthcare due to fear of infection in Spain to 24.5% (16.5%) of those in Luxembourg in SCS1 (SCS2). In SCS1, the figures for healthcare postponed ranged from 1.7% in Bulgaria to 55.6% in Luxembourg, and in SCS2, from 2.1% in Romania to 26.1% in Portugal.

Conversely, the average figures for denied healthcare in SCS1 and SCS2 remained almost unchanged, i.e. 5.6% of older adults asked for an appointment for medical treatment but did not get it. In SHARE Wave 9, almost 15% of older adults reported unmet healthcare needs, ranging from 3.5% in Cyprus to 20.8% in Greece.

As demonstrated, there was a general decrease in unmet healthcare needs across most countries during the pandemic. Nevertheless, a few notable exceptions warrant attention. For example, although respondents from most countries generally indicated fewer obstacles to accessing healthcare in SCS2 compared to SCS1, Bulgaria and Slovakia experienced an increase in the percentage of older adults whose scheduled medical appointments were postponed by a doctor or medical facility.

FIGURE 1
Percentages of older adults with unmet healthcare needs in SCS1, SCS2 and SHARE Wave 9 (horizontal axis) with 95% confidence intervals



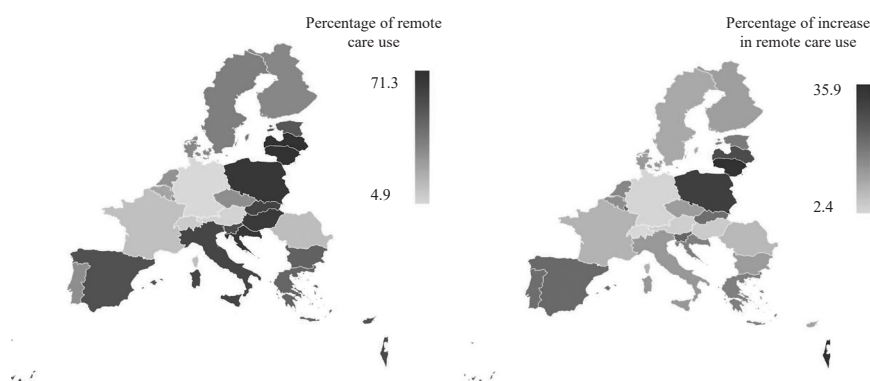
Note: Weighted data using calibrated cross-sectional individual weights. Dashed lines represent the average of the samples.

Source: Authors' calculations based on SHARE Wave 8 COVID-19 Survey release 8.0.0., SHARE Wave 9 COVID-19 Survey release 8.0.0., Preliminary Wave 9 Release version 0.

We further examined the utilization of TM as one of the methods used to reduce barriers to healthcare access, particularly during times like the COVID-19 pandemic. Figure 2 shows the percentages of older Europeans who reported using remote medical care as an alternative to traditional healthcare during the pandemic. On average, approximately one out of every three older adults utilized remote consultations during the pandemic. The utilization rates varied significantly, from around 5% in Germany to slightly over 71% in Latvia. Respondents from Eastern and Southern Europe and Israel embraced TM to a greater extent during the pandemic compared with the pre-pandemic period. The percentage of older adults who increased their use of TM ranged from 2.4% in Switzerland to 35.9% in Lithuania (right panel of figure 2).

FIGURE 2

Percentages of older adults who reported using TM in the COVID-19 pandemic (left) and who increased TM use compared with the period before the pandemic (right)



Note: Weighted data using calibrated cross-sectional individual weights.

Source: Authors' calculations based on SHARE Wave 9 COVID-19 Survey release 8.0.0.

Before outlining the factors contributing to unmet healthcare needs in the post-pandemic period, we provide descriptive statistics for our working data set in table 1, categorized by the utilization of remote consultations. During the pandemic, fewer older adults had remote consultations, and those who had remote consultations were, on average, younger. Factors such as female sex, living with others, the lowest educational attainment, reported economic difficulties and urban residence were associated with a higher likelihood of utilizing remote consultations during the pandemic. Furthermore, older individuals who used remote consultations were less prone to indicate good and better SRH, both before and after the onset of the pandemic, and those who engaged with remote medical consultations were nearly 50% more inclined to report fair and poor SRH. Older adults with chronic illnesses and those reporting unmet healthcare needs exhibited a significantly heightened likelihood of utilizing remote consultations during the pandemic. Lastly, individuals who experienced hospitalization or had personal connections with individuals who were hospitalized or who died due to COVID-19, indicating severe repercussions of the pandemic, were significantly more likely to have had remote consultations during this period.

TABLE 1
Sample descriptive statistics

	No remote consultations		Had remote consultations	
	N	Mean (%)	N	Mean (%)
Women	12,772	57.3	9,205	61.7***
Age (in years)	22,298	71.2	14,927	70.6***
Lives alone	6,042	27.1	3,701	24.8***
Education level				
Low	6,827	30.6	4,849	32.5***
Medium	9,885	44.3	6,709	45.0
High	5,586	25.1	3,369	22.6***
Had economic difficulties	6,851	30.7	6,697	44.9***
Lives in the urban area	14,235	63.8	10,252	68.7***
SRH (Wave 9) Good and better	14,722	66.0	7,891	52.9***
SRH before Corona				
Poor	866	3.9	948	6.4***
Fair	4,519	20.3	4,589	30.7***
Good	10,434	46.8	6,773	45.4***
Very good	4,490	20.1	1,979	13.3***
Excellent	1,989	8.9	638	4.3***
Suffering from chronic illness	11,326	50.8	9,367	62.8***
Had healthcare forgone	3,603	16.2	3,064	20.5***
Had healthcare postponed	6,575	29.5	5,705	38.2***
Had healthcare denied	1,519	6.8	1,818	12.2***
Affectedness by COVID-19				
No	12,170	54.6	7,205	48.3***
Mildly	6,850	30.7	5,209	34.9***
Severely	3,278	14.7	2,513	16.8***
Total SHARE sample (SCS1, SCS2 and Wave 9)	22,298	59.9	14,927	40.1

Note: Unweighted figures. *** $p < 0.01$.

Source: Authors' calculations based on combined data from SHARE Wave 8 COVID-19 Survey release 8.0.0., Wave 9 COVID-19 Survey release 8.0.0., Preliminary Wave 9 Release version: 0.

Table 2 displays the sample sizes of participants aged 50 and above across different countries, ranging from 332 in Israel to 3081 in Estonia.

TABLE 2
Sample sizes by country

Country identifier	N	%
Austria	1,707	4.59
Germany	1,713	4.60
Sweden	786	2.11
Netherlands	585	1.57
Spain	910	2.44
Italy	2,551	6.85
France	1,483	3.98
Denmark	1,273	3.42
Greece	2,646	7.11
Switzerland	1,415	3.80
Belgium	2,820	7.58
Israel	332	0.89
Czechia	1,661	4.46
Poland	2,182	5.86
Luxembourg	624	1.68
Hungary	520	1.40
Portugal	717	1.93
Slovenia	2,464	6.62
Estonia	3,081	8.28
Croatia	1,433	3.85
Lithuania	1,059	2.84
Bulgaria	484	1.30
Cyprus	439	1.18
Finland	967	2.60
Latvia	734	1.97
Malta	563	1.51
Romania	1,249	3.36
Slovakia	827	2.22
Total	37,225	100.00

Note: Unweighted figures.

Source: Authors' calculations based on combined data from SHARE Wave 8 COVID-19 Survey release 8.0.0., Wave 9 COVID-19 Survey release 8.0.0., Preliminary Wave 9 Release version 0.

To explore the determinants of unmet healthcare needs after the pandemic, we present the logistic regression model estimated odds ratios in table 3. These odds ratios indicate the likelihood of experiencing (reporting) unmet healthcare needs, as determined by our pooled logistic regression model with country controls. Our analysis reveals several significant findings. We found that women [OR = 1.12, 95% CI (1.04–1.19)] and those living alone [OR = 1.22, 95% CI (1.13–1.31)] were significantly more likely to report unmet healthcare needs. On the other hand, individuals aged 80 and above [OR = 0.69, 95% CI (0.62–0.77)] were significantly less likely to report barriers to accessing healthcare in the aftermath of the

pandemic. Interestingly, educational levels did not significantly affect the odds of reporting unmet healthcare needs in the post-pandemic period. Conversely, residing in urban areas [OR = 1.06, 95% CI (0.99–1.14)] and facing financial difficulties [OR = 2.03, 95% CI (1.89–2.18)] were associated with significantly higher odds of reporting unmet healthcare needs.

TABLE 3

Determinants of unmet healthcare needs in 27 European countries and Israel in the aftermath of the COVID-19 pandemic

	Odds ratios
Gender (<i>ref. Men</i>)	
Women	1.116***
Age (<i>ref. 50-64</i>)	
65-79	0.832***
80+	0.689***
Living arrangement (<i>ref. Living with others</i>)	
Living alone	1.217***
Education level (<i>ref. Low</i>)	
Medium	1.043
High	0.964
Financial situation of household (<i>ref. No econ. difficulties</i>)	
With econ. difficulties	2.029***
Area of residence (<i>ref. Rural</i>)	
Urban	1.062*
SRH (Wave 9) (<i>ref. Good and better</i>)	
Fair or poor	1.338***
SRH before Corona (<i>ref. Poor</i>)	
Fair	0.870**
Good	0.763***
Very good	0.648***
Excellent	0.543***
Suffering from chronic illnesses (<i>ref. No</i>)	
Yes	1.376***
Remote healthcare use (<i>ref. No</i>)	
Yes	1.230***
Healthcare forgone (<i>ref. No</i>)	
Yes	1.466***
Healthcare postponed (<i>ref. No</i>)	
Yes	1.217***
Healthcare denied (<i>ref. No</i>)	
Yes	1.789***
Affectedness by COVID-19 (<i>ref. No</i>)	
Mildly	1.140***
Severely	1.253***

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. How to read the results in the table? For example, women aged 50 and older in 27 European countries and Israel had nearly 1.12 times (or 12 percentage points) higher odds of reporting unmet healthcare needs after the pandemic compared to men aged 50 and older in 27 European countries and Israel, *ceteris paribus*.

Source: Authors' calculations based on SHARE Wave 8 COVID-19 Survey release 8.0.0., Wave 9 COVID-19 Survey release 8.0.0., Preliminary Wave 9 Release version 0.

Furthermore, various health-related factors emerged as significant predictors of limited access to healthcare following the pandemic. Older adults reporting fair or poor SRH [OR = 1.34, 95% CI (1.24–1.45)] and those grappling with at least one chronic or long-term illness [OR = 1.38, 95% CI (1.27–1.49)] were significantly more prone to reporting unmet healthcare needs in the post-pandemic times. On the other hand, individuals reporting better SRH before Corona (e.g., excellent, very good, good and fair compared with poor SRH) were considerably less likely to report barriers to accessing healthcare.

Concerning the variables of particular significance in this paper, remote care utilization played an important role, with an odds ratio of 1.23 and a 95% confidence interval of (1.15–1.32), indicating that odds of reporting unmet healthcare needs after the pandemic were 23% higher if the person had had remote medical consultations during the pandemic. Subsequently, individuals who had forgone healthcare in the pandemic exhibited an odds ratio of 1.47 [95% CI (1.36–1.58)], and those indicating postponed healthcare showed an odds ratio of 1.22 [95% CI (1.13–1.31)] for reporting unmet healthcare needs in Wave 9. These findings were statistically significant as well. Additionally, older adults with denied healthcare during the pandemic had 79% higher odds of reporting unmet healthcare needs in the post-pandemic period. Lastly, older adults who had or personally knew someone with COVID-19 symptoms, who had or personally knew someone with a positive COVID-19 test result [OR = 1.14, 95% CI (1.06–1.23)] or who were or personally knew someone who died or was hospitalized due to the COVID-19 disease [OR = 1.25, 95% CI (1.15–1.37)] had significantly higher odds of reporting unmet healthcare needs in SHARE Wave 9.

To enhance our analyses, we computed the average marginal effects of the predictors “healthcare forgone”, “healthcare postponed”, “healthcare denied” and “remote healthcare use”, at the level of countries using the observed values for the other predictors (see the appendix for more details). We conclude that respondents who avoided healthcare due to fear of COVID-19 infection had a probability of reporting unmet healthcare needs that is about 3.4–5.2 percentage points higher (on average 4.3 percentage points) than those who did not avoid healthcare. Next, on average, the probability that an individual will report unmet healthcare needs in the aftermath of the pandemic was 2.1 percentage points (range 1.3–2.9) higher for those who had their scheduled medical treatments postponed, 7 percentage points (range 5.7–8.3) if healthcare was denied and by 2.2 percentage points (range 1.4–2.9) if the individual had a remote consultation during the COVID-19 pandemic. If we observe the marginal effects for different countries, we see that the effects of healthcare forgone, postponed and denied, and remote healthcare use differ by country. For example, the probability of reporting unmet healthcare needs after the pandemic is almost 6 percentage points higher for those who forwent healthcare in Italy, and 1.5 percentage points in Cyprus (see figure A1 and table A1 in the appendix). It is evident that, in all the countries included in the sample, older adults who reported unmet healthcare needs during the COVID-19 pandemic had a greater

probability of continuing to experience unmet healthcare needs in the post-pandemic period. Similar findings hold for those who have had remote medical consultations during the pandemic. However, there is significant variation in the probability of unmet healthcare needs across countries after the pandemic.

We have implemented several robustness checks to assess the performance and reliability of our main model.² We examined the effects of including several control variables that describe the specific characteristics of a healthcare system in terms of financing and organization (Beveridge vs. Bismarck) and the institutional settings for TM deployment during the pandemic. Additionally, we examined the effects of using a continuous measure of remote healthcare use (number of remote consultations) during the pandemic. The results derived from these specifications align with the empirical findings in the first model, particularly regarding the factors associated with unmet healthcare needs amid the pandemic – healthcare forgone, postponed, and denied – as well as the utilization of remote healthcare such as participation in virtual medical consultations. Furthermore, the empirical findings corroborate the results observed in the main model results when considering the continuous variable for remote healthcare utilization.

5 DISCUSSION

This paper aimed to investigate the determinants of unmet healthcare needs for older Europeans in the aftermath of the pandemic and the extent and changes in TM utilization during the COVID-19 pandemic. To our knowledge, this is the first multinational study to assess the association of TM utilization, unmet healthcare needs experienced during the pandemic and unmet healthcare needs after the COVID-19 pandemic among Europeans aged 50 and above. Concurrently, our research constitutes a significant contribution to comprehending the diverse repercussions of the COVID-19 pandemic on the quality of healthcare for older adults across Europe.

Our analyses revealed that women and those living alone were more likely to report unmet healthcare needs following the pandemic. Like other studies (Eberly et al., 2020; Rodrigues, Block and Sood, 2022), we showed that older age was associated with less frequent utilization of remote healthcare. At the same time, education did not seem to play a significant role in this regard. On the other side, poorer SRH, the presence of chronic illness(es) and economic hardship were significant predictors of unmet healthcare needs after the pandemic. These findings are backed by previous research on unmet healthcare needs among older adults during the pandemic. For instance, a study by Tavares (2022) showed that women, occupationally active adults aged 50-64, individuals in poor health, and those facing financial difficulties were more likely to report unmet healthcare needs. Similar determinants of unmet healthcare needs among older Europeans were identified in studies such as those conducted by Arnault, Jusot and Renaud (2022), and Smolić, Čipin and Međimurec (2022) with

² Available upon request from the authors.

the SCS1 data. While those who lived in urban areas had higher odds of reporting unmet healthcare needs after the pandemic, it is interesting to note that they were more likely to utilize TM. Overall, there is an assertion that discrepancies in TM utilization were present throughout the COVID-19 pandemic, with the utilization patterns notably affected by urbanicity (Cantor et al., 2021; Frydman et al., 2022). Additionally, studies conducted outside of Europe, in settings like Korea (Kim, You and Shon, 2021; Kim and Hwang, 2023) and the US (Zhong, Huisingh-Scheetz and Huang, 2022), have detected poor economic status, i.e. lower income, or urban area of residence (Cantor et al., 2021) as significant factors contributing to unmet healthcare needs among older adults.

Regarding our explanatory variables of interest, we showed that older adults who utilized remote healthcare during the pandemic had higher odds of reporting unmet healthcare needs after the pandemic. This could suggest that although TM expanded during the pandemic, it may not have entirely resolved the healthcare access challenges for some vulnerable population groups as a result of the pandemic. Research conducted by Smith and Balvin (2021) illustrated that despite the increased adoption of TM in the initial months of the pandemic, unmet healthcare needs continued to persist. Before the pandemic, research also demonstrated a strong association between unmet healthcare needs and the various types of TM networks (Kim et al., 2018). An alternative interpretation of this finding is that individuals who were more likely to report unmet healthcare needs after the pandemic – even though they utilized TM during the pandemic – were also those with poorer SRH and probably with greater healthcare needs. For most of them, TM represented merely an additional avenue for access to healthcare. Therefore, TM did not completely compensate for the absence or limited access to healthcare during the pandemic, but it mitigated the adverse effects to some extent. Our findings support this notion (see table 1). For instance, significantly higher odds of utilizing remote consultations during the pandemic were observed for older adults with chronic illness(es).

Our findings on the association of past and current unmet healthcare needs also indicate that some individuals may persistently encounter unmet healthcare needs over an extended duration. We demonstrated that the unmet healthcare needs experienced in the past, particularly during the pandemic, play a significant role in determining the occurrence of unmet healthcare needs among older adults after the pandemic. This finding deserves special attention considering the well-documented findings that having unmet healthcare in the past is associated with a higher risk of mortality (Alonso et al., 1997; Lindström, Rosvall and Lindström, 2020). Additionally, we presented evidence to show that respondents' exposure to COVID-19, either personally or by having someone close who had symptoms, tested positive, was hospitalized or died due to COVID-19, is also an important determinant of unmet healthcare needs among older adults. This association can be explained in two different ways. Firstly, exposure to COVID-19 infection may have adverse effects on individuals' health, leading to long-term negative health consequences (Ma et al., 2022; del Rio, Collins and Malani, 2020). This, in turn, could lead to increased demand for healthcare after the pandemic, particularly

considering health treatments that were deferred or denied at the onset of the pandemic to curb the spread of the virus. Secondly, exposure to COVID-19 could have prompted some individuals to forgo medical appointments to avoid getting infected. Given that COVID-19 infection is still possible even today, the fear of infection constitutes one of the personal choices related to unmet healthcare (Smolić, Fabijančić and Blaževski, 2023).

6 CONCLUSION

Despite the accelerated adoption of TM during the COVID-19 pandemic, the lack of fully developed telehealth infrastructure may have introduced or exacerbated challenges, particularly in terms of human resource availability (Alami et al., 2021). While TM is recognized as a valuable tool for improving healthcare access, its reach has been somewhat limited due to factors such as low digital literacy among potential users, inadequate infrastructure, and the lack of clear reimbursement policies. In early 2020, as the pandemic disrupted traditional in-person care, governments swiftly embraced TM to maintain healthcare access (OECD, 2023). However, the uneven uptake of TM across health systems, due to the lack of a pre-existing TM network, raised challenges in terms of human resources and organization (Alami et al., 2021). Although TM accessibility and utilization increased during the pandemic, disparities persist, particularly among older adults. The recent health crisis has significantly raised awareness of TM among healthcare providers, patients, and society as a whole. As we move beyond the pandemic, it is crucial to consider the role of TM in the post-pandemic era (Thomas et al., 2022). However, future considerations regarding TM may present a challenge as scientific advice takes a backseat to economic and political considerations, and public support for restrictions diminishes with improving epidemiological conditions (Sagan et al., 2022). Nevertheless, we should be aware again that the COVID-19 crisis exposed weaknesses in healthcare infrastructure and exacerbated health inequalities (Alami et al., 2021).

Europe exhibits significant diversity in the regulation of TM and the provision of remote healthcare and the COVID-19 pandemic had contrasting effects on the expansion of TM across European healthcare systems. It accelerated the TM expansion in EU member states like Finland, the Netherlands, or Sweden, which already had established remote healthcare systems and corresponding payment mechanisms. Moreover, it encouraged the implementation and development of TM in countries such as Italy, Belgium, Denmark, Czechia, Slovenia, etc., which lacked an institutional framework for remote healthcare before the pandemic. Despite the pandemic, certain countries, including Austria, Spain, Greece, or Cyprus, have not yet established a more comprehensive system for continuous remote healthcare, limiting their offerings to e-prescriptions or telephone-based mental healthcare options (Waitzberg et al., 2022; HSRM, 2023).

In conclusion, this study offers valuable insights into the factors influencing healthcare access in the post-pandemic period. Policymakers should take note of the significance of previous unmet healthcare needs in understanding current

healthcare access challenges. It is essential to identify the components that contribute to policy-practice gaps when discussing any broader TM adoption among older adults. These components typically encompass the lower digital skills of older adults, the negative perception of TM, and the inadequate responses from key healthcare system stakeholders due to resource constraints, clear reimbursement policies, compliance and standards. Despite the inequalities in TM access, it offers a promising avenue for addressing health disparities, as it has the potential to benefit vulnerable populations. This includes older adults with poorer health and socioeconomic status, those significantly affected by the COVID-19 pandemic, or those who live alone.

7 STUDY LIMITATIONS

We acknowledge several limitations in our study. We employed a non-standard set of predictors to examine the unmet healthcare needs of individuals aged 50 and above during the pandemic, all of which were self-reported. Additionally, our study lacks the ability to distinguish between various types of remote healthcare services utilized. Our estimates of remote healthcare use may be biased upwards, as we may have included TM services that cannot be attributed explicitly to telehealth. Furthermore, we recognize that differences in TM settings across European countries, particularly in terms of regulations and payment structures, may have affected the availability (supply) of TM services. Despite these limitations, we believe our findings remain valuable in uncovering important determinants of unmet healthcare needs in the post-pandemic period. They could also serve in fostering more in-depth discussions on the significance of TM in ensuring ongoing healthcare access for vulnerable populations.

Disclosure statement

None of the authors have any conflict of interest to declare.

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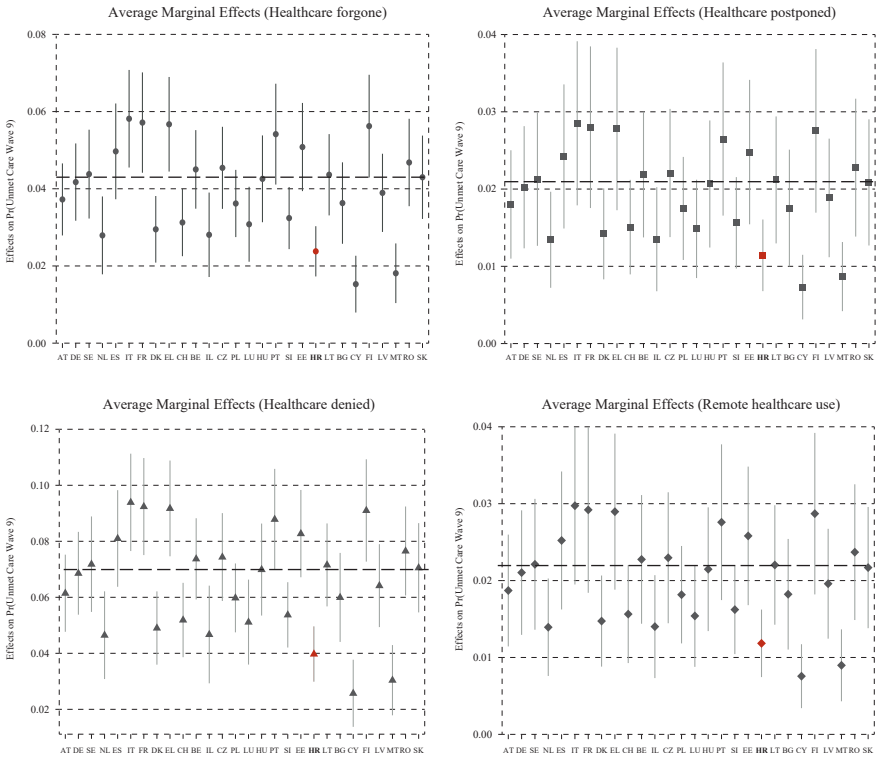
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FIGURE A1

Effects on the probability of unmet healthcare in SHARE Wave 9 at country level with 95% confidence intervals



Note: Average marginal effects for healthcare forgone 4.3 percentage points, healthcare postponed 2.1 percentage points, healthcare denied 7 percentage points and remote healthcare use 2.2 percentage points (dashed lines).

Source: Authors' calculations based on SHARE Wave 8 COVID-19 Survey release 8.0.0., Wave 9 COVID-19 Survey release 8.0.0., Preliminary Wave 9 Release version 0.

TABLE A1

Average marginal effects for selected predictors at country level

	(1)	(2)	(3)	(4)
Country	Healthcare forgone	Healthcare postponed	Healthcare denied	Remote healthcare use
Austria	0.0372*** (0.00476)	0.0180*** (0.00358)	0.0615*** (0.00703)	0.0187*** (0.00371)
Germany	0.0417*** (0.00511)	0.0202*** (0.00403)	0.0686*** (0.00754)	0.0210*** (0.00413)
Sweden	0.0438*** (0.00587)	0.0213*** (0.00439)	0.0718*** (0.00870)	0.0221*** (0.00434)
Netherlands	0.0279*** (0.00515)	0.0134*** (0.00317)	0.0465*** (0.00799)	0.0139*** (0.00323)
Spain	0.0497*** (0.00633)	0.0242*** (0.00476)	0.0810*** (0.00880)	0.0252*** (0.00458)
Italy	0.0581*** (0.00645)	0.0285*** (0.00542)	0.0939*** (0.00887)	0.0297*** (0.00523)
France	0.0572*** (0.00663)	0.0280*** (0.00534)	0.0924*** (0.00884)	0.0292*** (0.00550)
Denmark	0.0295*** (0.00440)	0.0142*** (0.00300)	0.0490*** (0.00668)	0.0147*** (0.00302)
Greece	0.0567*** (0.00625)	0.0278*** (0.00537)	0.0917*** (0.00872)	0.0290*** (0.00518)
Switzerland	0.0313*** (0.00446)	0.0151*** (0.00312)	0.0519*** (0.00677)	0.0156*** (0.00325)
Belgium	0.0450*** (0.00519)	0.0219*** (0.00415)	0.0737*** (0.00739)	0.0228*** (0.00427)
Israel	0.0281*** (0.00558)	0.0135*** (0.00344)	0.0467*** (0.00890)	0.0140*** (0.00341)
Czechia	0.0454*** (0.00542)	0.0221*** (0.00423)	0.0744*** (0.00800)	0.0230*** (0.00434)
Poland	0.0362*** (0.00444)	0.0175*** (0.00340)	0.0598*** (0.00627)	0.0182*** (0.00323)
Luxembourg	0.0308*** (0.00495)	0.0148*** (0.00325)	0.0511*** (0.00774)	0.0154*** (0.00338)
Hungary	0.0426*** (0.00574)	0.0207*** (0.00420)	0.0699*** (0.00838)	0.0215*** (0.00411)
Portugal	0.0542*** (0.00667)	0.0265*** (0.00506)	0.0879*** (0.00918)	0.0276*** (0.00517)
Slovenia	0.0324*** (0.00411)	0.0156*** (0.00302)	0.0537*** (0.00595)	0.0162*** (0.00295)
Estonia	0.0508*** (0.00583)	0.0248*** (0.00477)	0.0827*** (0.00795)	0.0258*** (0.00460)
Croatia	0.0238*** (0.00332)	0.0114*** (0.00236)	0.0397*** (0.00504)	0.0118*** (0.00224)
Lithuania	0.0436*** (0.00537)	0.0212*** (0.00419)	0.0716*** (0.00756)	0.0220*** (0.00396)

Country	(1) Healthcare forgone	(2) Healthcare postponed	(3) Healthcare denied	(4) Remote healthcare use
Bulgaria	0.0363*** (0.00538)	0.0175*** (0.00385)	0.0600*** (0.00811)	0.0182*** (0.00367)
Cyprus	0.0153*** (0.00375)	0.00731*** (0.00213)	0.0257*** (0.00612)	0.00757*** (0.00212)
Finland	0.0562*** (0.00679)	0.0275*** (0.00540)	0.0910*** (0.00932)	0.0287*** (0.00536)
Latvia	0.0389*** (0.00517)	0.0189*** (0.00391)	0.0642*** (0.00755)	0.0196*** (0.00364)
Malta	0.0181*** (0.00394)	0.00867*** (0.00228)	0.0304*** (0.00640)	0.00898*** (0.00239)
Romania	0.0468*** (0.00578)	0.0228*** (0.00455)	0.0765*** (0.00810)	0.0237*** (0.00450)
Slovakia	0.0430*** (0.00551)	0.0209*** (0.00417)	0.0705*** (0.00813)	0.0217*** (0.00402)
Observations	37,225	37,225	37,225	37,225

*Note: Standard errors in parentheses: *** $p < 0.01$. How to read the results in the table? For example, persons aged 50 and older in Austria who have forgone healthcare due to fear of COVID-19 infection had, on average, a 3.7 percentage points higher probability of reporting unmet healthcare needs after the pandemic compared to those who did not forgo their medical treatments due to fear.*

Source: Authors' calculations based on SHARE Wave 8 COVID-19 Survey release 8.0.0., Wave 9 COVID-19 Survey release 8.0.0., Preliminary Wave 9 Release version 0.