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Gender Gap in Unmet Need for Care in Later Life: The Moderating Role of Social Deprivation

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ABSTRACT

This study contributes to the inconclusive discourse on gender-related differences in unmet needs for personal care by unveiling the moderating role of social deprivation among older adults in Europe. Using a uniquely comprehensive index including 12 items on poor living conditions, lack of (digital) literacy, neighborhood deprivation, exclusion from social relations, and basic access to healthcare services, our results based on data from the Survey of Health, Ageing and Retirement in Europe (SHARE) across 15 countries in 2015 reveal that social deprivation, alongside potential material deprivation, is a key factor associated with an increased risk of unmet care needs among older women. By recognizing the multidimensionality of social deprivation, the findings highlight how lacking social participation among women is associated with greater challenges in advocating for and meeting their needs in older age, underscoring the urgency of targeted policies to mitigate disparities and create age-friendly environments for both men and women.

1 | Introduction

Driven by population aging, the number of older adults facing limitations in daily activities and a need for long-term care (LTC) services is on the rise [1]. If the European care system do not respond appropriately to the growing demand for LTC, the result may be unmet need, posing a challenge for societies and policymakers seeking to promote older adult's health, reduce barriers to access help, and support of personal and social engagement in age-friendly communities [2]. The relevance of this topic is further stressed as meeting (care) needs is an objective by the World Health Organization and emphasized in the United Nations' Sustainable Development Goals on Universal Health Coverage [3]. A thorough understanding of the potential individual and social determinants of unmet need for care is therefore critical for both researchers and policymakers.

In addition to commonly studied individual characteristics (e.g., age, health status, and education), gender disparities have been frequently explored, though with conflicting or insignificant results [3–9]. While some studies showed a greater likelihood of unmet need among women for the United States and selected European, Asian, and African countries [6, 10, 11], other studies found a greater likelihood of unmet need among men for European and Asian countries [4, 12, 13]. A Dutch longitudinal study suggests that men's unmet needs even increased over time [14]. While observed gender-specific help-seeking behaviors may exhibit heterogeneity, with women being more inclined to seek help when needed [15, 16], demographic data highlight that women generally live longer and have higher morbidity rates than men [17]. The gender gap in longevity does not only exhibit geographical heterogeneity but is argued to be more pronounced among specific subgroups of the population, such as those with

low socioeconomic status [18]. However, just as women might possess a greater need for care throughout their lifetime with additional limitations in accessing care resources due to financial and material constraints, the adverse consequences from their attributed societal roles potentially affect their ability to access and effectively advocate for care [19]. Traditional gender roles, wherein women are commonly expected to provide (more) informal care for their children and later on their spouses, prioritize family responsibilities, and potentially interrupt their working careers for family needs, may contribute to the accumulation of social deprivation among various dimensions [20].

While essential for societal well-being, women's caregiving responsibilities limit opportunities for education, employment, and social participation, reducing their access to necessary resources later in life [21, 22]. The cumulative and multidimensional nature of social deprivation is arguably crucial for understanding gender disparities in unmet needs. For instance, older women may face significant obstacles to accessing and advocating for adequate care—whether informal or formal—including social and geographical isolation, travel difficulties, and barriers to healthcare services [23]. Additionally, it is well-documented that social deprivation leads to psychological stress, anxiety, and depression, worsening health conditions and further limiting capabilities to seek help [24]. Consequently, the increased risk of encountering unmet personal care needs among women in older age may be linked to the compounded presence of heightened social deprivation, varying in nature and composition, and a pervasive lack of women's empowerment.

While there is no universally accepted definition of social deprivation, exclusion is commonly conceptualized along material and social dimensions. In this study, we focus on social deprivation as conceptualized by Jehoel-Gijsbers and Vrooman [25] and Myck et al. [26], who specifically study this issue in the context of older adults. They identify both material and nonmaterial (i.e., social) dimensions of social exclusion and distinguish the relational component into two aspects: integration in terms of social relationships and adherence to societal norms and values. In contrast to *material deprivation*—which refers to the lack of basic material resources—*social deprivation* encompasses social isolation, lack of social support, nonmonetary indicators of living standards, and access to basic services, as well as normative disintegration. The latter includes behavior inconsistent with laws and regulations, limited adherence to social norms and values, and reduced engagement in community or societal life [26]. Our definition of social deprivation is therefore also distinct from *socioeconomic deprivation*, which typically refers to characteristics, such as education, income, and employment. For instance, neighborhood deprivation—capturing one of five domains within our 12-item index of social deprivation (see details in Section 3.1)—not only reflects the physical quality of the area (e.g., vandalism or cleanliness) but also relational aspects—such as whether individuals feel part of the community or perceive the presence of helpful people in their surroundings. Similarly, (digital) literacy (i.e., another domain) relates to both normative integration (the ability to adhere to societal norms related to technology use) and social integration (participation in social networks facilitated by digital means).

The exclusion from social relations and civic participation, neighborhood deprivation, (digital) illiteracy, and other access barriers to basic services are known to influence the subjective well-being and health of older adults [27]. For instance, a study has shown that the prevalence of ageism and poor neighborhood quality, together with general health and mobility status, negatively impact social participation [28]. However, despite the evidence that social exclusion more broadly relates to unmet care need [21, 29], little is known about how the social dimension of deprivation moderates and potentially explains the relationship between gender and unmet need. Following Eagly's (1987) social role theory, which argues that barriers to participate in society are exacerbated by entrenched gender roles, negative cultural beliefs, and practices [30], we aim to study social deprivation as a moderator in the relationship between gender and unmet need. Building upon theoretical frameworks describing the behavioral determinants of healthcare utilization [31] and care poverty [32], we propose that social deprivation disproportionately increases the risk of unmet need for older women, thereby exacerbating gender-based disparities in unmet care need. Conversely, men are expected to face a lower risk of unmet need. Despite the lack of a common conceptual framework for the social exclusion of older adults, the interest in the role of social exclusion is rising in research as well as in politics. For instance, the European Union made new commitment on the basis of their unsuccessful Europe 2020 target strategy to lift at least 15 million people out of the risk of poverty and social exclusion by 2030 [33]. Previous studies have predominantly focused on material deprivation, neglecting social deprivation, both of which are critical dimensions of social exclusion [25, 26]. While social and material deprivation are strongly correlated, social deprivation is more prevalent among older adults, whereas material deprivation tends to decline with age [34]. That is, social deprivation encompassing a range of factors, such as poor quality of neighborhood and limited civic participation, was found to be of particular relevance for older adults [26, 35]. In fact, it has been argued that social inclusion becomes increasingly complex with advancing age, as older adults are often not regarded as integral to the structure and function of modern society. Yet, they are frequently marginalized, and old age is perceived as a "*role-less period that largely lacks content and purpose*"—a view that is increasingly at odds with social reality [34]. Further, albeit studies using a comprehensive set of indicators to reflect social deprivation remain scarce, research reveals gendered patterns with higher levels of social exclusion—closely tying it to material deprivation and poverty—among older women [36–38]. However, evidence is not unequivocal: Research on social deprivation often highlights that older women tend to maintain stronger social networks and higher levels of social participation than men [39–41], while simultaneously showing lower levels of civic engagement [37]. Focusing specifically on exclusion from social relations, Aartsen et al. [42] show that gender differences are complex: Women face disadvantages, such as a higher risk of widowhood, yet also display advantages, such as more frequent social engagement. These mixed findings, together with the absence of a common conceptual framework for social deprivation as a multidimensional phenomenon, underscore the importance of considering both the multifaceted nature of social deprivation and the potential gender-specific advantages and disadvantages that may vary across its dimensions.

Although the literature provides valuable insights, two research areas remain separated: i) gender differences in unmet need for

care, and ii) gender differences in material and social deprivation. Given the inconclusive evidence on gender disparities in unmet need and women's potential vulnerability to social exclusion in later life, this study aims to examine whether and to what extent social deprivation shapes gender differences in unmet need for personal care (defined by limitations with activities of daily living [ADL]). Specifically, we address the following primary research question:

Does social deprivation moderate gender differences in unmet need for ADL disability among older adults in Europe?

To clearly guide our analysis, we consider three specific subquestions:

i. Are there gender differences in unmet need for personal care (defined by ADL disability)?

ii. How is social deprivation, measured as multidimensional social deprivation index (SDI), associated with unmet need for personal care?

iii. Does social deprivation amplify or reduce gender differences in unmet need for personal care? If so, which specific domains within the SDI contribute most strongly to these potential gender differences?

These subquestions directly correspond to our empirical models and ensure a transparent link between research design, analysis, and interpretation.

In this study, social deprivation is measured using a well-established multidimensional index (SDI), which captures 12 items distributed across five distinct deprivation domains reflecting poor living conditions, lack of (digital) literacy, neighborhood deprivation, exclusion from social relations, and barriers to accessing basic healthcare services.

Building on social role theory and behavioral models of healthcare utilization, we hypothesize that higher levels of social deprivation disproportionately increase the risk of unmet need among women compared to men. It is important to clarify that we conceptualize social deprivation as a moderating factor rather than a mediating mechanism. That is, we do not assume that gender operates through social deprivation as a causal pathway. Instead, we examine whether the association between gender and unmet need varies across different levels of social deprivation. In this sense, social deprivation is treated as a contextual condition that may amplify or attenuate gender disparities in unmet need, rather than as an explanatory channel through which gender exerts its effect.

Utilizing data from the Survey of Health, Ageing and Retirement in Europe (SHARE), we contribute to the inconclusive findings on gender-related disparities in unmet need [43] and add to literature lacking a standard definition of unmet need [3]. The unmet needs approach regularly used in gerontology focuses on the micro level—particularly through the use of ADL [32]. While we follow this approach of unmet need—or equivalently "absolute care poverty"—we consider that unmet need results from an interplay between individual and societal factors [32, 44]. Overcoming some of the shortcomings in the literature, we account for social deprivation, which reflects structural factors at the societal level (e.g., neighborhood deprivation or barriers in access to basic medical services), while being measured at the individual level. With social deprivation being a less explored dimension of social exclusion, we expand upon existing literature and illuminate the multidimensional nature of social deprivation, employing a comprehensive index consisting of 12 items distributed across five distinct deprivation domains.

2 | Theoretical Framework

We follow theoretical frameworks by Andersen and Newman [31] and Kröger [32], in which care use, and conversely also no care use, is conceptualized as a result of intertwined individual and societal factors.

The *behavioral model of healthcare utilization* proposed by Andersen and Newman [31] provides the guiding rationale for the determinants of inadequate access to LTC. In addition to individual determinants reflecting predisposing factors (e.g., demographic, social structure, and beliefs), socioeconomic factors, and the illness level (e.g., severity of limitations with ADL), societal determinants of LTC utilization may influence individual-level factors directly and indirectly through the organization of the LTC system. Accordingly, gender, classified as predisposing factor, can affect access to LTC both directly and indirectly through societal norms, which, alongside technology, are considered one of the two major driving societal determinants [31].

Similarly, when conceptualizing gender inequality and *care poverty*, Kröger [32] argues that despite ongoing trends toward greater gender equality, women continue to face disadvantages in many aspects of society due to cultural norms, values, and expectations around (unpaid) care responsibilities. Earning, on average, less than men, women often experience career interruptions due to childbirth and caregiving activities provided to both children and adults later in life (e.g., their partners), which limit their ability to equally participate in society and the labor market [22, 32, 37]. Eagly and Wood [45] elaborate that men and women possess attributes that equip them for "sextypical" roles. They suggest that shared beliefs and gender stereotypes, which reflect individuals' perceptions of gender roles in a society, can help explain gender differences and similarities in behavior.

Analyzing unmet need for LTC through the lens of these frameworks may thus reveal if and to what extent lacking social participation (i.e., social deprivation)—shaped by prevailing societal norms—relates to gender disparities in access to personal care, including both informal and formal care resources.

3 | Materials and Methods

3.1 | Data and Variables

We analyze data from SHARE, which is a representative study on the health of community-dwelling older adults in Europe aged at least 50 years [46]. We limit our data to wave 6 conducted in 2015, which provides the most recent information on social deprivation of older adults and reduces the sample to 15 European countries (excluding Poland and Portugal due to small sample size and Israel) with observations on 48,935 individuals. For our empirical analysis, we further restrict our study population to individuals with care need defined by reporting at least one limitation in ADL capturing difficulties in dressing, bathing or showering,

getting in and out of bed, toileting, walking, and eating. The final sample includes 4851 observations of individuals aged between 50 and 103 years, with 60% women, from 15 European countries (i.e., Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Italy, Luxembourg, Slovenia, Spain, Sweden, and Switzerland). Figure 1 provides an overview on the implemented sample restrictions.

3.1.1 | Unmet Need for ADL Disability

We follow the literature on "absolute care poverty" by taking a more comprehensive approach considering one type of difficulty to be enough to experience need for care [5, 32, 47, 48]. As need is not explicitly defined, nor does unmet need have an agreed standard definition [3], and as we focus on care need at an individual level, in this study we use ADL as the main indicator of need for personal care [49]. We assume that personal care need is met if at least some type of care (such as help with dressing, bathing or showering, eating, getting in or out of bed, and using the toilet) is provided, whether formal or informal (Figure 1). Conversely, a person is considered to have *unmet need* (binary indicator: yes/no) if care need has been declared—defined as reporting at least one limitation with ADL (see Section 3.2 for sensitivity analyses using alternative need definitions and thresholds)—but neither informal nor any formal care has been received. SHARE data on both informal and formal care use are self-reported. Informal care includes any regular help (in the past 12 months) with ADL-related personal care tasks from both inside and outside the household, including family members, friends, or neighbors. Conversely, formal care relates to any professional or paid personal care service received. Specifically, the main questionnaire includes the following items:

Q1: *"Is there someone living in this household who has helped you regularly during the last 12 months with personal care, such as washing, getting out of bed, or dressing?"*

Q2: *"Thinking about the last 12 months, has any family member from outside the household, any friend or neighbour given you any kind of help listed on this card?"*

Q3: *"During the last 12 months, that is since [{–FLLastYearMonth–}], did you receive in your own home any professional or paid services listed on this card due to a physical, mental, emotional or memory problem?"* [43].

Regular help is defined as daily or almost daily assistance received for at least 3 months within the past year. The ADL-related personal care tasks listed include help with dressing, bathing or showering, eating, getting in or out of bed, and using the toilet.

3.1.2 | Gender

Gender is coded as a dichotomous variable, where 1 indicates being female and 0 otherwise.

3.1.3 | SDI

Social deprivation is conceptualized as distinct from material deprivation, though the two are highly correlated and commonly treated as complementary dimensions of social exclusion [26]. In this study, the selection of items was informed by previous research evaluating the nonmonetary (i.e., social) dimension of exclusion [25, 26, 50]. Several domains of social deprivation are identified in the literature on the individual and on the area level, including poor living conditions, lack of (digital) literacy, neighborhood deprivation, the exclusion from social relations, and barriers in access to basic healthcare services (access deprivation) [35, 51–55]. Following Myck et al. [26], who employed the polychoric correlation method to develop a multidimensional index specifically tailored for studies on older adults using SHARE data, we combine 12 items—each clearly assigned to one of the five domains identified in the literature (see also Table B.1)—into one single SDI. The domains (D) and their corresponding items are as follows:

1. D1: Poor living conditions *(1 item: less than one room per person)*
2. D2: Lack of (digital) literacy *(3 items: poor reading or writing skills, poor computer skills, and not attending any educational course in the last 12 months)*

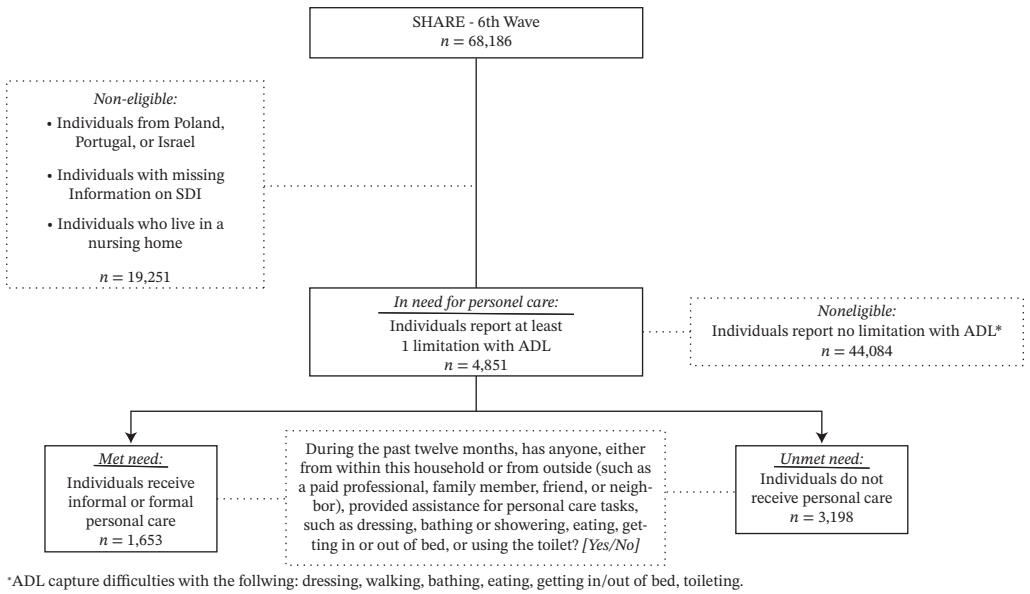

FIGURE 1 | Flowchart for the selection criteria of our sample data. Source: SHARE Wave 6.

3. D3: Neighborhood deprivation *(4 items: not feeling part of local area, vandalism in local area, local area not clean, and no helpful people in local area)*
4. D4: Exclusion from social relations *(3 items: not participating in any political or community-related organization in the last 12 months, lack of trust in people, and feeling left out of things/socially excluded)*
5. D5: Access deprivation *(1 item: waiting too long to see a doctor).*

Taken together, the items reflect both formal and informal dimensions of social participation [56]. Further, we include item-specific hedonic weights, which represent the relative relevance of the item for life satisfaction with feeling left out of things (weight = 0.24) and not feeling part of the neighborhood (weight = 0.10) being the most important elements of the index [26, 57]. This approach, which derives weights from the empirical relationship between individual deprivation items and life satisfaction measures, has the advantage that it can be applied consistently across all countries included in SHARE [34]. The SDI ranges from zero to 100, with 100 indicating being fully socially deprived.

3.1.4 | Control Variables

In the main analysis, age is categorized into 5-year age groups; results using age specified as a continuous variable (including age squared) are reported in Appendix Table C.7. We further control for the *severity of care need* defined by the number of ADL and instrumental activities of daily living (IADL), and partner status (i.e., 1: *partner/spouse and 0 otherwise),* largely considered the primary source of informal care. For the latter, we include both married and registered partnership couples, regardless of whether they live in the same household. Granular information on marital status (e.g., married living with a spouse or not, widowed, divorced, or in a registered partnership), as well as household size (to capture household composition), was used in additional analyses (see also "Robustness check and sensitivity analyses"). Additionally, in all our models, we account for country-specifics using country dummies [31].

3.2 | Empirical Strategy

After descriptively investigating our sample data, we estimate the gender differences in unmet care needs of older adults in Europe and the potential moderating role of social deprivation. We do so by fitting a logit model for our binary response variable of unmet need using maximum likelihood estimation. We further distinguish between three models, first considering gender and control variables (model a), adding SDI (model b) and, lastly, adding the interaction between gender and SDI (model c). A likelihood ratio test confirmed the relevance of the interaction term ($p = 0.0271$).

In mathematical terms, the final model can be formulated as:

$$\Pr(\text{unmet need}_i = 1) = F\left(\beta_0 + \beta_1 \text{gender}_i + \beta_2 \text{SDI}_i + \beta_3 \text{SDI}_i \times \text{gender}_i + \beta_4 X_i\right), \quad (1)$$

where i represents an individual and $F(z) = e^z/(1 + e^z)$ is the cumulative logistic distribution. X captures our set of control variables (age, severity of need, partner status, and country dummies) [58]. In all our models, we control for age, number of limitations with IADL, and partner status. Moreover, we include country dummies to control for country-specific effects. Summary statistics on all variables used in our main model as well as in our robustness or sensitivity analysis are provided in Table A.1 in the Appendix.

3.2.1 | Robustness Check and Sensitivity Analysis

In addition, we performed several robustness checks with respect to the sampling restriction criteria. First, to assess implications of the exclusion of countries with small sample size (Poland and Portugal), we also run our model including those two countries. Second, as there is no unique definition of (unmet) need, we applied both stricter and milder need thresholds to differentiate between met and unmet need for personal care (i.e., reporting at least 1 limitation with IADL or ADL, reporting 2+ limitations with ADL, and reporting mild and severe limitations using the Global Activity Limitation Indicator [GALI]) [59, 60].

Further, instead of using item-specific hedonic weights, we tested the robustness of our social deprivation measure using equal weights for each of the 12 items when calculating the SDI. Acknowledging some of the limitations of the SDI and challenging its composition, we made use of an alternative item composition, replacing single indicators within the domains on "poor living conditions" and "exclusion from social relations" (see also Table B.1.). Specifically, we replaced the number of rooms per person with the number of steps to the entrance as an alternative indicator for the physical accessibility of older adults [61] and used network dissatisfaction as an alternative indicator of mistrust in people that more directly reflects the quality of informal social networks, or relationships with family or friends [62].

To assess the sensitivity of our results, we also include domains of material deprivation (i.e., wealth, education, and household characteristics) in addition to social deprivation in our analysis [63]. For further insight, we also run the analysis with separate SDI domains instead of the composite index. Furthermore, beyond controlling for characteristics, such as the availability of a coresiding spouse (marital status), children, and household size, we conducted additional analyses incorporating the structure and quality of an individual's social network using the social network scale (SN scale). In SHARE, the SN scale provides a more direct assessment of informal social participation and social connectedness, complementing measures like the SDI that emphasize broader social engagement including formal participation. More concretely, the SN scale summarizes five key dimensions of social resources: network size, proximity, contact frequency, emotional closeness, and relationship diversity [64]. Accordingly, we include the SN scale alongside our SDI and also replace the SDI entirely—with its strong, though not exclusive, emphasis on formal participation—with the SN scale, which more directly captures individuals' interactions with close social

ties and personal relationships (informal social participation) [56].

4 | Results

Descriptive statistics reveal that 65.9% of older Europeans reported not having used any personal care service despite existing needs. Moreover, the vast majority (i.e., around 60%) of older adults reporting unmet need are female (Table A.2); however, large country-specific differences can be observed (Figure 2). While the proportion of men with unmet need is higher in some countries (Austria, Belgium, Denmark, France, Germany, and Sweden), the opposite is the case in others (Croatia, Czech Republic, Estonia, Greece, Italy, Luxembourg, Slovenia, Spain, and Switzerland).

For descriptive purposes, we report the prevalence of unmet need by gender and SDI quintiles in Table 1, with the first quintile representing the 20% of survey participants with the lowest SDI values, and the fifth quintile representing the most deprived participants. Interestingly, the gender distribution in unmet need for ADL disability varies by SDI, with 63.9% of older women in the most deprived quintile reporting that their care need remains unmet, compared with 56.4% of men.

Our results from a logit regression confirm that women are more likely to report unmet need, considering country differences and controlling for severity of need (i.e., functional limitations), age group, and partner status (Table 2, model a). This relationship remains consistent upon incorporating SDI into the model (model b). However, our findings indicate that the relationship between gender and unmet need is strongly moderated by the severity of social deprivation. That is, being female and socially deprived is associated with significantly higher risk of experiencing unmet need ($p < 0.05$; model c). While the magnitude per SDI point is small, the effect accumulates across the SDI distribution. For example, a 10-point increase in SDI is associated with roughly a 10% higher relative odds of unmet need among women compared with men. While the main regression tables report odds ratios, additional analyses using predicted probabilities are provided in Appendix. A graphical representation of predicted probabilities across the SDI distribution further illustrates how the gender gap widens as social deprivation increases (see Figure B.1). At higher levels of social deprivation (SDI of 80), women's odds are nearly twice those of men (0.88 vs. 0.49). For instance, severely deprived (SDI of 80) women, aged 75 to 79, have a 14% higher predicted probability of not having their care need met than their male counterparts while considering having one limitation with IADL and non-IADL and a partner or spouse (Table B.2). Geographical heterogeneity persists with some countries reporting a smaller gender gap in the predicted probability of unmet need for severely deprived older women (e.g., Italy, Slovenia, and Sweden), while others report a visibly larger gender gap (e.g., Austria, Belgium, Croatia, Czech Republic, Denmark, Greece, and Luxembourg). Notably, our results remain consistent—both in size and magnitude—when Poland and Portugal are included in the sample (Table C.1).

In this study, we focus on SDI as a composite index to capture its additive and multidimensional characteristics. Descriptive statistics, however, reveal that gender differences in the deprivation prevalence within each item of SDI vary greatly, with particularly large differences in *computer skills* (women: 75%; men: 60%) and *felt isolation* (women: 46%; men: 39%). In addition, gender-specific patterns can be recognized in the different domains with women reporting a greater lack of digital skills, greater exclusion from social relations, and a disadvantage in terms of access (Table B.1). However, when accounting for each social deprivation domain separately in the model, it becomes evident

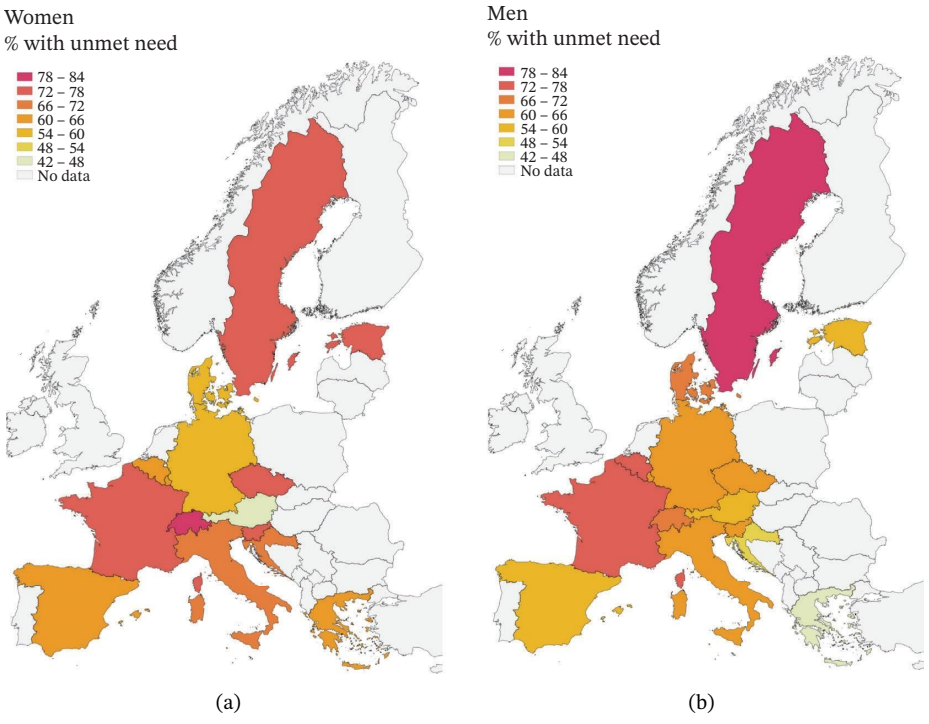

FIGURE 2 | Percentage of women (a) and men (b) aged at least 50 years with unmet need by country. Source: SHARE Wave 6.

TABLE 1 | Prevalence of unmet need by gender and SDI quintiles.

SDI (quintiles)	% with unmet need	
	Women	Men
1 (least deprived)	79.5	82.0
2	64.1	61.5
3	70.4	73.6
4	68.3	63.4
5 (most deprived)	63.9	56.4
Total	67.1	64.3
N	1941	1257

Note: Source: SHARE Wave 6; own calculation. SDI quintiles are presented for descriptive purposes to illustrate the distribution of social deprivation across the subsamples. The lowest quintile (1st) comprises the 20% of participants with the lowest SDI scores, while the highest quintile (5th) represents the most deprived 20%.

that the lack of digital literacy and barriers in accessing basic healthcare services ($p < 0.05$) are the most significant contributors to the observed gender differences in unmet need (Table 3). Although our model generally does not suffer from multicollinearity issues, both between SDI and other variables, and within the SDI items, correlations between individual SDI items may influence these results (see Table B.3). Using a single index combining all the items helps mitigate this by consolidating the variables and reducing the impact of correlations among them.

4.1 | Robustness and Sensitivity

The moderating effect of SDI remains stable, even when considering alternative definitions and thresholds of unmet care need (Table C.2). Associations between gender, SDI, and unmet need are notably reinforced when applying equal weights for the SDI items (the effect size increases), as opposed to utilizing the item-specific hedonic weights proposed by Myck et al. [26] (refer to Table C.3). Similarly, when testing the sensitivity of the SDI items used, associations become more pronounced (both in size and significance) when replacing indicators within the domains of "poor living conditions" and "exclusion from social relations" with measures that capture barriers to community engagement—specifically, *steps to the entrance* (reflecting formal, physical barriers) and *social network dissatisfaction* (reflecting informal, relational barriers) (see Table C.4). Both magnitude and significance remain consistent when incorporating additional dimensions of deprivation (financial or material resources) and further controls related to household composition (i.e., household size, availability of children, and marital status; see Table C.5). Additionally, our results remain robust when accounting for informal social participation more directly by including the SN scale alongside the SDI. Yet, we do not find a significant association between social network quality and unmet need, nor any moderating effect on the relationship between gender and unmet need (see Table C.6). It is important to note, however, that the availability of a partner or spouse—capturing emotionally close social resources—is significantly associated with lower unmet need.

5 | Discussion

Contributing to the inconclusive literature on gender differences in unmet need for personal care, we shed light on the moderating role of social deprivation in explaining gender gaps in unmet need among adults aged 50+ in 15 European countries. To address our primary research question—whether social deprivation, measured by a composite index encompassing 12 items across five domains (poor living conditions, lack of (digital) literacy, neighborhood deprivation, the exclusion from social relations, and barriers in access to basic healthcare services)

TABLE 2 | Logit regression of unmet need accounting for gender (Model a), gender and SDI (Model b), and gender, SDI, and their interaction (Model c).

Dependent variable:	Unmet need								
	(a)			(b)			(c)		
Female (ref. male)	1.147	*	(0.083)	1.148	*	(0.083)	0.874		(0.125)
SDI				0.997		(0.003)	0.991	**	(0.004)
Female × SDI							**1.01**	**	(**0.004**)
iadl	0.738	***	(0.013)	0.739	***	(0.014)	0.74	***	(0.014)
adl	0.799	***	(0.025)	0.8	***	(0.025)	0.8	***	(0.025)
Age groups (ref. below 65)									
65–69	0.838		(0.098)	0.837		(0.098)	0.834		(0.098)
70–74	0.816	*	(0.091)	0.814	*	(0.091)	0.809	*	(0.091)
75–79	0.739	***	(0.08)	0.737	***	(0.08)	0.731	***	(0.08)
80–84	0.715	***	(0.081)	0.712	***	(0.081)	0.708	***	(0.081)
Above 85	0.455	***	(0.056)	0.452	***	(0.055)	0.448	***	(0.055)
Partner (ref. none)	0.427	***	(0.034)	0.423	***	(0.033)	0.425	***	(0.033)
Country dummies	Yes			Yes			Yes		
N	4851			4851			4851		

Note: Coefficient estimates as odds ratios; standard errors in parentheses. The bold values highlight the coefficients and standard errors for the interaction term of interest.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

TABLE 3 | Logit regression of unmet need including separate domains of social deprivation instead of SDI.

Dependent variable:	Unmet need		
Female (ref. male)	0.644	*	(0.151)
Social deprivation domain			
Poor living condition	0.784		(0.211)
Lack of (digital) literacy	0.746	***	(0.064)
Neighborhood deprivation	0.957		(0.109)
Exclusion from social relations	0.946		(0.075)
Access deprivation	0.818		(0.136)
Female × social deprivation domain			
Female × poor living condition	0.396	***	(0.131)
Female × lack of (digital) literacy	1.24	**	(0.132)
Female × neighborhood deprivation	1.046		(0.16)
Female × exclusion from social relations	1.114		(0.111)
Female × access deprivation	1.567	**	(0.327)
iadl	0.745	***	(0.014)
adl	0.792	***	(0.025)
Age groups (ref. below 65)			
65–69	0.848		(0.101)
70–74	0.827	*	(0.095)
75–79	0.755	**	(0.085)
80–84	0.747	**	(0.089)
Above 85	0.473	***	(0.061)
Partner (ref. no partner)	0.424	***	(0.034)
Country dummies	Yes		
N	4851		

Note: Coefficient estimates as odds ratios; standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

moderates gender differences in unmet need for ADL disability among older adults in Europe—we first examined overall gender differences. In line with selected prior research [10, 11, 65], our study unveils a positive, despite only weakly significant ($p < 0.1$) association between gender and unmet need with women being more prone to unmet need. When considering social deprivation alone, we do not observe a significant overall effect on unmet need, suggesting that deprivation by itself does not account for variation across the population. Importantly, however, the interaction between gender and social deprivation is statistically significant ($p < 0.05$), indicating that social deprivation notably amplifies the probability that women's needs remain unmet. Though social deprivation is considered an additive and cumulative phenomenon, the dimensions of lack of digital literacy and barriers to accessing basic healthcare services were shown to be most strongly associated with higher levels of unmet need among women. Taken together, these results indicate that gender inequalities in unmet need are conditional on social deprivation—a relatively underexplored dimension of social exclusion—highlighting the importance of considering structural factors when understanding unmet care needs.

This study builds upon earlier research investigating the intersectional nature of gender disparities in unmet need. While individual factors, such as age, ethnicity, and socioeconomic status, have been widely suggested to interact with gender in exacerbating or mitigating the risk of unmet care needs [5, 9, 11], we highlight the important role of social deprivation as moderating factor. Previous research has found that women—compared to men—are at higher risk of exclusion from civic participation [37, 66, 67], cultural activities [67], access to health services [68], and digital literacy [55, 69]. Further, they show that providing (informal) care is associated with higher levels of loneliness, thus increasing the risk of social deprivation among women [70]. On the contrary, studies focusing on informal social participation suggest that women often experience advantages by maintaining stronger and more emotionally supportive social networks than men [39, 40, 42].

While some studies have demonstrated a connection between social deprivation and unmet need [21, 29], a gender-specific perspective has rarely been explored. To address gaps in the literature, our approach involved utilizing an already established composite index of social deprivation [26, 35, 71], allowing us to move beyond single-item studies focusing on particular facets of social deprivation. Moreover, our analysis of the moderating role of social deprivation on gender differences in unmet need aimed to offer a more comprehensive understanding of this complex relationship.

Our study reveals that women more frequently encounter deficits in digital skills, encounter barriers when seeking medical care, and face exclusion from social relations, most notably marked by feelings of isolation and detachment from their communities. The social deprivation dimensions *lack of digital literacy* and barriers in *access to basic healthcare services* are most strongly associated with higher levels of unmet need among women. Nevertheless, our findings emphasize that social deprivation goes beyond isolated areas and should be considered as an additive phenomenon, recognizing its multidimensionality and cumulative nature. Crucially, our research indicates that the cumulative impact of social deprivation across various domains, measured through a composite SDI based on 12 items, is associated with additional barriers for women in accessing essential home care services when needed. These barriers are often associated with traditional gender roles which result in women engaging in "role-appropriate" behavior with substantial caregiving responsibilities for children, the elderly, and the ill [32]. More specifically, in their "social role theory," Wood and Eagly [45] argue that gender roles emerge through three biosocial mechanisms: hormonal processes, sociocultural factors influencing gender identity, and others' stereotypical expectations, all of which promote stereotypical behavior. Building on the previously inconclusive literature, our results suggest that gender differences in unmet need—and the extent to which they are influenced by social deprivation—exhibit country-specific differences. As individuals internalize cultural meanings associated with their sex, the geographical heterogeneities observed may be shaped by societal factors, with those living in culturally atypical environments less likely to assimilate traditional gender norms and vice versa [45].

While caregiving remains crucial for societal well-being, it often constrains the caregiver's opportunities for education,

employment, and participation in social activities. As a result, it might restrict the availability of needed (care) resources during later stages of life [21, 22]. Socially excluded individuals may face financial challenges and lack the resources needed to access sufficient care. They encounter barriers in accessing healthcare services, including geographical barriers (living in remote areas), difficulties with transportation, access to key social support systems (i.e., social networks), or information needed to navigate the often-complex health and LTC system [23]. Correspondingly, social exclusion (compositing both social and material deprivation) is associated with poor mental well-being and psychological challenges, such as increased levels of stress, anxiety, depression, and other mental health issues, which can further exacerbate health conditions and make it difficult for older adults to effectively advocate for and address their care need, resulting in unmet need [24].

In conclusion, our findings emphasize the often overlooked yet crucial role of social deprivation—next to material deprivation—in potentially widening gender disparities in accessing care in later life. While this study contributes to the existing literature by filling a relevant research gap, it is important to acknowledge its limitations. Given the cross-sectional nature of the data, the observed associations should not be interpreted as causal effects. Rather, the results indicate conditional associations between gender, social deprivation, and unmet need at a given point in time. The temporal ordering between gender, social deprivation, and unmet need cannot be fully established, and reverse associations cannot be ruled out. For instance, experiencing unmet need may itself be linked to increased social withdrawal or perceived exclusion. Longitudinal analyses would be required to better disentangle the directionality of these relationships. Further, although we demonstrated the robustness of our SDI measure by using equal weights and varying its composition, the self-reported nature of the data remains prone to various sources of measurement error and bias, including social desirability bias [72]. Socially desirable responding, which may vary between countries, could potentially lead to an underestimation of social deprivation and the associations studied [73]. Similarly, limitations due to the self-reported nature of the data extend to other control variables, such as partner status. Since neither partner status nor marital status (as measured in SHARE) fully captures household composition, we go beyond it by including household size as a proxy and conducting robustness checks using more detailed marital status information. These measures enhance the robustness of our results and improve our understanding of access to (informal) care. However, complete information—such as whether older adults actually coreside with a partner, children, or others (e.g., when divorced or widowed)—is not available, which limits the interpretation of these findings.

Moreover, although using a previously developed index is a strength, several limitations should be noted. First, some components of the SDI (e.g., waiting times for medical care or aspects related to digital access) may capture mechanisms closely related to access to health care itself. As a result, some conceptual overlap between the SDI and unmet care needs cannot be entirely ruled out. Second, the SDI combines several heterogeneous domains into a single index using hedonic weights. While this approach reflects the multidimensional nature of social deprivation and the index has been validated in previous research, it still assumes that these dimensions can be meaningfully aggregated into a single scale. Future research might thus explore whether alternative specifications, including nonlinear combinations of these dimensions, yield additional insights into the relationship between social deprivation and LTC access. Similarly, while the SDI consists of 12 items reflecting five different areas of deprivation, it may still not fully capture all dimensions and facets of social deprivation. In fact, although the literature agrees on the multidimensional nature of social exclusion, there is little consensus regarding the number or scope of its dimensions [34]. Critiques of the SDI as proposed by Myck et al. [26] emphasized its focus on formal participation and partial overlap with material deprivation. Although termed "social deprivation," the SDI adopts a multidimensional perspective: It combines indicators of social participation and integration with measures of material and human capital constraints (e.g., housing conditions and literacy skills) that may hinder individuals' ability to engage socially. For example, the indicator "rooms per person" primarily reflects housing conditions but can also signal social marginalization in later life, as overcrowding may compromise privacy, reduce autonomy, and limit opportunities to host family or friends—factors linked to loneliness and reduced participation among older adults [74]. To address some of the concerns, we introduced alternative variations of the indicator in our sensitivity analyses, such as replacing "rooms per person" with "steps to the entrance," which more directly reflects physical accessibility and potential obstacles to community engagement [61]. We also incorporated subjective indicators of informal barriers—such as dissatisfaction with one's social network—both within the SDI and in complementary analyses that control for broader domains of deprivation including informal social participation, supporting the validity of our results. Although several indicators within the original 12-item SDI already encompass relational aspects (e.g., feeling left out of things, not feeling part of the local area, absence of helpful people, and lack of trust in people), the index largely emphasizes formalized participation (e.g., digital literacy, civic engagement, and access to basic care), an aspect that should be considered when interpreting our main results.

Generally, as SHARE is only representative of older adults living in the community, a possible attrition of older people in need to nursing homes or other residential care facilities may likely affect our results. For instance, research suggests that gender differences exist in preferences for LTC, with men tending to favor home-based care provided by a spouse, while women may lean more toward professional support or institutional LTC [75]. In addition, we were unable to use more recent waves of SHARE as they lack information on key variables reflecting neighborhood deprivation, or, as for wave 5, do not provide sufficient information on unmet need for personal care [46]. An advantage of using wave 6 is that it was collected before the COVID-19 pandemic, thereby avoiding potential biases in measures of social deprivation that could have arisen during or after the pandemic. Despite this, we also analyzed the notably smaller and distinct subsample of individuals who did not report a need in wave 5 (using SDI from wave 5). Although significance was lost—likely due to sample size issues and the different composition of the sample (predominantly individuals with very mild and hence unmet needs)—the direction of the effect appears to remain consistent.

Finally, in this study, we deliberately make use of an absolute approach of care poverty. This approach identifies individuals whose needs for personal care remain entirely unmet, excluding those whose needs are only partially or insufficiently addressed. Although the robustness of our definition of unmet need was tested by applying different cut-off points and alternative need measures to indicate whether personal care needs were met or not, the "absolute care poverty" approach could lead to an underestimation of the extent of unmet need, as the intensity of care received was not fully captured, and comparable information—particularly regarding the intensity of formal personal care—is lacking. A "relative care poverty" approach, as proposed by Kröger [32], presents a fruitful avenue for future research as it sheds light on older adults who receive care but find the quantity and/or quality of care insufficient to meet their need.

Our findings hold significant implications for policies and interventions aimed at establishing age-friendly and inclusive environments for all genders. Though our findings highlight the role of individual deprivation domains in their relative contribution to observed gender gaps in unmet need for personal care (i.e., lack of digital literacy or barriers in access to basic healthcare services), our study emphasizes the importance of moving beyond isolated areas of social deprivation. Instead, a more holistic approach is suggested to better understand and address individual and societal factors that affect and shape difficulties in meeting care needs in later life. Although the reasons why women are less likely to receive care are manifold and likely extend beyond social deprivation, next to alleviating the mental and physical burden of caregiving across the lifespan, particular attention might be paid to the enhancing (easier) access to basic healthcare services. This may include expanding the overall supply of high-quality formal home care services while keeping access to care affordable. Supporting social integration and improving neighborhood relationships can further assist those in need, both directly and indirectly, by encouraging carers to provide LTC within the community. Finally, underpinned by social role theory, the findings of this study imply that targeted support for women may be linked to the gender norms surrounding them. Policies might thus promote gender equality and the social inclusion of (older) women, especially for those whose possibilities have been negatively affected by bearing "female-typical" caregiving roles throughout their lives. As we continue to explore this multifaceted issue, further research encompassing both quantitative and qualitative methods will be pivotal. This may particularly include examining the impact of changing social norms (e.g., gender roles) or policies using longitudinal studies to track changes in unmet care needs over time, as well as qualitative cross-national comparative studies to identify best practices and inform policy design.

Author Contributions

Viktoria Szenkurök: conceptualization, methodology, formal analysis, visualization, and writing–original draft and review and editing.

Daniela Weber: conceptualization, methodology, and writing–original draft and review and editing.

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Ethics Statement

The authors have nothing to report.

Consent

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the SHARE. This paper uses data from SHARE Wave 6 (DOI: 10.6103/SHARE.w6.800), see Börsch-Supan et al. (2013), for methodological details. The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N °283646), and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°-823782, SHARE-COVID19: GA N°101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Supporting Information.** The supporting information contains the following sections: Section A: Sample description. Table A.1: Overview on our sample data of Europeans aged at least 50 years with care need (1 + ADL) providing summary statistics on all variables. Table A.2: Average SDI of older adults with (i) care need by gender and country and (ii) with unmet need by gender and country. Section B: Additional results. Table B.1: Social deprivation among older adults with care need (1+ ADL) in 15 European countries by gender. Figure B.1: Predicted probabilities of unmet care needs across the SDI distribution by gender. Table B.2: Predicted probabilities of unmet need based on logit regression across gender, age, and countries. Table B.3: Matrix of correlations of 12 single SDI items used. Section C: Robustness check and sensitivity analyses. Table C.1: Logit regression of unmet need including Poland and Portugal. Table C.2: Logit regression of unmet need using alternative definitions and need thresholds. Table C.3: Logit regression of unmet need using equal weights for each of the 12 items when constructing SDI. Table C. 4: Logit regression of unmet need using alternative SDI definitions (with and without weights). Table C.5: Logit regression of unmet need including additional domains of deprivation (i.e., wealth, education, and household characteristics) next to social deprivation. Table C.6: Logit regression of unmet need including SN scale. Table C.7: Logit regression of unmet care needs controlling for age and age squared.