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Hajek, André; Gyasi, Razak Mohammed; König, Hans-Helmut

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# Factors associated with institutionalization among the oldest old: Results based on the nationally representative study 'old age in Germany (D80+)'

André Hajek<sup>1</sup>  | Razak M. Gyasi<sup>2,3</sup> | Hans-Helmut König<sup>1</sup>

<sup>1</sup>Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Hamburg Center for Health Economics, Hamburg, Germany

<sup>2</sup>African Population and Health Research Center, Nairobi, Kenya

<sup>3</sup>National Centre for Naturopathic Medicine, Faculty of Health, Southern Cross University, Lismore, New South Wales, Australia

## Correspondence

André Hajek, Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Martinistr. 52, Hamburg 20246, Germany.

Email: [a.hajek@uke.de](mailto:a.hajek@uke.de)

## Abstract

**Objectives:** To examine the factors associated with institutionalization among individuals aged 80 years and over in Germany (total sample and stratified by sex).

**Methods/Design:** We used data from the nationally representative 'Old Age in Germany (D80+)' (analytic sample:  $n = 9572$  individuals), including individuals aged 80 years and over in Germany. Institutionalization (private living vs. institutionalization) served as an outcome measure. For the written interview, data collection took place from November 2020 to April 2021. Multiple logistic regressions of the overall sample (also stratified by sex) were applied.

**Results:** In the analytic sample, 10.2% (95% CI: 9.2%–11.3%) of the participants were institutionalized. The odds of being institutionalized were positively associated with being female (OR: 2.02, 95% CI: 1.08 to 3.80), being 90 years and over (compared to 80–84 years, OR: 1.67, 95% CI: 1.17 to 2.40), not being married (e.g., being single compared to being married: OR: 14.06, 95% CI: 6.73 to 29.37), higher education (e.g., high education compared to low education: OR: 1.88, 95% CI: 1.25 to 2.84), more favorable self-rated health (OR: 1.32, 95% CI: 1.07 to 1.62) and greater functional impairment (OR: 15.34, 95% CI: 11.91 to 19.74). Sex-stratified regressions were also conducted, mostly yielding similar results.

**Conclusion:** Our study highlighted the role of several sociodemographic factors (particularly marital status, e.g., being single) and functional impairment for the risk of institutionalization among the oldest old in Germany. This study confirms findings in studies in younger samples that functional decline is the main factor associated with institutionalization. As functional decline may be modifiable, efforts to maintain functional abilities may be important. This knowledge is important for relevant groups (such as clinicians and policy-makers) because it may guide early intervention and prevention efforts, can help allocate healthcare resources effectively and shape policies to support independent living. Further insights using longitudinal data is recommended.

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**KEYWORDS**

80 and above, aged, chronic conditions, education, functional impairment, marital status, oldest old, self-rated health, sex

**Key points**

- Based on nationally representative data of the D80+, the objective of this study was to investigate the determinants of institutionalization among the oldest old
- Marital status and functional impairment: key risk factors for institutionalization
- Strategies to delay functional limitations can help individuals to live at home for as long as possible

## 1 | INTRODUCTION

Over the coming decades, there is an anticipated marked increase in the percentage of individuals aged 80 years and older (i.e., oldest old).<sup>1</sup> As there is a clear connection between higher age and the requirement for long-term care, there is also a projected rise in the number of individuals in need of care.<sup>2</sup>

Previous research demonstrated a clear preference among individuals aged 65 years and over in Germany to remain in their private homes for as long as possible.<sup>3,4</sup> Additionally, previous research conducted in Germany has shown that only about 1 out of 20 of those residing in the community have intentions to transition to a nursing home in the future.<sup>5</sup> Nevertheless, when functional abilities deteriorate and informal caregivers are not or no longer available, the only alternative may be placement in a nursing or old age home. In fact, about one out of eight individuals aged 85 years and over lived in a nursing or old age home – as shown by a previous study conducted in six large German cities.<sup>6</sup> These notable percentages underscore the high importance of institutionalization in very late life.

Based on a societal perspective, institutionalization may come with a considerable economic burden. It should also be noted that nursing homes in Germany usually involve significant co-payments. Thus, several studies have examined the determinants of institutionalization – as summarized by previous reviews.<sup>7,8</sup> One previous review mainly included regionally or nationally representative samples of individuals aged 65 years or over.<sup>8</sup> This previous work found that advanced age, poor self-rated health, limitations in both physical and cognitive abilities, and dementia predict nursing home admissions among older adults. The second review included studies with individuals aged 60 years and older.<sup>7</sup> For example, this previous review found that losses in functional abilities can contribute to the risk of being institutionalized among the oldest old.<sup>7</sup> Nevertheless, the vast majority of existing studies did not use data from *nationally representative samples* focusing on individuals aged 80 and over. Thus, it therefore remains unclear to what extent the findings to date can be generalized to individuals aged 80 years and over in *entire countries*. Hence, the objective of this study was to examine the determinants of institutionalization exclusively among the oldest old (also stratified by sex) based on nationally representative data. Sex-

stratified analyses were conducted since the factors associated with institutionalization may vary between sexes.<sup>9</sup> Identifying these factors is crucial as it can help to detect oldest old men and women at risk of institutionalization.

## 2 | METHODS

### 2.1 | Sample

Data for this study came from the 'Old Age in Germany (D80+)' study, which reflects a substantial, nationally representative sample of individuals aged 80 years and older residing in Germany. The study encompasses both those living independently in the community and those in institutionalized settings. The University of Cologne conducted the study in collaboration with *ceres* (Cologne Center for Ethics, Rights, Economics, and Social Sciences of Health) and the German Center of Gerontology (DZA). Funding for the study was provided by the Federal Ministry for Family Affairs, Senior Citizens, Women, and Youth (BMFSFJ).

Due to the COVID-19 pandemic, adjustments had to be made to the study design. Originally planned as face-to-face interviews, the study instead implemented written interviews and additional telephone interviews (May to October 2021). The written survey was utilised to capture data on questions/tools that were most important for the study objectives (for example, sociodemographic and health related measures). The telephone interview was used to capture data on topics that were complementary to the study aims, but were ultimately of less importance to the overall study objectives. It is noted that the telephone interview also included measures for which the study subject requires assistance, that is, for measurement of cognitive functioning. *Ceres* determined which tools/measures would be included in the written survey or the telephone interview. A key focus was in keeping the written survey to a length that would ensure participation. *Ceres* anticipated a greater response rate for the written survey compared to the telephone survey. Further methodological details can be found in the corresponding method report.<sup>10</sup>

More than 10,000 individuals took part in the survey. Data collection for this occurred between November 2020 and April 2021. Additional details can be found in the work by Albrecht et al.<sup>11</sup>

The Ethics Committee of the Medical Faculty of the University of Cologne (protocol number: 19-1387\_1) has approved the D80+ study. The telephone interviews were only conducted with the consent of the interviewees. The questionnaire itself contains a short introduction and the data protection regulations. Consent is given when respondents complete and return the questionnaire.

## 2.2 | Dependent variable: Living situation

Referring to the current residential status or the current care constellation (available at the time of the interview), being institutionalized was defined as follows: Individuals residing in a retirement home, nursing home, residential care facility, or residential care group were categorized as “being institutionalized” (coded as 1). Private living (coded as 0) was assumed for traditional styles of independent living (also: multi-generational homes, outpatient assisted house and flat-sharing communities).

## 2.3 | Independent variables

Drawing upon theoretical considerations and following past research,<sup>7,8</sup> sociodemographic and health-related explanatory factors were included in the regression models. For example, the region (West and East Germany) was included in regression analysis because they may differ in their values of care. For example, Diederich et al.<sup>12</sup> found that individuals from East Germany, who experienced their formative years under communism, tend to place a greater emphasis on informal care over employment compared to their counterparts from West Germany, who were raised in a Western social market economy.

Regarding sociodemographic factors, we included in regression analysis: sex (men; women), age group (three groups: 80–84 years; 85–89 years; 90 years and above), marital status (five groups: married; married, but living separated from spouse; single; divorced; widowed), educational level (three groups: low, medium or high education; following the ISCED-2011 classification<sup>13</sup>), and part of Germany (West Germany; East Germany).

Regarding health-related factors, we included: self-rated health (1-item tool, ranging from 1 to 4, with higher values reflecting more favorable self-rated health in the past 4 weeks; more precisely: 1 = very bad; 2 = rather bad; 3 = rather good; 4 very good), chronic conditions and functional abilities. Following the multimorbidity index in old age,<sup>14,15</sup> the count of chronic conditions encompasses the following 21 chronic conditions (where the absence of a specific disease is denoted as 0, and 1 otherwise): myocardial infarction; heart failure; hypertension; stroke; mental illness; cancer; diabetes; respiratory or lung disease; back pain; gastrointestinal disease; kidney disease; liver disease; blood disease; joint or bone disease; bladder disease; sleep disorders; eye disease or visual impairment; ear disease or hearing impairment; neurological disease; (blood) vascular disease; thyroid disease. Functional impairment was

quantified based on a revised version of the Lawton and Brody IADL tool<sup>16</sup> consisting of seven items. These items in each case ranging from 0 (solely possible with assistance) and 2 (help not required) focus on the following areas: utilize the phone, plan routes beyond walking distance using public transportation or taxis, purchase own food and clothing, make own meals, handle household chores, adhere to medication schedules, and manage financial affairs. All items were averaged. Subsequently, we reversed the coding, that is, from 0 to 2, whereby higher values reflect higher functional impairment.

## 2.4 | Statistical analysis

Firstly, the analytic sample's characteristics (also divided by living situation: private living vs. institutionalized) are presented. Following this, multiple logistic regressions were employed to explore the factors associated with institutionalization. Cluster-robust standard errors, based on the primary sampling unit, were computed due to the multistage sampling procedure. Sampling weights were applied to account for survey non-response and the disproportionate sampling design, which involved oversampling men and older age groups.<sup>10</sup> Statistical significance was established at  $p < 0.05$  in the current study. All statistical analyses were performed using Stata 18.0 (Stata Corp., College Station, Texas).

## 3 | RESULTS

### 3.1 | Sample characteristics

The weighted analytic sample is described in Table 1. The majority of the participants (62.1%) were female and aged 80–84 years (58.9%). The mean age equaled 85.5 years (SD: 4.1 years, ranging from 80 to 100 years). In sum, 49.8% of the participants were widowed and 51.5% of the participants had a medium education. Additional details are presented in Table 1. It may also be worth noting that 10.2% (95% CI: 9.2%–11.3%) of the participants were institutionalized ( $n = 979$  individuals, whereas 8593 individuals lived in private homes, see Table 1). In Supplementary Table S1, the analytic sample is shown stratified by sex and living situation – thus showing the sample characteristics of four groups: (i) private living men, (ii) institutionalized men, (iii) private living women and (iv) institutionalized women.

### 3.2 | Regression analysis

Findings of multiple logistic regression (with living situation: private living vs. institutionalization as dependent variable) are presented in Table 2 (an unadjusted model and a model adjusting for age and sex are shown in Supplementary Table S2). In our study, Pseudo  $R^2$  was 0.43 (among men: 0.48, among women: 0.40). The odds of being institutionalized were positively associated with being female (OR: 2.02, 95% CI: 1.08 to 3.80), being 90 years and over (compared to

TABLE 1 Sample characteristics (weighted analytic sample, stratified by living situation).

Variables	Private living N = 8593 Mean (SD)/N (%)	Institutionalized N = 979 Mean (SD)/N (%)	Total N = 9572 Mean (SD)/N (%)
<b>Sex</b>			
Men	3412 (39.7%)	217 (22.2%)	3630 (37.9%)
Women	5181 (60.3%)	762 (77.8%)	5942 (62.1%)
<b>Age group</b>			
80–84 years	5394 (62.8%)	244 (24.9%)	5638 (58.9%)
85–89 years	2279 (26.5%)	314 (32.1%)	2593 (27.1%)
90 years and over	920 (10.7%)	421 (43.0%)	1341 (14.0%)
<b>Marital status</b>			
Married	3760 (43.8%)	97 (9.9%)	3857 (40.3%)
Married, living separated from spouse	92 (1.1%)	9 (0.9%)	100 (1.0%)
Divorced	398 (4.6%)	43 (4.4%)	441 (4.6%)
Widowed	4031 (46.9%)	735 (75.1%)	4766 (49.8%)
Single	312 (3.6%)	95 (9.7%)	407 (4.3%)
<b>Education</b>			
Low education	1951 (22.7%)	283 (28.9%)	2234 (23.3%)
Medium education	4386 (51.0%)	547 (55.9%)	4933 (51.5%)
High education	2257 (26.3%)	149 (15.2%)	2405 (25.1%)
<b>Region</b>			
West Germany	6652 (77.4%)	775 (79.2%)	7428 (77.6%)
East Germany	1941 (22.6%)	204 (20.8%)	2144 (22.4%)
Self-rated health (from 1 = very poor to 4 = very good)	2.7 (0.7)	2.3 (0.7)	2.6 (0.7)
Number of chronic conditions (based on 21 chronic conditions)	4.5 (2.6)	5.5 (2.7)	4.6 (2.7)
Functional impairment (from 0 to 2, with higher values reflecting greater functional impairment)	0.5 (0.6)	1.6 (0.5)	0.6 (0.7)

80–84 years, OR: 1.67, 95% CI: 1.17 to 2.40), not being married (e.g., being single compared to being married, OR: 14.06, 95% CI: 6.73 to 29.37), higher education (e.g., high education compared to low education, OR: 1.88, 95% CI: 1.25 to 2.84), more favorable self-rated health (OR: 1.32, 95% CI: 1.07 to 1.62) and greater functional impairment (OR: 15.34, 95% CI: 11.91 to 19.74). Additional details are depicted in Table 2.

Sex-stratified regressions are shown in Table 3. Among men, the odds of being institutionalized were positively associated with older age (e.g., 90 years and over compared to 80–84 years, OR: 4.13, 95% CI: 2.18 to 7.84), not being married (e.g., being widowed compared to being married, OR: 6.93, 95% CI: 4.11 to 11.67), medium education (compared to low education, OR: 2.24, 95% CI: 1.13 to 4.47), and greater functional impairment (OR: 13.47, 95% CI: 8.97 to 20.21).

Among women, the odds of being institutionalized were positively associated with being 90 years and over (compared to 80–84 years, OR: 1.79, 95% CI: 1.23 to 2.59), not being married (e.g., being widowed compared to being married, OR: 3.29, 95% CI: 1.96 to

5.53), higher education (e.g., medium education compared to low education, OR: 1.71, 95% CI: 1.26 to 2.33), more favorable self-rated health (OR: 1.43, 95% CI: 1.13 to 1.82), and greater functional impairment (OR: 16.31, 95% CI: 11.83 to 22.49). More details are shown in Table 3.

## 4 | DISCUSSION

Using data from a large, nationally representative survey, our purpose was to investigate the factors associated with institutionalization among individuals aged 80 years and over in Germany. Our key findings for the total sample: Several sociodemographic factors such as being 90 years and over, not being married (particularly singles), medium education (compared to low education), and perhaps most importantly, greater functional impairment were associated with a higher risk of being institutionalized. Sex-stratified regressions mainly revealed similar associations.

TABLE 2 Determinants of living situation among the total sample (private living vs. institutionalized).

Independent variables	Living situation: Institutionalized - among the total sample
<b>Sex</b>	
Men	1
Women	2.02* (1.08–3.80)
<b>Age group</b>	
80–84 years	1
85–89	1.08 (0.73–1.61)
90 and over	1.67** (1.17–2.40)
<b>Marital status</b>	
Married	1
Married, living separated from spouse	5.05** (1.50–17.02)
Divorced	4.16*** (2.01–8.60)
Widowed	4.73*** (3.13–7.16)
Single	14.06*** (6.73–29.37)
<b>Education</b>	
Low education	1
Medium education	1.79*** (1.36–2.36)
High education	1.88** (1.25–2.84)
<b>Region</b>	
West Germany	1
East Germany	0.91 (0.67–1.24)
Self-rated health (from 1 = very poor to 4 = very good)	1.32** (1.07–1.62)
Number of chronic conditions (based on 21 chronic conditions)	1.00 (0.95–1.05)
Functional impairment (from 0 to 2, with higher values reflecting greater functional impairment)	15.34*** (11.91–19.74)

Note: Results of multiple logistic regressions ( $n = 9572$  individuals). Odds ratios are displayed; 95% CI in parentheses; cluster-robust standard errors were computed (based on the primary sampling unit); sampling weights were used; additionally, it was adjusted for sample cells (which are used for the stratification of the secondary sampling unit).

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ , + $p < 0.10$ .

TABLE 3 Determinants of living situation stratified by sex (private living vs. institutionalized).

Independent variables	Living situation: Institutionalized – among men	Living situation: Institutionalized – among women
<b>Age group</b>		
80–84 years	1	1
85–89	2.89*** (1.63–5.14)	1.14 (0.77–1.70)
90 and over	4.13*** (2.18–7.84)	1.79** (1.23–2.59)
<b>Marital status</b>		
Married	1	1
Married, living separated from spouse	2.57 (0.27–24.60)	5.81* (1.47–22.89)
Divorced	4.66* (1.14–19.13)	3.03** (1.38–6.64)
Widowed	6.93*** (4.11–11.67)	3.29*** (1.96–5.53)
Single	32.47*** (10.93–96.45)	7.24*** (2.96–17.70)
<b>Education</b>		
Low education	1	1
Medium education	2.24* (1.13–4.47)	1.71*** (1.26–2.33)
High education	1.72 (0.79–3.75)	2.38*** (1.43–3.94)
<b>Region</b>		
West Germany	1	1
East Germany	1.09 (0.58–2.06)	0.84 (0.60–1.17)
Self-rated health (from 1 = very poor to 4 = very good)	1.03 (0.66–1.61)	1.43** (1.13–1.82)
Number of chronic conditions (based on 21 chronic conditions)	0.92+ (0.85–1.01)	1.02 (0.97–1.09)
Functional impairment (from 0 to 2, with higher values reflecting greater functional impairment)	13.47*** (8.97–20.21)	16.31*** (11.83–22.49)

Note: Results of multiple logistic regressions ( $n = 4619$  among men;  $n = 4953$  among women). Odds ratios are displayed; 95% CI in parentheses; cluster-robust standard errors were computed (based on the primary sampling unit); sampling weights were used; additionally, it was adjusted for sample cells (which are used for the stratification of the secondary sampling unit).

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ , + $p < 0.10$ .

The frequency of being institutionalized (about one out of ten) found in our study is similar to a recent German study which found that about one out of eight individuals aged 85 years and over were institutionalized. Data collection in this previous study took place in the years 2016 and 2017. The slight differences may be mainly

explained by significant ( $p < 0.001$ ) and important (Cohen's  $d = 1.24$ ) differences in mean age (in our study, the mean age equaled 85.5 years (SD: 4.1), whereas the mean age was 90.5 years, SD: 2.9 in the previous study). Moreover, the previous study used data from six large German cities (excluding more rural areas in Germany). In more

rural areas (which are included in the D80+ study), close relatives could live even closer geographically – which in turn could favor the chance of private care for as long as possible.<sup>17</sup>

Higher odds of institutionalization among women have been partly attributed to lower remarriage rates among women.<sup>9</sup> Certain differences in certain attitudes and emotions between men and women could also play a role here: for example, women may be more inclined to institutionalization in order to no longer be a burden on their families – in the course of time-consuming private care in very old age.<sup>18–20</sup> The willingness to take on private care could also differ between the sexes.<sup>21</sup> In addition, the male spouse could also be more likely than the female spouse to be unable to provide private care for health reasons or may be unwilling to provide spousal care.<sup>22</sup> In this vein, women usually grow older than men in Germany (also, wives are often slightly younger than their husbands – which could reinforce the effect that wives outlive their husbands). This could make it more difficult for women to obtain private care. However, further research is needed to investigate these potential mechanisms in more detail.

In our study, we found higher odds of being institutionalized particularly among individuals aged 90 years and over. One could initially assume that possible health differences between the age groups (which are not explained by the health-related variables included) play a decisive role here. Furthermore, individuals (and their relatives and friends – with whom they discuss such issues) of a certain age could also have a higher tendency toward institutionalization and thus see this as the usual form of living, for example, from the age of 90 (compared to 80-year-olds). After a certain age, they may be less likely to resist admission to a nursing or retirement home. However, studies are missing to support this assumption indicating the need for upcoming studies.

The role of the marital status – which was found in our study – is well in line with previous research that demonstrated the key role of the marital status for institutionalization.<sup>9</sup> It may be worth noting that being single was particularly strongly related to the odds of being institutionalized among men. It could be that male singles in this age bracket are more dependent on institutionalized forms of housing due to differences in the social network<sup>23,24</sup> with women reporting stronger social ties.<sup>24</sup> Corresponding social networks among single women in this age bracket could in turn facilitate private forms of care – which should be investigated in future research.

We also found that higher education was associated with higher odds of institutionalization – supporting a recent study from Germany.<sup>6</sup> Of note, in unadjusted analysis, there was an association between high education (compared to low education) and lower odds of institutionalization. However, these findings already changed considerably when it was adjusted for sex and age (for example, Cramer's V was 0.40 for the association between education and sex). When further adjustments were made (i.e., fully adjusted model where it was, among other things, also adjusted for several health-related factors), there was the aforementioned association between higher education and higher odds of institutionalization. This highlights the importance of the model specification (and including sociodemographic and health-related covariates) when examining the

association between education and institutionalization. Overall, such findings align with previous research which found that higher educated individuals aged 65 years and over (based on a representative sample) already prepared for long-term care in the sense that they already undertook financial preparations for long-term care needs (e.g., additional long-term care insurance).<sup>25</sup> A financially better preparation of higher educated people (and higher disposable income and assets) could also reflect better accommodation options (e.g., single rooms) or a generally higher quality of institutionalized care. In this respect, transitions to such forms of housing (e.g., with offers such as numerous leisure activities or a wide selection of meals) could be a little easier to accept for individuals with a higher level of education than for people with a lower level of education, who presumably postpone such forms of housing for as long as possible for the reasons mentioned above. However, we recommend future research (e.g., based on qualitative approaches or mediation analysis) to support our statement.

Surprisingly, more favorable self-rated health was associated with *higher* odds of being institutionalized in our study – which was driven by women. Previous research mainly showed poorer health in nursing home residents compared to individuals living at home.<sup>26,27</sup> It may be the case that institutionalized women in this age bracket compare their health with others (who may be in poorer health) in institutionalized settings. Such positive health comparisons are associated with a more positive evaluation of their own health.<sup>28</sup> Moreover, such findings could also indicate that women (with certain personality traits) may go into a nursing home early (i.e. despite good self-rated health) in order to no longer be a burden for caring friends and relatives.<sup>17–19</sup> Of note, this association switched sign (i.e., more favorable self-rated health was associated with lower odds of being institutionalized) when functional impairment was removed from the fully adjusted main model (OR: 0.60, 95% CI: 0.49 to 0.73). By further exploring this association, an interaction term was added (self-rated health x functional impairment) to the main model. This interaction term achieved statistical significance (OR: 0.68, 95% CI: 0.47 to 0.98). There was a particular strong association between favorable self-rated health among individuals without any functional impairment (OR: 4.17, 95% CI: 1.16 to 15.1). Among such individuals without functional impairment, a favorable self-assessment of health can lead to a false sense of independence and delay the recognition of emerging health problems which can eventually lead to nursing home admission. However, further research is urgently needed to analyze these findings in greater depth.

Moreover, functional impairment was a key driver of institutionalization in our study. This adds to our current understanding mainly based on findings using somewhat younger age brackets.<sup>29</sup> Considering that functional impairment reflects difficulties in performing instrumental activities of daily living – which are obviously central to independent living – such results are very plausible.

Acknowledging certain strengths and limitations of the current study is important. The data were taken from a sizable, nationally representative sample comprising individuals aged 80 and above living in community-dwelling and institutionalized settings. It is



crucial to recognize that the D80+ study utilized a cross-sectional design, which poses limitations in terms of establishing causality. Moreover, some bias due to self-reporting (e.g. functional limitations) are also possible. In addition, other variables of relevance may be missing (e.g. certain personality traits). Furthermore, the D80+ took place during the pandemic. The extent to which the results can also be transferred to the present needs to be investigated in future studies.

## 5 | CONCLUSION AND FUTURE RESEARCH

Our study highlights the role of several socio-demographic factors (especially marital status: being single) and functional impairment in the risk of institutionalization among older people in Germany. Delaying functional decline can be beneficial in order to live at home for as long as possible. For example, sustaining a healthy lifestyle (e.g., in terms of avoiding alcohol intake and smoking, physical activity) can help to maintain functional abilities.<sup>30</sup> Moreover, the finding that women and singles have a higher risk of institutionalization is also of great relevance for political decision-makers.

Upcoming longitudinal studies are desirable to confirm our current findings. Moreover, using causal mediation analysis could help to clarify the underlying mechanisms. Furthermore, other factors of relevance (such as personality factors) could be included in upcoming research. Additionally, further studies with even more recent data (in the post-pandemic era) would be desirable.

### AUTHOR CONTRIBUTIONS

**André Hajek:** Conceptualization; Data curation; Methodology; Project administration, Visualization; Roles/Writing - original draft, Writing - review & editing, Formal analysis. **Razak M. Gyasi:** Writing - review & editing, Visualization. **Hans-Helmut König:** Conceptualization; Resources; Writing - review & editing; Supervision; Visualization.

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### CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

### DATA AVAILABILITY STATEMENT

All data are available from the German Center of Gerontology. For further details (application for data use): <https://www.dza.de/en/research/fdz/access-to-data/application>.

### ETHICS STATEMENT

The ethical board of the medical faculty at the University of Cologne (Protocol #: 19-1387\_1) approved the D80+ study. The interviews

were only conducted with the consent of the interviewees. The questionnaire itself contains a brief introduction and the privacy policy. Consent is given when the respondents complete and return the questionnaire.

### ORCID

André Hajek  <https://orcid.org/0000-0002-6886-2745>

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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