

Cohabitation Status and Onset of Disability Among Older Danes

Is Social Participation a Possible Mediator?

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Objectives: To investigate the effect of cohabitation status in older men and women on (a) onset of disability at 3- and 4.5-year follow-up and (b) changes in functional ability between 3- and 4.5-year follow-up, and to analyze whether this effect was mediated by social participation. **Method:** A total of 2,533 nondisabled older men and women enrolled in the Danish Intervention Study on Preventive Home Visits constituted the study population. Data were collected by mailed questionnaires in 1998-1999, 2000, 2001-2002, and 2003. **Results:** Living alone significantly increased the risk of onset of disability (T3 OR = 1.60[1.06-2.43], T4 OR = 1.74[1.22-2.47]) and the risk of sustained poor functional ability (OR = 2.35[1.44-3.84]) among men, but not among single-living women. Social participation mediated only a small part of the effect of cohabitation status on functional ability. **Discussion:** Our results underline the importance of cohabitation/marriage for maintaining a high functional ability among older men.

Keywords: *cohabitation status; onset of disability; mediation; social participation.*

Authors' Note: This study is supported by grants from the Danish National Council for Health Research, the Research Foundation for General Practice and Primary Care, East Danish Research Forum, the County Value-Added Tax Foundation and the Danish Ministry of Social Affairs. The authors thank Mikkel Vass, MD, who has been responsible for the study concept, design, and acquisition of data in the Danish Intervention Study on Preventive Home Visits as principal investigator together with Kirsten Avlund. Correspondence concerning this article should be addressed to Charlotte Juul Nilsson, MD, Department of Social Medicine, Institute of Public Health Science, University of Copenhagen, Øster Farimagsgade 5, PO Box 2099, DK-1014 Copenhagen K; e-mail: c.nilsson@socmed.ku.dk.

Introduction

Among older people, disability is an important indicator of ageing, and studies on predictors of onset of disability may contribute to the understanding of the ageing process.

Cohabitation status might be such a predictor. During the last 16 years, the number of single-living adults in Denmark has increased to around 65,000 individuals (Statistics Denmark, 2006). The effect of living alone on the risk of onset of disability among older people is therefore an issue that demands attention and investigation.

In studies concerning associations between living alone or being unmarried and functional ability among older people, the findings are disparate (Avlund, Due, Holstein, Sonn, & Laukkanen, 2002; Avlund, Lund, Holstein, & Due, 2004; Goldman, Korenman, & Weinstein, 1995; Hughes & Waite, 2002; Magaziner, Cadigan, Hebel, & Parry, 1988; Michael, Berkman, Colditz, & Kawachi, 2001; Mor et al., 1989; Sarwari, Fredman, Langenbers, & Magaziner, 1998; Strawbridge, Camacho, Cohen, & Kaplan, 1993; Waite & Hughes, 1999). Among these, three studies considered only women and found cohabitation to both increase and reduce the risk of functional decline, as well as to be of no importance (Magaziner et al., 1988; Michael et al., 2001; Sarwari et al., 1998). Two studies found a stronger protective effect on functional ability of being married among older men than among older women (Goldman et al., 1995; Strawbridge et al., 1993), and in a study on both genders, only the older women living alone had a significantly increased risk of sustaining poor functional ability (Avlund et al., 2002). In other studies, both genders benefited from cohabiting or being married (Mor et al., 1989; Waite & Hughes, 1999). Finally, some studies have not found an increased risk of functional decline among either older men or women living alone (Avlund et al., 2004; Hughes & Waite, 2002).

Umberson (1987) indicated that there might be some a priori characteristics of the individual—for example, prior health status—that affect both the individual's engagement in social relations and the health outcome measured, thereby questioning the causal connection between, for example, cohabitation or marital status and subsequent functional ability. Similarly, older people might choose their living arrangements because of health reasons (Magaziner et al., 1988). Studying the possible relation between cohabitation status and subsequent functional ability would therefore be improved by starting from a population of individuals who are nondisabled at baseline (e.g., Avlund et al., 2004; Mor et al., 1989).

Furthermore, it might be important to consider possible mediators of the effect of cohabitation status on functional ability—for instance, social participation, which has been associated with marital or cohabitation status as well as functional ability. A high level of social participation is important for maintaining a high functional ability (Avlund et al., 2004), and social participation is shown to be lower among people living alone in comparison with cohabiting individuals (Lindström, Merlo, & Östergren, 2002) and among widowed or divorced people in comparison with married individuals (Baum et al., 2000).

The aim of the present study is to investigate the association between baseline-cohabitation status and (a) onset of disability at 3- and 4½-year follow-up, and (b) changes in functional ability between 3- and 4½-year follow-up, among older men and women nondisabled at baseline. It will also be investigated whether baseline social participation is a possible mediator of the effect of cohabitation status on functional ability.

Method

Design and Study Population

The present study is based on data from the Danish Intervention Study on Preventive Home Visits, a randomized controlled intervention study with the aim of examining whether preventive home visits to older people, if made in a systematic and standardized way, enhance active life expectancy (Vass, Avlund, Hendriksen, Andersen, & Keiding, 2002). Randomization and intervention were at municipality level and outcome was measured at individual level. In total, 34 Danish municipalities participated, with 17 intervention and 17 control municipalities. The intervention implied interdisciplinary education of the professionals involved in the preventive home visits and is described elsewhere (Vass et al., 2002). Baseline data were collected in 1998-1999 (T1), and follow-up data were collected in 2000 (T2), 2001-2002 (T3), and 2003 (T4), all by mailed questionnaires concerning, for example, social relations, functional ability, and the preventive home visits. The study population included all noninstitutionalized citizens in the 34 municipalities born in 1918 (80 years old at baseline) or 1923-1924 (74-75 years old at baseline). The participation rate was 70%, and the study population included 4,060 individuals at baseline (Vass, Avlund, Lauridsen, & Hendriksen, 2005; Vass et al., 2002).

The present analyses are based on the participants who were nondisabled at baseline (manage transferring, walking indoors, going outdoors, walking

outdoors in nice/poor weather and climbing stairs without need of help; $N = 3,144$). In addition, we excluded 105 individuals who did not have full records on all included variables and 506 individuals who did not survive until T3/T4, $N = 2,533$.

Measures

Cohabitation status was estimated in 1998 (T1) by the question “Do you live alone?” (yes/no).

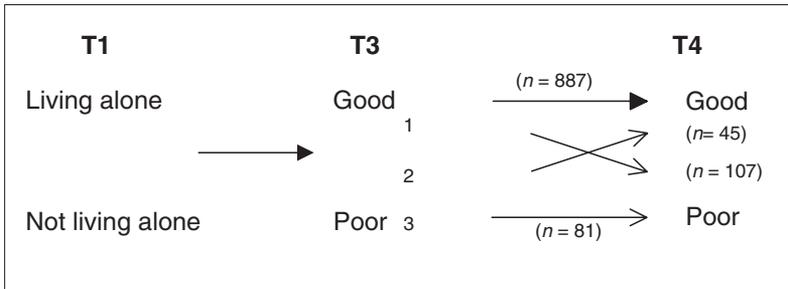
The measures of functional ability used here are from 2001 to 2002 (T3) and 2003 (T4). Functional ability was estimated by the Mobility-Help Scale (Mob-H Scale), a validated scale (Avlund, Kreiner, & Schultz-Larsen, 1996; Avlund, Thudium, Davidsen, & Fuglsang-Sørensen, 1995), which measures how many mobility activities can be performed without needing help (0-6): transfer, walking indoors, going outdoors, walking outdoors in nice/poor weather, and climbing stairs (Avlund & Holstein, 1998). A high score is consistent with a good functional ability. In the present analyses, the Mob-H Scale was included as a dichotomized variable: manage all activities without help versus need of help in one or more activities (0, 1+). Variables comprising changes in functional ability from T3 to T4 were performed (Figure 1): good \rightarrow good (sustained good functional ability), good \rightarrow poor (decline in functional ability), poor \rightarrow good (recovery from disability), and poor \rightarrow poor (sustained poor functional ability).

Age (75 or 80 years old at baseline, T1), living in an intervention municipality versus control municipality, socioeconomic status, and mental well-being were included in the analyses as potential confounders.

The intervention is shown to be associated with better functional ability among older women, but not among older men (Vass et al., 2004). Therefore, living in an intervention municipality versus control municipality (intervention status) was included in the analyses.

Financial assets in 1999 were used as a measure of socioeconomic status. Financial assets are associated with health and are more important than other measures of socioeconomic status when considering older people (Robert & House, 1996). Data were obtained by merging the analyses by the participants' civil registration number to Statistics Denmark. Financial assets were based on bonds and stocks deposited in financial institutions and mortgage debt and were categorized into five variables: less than 0 US\$, from 0 up to and including 6,000 US\$, from 6,000 up to and including 53,000 US\$, from 53,000 up to and including 131,000 US\$, and more than 131,000 US\$.

Figure 1
Changes in Functional Ability Between T3 and T4 (Good → Good, Good → Poor, Poor → Good, Poor → Poor) Subsequent to Cohabitation Status 3 and 4½ Years Prior



- 1 sustained good functional ability compared to functional decline.
- 2 sustained good functional ability compared to functional recovery.
- 3 sustained good functional ability compared to sustained poor functional ability.

Mental well-being is an emotional aspect of mental health, which is a well-known predictor of subsequent functional ability (Raji, Ostir, Markides, & Goodwin, 2002). Mental well-being was estimated at baseline by questions concerning feeling down, being aggressive, and feeling tired without a specific reason (often/sometimes versus rarely/never; Avlund, Vass, & Hendriksen, 2003). Answering rarely or never was assigned 1 point (0-3). In the present analyses, a dichotomized variable was used: good mental well-being (2-3) versus poor mental well-being (0-1).

Social participation was estimated at baseline by three items; visiting other people, receiving visitors at home, and participating in social activities outside the home (Avlund et al., 2003). Carrying out each of these activities every month was assigned 1 point (0-3). In the present analyses, a dichotomized variable was used: high social participation (2-3) versus low social participation (0-1).

Statistical Analyses

All analyses were stratified by gender. The distribution of the measures of cohabitation status, functional ability, and the other covariates according to

gender were investigated by chi-square tests (PROC FREQ, SAS version 9). The association between cohabitation status and functional ability, respectively, and social participation were investigated similarly. Further analyses were made in the same way with onset of disability at T3 and T4 and changes in disability from T3 to T4 (decline/recovery/sustained poor compared to sustained good [Figure 1]) as outcome measures. Crude odds ratios for the association between living alone and the outcome measures were calculated, with cohabiting individuals as the reference group (OR = 1.00; PROC LOGISTIC). Multivariate logistic regression analyses were then made. Model 1 described the crude association between living alone and the outcome measures. Model 2a included age, financial assets, intervention status, and mental well-being as possible confounders. The variables that became insignificant in Model 2a were excluded, resulting in Model 2. Model 3 equaled Model 2 and included social participation.

Results

The following results are based on 2,533 individuals, 1,120 men (44%) and 1,413 women (56%).

Table 1 shows the distribution of functional ability measures by gender. At T3, 11% of men and 22% of women experienced onset of disability, and at T4, 17% of men and 27% of women experienced onset of disability. A major proportion of both men and women sustained good functional ability between T3 and T4, whereas 7% of men and 15% of women sustained poor functional ability between T3 and T4. Around 10% of both men and women experienced a decline in functional ability from T3 to T4 and only 4% to 7% experienced a recovery. Significantly more women than men experienced onset of disability at T3 or T4, experienced a decline in or recovery from poor functional ability, or had sustained poor functional ability. Table 2 shows the distribution of cohabitation status and other covariates by gender. Significantly more women than men lived alone. Both cohabiting men and women were most likely to be living with a spouse/partner. Significantly more men than women had good mental well-being and large financial assets, whereas significantly more women than men had a high social participation. The distribution of men and women into the separate age and intervention status groups was almost identical.

Table 1
Distribution of Functional Ability at T3 and T4, and of Change in Functional Ability Between T3 and T4, by Gender (N = 2,533)

	Men ^a (%)	Women ^b (%)	<i>p</i> Value ^c
Functional ability (T3)			
Good	994 (89%)	1,108 (78%)	< 0.0001
Poor	126 (11%)	305 (22%)	
Functional ability (T4)			
Good	932 (83%)	1,028 (73%)	< 0.0001
Poor	188 (17%)	385 (27%)	
Change in functional ability T3-T4			
Sustained good	887 (79%)	937 (66%)	
Decline	107 (10%)	171 (12%)	0.0016
Recovery	45 (4%)	91 (7%)	0.0005
Sustained poor	81 (7%)	214 (15%)	< 0.0001

a. *n* = 1,120.

b. *n* = 1,413.

c. From chi-square analysis of the difference in prevalence of functional ability outcomes between men and women.

Social participation was significantly associated with cohabitation status among both men and women, whereas social participation was significantly associated with functional ability at T3 and T4, respectively, only among men.

Table 3 shows that men living alone had doubled odds of onset of disability at T3 and T4 when compared to cohabiting men. Inclusion of the potential confounding variables attenuated this association somewhat (Table 3, Model 2). The increased risk for men living alone was virtually unchanged after inclusion of the potential mediator (social participation) of the effect of cohabitation status on functional ability (Table 3, Model 3).

The risk among men living alone of declining functional ability or the chance of recovering between T3 and T4, compared to sustaining a good functional ability between T3 and T4, was not significantly different from the risk of cohabiting men (Table 3). The risk of sustaining poor functional ability compared to sustaining good functional ability between T3 and T4 was significantly increased among men living alone. Inclusion of social participation in the analyses attenuated this association slightly, but it remained significant (Table 3, Model 3), for example, social participation mediated

Table 2
Distribution of Cohabitation Status, Intervention Status, Age, Mental Well-Being, Socioeconomic Status, and Social Participation Stratified by Gender (N = 2,533)

	Men ^a (%)	Women ^b (%)	<i>p</i> Value ^c
Baseline cohabitation status			
Do you live alone?			
Yes	255 (23%)	827 (59%)	< .0001
No	865 (77%)	586 (41%)	
Who do you live with?			
Spouse/partner	831 (98%)	554 (95%)	.0243
Child/children	9 (1%)	19 (3%)	
Siblings	5 (0.6%)	5 (1%)	
Others	3 (0.4%)	3 (1%)	
Living in an intervention municipality			
Yes	590 (53%)	734 (52%)	.6888
No	530 (47%)	679 (48%)	
Age			
74-75 years at baseline	862 (77%)	1,057 (75%)	.2079
80 years at baseline	258 (23%)	356 (25%)	
Mental well-being (T2)			
Good	998 (89%)	1,158 (82%)	< .0001
Poor	122 (11%)	255 (18%)	
Financial assets (1999)			
Less than 0 US\$	54 (5%)	77 (5%)	< .0001
0-6,000 US\$	144 (13%)	359 (25%)	
6,000-53,000 US\$	202 (18%)	431 (31%)	
53,000-131,000 US\$	338 (30%)	295 (21%)	
More than 131,000 US\$	382 (34%)	251 (18%)	
Baseline social participation			
High	985 (88%)	1,324 (94%)	< .0001
Low	135 (12%)	89 (6%)	

a. *n* = 1,120.

b. *n* = 1,413.

c. From chi-square analysis of the difference in prevalence of determinants between men and women.

about 11% of the effect of cohabitation status on sustained poor functional ability (mediation proportion $[2.52-2.35]/[2.52-1] \sim 11\%$; Lynch, Kaplan, Cohen, Tuomilehto, & Salonen, 1996).

Table 3
Men: Odds Ratios (95% CI) for Onset of Disability at T3 or T4 by Cohabitation Status, and Odds Ratios for a Decline/Recovery/ Sustained Poor Functional Ability (Compared to a Sustained Good Functional Ability) Between T3 and T4 by Cohabitation Status

	Odds Ratio (95% CI)			Percentage Reduction in OR (%) ^a
	Model 1	Model 2	Model 3	
Onset of disability from T1 to T3 (<i>n</i> = 1,120)				
Cohabiting	1.00	1.00	1.00	
Not cohabiting	1.83 (1.23-2.74)	1.67 (1.11-2.53)*	1.60 (1.06-2.43)	10.45
Onset of disability from T1 to T4 (<i>n</i> = 1,120)				
Cohabiting	1.00	1.00	1.00	
Not cohabiting	1.88 (1.34-2.67)	1.79 (1.26-2.55)*	1.74 (1.22-2.47)	6.33
Functional decline from T3 to T4: good → good/good → poor (<i>n</i> = 994)				
Cohabiting	1.00	1.00	1.00	
Not cohabiting	1.35 (0.85-2.13)	1.27 (0.80-2.04)*	1.27 (0.79-2.03)	0

(continued)

Table 3 (continued)

	Odds Ratio (95% CI)			Percentage Reduction in OR (%) ^a
	Model 1	Model 2	Model 3	
Functional recovery from T3 to T4:				
good → good/poor → good (<i>n</i> = 932)				
Cohabiting	1.00	1.00	1.00	
Not cohabiting	0.82 (0.38-1.79)	0.76 (0.34-1.69)*	0.75 (0.34-1.68)	4.17
Sustained poor functional ability from T3 to T4; good → good/poor → poor (<i>n</i> = 968)				
Cohabiting	1.00	1.00	1.00	
Not cohabiting	2.75 (1.72-4.40)	2.52 (1.56-4.09)**	2.35 (1.44-3.84)	11.18

Note: Percentage reduction in odds ratios between Model 2 and Model 3.

Model 1: cohabitation status → functional ability T3/T4/change in functional ability T3-T4.

Model 2*: cohabitation status + age + financial assets + mental well-being → functional ability T3/T4/change in functional ability T3-T4.

Model 2**: cohabitation status + age + financial assets → functional ability T3/T4/change in functional ability T3-T4.

Model 3: Model 2 + social participation → functional ability T3/T4/change in functional ability T3-T4.

^aFormula: $(OR_{(\text{adjusted for confounders})} - OR_{(\text{adjusted for confounders plus social participation})} / OR_{(\text{adjusted for confounders})} - 1) \times 100\%$.

We performed the same analyses as mentioned above with physical activity as a possible mediator. Yet physical activity was not significantly associated with cohabitation status among men and did not show to mediate the effect of cohabitation status on functional ability either.

Among women living alone, there was no significantly increased risk of onset of disability at T3 (odds ratio 1.27 [95% CI 0.98-1.64]) and T4 (odds ratio 1.15 [95% CI 0.91-1.47]) compared to cohabiting women in the crude analyses. Furthermore, women living alone had no significantly increased risk of a decline (odds ratio 1.12 [95% CI 0.80-1.56]), chance of recovery (odds ratio 1.40 [95% CI 0.89-2.19]), or risk of sustaining poor functional ability at T4 in the crude analyses, yet the tendency was in the same direction as for men. Inclusion of the potential confounding variables further attenuated these insignificant associations (odds ratio for onset of disability at T3 1.25 [95% CI 0.95-1.66], onset of disability at T4 1.09 [95% CI 0.84-1.41], decline 1.06 [95% CI 0.74-1.52], recovery 1.49 [95% CI 0.92-2.40], and sustained poor functional ability 1.6 [95% CI 0.83-1.62]). On the basis of these insignificant results and the lack of association between social participation and functional ability at T3 and T4, no further analyses were made among women, and therefore analyses including physical activity as a potential mediator were also omitted.

A model including an interaction term between cohabitation status and intervention group status showed no interaction between cohabitation status and intervention status.

Although a model including an interaction term between gender and cohabitation status showed no sign of effect modification of gender on the association between cohabitation status and onset of disability, we decided to keep the gender stratified analyses in order to identify the gender-specific estimates.

Discussion

The results of the present study showed that living alone was associated with a significantly increased risk of onset of disability at T3 and T4 and an increased risk of sustained poor functional ability between T3 and T4 among older men, compared to cohabiting men. Social participation mediated only a small part of this relation. Among women living alone, no significantly increased risk of onset of disability or changes in functional ability was found, although the tendency was in the same direction as for men.

As previous studies using cohabitation status as a determinant for functional decline showed nothing of significance among men (Avlund et al., 2002; Hughes & Waite, 2002; Waite & Hughes, 1999), the gender difference

found in the present study, showing older men at a disadvantage, was quite surprising. We found that 98% of cohabiting men and 95% of cohabiting women in the present study were living with a spouse. That is, the observed effect of cohabitation status on functional ability might as well be an effect of marital status on functional ability. Several studies have shown that marriage and cohabitation are more important to men than to women in the protection against an increased mortality risk (Avlund, Damsgaard, & Holstein, 1998; Barefoot, Grønbaek, Jensen, Schnohr, & Prescott, 2005; Ben-Shlomo, Smith, Shipley, & Marmot, 1993; Davis, Neuhaus, Moritz, & Segal, 1992; Goldman et al., 1995; Johnson, Backlund, Sorlie, & Loveless, 2000; Lund et al., 2002; Lund, Holstein, & Osler, 2004; Lund, Modvig, Due, & Holstein, 2000; Rosengren, Wedel, & Wilhelmsen, 1989; Shye, Mullooly, Freeborn, & Pope, 1995; Welin et al., 1985). This distinct pattern of men being more disadvantaged than women is not found correspondingly clearly in the literature concerning marital or cohabitation status and functional decline as an outcome measure (Avlund et al., 2002, 2004; Goldman et al., 1995; Hughes & Waite, 2002; Magaziner et al., 1988; Michael et al., 2001; Mor et al., 1989; Sarwari et al., 1998; Strawbridge et al., 1993; Waite & Hughes, 1999). One possible explanation could be that mortality is higher among men, whereas functional decline is more prevalent among women (Avlund, 2004; Kaplan & Erickson, 2000; Murtagh & Hubert, 2004). Another explanation could be the different ways in which functional ability are measured (ADL, IADL, mobility), whereas death as an outcome is unambiguous.

An explanation for the gender differences, with a disadvantage for unmarried men, was suggested by Antonucci and Akiyami (1987). Men throughout their lives were more likely to receive social support from only one person, most often the spouse, whereas the social networks of women were greater than men's, and women received more social support from their networks than men did. Women were more satisfied with their friends than men, but men were more satisfied with their marriage than women. The larger size and the greater importance of women's social networks, compared to those of men, might make living alone less problematic to older women, whereas men may be more vulnerable after losing their spouse.

We must also consider the possibility that changes in cohabitation status might have occurred between baseline and follow-up. The observed onset of disability and changes in disability between T3 and T4 might not have resulted from cohabitation status at baseline, but from changes in cohabitation status during the follow-up period. Our study population is rather old even at baseline, and many of the cohabiting men and women might lose their spouse during the follow-up period, perhaps very shortly after baseline.

Therefore, some of the study participants might have been misclassified into the cohabiting group. This might lead to an underestimation of our results, because in reality more study participants might have been living alone for approximately the whole follow-up period. It might be the transition from marriage to widowhood or from cohabitation to living alone, rather than widowhood and living alone in itself, that increases the risk of disability or mortality (Shye et al., 1995; van den Brink et al., 2004), and according to this suggestion, the older men and women who began living alone in the follow-up period of the present study might be at even greater risk of disability than the individuals living alone at baseline. Some sort of habituation to living alone might be present, with the increased risk of functional decline coming in the immediate aftermath, for example, of the spousal loss. Though Avlund et al. (2004) studied the risk of onset of disability at 1½-year follow-up as a result of baseline cohabitation status using the present data, they found no increased risk among those living alone, which might be due to the gradual appearance of the negative effects of living alone.

To our knowledge, no other studies have investigated changes in functional ability as a result of cohabitation status 3 years earlier. Because the functional ability of older people is predicted by many different factors (Pérès, Verret, Alioum, & Barberger-Gateau, 2005), we must expect it to be somewhat unstable over time, and we therefore find it relevant to study changes in functional ability, in addition to our measures of disability, at two separate points in time.

Changes in functional ability status appearing more frequently than we have been able to measure in the present study must be considered. If the transition into living alone is the true risk factor, disability may appear shortly hereafter, but may be absent when functional ability is assessed perhaps more than 2 years later. In the present study, effects of cohabitation on functional ability might have been present but too transient for us to measure. If functional ability was assessed closer to the baseline measure of cohabitation status, it might have resulted in findings of a stronger relation between living alone and onset of disability among perhaps both men and women. Monthly assessments of functional ability over a period of 3 years were completed by Hardy and Gill (2005) to study functional ability trajectories among older men and women. The short assessment intervals reduced the risk of underestimating the incidence of disability episodes. Among those who experienced disability, 81% recovered within 5 months, and 21% of these individuals experienced only 1 month of recovery.

Only a small part of the effect of cohabitation status on functional ability was mediated by baseline social participation in the present study, most

pronounced when regarding sustained poor functional ability. That is, among men living alone, visiting others, receiving visitors at home, and going out to different activities are important activities for avoiding onset of disability and sustained poor functional ability in the subsequent years. Utz, Carr, Nesse, and Wortman (2002) found that many widowed individuals used increased social participation as a coping strategy to deal with the negative effects of having become widowers, suggesting that social participation might be a mediator of the effect of cohabitation or marital status on different health outcomes.

The lack of a strong mediation effect by baseline social participation in the present study might be due to older men not having much social participation, neither prior to becoming alone nor after, because it is suggested that the best predictor of social participation after widowerhood is social participation prior to widowerhood (Utz et al., 2002). If the spouse were the only important social relation to the older men, other social relationships might be neglected both prior to and after the death of the spouse, and the benefits of social participation for health might not be fully achieved. Although we find low social participation to be significantly predictive of onset of disability among older men, low social participation might not be of great importance compared to the spousal loss, and therefore is not a strong mediator. Possibly, social participation might modify the effect of cohabitation status on functional ability, rather than mediate it. Present social participation might be more important than, for example, social participation in the years prior to spousal loss in affecting functional ability.

Vigorous physical activity was the only health behavior possible for us to measure in this study, yet we did not find vigorous physical activity to mediate the effect of cohabitation status on functional ability. As it is suggested that health behaviors mediate the effect, for example, of cohabitation status on functional ability (Schone & Weinick, 1998; Umberson, 1992), we might have expected some mediation by vigorous physical activity. Other measures of physical activity and other health behaviors (e.g., smoking, alcohol intake) might have mediated the effect of cohabitation status on functional ability. On the other hand, Lund et al. (2002) found that health behaviors such as smoking, diet, and physical activity did not explain differences in mortality among cohabiting and noncohabiting older people.

Among the individuals who did not have full records on all included variables, compared to the study participants, there were more males, more individuals in the oldest age group, more individuals with low social participation, more individuals living alone, more individuals with poor mental well-being, and more individuals with lower financial assets. The distribution

into intervention or control municipalities was equal among study participants and “missing.”

Because of the excluded individuals’ disadvantages regarding some determinants, it might be expected that these individuals experienced more disability at follow-up than the study participants, and therefore the results of the present study might be underestimated. The observed effect of social participation on the relation between cohabitation status and functional ability might have been more obvious, had these individuals been included in the analyses.

Our measure of mental well-being was a significant predictor of onset of disability, yet not a strong confounder. Other ways of assessing mental health, such as using a depression scale, might have revealed other results. Inclusion of the cognitive aspect of mental health might also have been relevant.

Education is a widely used measure of socioeconomic status, which has been shown to be associated with social relations as well as functional ability (House et al., 1990; Krause & Borowski-Clark, 1995). In the present study, we attempted to use education (data from Statistics Denmark) as a measure of socioeconomic status, but data were missing for the majority of study participants in the oldest age group, and so we used financial assets instead. We found low financial assets to be a significant predictor for onset of disability, yet not a strong confounder.

Notwithstanding what has been discussed this far, the present study has both strengths and limitations. It is a strength of the study that data are from a sample of the total population of older men and women in 34 municipalities, and that the response rate was relatively high at baseline (70%). Stratification by gender is obviously important, because several studies have found gender differences when regarding cohabitation or marital status and arrived at different outcomes. The longitudinal study design and starting from a population of only nondisabled older men and women make it easier to study possible causal relations between cohabitation status and onset of disability. Another strength is the Mob-H Scale used to measure functional ability, which is a well-validated measure of actual functional disability (Avlund et al., 1996). The weakness of the present study might be that we have no objective measure of the functional ability or health status of the older men and women, only self-reports on functional ability. However, need for help as measured by the Mob-H Scale is strongly related to physical performance tests on walking speed (Avlund, Schroll, Davidsen, Løvborg, & Rantanen, 1994), stair walking (Avlund et al., 1994), and balance (Era et al., 1997). The opportunity to obtain data on socioeconomic status from registers at

Statistics Denmark is also an important strength. It might also be a weakness that the effect of other measures of health behaviors (e.g., smoking, alcohol intake) are not investigated, as they have been shown to mediate the effect of cohabitation status on functional ability (Schone & Weinick, 1998; Umberson, 1992), yet no data were available on these matters.

In conclusion, our findings were that among older men, living alone significantly increased the risk of onset of disability after 3 and 4½ years and the risk of sustained poor functional ability between 3- and 4½-year follow-up. Among older women, living alone did not significantly increase the risk of onset of disability or changes in functional ability, although the findings were in the same direction as for men. Social participation mediated a small part of the effect of baseline cohabitation status on onset of disability. There must be other mechanisms than those investigated in the present study, mediating the effect of cohabitation status on functional ability.

The detection of other possible mediators of the effect of cohabitation status on functional ability will be an interesting aim of future studies. Seeking out factors that might make living alone less disadvantageous for older men is important. As high social participation might prevent prolonged functional decline, encouraging older people of poor as well as of good functional ability to participate in social activities is essential. Access, for example, to means of transport and finances, as well as to social activities is an important matter. Although we did not find a significant increase in the risk of onset of disability among older women living alone, we must not rule out the possibility that older women might also benefit from cohabitation and participation in social activities. The results of the present study underscore the importance of stratifying by gender in analyses of social relations and functional ability.

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