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Self-care ability among home-dwelling older people in rural areas in southern Norway

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Introduction: The growing number of older people is assumed to represent many challenges in the future. Self-care ability is a crucial health resource in older people and may be a decisive factor for older people managing daily life in their own homes. Studies have shown that self-care ability is closely related to perceived health, sense of coherence and nutritional risk.

Aim: The aim of this study was to describe self-care ability among home-dwelling older individuals living in rural areas in southern Norway and to relate the results to general living conditions, sense of coherence, screened nutritional state, perceived health, mental health and perceived life situation.

Methods: A cross-sectional survey was carried out in rural areas in five counties in 2010. A mailed questionnaire, containing background variables, health-related questions and five instruments, was sent to a randomly selected sample of 3017 older people (65+ years), and 1050 respondents were included in the study. Data were analysed with statistical methods.

Results: A total of 780 persons were found to have higher self-care ability and 240 to have lower self-care ability using the Self-care Ability Scale for the Elderly. Self-care ability was found to be closely related to health-related issues, self-care agency, sense of coherence, nutritional state and mental health, former profession, and type of dwelling. Predictors for high self-care ability were to have higher self-care agency, not receiving family help, having low risk for undernutrition, not perceiving helplessness, being able to prepare food, being active and having lower age.

Conclusions: When self-care ability is reduced in older people, caregivers have to be aware about how this can be expressed and also be aware of their responsibility for identifying and mapping needs for appropriate support and help, and preventing unnecessary and unwanted dependency.

Keywords: mental health, nutritional status, perceived health, self-care agency, sense of coherence.

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Introduction

The growing number of older people in the future is assumed to represent many challenges for the public welfare society, as well for the older individual him/herself and for the informal caregivers and networks. One inevitable consequence of the expansion in the older population is that many of these individuals will continue to live in their own homes even with functional declines and advanced age, and probably, in many cases, this will be in accordance with the older persons' own preferences (1–3). Self-care ability is shown to be crucial as a health resource in older people, and it may be the decisive factor for managing daily life in their own homes (4). Likewise, reduced self-care ability is found to reduce life satisfaction in older people (5), and thus, it is of great importance to gain an insight into and understanding of influencing factors.

In a Swedish study, it was found that advanced age and lower perceived health were related to weaker self-care ability (6). This is not quite in line with the results of a meta-analysis of self-care behaviour research among older people in Thailand reported by Klainin and Ouannapiruk (7). They found that health status and overall health beliefs were factors with strong relationships with self-care, while demographic variables like age, sex and education displayed the weakest relationships with self-care behaviour.

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The activity level is yet another factor found to be associated with self-care ability and a healthy lifestyle, and being active is shown to be a predictor for self-care ability for older home-dwelling people (6, 8). Byam-Williams and Salyer (9) showed that older home-dwelling women had a healthier lifestyle than older men, and in general, the participants in that study perceived themselves as having a health-promoting lifestyle. They expressed satisfaction with their social networks and support as well as their living arrangements. A similar result was reported by Dale et al. (10), who concluded that a robust and nourishing social network was important for older people to manage their home situation.

Higher coping and self-care abilities are positively related to good mental health and perception of high quality of life in older people (11). Depressive moods and feelings of loneliness are found to be negatively related to self-care behaviours (12). A key concept related to successful coping is sense of coherence (SOC), that was introduced by Aron Antonovsky (13, 14), reflecting the dimensions comprehensibility, manageability and meaningfulness. Experiences of meaning and purpose in life, and the capability to deal with health-threatening situations, represent important self-care and health resources (15–17). Sense of coherence, as well as self-care ability, is found to be clearly associated with perceived good health in older people (18, 19).

As SOC concerns health resources and problem-solving capacity, it is associated with self-care ability, which has been shown in a study among older individuals at risk for undernutrition (19). Nutrition is a crucial topic regarding self-care and health promotion in older people, because the phenomenon of ageing includes many changes, both physiologic and psychological, that could affect nutritional status. Older people may underestimate their capabilities, which may result in unhealthy and risky health habits such as poor nutrition (9).

Self-care is a multidimensional health-related concept, which has been defined and interpreted in different ways in the literature. According to Høy et al. (4), a lack of consensus seems to exist regarding definitions and understanding of the self-care concept, depending on the professionals' theoretical and philosophical approach. However, an instrument especially developed for assessing self-care ability in older people is the Self-care Ability Scale for the Elderly (SASE) (20). The structure of this instrument was influenced by Orem's (21) self-care deficit theory of nursing (22, 23) and directly based on the theory of health and adaptedness by Pörn (24). A fundamental assumption in Pörn's theory is that human beings are rational, acting subjects who have their own free will and ability to act in relation to themselves and other individuals. Their state of health is determined by an equilibrium between their environment, their goals and their repertoires (that is what they can do). According to Söderhamn et al. (20), the construct of self-care ability means the individual ability a person has to care for his or her environment, repertoire and goals.

However, few studies are found that describe self-care ability and health-related issues among older home-dwelling people. And as the number of older people living at home is increasing in the Scandinavian countries, as in the rest of the world, the importance of investigating such issues is obvious.

Moreover, knowledge about the situation of older people living in rural areas is limited, and results from former studies concerning this topic are not congruent (1, 25). People living in rural areas may be faced with challenges such as geographic and social isolation, and the lack of service infrastructure, transportation and medical care, which is more available in central areas (25). Rural older individuals are claimed to be an underserved population group with limited access to public home health care services (26, 27). Nevertheless, studies focussing on self-care ability and health-related issues among older people living in rural areas are, in general, sparse, and especially in Norway.

Aim

The aim of this study was to describe self-care ability among home-dwelling older (65+ years) individuals living in rural areas in southern Norway and relate the results to general living conditions, sense of coherence, screened nutritional state, mental health, overall perceived health and perceived life situation.

Methods

Study design and sample

This survey study has a cross-sectional design and was carried out in rural areas in five counties in southern Norway. The current area had, at the time this study was implemented, a population of 10 35 010 distributed in 84 municipalities (28). A total of 3017 older persons living in 23 small municipalities (350–3999 inhabitants), eight medium-size municipalities (4000–10 000 inhabitants) and six large municipalities (10 000–22 000 inhabitants) were invited to participate in this study.

Data were collected during the spring and summer 2010 through a mailed questionnaire to a randomly selected sample of 3017 older people, 65 years old in present year or older. The national directory of residents accomplished the randomization, due to their common procedures. Answering and returning the questionnaire were considered as informed consent to participate in the study. A total of 839 persons responded to the questionnaire. A reminder was sent out after 2 months, and 211 additional persons responded. Of the persons who received the reminder, 14

were found to be deceased. Thus, of a total of 3003 accessible persons, 1050 persons (35%) were included in the study.

The questionnaire

In the self-reported questionnaire, the following variables were included: age, sex, marital status, profession, type of dwelling and size of living-municipality, 11 health-related questions (that could be answered by yes or no), three questions on ordinal level about frequency of contact with family, neighbours and friends, and five instruments. These instruments were the Norwegian versions of the SASE (20), the Appraisal of Self-care Agency scale (ASA) (29, 30), the Sense of Coherence scale (SOC) (13, 14), the Nutritional Form For the Elderly (NUFFE) (31–33) and the Goldberg's General Health Questionnaire (GHQ) (34).

Self-care Ability Scale for the Elderly is an instrument at ordinal level, developed in Sweden, for assessing older peoples' self-care ability. The items are reflecting areas of concern for older people such as activities of daily living, mastery, well-being, volition, determination, loneliness and dressing. Each item score ranges from 1 to 5 scores on a Likert scale, i.e. totally disagree to totally agree. A score of 3 was considered to be a neutral score. Four items are negatively stated and must be reversed in the summation of the scores. The total score can range between 17 and 85. A higher score indicates higher perceived self-care ability (20). SASE is shown to be a reliable and valid instrument (20, 35), and the cut-off score of ≤69 was indicating lower self-care ability and >69 indicating higher self-care ability (35).

The ASA scale is an ordinal Likert-type scale that measures engagement and activation of power in self-care actions. It includes 24 items, and each item has five response categories that ranges from one 'totally disagree', to five 'totally agree'. Maximum score is 120. A higher score indicates higher self-care agency. Nine items are negatively stated and have to be reversed in the summation (29, 36). The scale has been translated from Dutch to Norwegian, and this version has been tested by Van Achterberg et al. (37) and Lorensen et al. (30).

Sense of coherence is the central concept in Antonovsky's salutogenic theory that is designed to advance the understanding of stressors, coping and health. The SOC scale is a semantic differential scale on the ordinal level with two anchoring phrases and with each item ranging from 1 to 7 scores. The scale consists of 29 items. These are distributed in the following way: eleven items address the comprehensibility, ten items the manageability and eight items the meaningfulness. Thirteen of the items are formulated negatively and have to be reversed before summation. Total score ranges from 29 to 203, with a higher score expressing a stronger SOC. The SOC scale was initially developed and tested in Israel, but it has been translated into many languages and has been used in several studies in various countries. It has been shown to be a reliable and valid scale (13, 14).

Nutritional Form For the Elderly is a nutritional screening instrument, at ordinal level, developed in Sweden, for screening older people. It contains 15 three-point items that involve dietary history, dietary assessment and general assessment. The most favourable option produces a score of 0 and the most unfavourable option a score of 2. Maximum score is 30. Higher screening scores indicate higher risk for undernutrition (31, 32). In Swedish (31, 32) and Norwegian testing studies (33), regarding reliability and validity, sufficient psychometric properties have been found.

Goldberg's General Health Questionnaire is an instrument with a four-point Likert-type scoring system for screening mental problems. It contains 30 items or statements with responses from strong 'symptom absence' to strong 'symptom presence'. Fifteen items are positively worded and 15 are negatively worded. The wording of the items means that they all can be scored in the same direction. Total scores ranges between 0 and 90. Higher scores indicate that conditions are more severe (34, 38). GHQ is developed in USA and has been translated into many languages. The Norwegian version of GHQ is tested by Dale et al. (39) with support for reliability and validity.

Statistical analyses

Descriptive statistics were used for describing the study sample, as numbers (n) and percentages (%) for nominal data. Ordinal data, regarding the instruments, were described with mean values and standard deviations (SD). Missing data up to five items, regarding the instruments SASE, ASA and SOC, were replaced with the neutral scores.

The assumption of normal distribution of the sample was not met, and nonparametric statistics were used in most of the analyses. Chi-square test, Mann–Whitney *U*-test for independent samples (two-tailed significance) and *t*-test for independent samples (two-tailed significance) were used for testing differences between groups regarding nominal, ordinal and interval data, respectively. When multiple comparisons were performed for testing differences between two groups, Bonferroni's correction was used to adjust p-values to control the Type 1 error rate at no more than 5% (40). When testing differences between three age groups, regarding SASE and ASA scores, one-way ANOVA with Bonferroni *post hoc* test was used.

To find the predictors for self-care ability, a multiple forward stepwise conditional logistic regression analysis was performed. Dependent variable was SASE scores dichotomized and labelled as 1 = higher SASE scores (>69) and as 0 = lower SASE scores (≤69). The choice of independent variables was based on variables that in univariate analyses reached a p-value of <0.2 (40), when compared to

higher or lower SASE scores. The following variables were included: age, marital status (married/cohabitant or not), type of dwelling (own home or sheltered residence), profession (professional/white collar or blue collar/home wife), perceived health, perceived helplessness, feeling satisfied with life, having chronic disease/handicap, being active, preparing food, having food distribution, having home nursing, having home help, having family help, telephone contact as a social contact, frequency of contact with family, frequency of contact with neighbours, frequency of contact with friends, ASA scores, NUFFE scores, GHQ scores and SOC scores. For statistical analyses, the computer program PASW Statistics 18 (SPSS Inc., Chicago, IL, USA) was used. A p-value of <0.05 was considered statistically significant.

Ethical considerations

When designing and performing the study, the intentions of the Declaration of Helsinki (41) and ethical standard principles (42) were followed. The study was approved by the Regional Committee for Medical Research Ethics in southern Norway (REK Sør-Øst D, 2009/1299).

Results

Study sample and dropouts

The study sample (n = 1050) consisted of 524 women and 526 men, ranging in age between 65 and 96 years, with a mean age of 74.3 years (SD 6.8). The dropouts had a higher mean age (77.4 years, SD 8.2, $p < 0.001$), and more women (n = 1133) than men (n = 834) were not responding ($p < 0.001$). There were no difference regarding the size of living-municipality between the study sample and the dropouts.

Self-care ability and self-care agency

The results of measured self-care ability and self-care agency using SASE (n = 1020) and ASA (n = 977) in the total study sample showed a mean score of 74.6 (SD 9.3) ranging from 27 to 85, and 92.3 (SD 10.9) ranging from 42 to 120, respectively. Lower self-care ability and self-care agency were significantly related to more advanced age, when the sample was grouped in three age cohorts (Table 1).

Self-care ability and respondents' characteristics

A total of 860 individuals (84.3%) were found to have higher self-care ability (≥69 scores) using SASE, and 180 (15.7%) had lower self-care ability (<69 scores). Those who had higher self-care ability had a mean SASE score of 77.8 (SD 4.2) and those who had lower self-care ability had a mean SASE score of 57.4 (SD 10.0). Regarding the characteristics of the respondents, type of dwelling and profession were found to be related to self-care ability (Table 2).

Self-care ability and health-related variables

In Table 3 it is displayed that self-care ability also was related to perceived health, perceived helplessness, receiving help, being satisfied with life, being active, chronic disease or handicap, sense of coherence, mental health, self-care agency and risk for undernutrition.

Predictors for self-care ability

Six predictors for self-care ability emerged in the logistic regression analysis. Higher self-care agency, being able to prepare food and being active were found to predict self-care ability positively. Perceived helplessness, receiving help from family, being at risk for undernutrition and more advanced age emerged as negative predictors for self-care ability (Table 4).

Discussion

The aim of this study was to the describe self-care ability among home-dwelling older individuals living in rural areas in southern Norway and to relate the results to general living conditions, sense of coherence, screened nutritional state, mental health, perceived health and perceived life situation.

The mean score of self-care ability and self-care agency in the study sample was high, which indicates that the

Table 1 Self-care ability and self-care agency measured by SASE and ASA in three age cohorts

Instruments	*Age cohort 1 65–74 years n = 602 (57.3%)*	*Age cohort 2 75–84 years n = 353 (33.6%)*	*Age cohort 3 85 + years n = 95 (9.0%)*	*p-value*
SASE scores, mean (SD), n	77.1 (7.0) n = 586	72.6 (10.2) n = 340	67.1 (12.1) n = 94	<0.001[a]
ASA scores, mean (SD), n	94.7 (10.4) n = 565	90.0 (10.2) n = 327	85.4 (11.6) n = 85	<0.001[b]

[a]$p < 0.001$ between all age cohorts;

[b]$p < 0.001$ between age cohorts 1 and 2, 1 and 3, $p = 0.001$ between 2 and 3;

ASA, Appraisal of Self-care Agency scale; SASE, Self-care Ability Scale for the Elderly.

Table 2 Characteristics of the respondents in relation to higher and lower self-care ability using SASE

Characteristics of the respondents	*Higher SASE scores ≥69 n = 860 (84.3%)*	*Lower SASE scores <69 n = 160 (15.7%)*	*p-value*
Sex			
Female n (%)	422 (49.1)	86 (53.8)	ns
Male n (%)	438 (50.9)	74 (46.2)	
Marital status			
Single n (%)	75 (8.7)	17 (10.6)	ns
Married/cohabitant n (%)	593 (69.0)	96 (60.0)	
Widow/-er n (%)	183 (21.3)	45 (28.1)	
Missing n (%)	9 (1.0)	2 (1.3)	
Profession			
Professional n (%)	172 (20.0)	17 (10.6)	<0.015
White collar n (%)	203 (23.6)	24 (15.0)	
Blue collar n (%)	406 (47.2)	90 (56.3)	
Home wife n (%)	47 (5.5)	20 (12.5)	
Missing n (%)	32 (3.7)	9 (5.6)	
Type of dwelling			
Own home n (%)	820 (95.3)	137 (85.6)	<0.015
Residential living n (%)	13 (1.5)	14 (8.8)	
Other dwellings n (%)	14 (1.6)	7 (4.4)	
Missing n (%)	13 (1.5)	2 (1.3)	
Size of living- community			
Small n (%)	315 (36.6)	55 (34.3)	ns
Medium n (%)	225 (26.2)	51 (31.9)	
Large n (%)	320 (37.2)	54 (33.8)	

SASE, Self-care Ability Scale for the Elderly; ns, not significant.

responding group, in general, managed well in performing self-care activities. Self-care agency, assessed by ASA, was closely related to the concept of self-care ability. Nevertheless, these constructs also have important differences. In Orem's self-care deficit theory (21), self-care agency consists of self-care activity in addition to self-care ability. The term 'agency' reflects the person's action repertoire, including understanding, estimation and production of self-care actions needed to be performed to maintain self-care in specific and altered situations (21). In that sense, the estimations and actions are goal directed. Self-care ability, on the other hand, may be conceptualized as a necessary condition for self-care actions (6). The significant relationship between these two concepts in the current study, also illuminated in the logistic regression analysis, highlights the close association between the potential for, and the actual performance of, self-care actions.

Nevertheless, a minor part of the study sample reported lower self-care ability, and lower perceptions of both self-care ability and self-care agency were clearly related to more advanced age. These results are consistent with several other studies (6, 43, 44). Older people's self-reports of severe disability increase with age, and their expectations of good health, functioning and performance

Table 3 Groups with higher and lower self-care ability using SASE in relation to health-related variables and instruments

Health-related variables	*Higher SASE scores ≥69 n = 860 (84.3%)*	*Lower SASE scores <69 n = 160 (15.7%)*	*p-value*
Perceived good health n (%)	791 (92.0)	110 (68.8)	<0.015
Perceived ill health n (%)	22 (2.6)	40 (25.0)	
Missing n (%)	47 (5.4)	10 (6.2)	
Perceived helplessness n (%)	23 (2.7)	71 (44.4)	<0.015
No perceived helplessness n (%)	813 (94.5)	82 (51.2)	
Missing n (%)	24 (2.8)	7 (4.4)	
Receiving help n (%)	49 (5.7)	71 (44.4)	<0.015
Not receiving help n (%)	791 (92.0)	81 (50.6)	
Missing n (%)	20 (2.3)	8 (5.0)	
Satisfied with life n (%)	801 (93.2)	108 (67.5)	<0.015
Not satisfied with life n (%)	33 (3.8)	45 (28.1)	
Missing n (%)	26 (3.0)	7 (4.4)	
Being active n (%)	774 (90.0)	81 (50.6)	<0.015
Not being active n (%)	64 (7.4)	74 (46.3)	
Missing n (%)	22 (2.6)	5 (3.1)	
Chronic disease or handicap n (%)	318 (37.0)	112 (70.0)	<0.015
No chronic disease or handicap n (%)	507 (59.0)	39 (24.4)	
Missing n (%)	35 (4.0)	9 (5.6)	
SOC scores Mean (SD)	155.7 (20.3)	130.5 (25.4)	<0.015
Missing n	58	18	
GHQ scores Mean (SD)	22.4 (6.8)	34.11 (14.3)	<0.015
Missing n	87	20	
ASA scores Mean (SD)	94.5 (9.2)	80.1 (11.7)	<0.015
Missing n	43	19	
NUFFE scores Mean (SD)	3.3 (2.3)	7.1 (4.6)	<0.015
Missing n	74	22	

ASA, Appraisal of Self-care Agency scale; GHQ, Goldberg's General Health Questionnaire; NUFFE, Nutritional Form For the Elderly; SASE, Self-care Ability Scale for the Elderly; SOC, Sense of Coherence scale.

Table 4 Predictors for self-care ability

Dependent variable	*Predictors*	R^2	*B*	*p-value*	*OR*	*95% CI*
Higher or lower self-care ability		0.56				
	Perceived helplessness		−2.143	<0.001	0.117	0.045–0.305
	ASA scores		0.088	<0.001	1.092	1.050–1.136
	Receiving family help		−1.013	0.004	0.363	0.183–0.722
	Preparing food		0.600	0.005	1.823	1.201–2.766
	Being active		1.053	0.007	2.868	1.338–6.146
	NUFFE scores		−0.158	0.019	0.854	0.748–0.975
	Age		−0.055	0.025	0.946	0.901–0.993

ASA, Appraisal of Self-care Agency scale; NUFFE, Nutritional Form For the Elderly.

decrease simultaneously (44). In a study by Callaghan (43), the oldest age group did not report higher self-care ability, even when practicing a more healthy behaviour and having higher self-efficacy beliefs. Regarding other demographic characteristics, the analyses also showed that those with higher educational background had higher self-care ability in the present study. This result is not in line with the study by Klainin and Ouannapiruk (7), who found that the relationship between educational background and self-care ability was limited. A possible explanation to the different results may be that they reported results from studies performed in a cultural context quite different from Scandinavian cultures. Our study also revealed that those who lived in their original dwellings had higher self-care ability, and an explanation to this may be that older people in Norway often relocate into sheltered dwellings when their health declines. Nevertheless, these demographic factors did not emerge as predictors in the regression analysis.

The comparisons of groups who had higher and lower self-care ability with ten health-related variables or scales (Table 3) showed significant differences between the groups regarding all these factors. Higher self-care ability was related to perceived good health and satisfaction with life, and this result is in line with several other studies (6, 45). The possibility to feel healthy is dependent on older persons' ability to adjust and compensate to their actual situation (46), which may be one explanation for the positive results found in the current study. Furthermore, a positive expectation about ageing, in general, has been found to be an important influencing factor for maintaining good physical and mental health (47). In line with the study by Söderhamn et al. (6), higher self-care ability and being active were also significantly related in our study, and a great deal of the respondents performed regularly physical activities, often in company with others. Physical activity has been found to be positive associated with health status in older community-living people (8). To have the ability to perform daily activities, moving around and perceiving good health were issues that older people, in a Norwegian study (48), were given high importance. Thus, being physically active seems to be an important factor for performing self-care actions.

Although more than half of the study sample reported not having any chronic disease or handicap, such conditions were evidently more present among those with lower self-care ability. As people live longer, the amount of older persons burdened with chronic health conditions like diabetes, heart and vascular diseases and arthritis will increase (49). Chronic diseases may cause many limitations in social as well as in physical and mental functioning in older people and may result in dependence on other persons for the daily living (50). Although the greatest part of the sample in our study perceived good satisfaction in life, reduced self-care ability was closely related to an increased feeling of helplessness and increased reception of family help. A study by Dale et al. (10) also showed that older people living in rural areas had more family help than formal home care, and one explanation may be that older people living in rural areas in Norway often live in their original homes. A report from the Norwegian Board of Health (51) concludes that those living in original dwellings tend to be underserved by formal home services and therefore represent a risk group. Nevertheless, the individuals living in original homes in our study reported high self-care ability. This result may reflect the fact that this study group, in general, perceived good health and high self-care ability.

Having high self-care ability includes the possibility for an autonomous and independent living. Beswick et al. (52) suggest that being independent, in the sense of personal growth and physical and psycho-social functioning, is one of the major constituents of healthy ageing, in addition to life satisfaction. A fundamental assumption of self-care ability and self-care agency is that of being able to independently care for oneself – by oneself (22). Further, the fear of being a burden and loss of autonomy and independence are reported to be of major concern for older people (53).

An essential topic regarding self-care ability is that of nutrition (21), and this association was supported in this study, because those being at nutritional risk were found to have lower self-care ability. It can be claimed that nutrition and self-care ability are closely related, because the nutritional screening results in this study showed high association with self-care ability. This circumstance was also highlighted when using the nutritional screening scores in the logistic regression analysis. This result can be compared with another study (19), where lower self-care ability was found to predict risk for undernutrition in older patients. Furthermore, the regression analysis revealed that those who had insufficient capacity for food preparation had lower self-care ability. The prevalence of older people at nutritional risk has been found to be lower among community-living people (54, 55) compared to older hospital patients (56–58). One explanation may be that the hospital group simply had poorer health condition and decreased appetite. Another explanation may be that the home-living situation includes possibilities for choosing and preparing own food in the persons' own ways and in their daily life surroundings. However, being old and at risk for undernutrition highlight difficulties to manage daily life, especially among single living persons (55).

Declined mental health was associated with lower self-care ability, and this result underlines the mutual relationship between mental health and the capacity for independently managing daily living in later life. It is well known that mental problems like depression and anxiety are predicted to be a major problem among older people because of factors like serious illnesses and several losses

and changes that occur in later life (59, 60). However, a great part of this survey sample reported good mental health. One possible explanation may be that those with more severe mental conditions were among the non-respondents. A great deal of the individuals in the current study did not live alone, and in general, they reported to have good overall health, which may be parts of the explanation to the positive result regarding mental health. Still, one factor to have in mind is that mental problems in older people are claimed to be unrecognized and under-reported (61).

The assessed sense of coherence in the current study sample was stronger in the group with higher self-care ability, although it did not emerge as a predictor in the logistic regression analysis. Exploring the older persons' sense of coherence may provide a better understanding of how some older people appear to have more strengths and abilities to compensate for age-related declines and losses than others (16, 62). Sense of coherence is a problem-solving and resource-oriented concept, focussing on the individuals' perceptions of life as comprehensive, manageable and meaningful (14), and is shown to be closely related to perceived health as well as quality of life and life satisfaction (15, 63). The obtained results showed that sense of coherence is an important issue in relation to self-care ability.

However, in addition to variables like marital status, type of dwelling, profession, social contact, frequency of contact, the size of the residential municipality did not emerge as predictors for self-care ability in this study.

Methodological considerations

There were 35% of the invited persons that responded the questionnaire. This is a low response rate compared to another Norwegian postal survey (48) that reported a response rate of 43%. However, it was only sent one reminder to those who did not respond according to rules for distribution of randomized addresses in Norway.

The number of male respondents in the study sample was higher compared to the invited sample, which may indicate that the males in this study were more willing, or capable, to complete the questionnaire. The mean age of the respondents was also significant lower compared with the dropouts. A reported methodological problem related to population health-surveys among older people is that the final sample tends to constitute the youngest, healthiest and least vulnerable individuals (64, 65). Recruiting older persons, especially frail, rural-dwelling women, are found to be a challenging and persistent problem, and the individuals with the most severe health conditions are often underrepresented (66). Consequently, a generalization to the population, in general, has to be performed with caution. Maybe a more balanced sample, e.g. with more women and very old persons responding, would show some other results regarding self-care ability, because of more severe mental or physical health conditions. Nevertheless, although a considerable part of the invited persons did not complete and return the questionnaire, the remaining sample is considered to represent an important database for investigating several conditions concerning the older population living at home in this part of Norway.

However, with a cross-sectional design it is not possible to find causal connections between self-care ability and related factors. But the result has revealed that a number of aspects are closely related to self-care ability, either as the affecting or the affected factors. For instance, a poorer nutritional condition may cause, but also be the result of, declined health and lower self-care ability.

The aim of this study was to investigate several aspects related to many persons' self-care ability and health. Although the methodological approach was appropriate, one problem with such comprehensive postal surveys is the low response rate. However, a response rate around 30% is not unusual in similar studies among older people (6, 35). In a Canadian study implemented in a corresponding sample (67), the postal enquiry was followed up by a telephone contact, resulting in a higher response rate. A similar procedure could have been used in our study, but on the other side, a telephone reminder also involves some ethical concerns regarding the aspect of voluntariness (42).

Another weakness with surveys is that the questionnaire can be more or less incomplete, i.e. all questions will not be answered by all respondents. Missing data in this survey were considered to be completely at random. However, some of the respondents had not filled out all pages in the questionnaire, which can indicate difficulties to turn over the pages. Missing data regarding the instruments were handled rather strictly. When more than five of the questions were unanswered in the instruments with a neutral score (i.e. SASE, ASA and SOC), they were not replaced with the neutral score. In those cases where missing data not were replaced, the instrument scores were excluded in the analyses. In the other instruments, NUFFE and GHQ, missing data were not replaced. Thus, the data regarding the instruments can therefore be concerned as valid.

Correlations between some of the independent variables in the logistic regression analysis revealed that some of the variables were highly correlated with each other, for example SOC and GHQ. However, Altman (40) states that it is advantageous to use stepwise regression, which was used in present study, because misleading findings attributed to high correlations cannot occur with this regression model.

Conclusion

The results of this survey study among home-dwelling older people in rural areas in Norway revealed that more than three-fourths of the respondents had higher self-care

ability that was closely related to perceived health, health-related issues, self-care agency, mental health, nutritional state and sense of coherence. The instruments used for mapping different aspects in this study are based on theoretical assumptions that are somewhat inter-related, e.g. the importance of health preserving and enabling resources, ability to find meaning and purpose in life, to have a positive self-conception and the ability to act appropriately. Issues that especially explained self-care ability were risk factors like perceived helplessness, receiving family help, risk for undernutrition and impaired mental health, and reinforcing factors were self-care agency, activity and preparing food. When self-care ability is reduced in older people, caregivers have to be aware about how this can be expressed, and also be aware of their responsibility for identifying and mapping needs for appropriate support and help, and preventing unnecessary and unwanted dependency.

However, further studies are necessary to investigate self-care ability and related factors both in rural and urban home-dwelling older people. Moreover, it is important to elucidate lived experiences of self-care and features that may influence health and self-care among older home-dwelling individuals to be able to give support.

Author contributions

The study was designed by Bjørg Dale, Ulrika Söderhamn and Olle Söderhamn. Bjørg Dale and Ulrika Söderhamn performed the data collection. Ulrika Söderhamn carried out the analyses. Bjørg Dale and Ulrika Söderhamn drafted the manuscript and all authors revised it critically. Olle Söderhamn supervised the project. All authors read and approved the final manuscript.

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