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Functional ability and health complaints among older people with municipal and informal care versus municipal care only

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ABSTRACT

The aim of the study was to investigate functional ability and health complaints of people, 65+, living in special accommodation (equivalent to nursing home) and their counterparts who live at home and receive municipal care or a combination of municipal and informal care. Persons (n=1958) receiving municipal care were assessed in terms of functional ability, health complaints, and level of informal and municipal care and services. The results showed that more home care, services and help with IADL were provided to those receiving only municipal care at home, while more home care and services associated with PADL as well as nursing care were provided to those receiving informal care in addition to formal care. Cohabitation was a predictor of a combination of municipal and informal care in the home (OR 5.935), while assistance with IADL provided by municipal home care and services predicted municipal care only (OR 0.344). Care in special accommodation was predicted by advanced age (OR 1.051), dependency in IADL (OR 19.883) and PADL (OR 2.695), and impaired cognitive ability (OR 3.849) with receiving municipal care only as a reference. Living alone (OR 0.106), dependency in IADL (OR 11.348) and PADL (OR 2.506), impaired cognitive ability (OR 3.448), impaired vision or blindness (OR 1.812) and the absence of slowly healing wounds (OR 0.407) were predictors of special accommodation with a combination of informal and municipal care at home as a reference. The distribution of municipal care divided older people into three distinct groups. The most frail and elderly people who had no cohabitants received care in special accommodation, determined by their level of physical and cognitive dependency. The frailest individuals living at home were cohabiting and received a combination of municipal and informal care, while those who were less dependent mainly had help with IADL from municipal care only. The results indicate that there is a shift from the substitution to the complementary model and highlights that attention to the family caregivers is needed.

Keywords: Home care service, Home nursing, Residential residence, Functionally-impaired elderly, Symptoms

INTRODUCTION

The relation between advanced age and an increase in the number of diseases and functional impairments is well known and implies a greater need of care and services [1]. Knowledge about the extent to which individual care needs in terms of functional impairment are fulfilled by the care and services provided by municipal and informal carers is needed, as is an understanding of the factors that determine whether the individual is cared for at home or in special accommodation. Such knowledge has implications for nursing competence, as well as for the elderly individuals themselves and their closest family members.

The main philosophy regarding long term care to the elderly is that they are best cared for at home [2, 3], although there is a lack of knowledge about factors that determine whether the elderly is cared for at home or in special accommodation/nursing homes. Special accommodation is defined as housing for older people in extensive need of care and attention with access to around-the-clock service and care [4]. It is known that a majority of older people receive municipal care at home, whilst increased dependence in Instrumental Activities of Daily Living (IADL) and Personal Activities of Daily Living (PADL) is supposed to result in the need for care in special accommodation [5]. A Finnish study (n=5652) investigated the ADL ability of people over the age of 65 years in different care settings. Those in long-term care in a hospital or special accommodation were most dependent in ADL, followed by clients in short-term care in a hospital or special accommodation, while those who received home nursing care or home help were least dependent [6]. Cognitive impairment was found to be a predictor of care in special accommodation [7] and was often combined with behavioural problems [8]. In Sweden, care and services for the elderly have, since the early 1990s, been transferred from special accommodation to the old person's own home [9]. It is assumed that it is best for older people to remain at home, although a comparison of those with the same functional ability and social network living at home or in special accommodation provided no hard evidence to support such an assumption. No differences in quality of life (QoL) were found between older people living at home or in special accommodation when controlling for functional ability [10]. Help at home has also concentrated more on those in need of extensive care [11], indicating that those cared for at home have a poorer health status nowadays than previously was the case. An understanding of factors determining the distribution of municipal resources may be useful for providing appropriate care and support to older people, as well as feed back to the municipalities in order to ensure sufficient knowledge among nursing care staff. From a democratic

perspective, such knowledge is important for society as well as it renders the distribution of municipal resources visible and gives elderly people an idea of what is available.

Whether a substitution or a complementary model applied, provide care at home indicates that it is provided in partnership; professionals and families. Being cared for at home as opposed to care in special accommodation means receiving care and help from family members (informal caregivers) although there is no legal obligation in Sweden for family members to provide such care. Two models as for family involvement has been put forward; the substitution or the complementary model. The substitution model holds that public care is a substitute for informal care [12], while the complementary model suggests that public care complements informal care. Municipal care is added as a complement when the needs of older persons exceed the informal resources [13]. The extent of family care giving as well as the number of hours involved is not well known. However, estimations have shown that informal care is two to three times greater, in terms of hours, than municipal care [14] suggesting that municipal function rather as a complement to informal care although from a political view it is suggested to be the opposite. Thus, informal care seems to shoulder the bulk of care for older people, also in countries supposed to have a public system financed through taxes. A recent study revealed that informal care related to older people has increased from 60 % in 1994 to 70 % in 2000 [15]. Another study showed that older people receiving a combination of municipal and informal care had more help in IADL and PADL compared to those who received either only municipal or only informal care [16]. Among people with a cognitive impairment, remaining at home seems to depend on the availability of an informal caregiver [17]. Thus, informal caregivers seemingly contribute extensively to the care of the elderly, although determinants or the distribution of formal care versus informal care are not fully investigated. The complementary model is believed to be strongest in southern Europe due to a tradition of family solidarity in care of the older people and a low level of public long term care. In Sweden and northern European countries with a public welfare system, the individual's right to public care with no obligation on relatives is in line with the substitution model [3]. The model considers that public care is the main provider and that the older people should not rely on the family for help or support [12]. In contrast the complementary model connects to theory arguing that care and service at home is a dynamic relationship between municipal and informal care. Such theory implies the concept of work transfer from municipal to informal care and visa versa [18]. In Sweden, the recent reduction in municipal care has

been matched by an increase in informal care [19]. However, more knowledge is needed about how municipal care is distributed and related to informal care.

The public care and services for older people at home may be determined by a number of factors. In the 1960s home help was provided to older persons whose needs were not very great and who mainly required assistance with IADL. In recent years more municipal care time at home is devoted to PADL while IADL needs have to be dealt with by the old person him/herself or by informal care [20]. Factors determining the distribution of care tasks are not well understood. Earlier studies, for example by Herlitz [21], have shown that living alone and needing more help with PADL than with IADL was associated with municipal care. These studies however, did not focus solely on those receiving municipal care. Knowledge of how municipal care and services correspond to older people's functional ability is needed to better understand how resources are distributed and to determine the competence required within municipal care when dealing with older people as well as how to support and provide assistance to informal caregivers. Such knowledge is also important from a democratic perspective, as it renders the distribution of municipal resources visible to elderly people and their family members.

AIMS

The aim was to describe and compare functional ability and health complaints of elderly people living in special accommodation and their counterparts who live at home and receive municipal care or a combination of municipal and informal care. An additional aim was to identify determinants for receiving municipal and/or informal care at home compared to special accommodation.

METHOD AND MATERIALS

Sample

A total of 1958 people who received long-term municipal care were included in the study. Data were collected from the care and services part of SNAC (the Swedish National study of Ageing and Care), a longitudinal study of municipal care and services provided to elderly persons in relation to their needs and ability [22]. SNAC is carried out in four regions of Sweden, one of which is the province of Skåne (GAS-Good Ageing in Skåne) [23]. Data in this analysis comprised individuals, 65+, living in four municipalities in southern Sweden, representing urban and rural areas. Two municipalities consisted of small towns with rural

areas, one municipality was a medium sized city with neighbouring rural areas and one was rural. All individuals aged over 65 years who received municipal home help, who lived in special accommodation or who had at least four home nursing care or rehabilitation visits per month were invited to participate in the study. Those who only had a personal alarm, meals on wheels or transport services were excluded [23]. The precise number of people receiving municipal care and services cannot be obtained, as there are no exact official statistics. In this study, the total number of people receiving long-term municipal care was estimated from Swedish group statistics to be 4288 persons [24]. The number of persons who declined participation varied among the four municipalities and totalled 467 (11 %). The mean age of those who declined was 85 years (SD 7.0), with 12 % in the 65-74 age group, 36 % in the 75-84 age group and 52 % in the 85+ age group, and 71 % were women. It was estimated that 1858 (43 %) eligible individuals were not invited to participate. Heavy workload among the personnel who collected the data was the explanation given by the personnel for not to ask the elderly about participation.

Measurement

A Swedish national research group [22] developed the form for assessing older people's functional ability and provision of municipal care and services, based on the literature and consultations with an expert group of researchers in geriatrics, gerontology, nursing science and social science. It was decided to include already tested instruments as much as possible in the form. It covered *demographic data, functional ability, health complaints, municipal and informal car*e. *Demographic data* included age, gender, civil status and accommodation situation [22].

Functional ability was covered by the Katz ADL-index [25], which is hierarchically constructed and measures physical ability as well as the capacity to perform the personal care activities of daily living (PADL). PADL consists of six functions: hygiene, dressing and undressing, ability to go to the toilet, mobility, ability to control bowel and bladder, and food intake. Validity and reliability tests has been conducted by means of a comparison with the Activity Index (n=131) and showed a correlation coefficient of 0.93 and a Cronbach's alpha of 0.94 [26]. Also variables pertaining to the ability to keep their home clean, buy food and cook as well as transportation, i.e. instrumental activities of daily living (IADL) was included. When combined, IADL and PADL variables are commonly known as the "ADL-staircase" [27]. Each function in the "ADL-staircase" is graded as independent, partly dependent or

dependent. The “ADL-staircase” summarises an individual’s overall performance in IADL and PADL, and the degree of dependency is calculated and ranked from zero to ten, in a specific order. Zero signifies independence in all activities, one to nine dependency in one to nine activities, and ten total dependency. The scale has shown good validity and reliability, inter-observer reliability r=0.81-0.88 [28] and Cronbach’s alpha 0.88 [29]. Apart from the variables in the “ADL-staircase” one variable about taking care of the laundry was added, after consultation with the expert group.

The ADL index has been analysed by means of factor analysis which revealed three components: Instrumental ADL (SNAC-IADL index), Personal Activities of Daily Living (SNAC-PADL index) and Psychosocial dependency (SNAC-Psychosocial index) [30]. The SNAC-PADL included transfer, going to the toilet, faecal incontinence, eating, urinary incontinence, mobility, dressing and cognitive ability. The SNAC-IADL comprised washing, shopping, cooking, bathing, transportation, cleaning and going outdoors. SNAC-Psychosocial dependency covered anxiety, depressed mood, difficult behaviour, need for supervision and special care needs. The indexes summarises dependency severity in five steps, from no dependency to very extensive dependency. Cronbach’s alpha showed 0.86 for SNAC-IADL, 0.91 for SNAC-PADL and 0.72 for SNAC-Psychosocial index [30].

Cognitive ability was assessed using the Berger scale, which classifies the level of dependency on the basis of the carer’s assessment [31]. The scale correlates well with the typical clinical course of Alzheimer’s Disease and clinical experience has revealed it to be a valid and reliable means of obtaining an overview of cognitive status. The scale is hierarchically constructed in six levels. The first level corresponds to that the person is independent, but forgetfulness is often disruptive of daily activities, the second level to that the person undertake activities, but gets easily confused, the third level to that memory is seriously defected and lack of initiative could be seen. The fourth level corresponds to the presence of dyspraxia, often with dysphasia, and the fifth level to that the person is ambulatory, but can not communicate verbally, while the sixth and last level corresponds to a severely affected motor functioning [31].

Questions about *health complaints* used as single items included impaired mobility, vision, hearing, dizziness, urine and faecal incontinence, pain, depressed mood, anxiety and behaviours that are difficult to handle. The response alternatives for the questions on health

complaints were ‘periodically and slight’, ‘periodically and severe’ and ‘constantly severe’, while extra supervision and special care needs had a ‘yes /no’ response alternative. For vision and hearing the alternatives were ‘slightly impaired’, ‘severely impaired and ‘blind/deaf. The questions about slow healing wounds and pressure ulcers had two response alternatives: ‘have no ulcer’ or ‘have ulcer’. The response ‘do not know’ was included in all variables, due to that the assessors (professionals) were instructed to use data from the assessments made at the time when the decision about municipal care was taken.

Municipal care covered home help services, including day, evening and night, and care in special accommodation. Questions pertaining to home help services referred to assistance with IADL or/and PADL, and number of hours per week. Home nursing care included days, evenings and nights and respondents were requested to state the number of visits and hours per month and the staff category (registered nurse, assistant nurse, other staff) involved.

Informal care pertained to help with IADL and PADL and comprised questions about who provided the informal assistance: spouse, children, other relative, neighbour and/or friend. The response alternatives for each informal helper were: ‘not applicable’, ‘no help’, ‘help less than once a week’, ‘more than once a week’, ‘daily help’ and ‘do not know’ [22].

Procedure

Nurses filled in the form for home nursing care and special accommodation, home help officers concerning home help services, and occupational therapists and physiotherapists filled in data concerning rehabilitation. Staff members were provided with oral and written instructions about the procedure for obtaining informed consent and how to collect data and fill in the questionnaire. The instruction to the staff was to collect current information/data about the older person receiving care and service. Thus in cases with a recent assessment or regular contact data were collected through personal knowledge and/or documentation, in other cases a new assessment was made. Eighteen percent of the staff members responsible for the data collection made a new assessment of the respondent, 34 % used documentation or asked the colleagues who were close to the respondent while 4 % used a combination of methods. However, 44 % did not report how data was collected. A pilot study was carried out to improve the data collection procedure [32]. The study was approved by the Ethics Committee of Lund University (LU 650-00).

Analysis

Comparisons between accommodation, and municipal care or a combination of municipal and informal care were made concerning demographic data, the PADL-index, the Hulter-Åsberg IADL-index and health complaints. The chi-square test (Fisher´s exact test where applicable) was applied to analyse the differences between two independent groups measured on an ordinal scale. Logistic regression (LR) analyses were carried out using the Backward LR method. Informal and municipal care (1) and municipal care only (0) at home were used as dependent variables. Independent variables were SNAC-PADL, SNAC-IADL, SNAC-Psychosocial dependency and cognitive ability. Age and gender were entered as independent variables in each analysis. Confidence intervals (Cl) of 95 % were calculated for the odds ratios (OR). Model fit was measured with the Hosmer and Lemeshow goodness-of-fit test. Good model fit is specified by a non-significant and small chi-square value, which means no differences between actual and predicted dependent values [33]. The present analyse indicated 7.813 for Chi-square and 0.452 for significance in this study. Multinominal logistic regression analyses were performed [34] with response alternatives receiving municipal care only at home, receiving a combination of municipal and informal care at home and care in special accommodation as the dependent variable. Independent variables were age, gender, cohabitation, the Katz PADL-index, the Hulter-Åsberg IADL-index, SNAC-Psychosocial dependency, cognitive ability, hearing, vision, slow healing wound, pressure ulcer, pain and dizziness. A p-value of below 0.05 was regarded as significant. In comparisons between three independent variables, a reduced p-value ($p<0.017$) was used to avoid mass significance [35]. The statistical package used was the SPSS 11.0.

RESULTS

Functional ability in relation to living and care provided

Those living in special accommodation were significantly older (mean 85 years) than those living at home (mean 82 years) ($p<0.001$) and less likely to be married (17 % compared to 24 %) ($p<0.001$) or cohabiting (5 % compared to 25 %) ($p<0.001$) Those in special accommodation were significantly more dependent in IADL (median = 4, q1/q3 = 4/4) as well as PADL (median = 4, q1/q3 = 1/5) than those at home (median = 4, q1/q3 = 2/4 and median = 1, q1/q3 = 0/2 respectively) ($p<0.001$).

Significantly more individuals who received both municipal and informal care were married (30 % versus 14 %) or cohabiting (32 % versus 9 %) compared to those who only received municipal care in the home ($p<0.001$) (Table 1). The number of elderly people living in special accommodation increased in line with age.. Those living at home receiving both informal and municipal care were more dependent with regard to shopping (82 %, $p<0.001$), transportation (85 %, $p<0.001$), cooking (61 %, $p<0.001$) and laundry (63 %, $p<0.001$) compared to those with municipal care only (59 %, 61 %, 53 % and 53 % respectively). In addition, those receiving both municipal and informal care were significantly more dependent with regard to dressing (24 % versus 20 %, $p=0.020$), toileting (19 % versus 13 %, $p=0.043$), transportation (17 % versus 11 %, $p=0.026$) and continence (35 % versus 27 %, $p=0.040$) compared to those receiving municipal care only.

Insert Table 1

Health complaints

Those in special accommodation had a higher level of mobility problems (87 % versus 74 %), impaired vision (41 % versus 29 %), urinary incontinence (62 % versus 30 %), faeces incontinence (39 % versus 9 %), cognitive impairment (71 % versus 28 %), anxiety (50 % versus 39 %), depressed mood (49 % versus 37 %), behaviours difficult to handle (19 % versus 8 %), need for extra supervision (19 % versus 13 %) and special care needs (15 % versus 10 %) compared to those living at home ($p<0.001$).

Those living at home and receiving a combination of informal and municipal care had a higher level of impaired mobility (78 % versus 67 %) and urinary incontinence (36 % versus 24 %) compared to those with municipal care only ($p<0.001$) (Table 2). Those living in special accommodation had a higher level of impaired hearing (36 % versus 26 %) and more often had pressure ulcer (4 % versus 2 %), but were less likely to have slow healing wounds (5 % versus 9 %) compared to those with a combination of municipal and informal care at home ($p<0.001$). The personnel answered 'Do not know' regarding hearing ability (11 %), urinary incontinence (12 %), faeces incontinence (11 %), slow healing wound (13 %), pressure ulcer (13 %), pain (19 %) and dizziness (26 %) for those receiving municipal care only at home. Furthermore, 'Do not know' was stated in relation to urinary incontinence (14 %), faeces incontinence (10 %), slow healing wound (12 %), pressure ulcer (10 %), pain (15

%) and dizziness (19 %) for those receiving both municipal and informal care at home, while 17 % answered 'Do not know' regarding dizziness for those in special accommodation.

Insert Table 2

Municipal care provided at home

Those with only municipal care at home received more home care and services (84 %) (p=0.002) compared to those who received a combination of municipal and informal care (73 %) (Table 3). Help with IADL was more common (79 %) (p<0.001) and more time intensive (md 1.7) (p=0.044) among those who received municipal care only compared to those who received a combination of municipal and informal care (57 % and md 1.0 respectively). Help solely with IADL was more common (p=0.004) among those who received municipal care only (33 %) compared to those who also received informal care (18 %), while less municipal home care and services pertaining to PADL (48 %) (p=0.002), home nursing care (51 %) (p<0.001) and less frequent help from assistant nurses (md 30, range 1-124) (p=0.029) were provided to those with municipal care only at home compared to those who received a combination of municipal and informal care (51 and 68 %, and md 30, range 1-170 respectively).

Insert Table 3

Determinants for receiving municipal and/or informal care

Logistic regression (LR) analyses for those receiving care and services at home showed that cohabitation (OR 5.935; CI 2.090-16.854) predicted a combination of municipal and informal care (p=0.001), while assistance with IADL from home care and services' personnel was a predictor (OR 0.344; CI 0.120-0.984) of municipal care only (p=0.047). In the multinominal logistic regression analyses, advanced age (p=0.005), dependency in IADL (p<0.001) and PADL (p=0.005), as well as impaired cognitive ability (p<0.001) predicted care in special accommodation with receiving municipal care only as a reference (Table 4). Moderate to total dependency in IADL (p<0.001) and PADL (p<0.001), moderate to seriously impaired cognitive ability (p<0.001), severely impaired vision or blindness (p=0.038), no slow healing wounds (p=0.015) and no cohabitation (p<0.001) predicted care in special accommodation, with receiving a combination of informal and municipal care at home as a reference.

Dependency in IADL and cohabitation predicted a combination of informal and municipal care at home, with receiving municipal care only at home as a reference ($p=0.027$ and $p<0.001$ respectively)

Insert Table 4

DISCUSSION

The response rate was estimated to be low (46%), which could be a threat to external validity, thus limiting the extent to which the results can be generalised [36]. The exact number of older people receiving municipal care and services cannot be obtained, as there are no exact official statistics [24]. The issue, however, depends more on whether the dropout is systematic than on its size [35]. The distribution of age and gender among the dropouts was similar to the subjects who participated, although a higher proportion of the latter lived in special accommodation ($p<0.001$), which indicates that more older people with impaired functional ability were included. Of the dropouts, approximately 11% declined to participate in the study, while approximately 43% had not been invited. The reason why they were not invited to take part in the study was reported to be due to heavy staff workload and was therefore unlikely to be systematic. The representativeness of the study sample can, however, be questioned. Data were based on information provided by the staff and methods for data collection varied, which could be a threat to internal validity as no interreliability test was performed. Moreover, there could be a risk of bias in the measurement, which would affect the validity and reliability of the collected data [36]. However, all staff received identical information on how to collect current data about the older persons receiving care and service, at home as well as in special accommodation, and the sample was large. Further, the questionnaire and procedure were tested in a pilot study and it included reliable and valid instruments such as the Berger scale [31], the Katz ADL index [25] and the Hulter-Åsberg index for IADL [27].

A number of questions covering health complaints were answered by ‘Do not know’, which is noteworthy and was a surprisingly finding of this study. The drop out analysis indicated that the staff members providing care at home seem to have poorer knowledge about their care clients’ health complaints compared to their colleagues in special accommodation. This may reflect how needs assessment is carried out on older people who require care and services. Previous studies of needs assessment showed that home help officers seemed to prioritize

institutional goals and municipal guidelines, which may only allow certain needs to be disclosed [37]. Frequent ‘Do not know’ answers were within the area pertained to health complaints, vision, hearing, urinary and faeces incontinence, wounds, pain, dizziness, anxiety and depressed mood. This lack of knowledge is surprising and problematic, especially as the results showed that having a slow healing wound predicted informal and municipal care at home and differed significantly from the needs of clients in special accommodation. It may also imply that care is not provided for problems that could be treated effectively which most likely means decreased quality of life. In spite of that such health complaints are common among elderly people and are known to negatively affect quality of life (QoL) [38] and ADL, they remain undetected except when the client specifically draws attention to them [39]. One study by Lindelöf & Rönnbäck demonstrated that needs assessments were based on personal standards and routines, thus not performed in a systematic way and rarely involved the use of a standardised instrument to evaluate functional ability, which meant that social, mental and existential needs were ignored. Furthermore, clients’ needs were often described in terms of solutions or services rather than taking a comprehensive view of their requirements and problems [40]. The poor quality of assessment revealed in this study makes it more difficult for municipalities to ascertain whether resources are used efficiently based on the needs of the older persons. The risk of ignoring problems that could be alleviated is also obvious. According to the National Board of Health and Welfare [41], the needs assessment should be based on a comprehensive view that takes social, physical, medical, psychological and existential needs into account. This study revealed that municipal care and services seem to concentrate on compensating for decreased physical ADL abilities. A more comprehensive view may improve the quality of life for older people, provided that steps are taken to alleviate their problems.

Receiving care at home or in special accommodation

The study showed a clear distinction between those receiving care at home and those cared for in special accommodation. The latter were significantly older, less likely to be cohabitating, more often women, more dependent in IADL and PADL and more frequently reported as having health complaints. Previous studies have shown a similar pattern [5, 6]. In this study, dependency in IADL (odds 20 to 1) and PADL (odds 2.5 to 1) and impaired cognition (odds 4 to 1) predicted receiving care in special accommodation, with receiving municipal care only at home as a reference, while the odds were 11.5 to 1 for dependency in IADL, 2.5 to 1 for dependency in PADL and 3.5 to 1 for impaired cognition, with receiving a combination of

municipal and informal care at home as a reference. In addition, living alone predicted being cared for in special accommodation. Beside dependency in IADL and PADL, previous studies have indicated that cognitive impairment is a strong predictor of care in special accommodation [7]. This suggests that the oldest and most frail people who live alone, probably with some form of cognitive impairment, receive care in special accommodation. However, there is a group of older people with extensive health complaints and dependency in ADL who live at home, which may be explained by the reduced number of beds in special accommodation. In Sweden, the number of beds in special accommodation has decreased by 11% between 2000 and 2004, while care and services in the home have increased by 9 % [42]. This is in line with the Swedish policy that assumes that it is best for older people to remain at home for as long as possible. In consequence of this increased care at home model of care for older people applied is rather the complementary model, the public care being a complement to family care. The increasing number of frail older people being cared for at home demands higher nursing competence and availability to support and monitor the care and in addition transferring knowledge to the family care givers. However, it is not known if resources and competence have been transferred to care and services in the home. Psychosocial dependency was no predictor of receiving care at home or in special accommodation. A previous study of older people receiving care (mean age 79) showed that the presence of depression or anxiety was associated with less help in ADL and had a negative impact on well being [43]. Apart from the policy that older people should remain in their own home for as long as possible, frailty and cohabitation have a strong impact on the distribution of municipal care. A more comprehensive assessment including psychosocial needs may improve well being among older people receiving municipal care at home as well as relieving the pressure on the family to provide care for their relative.

Receiving care from municipal and informal care or municipal care only

Care and services to older people in the home seem to rely heavily on informal care. In this study, 69 % of those receiving care at home had informal care, which can be regarded as belonging to the complementary model. The complementary model assumes that informal care is the basis for care and services to older people and that public care is a supplement when the needs exceed what the family members can provide [13]. Officially informal care is connected to the substitution model in Sweden and the Nordic countries, while in reality it seems rather to be provided along the lines of the complementary model [3]. It seems important that this possible shift in policy is made visible to the public. Those cared for by

family caregivers in combination with formal care were frailer in terms more dependent in IADL, and PADL and more mobility problems as well as more incontinent. Those receiving municipal care only were less dependent and were less likely to have a family member available to provide care. In addition, they received less home care and services pertaining to IADL, but more home care and service for PADL and home nursing care compared to those receiving municipal care only. This is in accordance with a previous study showing that older people receiving help from a combination of municipal and informal care had more help in IADL and PADL compared to those receiving help from municipal care only [16]. Informal care thus seems to be the basis for care and services to older people at home, in accordance with the complementary model. In this study a majority at home had a combination of municipal and informal care (69 %), while 31 % had only municipal care. This study indicates that help in IADL was largely covered by informal caregivers and that the odds of receiving informal care were 2 to 1 for dependency in IADL. Despite that those having a combination of municipal and informal care were more dependent in IADL and PADL they received less help with IADL and equal hours/week with PADL compared to those having municipal care only. The gap between needs and provision of care is presumably covered by informal care. Thus, while help with PADL to a certain extent was provided by municipal care, assistance with IADL seems to have been transferred to informal caregivers [20]. This is in line with theory that implies the concept of work transfer from municipal to informal care and visa versa [25]. The policy of providing more care and services to older people at home and reducing the number of beds in special accommodation means that family members are increasingly involved in the provision of care. There are indications that they feel overlooked, when needs are assessed prior to a decision on municipal care [44]. To support older peoples adaptation to the increasing dependency more organised support for and knowledge transfer to informal caregivers, as well as collaboration between municipal and informal care in planning and providing care and service appears to be needed. More emphasis on the family seems to be required when providing care and services, and may benefit informal caregivers as well as the elderly clients. Increased family involvement highlights a need of attention for the family as a whole when providing municipal care and service. The Family Systems Illness model is grounded in a strength-oriented perspective and viewing family relationship as a potential recourse [45]. Furthermore, from a democratic perspective it is essential to specify whether a shift has taken place from the substitution to the complementary model and to make the distribution of care visible to families and older people.

CONCLUSIONS

The limited reporting of health complaints by health care staff, especially in the case of those at home, indicated an inadequate needs assessment and the fact that municipal care and services aim to compensate for decreased physical functional abilities, rather than applying a comprehensive view of the older person. The most frail and elderly people were cared for in special accommodation, as determined by their physical and cognitive dependency, while psychosocial dependency seemed to have less impact. However, from a comprehensive view it is important to include physical as well as psychosocial needs in relation to care and service. Care and services for older people living at home rely heavily on informal care and demand increased family orientation in municipal care. The frailest persons at home were cohabitants and were cared for by a combination of municipal and informal caregivers, while those in need of less care received municipal care only. The extensive amount of informal care require more organised support and knowledge transfer for informal caregivers, as well as effective collaboration between municipal and informal care. The attitude to care and services for older people and their families may have shifted, so that municipal care will become a complement to informal care, in contrast to the officially recognised substitution model.

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Table 1. Demographic data and ADL dependency of those cared for in special accommodation, those receiving only municipal care at home and those with a combination of municipal and informal care.

	At home		Special accommodation	*P*-value
	Municipal care only n= 282, 15 %	Municipal and informal care n= 638, 34 %	n=969, 51 %	
Women/men, %	66 / 34	66 / 34	71/29	**0.034**
Age: mean (sd)	82 (7.0)	83 (7.2)	85 (6.8)	**<0.001**[b, c]
Married, %	14	30	17	**<0.001**[a, b, c]
Cohabiting, %	9	32	5	**<0.001**[a, b, c]
Dependence IADL,%				
Cleaning	84	86	96	**<0.001**[b, c]
Shopping	59	82	98	**<0.001**[a, b, c]
Transportation	61	85	97	**<0.001**[a, b, c]
Cooking	53	61	98	**<0.001**[a, b, c]
Laundry	53	63	97	**<0.001**[a, b, c]
IADL summary, median (q1-q3)	**3 (1-4)**	**4 (3-4)**	**4 (4-4)**	**<0.001**[a, b, c]
Dependence PADL, %				
Bathing	51	56	87	**<0.001**[b, c]
Dressing	20	24	63	**<0.001**[b, c]
Toileting	13	19	64	**<0.001**[b, c]
Transfer	11	17	55	**<0.001**[b, c]
Continence	27	35	63	**<0.001**[b, c]
Feeding	1	2	16	**<0.001**[b, c]
PADL summary, median (q1-q3)	**1 (0-2)**	**1 (0-2)**	**4 (1-5)**	**<0.001**[b, c]

[1)] The Chi-Square test for nominal level data, the Kruskal-Wallis test between the three groups and the Mann-Whitney U-test as post hoc test for interval level data. Reduced p-value <0.017 used for post hoc test. [a]=municipal care only differs from a combination of municipal and informal care at home, [b]= municipal care only at home differs from care in special accommodation, [c]= a combination of municipal and informal care at home differs from care in special accommodation. Internal missing for informal care at home n=69.

Table 2. Health complaints among those cared for in special accommodation, those receiving only municipal care at home and those with a combination of municipal and informal care, in percent.

Health complaints	At home		Special accommodation	*P*-value
	Municipal care only n= 282	Municipal and informal care n= 638	n=969	
Mobility				**<0.001**[a, b, c]
Ability to walk outdoors with aids	43	49	20	
Ability to walk indoors with aids	17	19	30	
Assistance with walking or bedridden	7	10	37	
Do not know	1	2	0	
Vision				**<0.001**[b, c]
Slightly impaired	16	18	25	
Severely impaired	10	11	14	
Blind	1	1	2	
Do not know	9	7	7	
Hearing				**<0.001**[c]
Slightly impaired	22	18	24	
Severely impaired	6	8	12	
Deaf	0	0	0	
Do not know	11	7	6	
Urinary incontinence				**<0.001**[a, b, c]
Occasional difficulties	15	22	29	
Severe difficulties	4	4	10	
Unable to control urine	5	10	23	
Do not know	12	14	4	
Faeces incontinence				**<0.001**[b, c]
Occasional difficulties	7	6	20	
Severe difficulties	1	1	7	
Unable to control faeces	2	2	12	
Do not know	11	10	3	
Ulcer				
Slow healing wound	5	9	5	**<0.001**[c]
Do not know	13	12	4	
Pressure ulcer	2	2	4	**0.004**[c]
Do not know	13	10	4	
Pain				0.536
Slight pain	32	32	41	
Periodic severe pain	10	14	11	
Constant severe pain	2	2	3	
Do not know	19	15	8	
Dizziness				0.317
Periodic dizziness	28	32	31	
Periodic severe dizziness	4	5	3	
Constant severe dizziness	1	1	3	
Do not know	26	19	17	
Cognitive ability				**<0.001**[b, c]
Mild impairment (Berger 1-2)	16	16	23	
Moderate impairment (Berger 3-4)	7	11	33	
Serious impairment(Berger 5-6)	3	3	15	
Do not know	4	4	3	
Anxiety				**<0.001**[b, c]
Periodic anxiety	31	30	34	
Periodic severe anxiety	7	9	13	
Constant severe anxiety	1	1	3	
Do not know	7	8	5	

Depressed mood				**<0.001** [b, c]
Periodic depressive mood	28	31	38	
Periodic severe depressive mood	8	8	10	
Constant severe depressive mood	1	1	1	
Do not know	7	8	6	
Difficult to handle behaviours				**<0.001** [b, c]
Slight or temporary behavioural difficulties	4	2	7	
Periodic difficult behaviour	2	6	9	
Constant difficult behaviour	1	1	3	
Do not know	1	2	1	
Need for extra supervision				**<0.001** [b, c]
Yes	9	13	19	
Do not know	3	1	4	
Special care needs				**<0.001** [b, c]
Yes	9	10	15	
Do not know	3	1	4	

[1)] The Chi-Square test for nominal level data, the Kruskal-Wallis test between the three groups and the Mann-Whitney U-test as post hoc test for interval level data. Reduced p-value <0.017 used for post hoc test. [a]=municipal care only differs from a combination of municipal and informal care at home, [b]= municipal care only at home differs from care in special accommodation, [c]= a combination of municipal and informal care at home differs from care in special accommodation. Internal missing for informal care at home n=69.

Table 3. Municipal care and services distributed to those receiving municipal care only compared to those with a combination of municipal and informal care at home.

	Municipal care only n= 282		**Municipal and informal care n= 638**		***P*-value**	**Total n=920**	
	%	Median (range)	%	Median (range)		%	Median (range)
Home care and service	84		73		**0.002** [a]	77	
Help with IADL	79		57		**<0.001** [a]	64	
Help with IADL, hours/week n=557		1.7 (0.5-62)		1.0 (0.5-28)	**0.044** [b]		1.5 (0.5-62)
Help with IADL solely	33		18		**0.004** [c]	22	
Help with PADL	48		51		**0.002** [a]	50	
Help with PADL, hours/week n=454		3.8 (0.5-62)		3.5 (0.5-56)	0.536 [b]		3.5 (0.5-62)
Help with PADL solely	2		11		0.056 [d]	8	
Home nursing care	51		68		**<0.001** [a]	60	
Visits/month by registered nurse n=438		4 (1-43)		4 (1-126)	0.611 [b]		4 (1-126)
Visits/month by assistant nurse n=363		30 (1-124)		30 (1-170)	**0.029** [b]		30 (1-170)

[a] Mann-Whitney U-test, [b] T-test, [c] Chi-Square, [d] Fisher's Exact Test

Table 4. Determinants for receiving care in special accommodation, municipal care only at home or a combination of municipal and informal care at home.

Dependent variable	Independent variables	Odds ratio	95 % CI for OR	*p*-value
Care in special accommodation: with municipal care only at home as a reference				
	Age	1.051	1.015-1.088	**0.005**
	Gender, female	1.536	.900-2.621	0.229
	Cohabitation	.632	.253-1.581	0.327
	Moderate – total dependency in IADL	19.883	9.971-39.648	<**0.001**
	Moderate – total dependency in PADL	2.695	1.343-5.409	**0.005**
	Moderate – very extensive psychosocial dependency	.721	.389-1.336	0.298
	Severely impaired hearing/deaf	1.698	.679-4.248	0.258
	Severely impaired vision/blind	1.546	.730-3.274	0.255
	Slow-healing wound	.556	.213-1.450	0.230
	Pressure ulcer	.695	.140-3.454	0.657
	Periodic/constant severe pain	.919	.490-1.724	0.793
	Periodic/constant severe dizziness	2.101	.648-6.811	0.216
	Moderate/seriously impaired cognitive ability	3.849	1.972-7.513	<**0.001**
Care in special accommodation: with municipal and informal care at home as a reference				
	Age	1.025	1.013-1.068	0.077
	Gender, female	.808	1.139-2.532	0.319
	Cohabitation	.106	.058-.192	<**0.001**
	Moderate – total dependency in IADL	11.348	3.817-14.286	<**0.001**
	Moderate – total dependency in PADL	2.506	1.629-4.149	<**0.001**
	Moderate – very extensive psychosocial dependency	.811	.700-1.140	0.386
	Severely impaired hearing/deaf	1.541	.629-2.128	0.185
	Severely impaired vision/blind	1.812	.907-2.604	**0.038**
	Slow healing wound	.407	.219-.988	**0.015**
	Pressure ulcer	1.692	.0533-16.949	0.456
	Periodic/constant severe pain	.716	.375-.982	0.165
	Periodic/constant severe dizziness	.810	.312-1.247	0.548
	Moderate/seriously impaired cognitive ability	3.448	1.751-4.255	<**0.001**
Municipal and informal care at home: with municipal care only at home as a reference				
	Age	1.025	.991-1.061	0.151
	Gender, female	.898	.546-1.476	0.671
	Cohabitation	5.968	2.696-13.211	<**0.001**
	Moderate – total dependency in IADL	1.752	1.067-2.877	**0.027**
	Moderate – total dependency in PADL	1.076	.498-2.322	0.853
	Moderate – very extensive psychosocial dependency	.889	.480-1.646	0.709
	Severely impaired hearing/deaf	1.101	.429-2.824	0.841
	Severely impaired vision /blind	.853	.398-1.829	0.683
	Slow healing wound	1.365	.573-3.253	0.482
	Pressure ulcer	.411	.065-2.610	0.346
	Periodic/constant severe pain	1.284	.705-2.340	0.414
	Periodic/constant severe dizziness	2.596	.827-8.145	0.102
	Moderate/seriously impaired cognitive ability	1.115	.540-2.303	0.769

Independent variables: Age, Gender, Cohabitation, Katz PADL index, Hulter-Åsberg IADL index and SNAC-Psychosocial index, Vision, Hearing, Slow-healing wound, Pressure ulcer, Pain, Cognitive ability, Dizziness.
CI=Confidence interval