Use of Assistive Technology and Need for Social Support for Elderly With Physical Disabilities

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ABSTRACT

Objectives: The purpose of this study is to examine the use of assistive technology, social support in everyday life and psychological existential orientation for individuals with physical disabilities.

Methods: Forty-six elderly persons with physical disabilities (aged 73.7±10.6 years, range 53-93 years) were examined with regard to the use of assistive technology, social support in everyday life and psychological existential orientation by an extensive questionnaire set (questionnaire for assistive technology (AT-24), questionnaire for social support (F-SOZU-K-22) and Brief Symptom Inventory (BSI).

Results: The subjects stated that they needed aid and social support in order to carry out their daily indoor/outdoor activities (for e.g. dressing, having a bath / shower, using toilet, eating, going up / down the stairs, shopping, or going out). The most commonly used mobility aid was the walking frame that accounted for 61.9%, followed by the walking stick with 40.5% and a bathtub lift with 21.4%. The results also showed the psychopathological symptoms in the sample.

Discussion: Assistive technologies together with the support of relatives and care services help people to cope with a variety of activities in their daily lives with fewer restrictions. The effectiveness of the aids differs between participants because it depends on several factors such as health, knowledge, and information about aids, as well as the appropriate selection of aids.

1. Introduction

The population of the elderly and high-maintenance people is expected to have a sharp growing proportion in the near future. The probability of being in need of care doubles over the age of 65 years is approximately every five years [1]. In the next few decades, the number of older people and their share in the total population will increase significantly. The reasons include increasing life expectancy and falling birth rate [2]. This does not affect only Germany (the study area) but almost all industrial and service societies [3, 4].

Disability is defined as a limitation in performing certain tasks, which the society expects out of an individual. This refers to the restriction of the interactions of a

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person with the social and physical environmental factors [5, 6]. According to the statement of the Federal Statistical Office [7], 10.1 million people in Germany lived with an officially recognized disability in 2013. On an average, every eighth resident was disabled. Since 2009, the proportion of the disabled people has increased by 7%, 73% of whom were 55 years old and above. Poor health status limits the activities of daily living and has a negative impact on the psyche of the relevant people [8, 9]. The possibilities of family support are reduced due to the professional life of women, birth deficits, changing family structures, increasing age of caregivers, and increasing job mobility. In addition, the concerned persons possibly do not like to live with their families due to the feeling of negligence. Thus, there is a growing need for nursing care and an increasing demand for nurses at home. At the same time, there is also a clear unavailability of nursing staffs as well as care places, which has resulted in an unsatisfactory care of the relevant people. Various studies showed a rate of decline in the quality of life due to the movement from their own home environment to a retirement or nursing home [3, 10, 11].

With respect to this issue, the assistive technology provides an important assistance. The World Health Organization (WHO) defines assistive technology as "An umbrella term for any device or system that allows individuals to perform tasks they would otherwise be unable to do or increases the ease and safety with which tasks can be performed" [12]. Assistive technology helps people with congenital or acquired disabilities (due to illness, accident or old age) to maintain an active and independent life by overcoming the difficulties faced in restricted areas, such as mobility and communications [13, 14, 15, 16]. It is focused on the capabilities and strengths of the disabled and the elderly people and provides assistance based on their needs. Here, a co-ordinated combination of different experts (therapists, user groups associations, rehabilitation centers and engineers) is required [13].

However, it is not possible to expect the full effectiveness of an aid. Typical characteristics, which are responsible for limiting the effectiveness, such as difficulties and inconveniences using aids, lack of information about the aids and insufficient training of aids, environment, psychological and health factors, need to be mentioned in this context [17, 18, 19, 20].

The purpose of this study is to investigate the functional performance of the elderly people with physical disabilities based on psychological existential orientation, social support, and the use and reliability of aids in everyday life.

2. Methods

Sample

Forty-six people with physical disabilities participated in this study. The sample consisted of 35 women and 11 men, in the age range of 53-93 years (average age, 73.7 years; SD = 10.6 years). Of the participants, 11 (24.4%) were reported to be in a committed relationship, and 34 (75.6%) were single. With regard to the nationality, 43 were Germans (93.5%), constituting the highest proportion. More socio-demographic data of the sample can be extracted from Table (1).

Examination procedure

Data collection took place by means of an anonymous questionnaire set. First contact was made with organizations such as nursing services, communities, municipal facilities that are in contact with persons with disabilities. The questionnaires were distributed in five organizations. Subjects were briefly explained the content and process of the examination, referred to the voluntary nature of participation, and were demonstrated the ability to stop the study at any time. In the case the respondents were willing to participate in the study, a date was fixed for the processing of the questionnaires. The study took place in Bochum, Nordrhein-Westfalen, Germany.

All persons residing in a nursing or retirement home were excluded from this study. The consent to this study was presented by the local ethics committee.

Measuring instruments

Questionnaire on Social Support (F-SOZU-K-22)

F-SOZU [21] is a questionnaire on social support that measures how the people experience and estimate social support. The three scales of social support include "emotional support," "practical support" and "social integration." The questionnaire on social support can be combined to a total value "Perceived social support" (WASU). Out of this, a short form was developed. This outline (F-SOZU-K-22) contained the following items: "emotional support" (8 items), "practical support" (4 items), and "social integration" (6 items). In addition, the F-SOZU-K-22 also included the following four items: "confidant" (2 items) and "satisfaction with social support" (2 items) of the long version of the F-SOZU. The 22 items of the questionnaire were evaluated on a 5-point rating scale ranging from 1=does not apply at all, to 5=apply exactly. Cronbach's alpha for this study was found to be α=0.94.

Brief Symptom Inventory (BSI)

The BSI [22] is a short form of the SCL-90-R. This self-assessment tool measured the psychological distress of a person within a period of seven days. It has the following nine scales: "somatization" (SOMA, 7 items), "obsessive-compulsive" (ZWAN, 6 items), "interpersonal sensitivity" (UNSI, 4 items), "depression" (DEPR, 6 items), "anxiety" (ANGS, 6 items), "aggressiveness/hostility" (AGGR, 5 items), "phobic anxiety" (PHOB, 5 items), "paranoid ideation" (PARA, 5 items), and "psychoticism" (PSYC, 5 items). BSI also includes three global figures "Global Severity Index" (GSI), "Positive Symptom Distress Index" (PSDI) und "Positive Symptom Total" (PST). With four additional items, BSI consisted of 53 items. The incidence was estimated on a 5-point Likert scale with 0=not at all, 1=a little, 2=rather, 3=strong, and 4=very strong. The internal consistency of the BSI scales for the subjects in the present study ranged from α=0.33 (psychoticism) to α=0.80 (somatization and anxiety). Particular attention should be paid on consistently very high internal consistency of GSI, i.e., α=0.94.

Questionnaire on Assistive Technology (AT-24)

The AT-24 [23] is a self-designed questionnaire for identifying assistive technologies with regard to the psycho-social existential orientation.

The questionnaire consisted of two parts A and B. Part A consisted of the following two scales: "Aids" with three items (use of assistive technology in everyday life of people with disabilities/illnesses); and "Factors" with four items (effectiveness of aids in daily life).

In addition to the scales, the following sub-scale was also used, i.e., "satisfaction" with three items (satisfaction with aids). Part A, thus, consisted of ten items. Part B consisted of the following four scales: "Supportive behavior" with two items (social support of environment); "Burdening effect" with one item (self-assessment about disabilities that can be a burden to others, such as family or friends); "Burdening behavior" with four items (the individual experience, the assessment of person concerned and a kind of help from others which may have a negative impact), and "Social integration" with three items (participation in the society).

In addition, there were two sub-scales: "suffering" with two items (disability/illnesses, identifying) and "activity" with two items (activity limitation). Part B consisted of 14 items. The questionnaire consisted of a total of 24 items. The statements were evaluated based on a 5-point Likert scale with 1=not at all, 2=little, 3=rather, 4=strong, and 5=very strong.

Statistical analysis

All statistical procedures were performed using the SPSS data analysis system for Windows. In the process, a two-sided significance test was performed. The level of significance was set at $P<0.05$. The reliabilities were determined by Cronbach's alpha. Furthermore, the correlations based on Pearson were conducted and tested for significance.

3. Results

Diagnosis of disability/illness of the subjects

The surveyed subjects had physical disabilities. The type and degree of the disabilities were pronounced differently. Thirty-seven persons were severely disabled (the degree of disability is at least 50%), and two people were in the current proceedings for a certificate of disability. Seven of them did not name the degree of their disability. Forty-two participants reportedly suffered from various illnesses.

In the present study, the subjects, because of their physical disabilities, illnesses or age, faced difficulties in performing certain activities, such as housework, shopping, and visiting friends. Table 2 gives an overview of the restrictions in everyday life of the subjects. When looking at the mean scores, it was found that the existing restrictions on outdoor activities were estimated to be higher than the indoor activities.

Use and performance of the aids in everyday life

Forty-five subjects reported that they used assistive aids to cope with their everyday activities. Depending on the type and degree of disability, illness and age, they often used more than one aid for various implementing areas (e.g. mobility, personal hygiene, and communication). Only one visually challenged subject did not use any aid. The walking frame mobility aid was the most used aid (61.9%), followed by walking stick with 40.5% and a bathtub lifter with 21.4%. Table 3 shows an overview of the use of the aids by the subjects in the present study.

Regarding the answers to the question about the satisfaction of subjects with their aids, two persons were "little" satisfied with the resources, 12 stated to be satisfied with "rather" and 30 were satisfied with either "strong" [22] or "very strong" [8]. In this study, the correlative

Table 1. Sociodemographic data of the subject group.

	n=46	Whole Group
Age in years	Mean (SD)	73.7(10.6)
	Range	53-93
Gender	Man	11(23.9)
	Woman	35(76.1)
Nationality	German	43(93.5)
	Polish	1(2.2)
	Russian	2(4.3)
Partnership	Yes	11(24.4)
	No	34(75.6)
Housing situation	Living alone	30(66.7)
	With partner/spouse	6(13.3)
	With children	5(11.1)
	With parent	1(2.2)
	With relatives/acquaintances	2(4.4)
	With spouse and children	1(2.2)
Marital status	Single	7(15.2)
	Married	8(17.4)
	Widowed	25(54.3)
	Divorced	6(13.0)
School-leaving/training qualification	No school-leaving qualification	2(4.3)
	Pre-school//main school qualification/Primary school	23(50.0)
	High-school diploma/secondary school leaving certificate	11(23.9)
	A level/advanced vocational certificate of education	5(10.9)
	Completed studies	5(10.9)
Occupation	No information	1(2.2)
	Employee/clerk	2(4.3)
	Homemaker	2(4.3)
	Retired/pensioner	41(89.1)

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relation of satisfaction with the aids and the need for more assistance in everyday activities was investigated. A significant negative correlation was derived between the two items (r=-0.30; P=0.045).

A correlation analysis showed a significant correlation between the quoted need for additional help using an aid and the difficulties using an aid (r=0.53; P=0.000). With increasing difficulties faced by the subjects when using

Table 2. Restricted everyday activities.

AT 3: What activities are restricted in your life?	
Outdoor Activities	**Indoor Activities**
Mean (SD) **3.7(0.8)**	**Mean (SD)** **2.5(0.8)**
Using public transportation	To have a bath
To do the shopping	To have a shower
To see a doctor	To clean a house
To go up stairs	To wash
To go down stairs	To make a bed
To go for a walk	To wash up the crockery
To see companies	To dress
To visit theatres	To undress
To go to the cinema	To go to bed
To travel	To get out of bed
To go to the restaurant	To watch TV
-	To have a wash
-	To make a phone call
-	To eat
-	To prepare meals
-	To sit down
-	To stand up from a seat
-	To do paperwork

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their aid tools, the need for additional help also increased. The limitations in everyday life (outdoor activities and indoor activities) were also correlated with the need for additional help when using the aids (r=0.39; P=0.014 and r=0.55; P=0.001). The extent of the restrictions on everyday activities that can be caused by physical disabilities, illness and age, increased the need for additional help when using an aid. A significant gender difference was found for the need of additional help in the case of the use of an aid, with a higher prevalence in women (Figure 1).

The significant positive correlation was obtained between the presence of sufficient knowledge about the aids and greater independence. For example, relative (r =0.43; P=0.004) and the nursing services (r=0.36; P= 0.019) by the use of aids in everyday life showed that the knowledge and the right information about an aid played an important role. It stated a direct correlation between the knowledge and information available about the resources and the concerned persons benefitted from them.

Social support

In addition, the majority of the subjects reported having to needed support from fellow humans to cope in everyday life. The relatives reached the largest mean scores (AT 4: Who helps you? Relatives (M=3.1; SD=1.5)), followed by nursing service (AT 4: Who helps you? nursing service (M=2.3; SD=1.6)). In the evaluation of the questionnaire on social support (F-SOZU-K-22), it was revealed that the subjects have high social support (M= 3.7; SD=0.8). The social support for the sample of the present study was

reviewed from a gender perspective. There was no significant difference between the women (M=3.7; SD=0.8) and men (M=3.5; SD=1.0), (T=0.78; P=0.430).

Psychological distress symptoms

Table 4 shows the psychopathological symptomatology of the sample in this study. The values reported a psychological distress symptom in the subjects. Based on the gender, the analysis of nine scales (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, aggressiveness/hostility, phobic anxiety, paranoid ideation, and psychoticism) and the GSI of the BSI tended to show a significant difference in the scale "anxiety" only. The anxiety was more in the case of women (M=0.7; SD=0.6) than in men (M=0.4, SD=0.7), (Z=-1.874; P=0.063). This represents a positive correlation of anxiety with the difficulties using the aids (r=0.36; P=0.017) and the additional help using the aids (r=0.48; P=0.001). The higher was the anxiety, the greater were the difficulties in using an aid and the needs for additional help.

Correlations of restricted activities in daily life and the GSI

The correlative relationships of the variables "restricted outdoor activities" and "restricted indoor activities" with the GSI were analyzed in this study. The GSI showed a significant positive correlation between both the variables, i.e. "restricted outdoor activities" (r=0.34; P=0.031) and "restricted indoor activities" (r=0.43; P=0.012). Thereby, stronger restricted daily activities were associated with poor psychological distress.

4. Discussion

The study shows that the subjects need assistive technology and social support to cope with their life better. In people with health problems, the influence of state of

Table 3. Aiding devices used in everyday life of subject group.

	Aid Devices	Percent
Mobility	Walking frame	61.9
	Walking stick	40.5
	Wheel chair	14.3
	Cane stick	9.5
	Long cane	4.8
	Ramp	4.8
	Car	2.4
Personal hygiene	Bath lift	21.4
	Toilet seat raiser	16.7
	Bath seat and bath/shower tool	4.8
	Shower chair and shower seat	4.8
	Commode seat	4.8
Nursing care and medical provision, orthopedic aids	Care bed lifter	11.9
	Compression hosiery	4.8
	Wedge-shaped bolster	2.4
	Medical thermometer	2.4
	Blood pressure monitor	2.4
	Compression bandages	2.4
	Antithrombosis stockings	2.4
	Hip prosthesis	2.4
	Hip protector	2.4

	Aid Devices	Percent
Communication and daily aids	Glasses	19.0
	Hearing aid	11.9
	Lupe	4.8
	Computer	4.8
	Grabber	4.8
	Stocking pullers	4.8
	Grip	2.4
	Lift	2.4
	Trousers dressing aid	2.4
	Long shoehorn	2.4
	Stocking pulling out	2.4
	Electric roll	2.4
	Extended arm aid	2.4
	Screen reader	2.4
	Speech Synthesis	2.4
	Clock	2.4
	Mobile	2.4
	Speech prosthesis	2.4
	Contact lens	2.4%
	Binoculars	2.4
	CD recorder cassette	2.4
	Guide dog	2.4
	Dictaphone	2.4
	Reader device	2.4
	Daisy player	2.4
	Color recognition system	2.4
	Long distance readers	2.4
	Magnifying glasses	2.4
Safely and alarm system	House and emergency system	2.4

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health on the use of a resource has been clearly presented. In this respect, it should be noted that more limitations in the activities of daily life are related to greater needs for additional help using an aid device. The major difficulties are faced with the use of a resource, e.g., the aid involves any complicated technology, lack of information and unsuitable aids, also increase the need for additional help. The study reflects a stronger additional assistance for women compared to men. This can probably be pronounced due to more fear and anxiety in women, which was shown in this study. It has also been reported in studies of Hinz & Schwarz and Jacobi that in the German population, the women are more anxious than men [24, 25]. The study by Häußler et al., [8] showed that many subjects needed extra help, for example, relatives and nursing services, in using their aid tools. More additional human help was required, in the case of severe disability and illness. If there was an absence of sufficient information on the resources, the environment was not adjusted, and the technology was complicated, the subjects

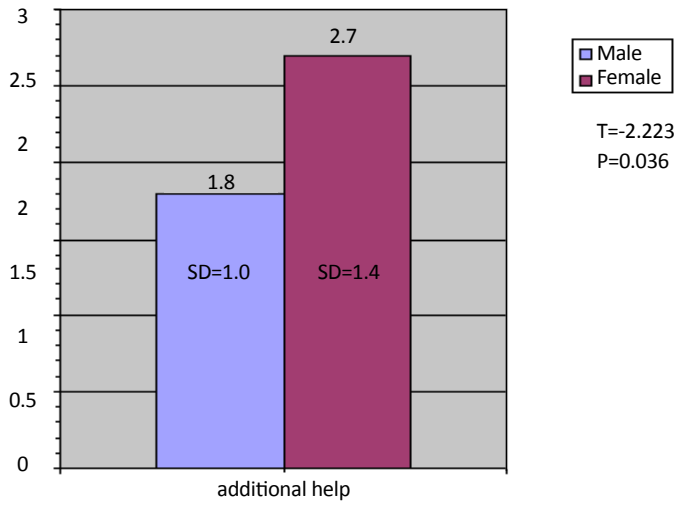

Figure 1. The mean scores of need for additional help using the aids in consideration of gender.

faced difficulty in using the aids without any additional or external help. Referring to this, the deficits can also be compensated better by a demand-oriented combination of assistive devices and social institutions [26].

This study showed a positive correlation between restriction in the daily life of participants caused by physical disabilities and illnesses, with the GSI scale. It also highlighted the poor health status that strongly limited the abilities of the subjects in performing their everyday life activities and caused dependency on the environment - the family and the nursing service. Such circumstances have a negative impact on the psychological condition of the subjects [9, 25].

It is generally assumed that assistive technology plays an important role in the lives of many people with health problems, which are caused by disabilities, illnesses and old age, for carrying out their daily activities. These techniques can be used as a better and more effective tool taking into consideration the social components, the needs of disabled people, their experiences and their views [27, 28]. Due to the expected demographic changes in the future, it is important that research is concerned particularly with an appropriate age group.

Table 4. Psychological distress symptoms (BSI).

BSI	Mean (SD)
SOMA (somatization)	1.1(0.8)
ZWAN (obsessive/compulsive)	0.9(0.7)
UNSI (interpersonal sensitivity)	0.4(0.5)
DEPR (depression)	0.7(0.7)
ANGS (anxiety)	0.6(0.7)
AGGR (aggressiveness/hostility)	0.4(0.5)
PHOB (phobic anxiety)	0.6(0.7)
PARA (paranoid ideation)	0.5(0.7)
PSYC (psychoticism)	0.4(0.4)
GSI (Global Severity Index)	0.7(0.5)

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Conflict of Interest

The authors report no conflict of interests.

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