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ORIGINAL ARTICLE

# Meeting needs for rehabilitation equipment and home adjustments among the disabled in their life environment

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## Abstract

**Introduction**. The elimination of functional barriers resulting from disability through the provision of adequate orthopaedic and rehabilitation equipment, and homes adjusted for disability is the precondition for an efficient and independent functioning, and high quality of life of the disabled. The objective of the study was recognition of the needs of the disabled declared by them, and the degree of satisfaction with these needs.

**Methods**. The study covered 478 disabled from the Lublin Region. The research instrument was the 'Questionnaire for the Disabled' designed by the authors.

**Results**. Considering the needs expressed by the respondents concerning the provision of orthopaedic and rehabilitation equipment and meeting these needs, four groups were distinguished: No Needs – 30.1%, Needs Partially Met – 22.4%, Needs Fully Met – 37.7%, Needs Not Met – 9.8%. The group Needs Not Met was characterized by younger age, in the group Needs Partially Met worse indicators of the state of health were noted, more frequent independent living, loneliness and low material standard. Considering the expressed needs for home adjustments adequate to disability and meeting these needs, three groups were distinguished: No Needs – 59.6%, Needs Not Met – 15.9%, and Needs Met – 24.7%. The group Needs Not Met more rarely covered respondents living in residential homes, compared to those living independently in rural or urban areas. The group Needs Met more rarely included rural inhabitants, while more frequently including the disabled who had a high material standard.

**Conclusions**. Both the provision of orthopaedic equipment and adjustment of the home to disability are insufficient with respect to the needs. The meeting of these needs is significantly conditioned by high or very high material standard. The lack or incomplete satisfaction with the needs for rehabilitation equipment is associated with a relatively younger age, independent, single residence and low material standard. Living in an residential home means better adjustment of the living environment, and better provision with orthopaedic and rehabilitation equipment.

## Key words

disabled, provision of orthopaedic and rehabilitation equipment, home adjustments

## INTRODUCTION

In every population of the disabled, some of them struggle with technical barriers in their functioning; therefore, they need the provision of various types of orthopaedic and rehabilitation equipment, as well as auxiliary aids, and also encounter architectural barriers which create the need for home adjustments suited to the type of disability. These needs vary according to the degree and type of disability, the presence of additional factors which decrease the level of health, as well as specific social roles, needs related with gender, marital status, occupational activity, material standard and place of residence.

The majority of the disabled use only simple, basic aids, which frequently do not satisfy the basic needs for functioning in the living environment, and some of them do not possess any rehabilitation equipment at all. An equally important problem concerns various barriers, mainly architectural, which considerably hinder the daily life functioning of the disabled [1, 2, 3].

The above-signalled problems indicate that it is necessary to conduct studies in order to recognize the actual and expressed needs, and even more so, that there is often a discrepancy of opinions in this respect between the physician in charge of treatment and the disabled person. Additionally, not only the disabled are frequently unfamiliar with the procedure of purchasing such equipment, but also quite often the medical specialists who decide about the needs in this area [1]. Moreover, there are disabled who, despite the fact that they evidently need various type of equipment, do not report such needs.

Undoubtedly, an optimum provision of the disabled with orthopaedic and rehabilitation and technical aids, as well as specified home adjustments, constitute a fundamental

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basis for a high quality of life. In turn, the lack of adequate satisfaction of these needs, in many disabled leads to secondary disability [4].

The presented study demonstrates an analysis of socio-demographic and health conditions of the lack of satisfaction, experiencing an incomplete or complete satisfaction of these needs, or not experiencing these needs despite disability.

## MATERIALS AND METHOD

**Sample selection and course of study.** Two-stage sample selection was used. At the first stage, a list of was made of nursing homes, primary health care, specialist outpatient departments, and hospital wards in the Lublin Region. From this list, 36 facilities were selected by simple sampling. The facilities where a consent was obtained from the manager were qualified for the study. At the second stage, the respondents for the study were selected by the method of targeted sampling from among patients of individual facilities. Exclusively the disabled (legally or biologically) who were capable for participating in the survey and expressed their consent to participate were qualified for the study. The study was conducted in individual facilities by trained surveyors. Valuable information was collected from 478 disabled – 42.7% males and 57.3% females.

**Research instruments.** The 'Questionnaire for the Disabled' designed by the author was used in the study, which consisted of four sections. The first section contained demographic and social data, such as age, gender, and education level. The second section contained data concerning the disability, e.g. causes of disability, information pertaining to the legal decision made concerning disability, types of past injuries and accidents which required medical intervention. The third section provided information about rehabilitation, e.g. provision of orthopaedic and rehabilitation equipment and technical aids expressed by the disabled and technical home adjustments. In the fourth, the last section, information was included pertaining to the difficulties and barriers of daily living, social support and availability of medical services for the disabled. The questionnaire contained two types of questions: about the respondent's opinion and evaluation, and questions about facts. The majority of the questions were closed. The surveyors collected general information concerning the decision made about the degree and causes of disability based on medical records possessed by the disabled person, or the institutions where the respondent stayed. From the above-described research instrument selected items were used which were relevant to the objective of the study.

The questionnaire form was designed by the author due to the lack in relevant literature of standardized research instruments for the assessment of provision with orthopaedic, rehabilitation equipment, and technical aids. This questionnaire has been used in several research projects, and therefore enables comparisons of the results [5].

**Selection and preparation of variables.** The following demographic and social variables which may affect the quality of provision with equipment and home adjustments were considered: gender, age, marital status, education level, material standard, and place of residence. For the purposes of analysis, the variables were categorized:

- age: <50, 50–64, 65–79, ≥80;
- marital status: 1) never married, 2) married, 3) widowed/divorced/separated;
- education: 1) elementary vocational, 2) secondary school/university;
- place of residence: 1) urban area, 2) rural area, 3) Residential Home (RH).

The selection of the last group was justified due to difficulties with the qualification of the place of residence of the residents before their stay in RH. The majority of RHs function within large cities and small towns, and their residents came from various living environments and had various periods of residence.

Considering the needs expressed by the respondents concerning the provision of orthopaedic and rehabilitation equipment and meeting these needs, four groups were distinguished:

1) a group declaring the lack of such needs (No Needs), into which were qualified respondents who declared that they did not possess and needed neither equipment nor technical aids);
2) a group with unsatisfied needs, i.e. respondents who declared that they needed equipment but did not possess any (Needs Not Met);
3) a group with partially satisfied needs, i.e. who had equipment but who declared the need for possessing other equipment (Needs Partially Met);
4) a group with fully satisfied needs who possessed equipment, and declared that they did not need any additional equipment (Needs Fully Met).

Considering the expressed needs for home adjustments adequate to disability and meeting these needs, three groups were distinguished:

1) a group which declared the lack of needs in this area (No Needs);
2) a group with unsatified needs, i.e. those who needed home adjustments but did not possess them (Needs Not Met);
3) a group with Needs Met who possessed adjustments at home; however, without the specification whether the scope of adjustment was fully satisfactory (Needs Met).

**Statistical analyses.** Statistical analyses and the transformations of data were performed using statistical software SPSS PL, v. 12. Two-variable analyses of the categorial data were performed using chi-square test (chi2), and multi-variable analyses were performed by means of logistic regression.

## RESULTS

**Needs for orthopaedic equipment and technical aids.** In the population examined, 60% of respondents declared that they possessed some equipment. They were divided into the following groups: Needs Partly Met – 22.4%, and Needs Fully Met – 37.7%; while 40% of respondents did not possess any equipment, and were divided into the groups: No Needs – 30.1% and Needs Not Met – 9.8%.

**Table 1.** Needs for orthopaedic equipment and technical aids

| Variable | Category | 1 No Needs | | 2 Needs Not Met | | 3 Needs Partially Met | | 4 Needs Fully Met | | P[A] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | % | n | % | n | % | N | % | | |
| | | 144 | 30.1 | 47 | 9.8 | 107 | 22.4 | 180 | 37.7 | | |
| Gender | Males | 63 | 43.8 | 20 | 42.6 | 45 | 42.1 | 76 | 42.2 | 1–2 | 0.94 |
| | Females | 81 | 56.3 | 27 | 57.4 | 62 | 57.9 | 104 | 57.8 | 1–3 | 0.86 |
| | | | | | | | | | | 1–4 | 0.87 |
| | | | | | | | | | | 2–3 | 1.00 |
| | | | | | | | | | | 2–4 | 0.99 |
| | | | | | | | | | | 3–4 | 0.98 |
| Age | < 50 | 23 | 16.0 | 14 | 29.8 | 25 | 23.4 | 15 | 8.3 | 1–2 | **0.03** |
| | 50–64 | 53 | 36.8 | 19 | 40.4 | 45 | 42.1 | 60 | 33.3 | 1–3 | 0.32 |
| | 65–79 | 45 | 31.3 | 14 | 29.8 | 23 | 21.5 | 73 | 40.6 | 1–4 | 0.19 |
| | 80 and over | 23 | 16.0 | 0 | 0.0 | 14 | 13.1 | 32 | 17.8 | 2–3 | 0.12 |
| | | | | | | | | | | 2–4 | **0.0004** |
| | | | | | | | | | | 3–4 | **0.0011** |
| Place of Residence | Rural Area | 47 | 32.6 | 19 | 40.4 | 44 | 41.1 | 52 | 28.9 | 1–2 | **0.031** |
| | Urban Area | 45 | 31.3 | 22 | 46.8 | 41 | 38.3 | 57 | 31.7 | 1–3 | 0.07 |
| | Residential Home | 52 | 36.1 | 6 | 12.8 | 22 | 20.6 | 71 | 39.4 | 1–4 | 0.84 |
| | | | | | | | | | | 2–3 | 0.56 |
| | | | | | | | | | | 2–4 | **0.016** |
| | | | | | | | | | | 3–4 | **0.02** |
| Marital Status | Never-married | 21 | 14.6 | 10 | 21.3 | 34 | 31.8 | 30 | 16.7 | 1–2 | 0.55 |
| | Married/Partnership | 65 | 45.1 | 22 | 46.8 | 29 | 27.1 | 70 | 38.9 | 1–3 | **0.008** |
| | Divorced/Widowed/Separated | 58 | 40.3 | 15 | 31.9 | 44 | 41.1 | 80 | 44.4 | 1–4 | 0.64 |
| | | | | | | | | | | 2–3 | 0.11 |
| | | | | | | | | | | 2–4 | 0.43 |
| | | | | | | | | | | 3–4 | **0.031** |
| Education Level | Elementary/Vocational | 70 | 48.6 | 26 | 55.3 | 70 | 65.4 | 113 | 62.8 | 1–2 | 0.57 |
| | Secondary/University | 74 | 51.4 | 21 | 44.7 | 37 | 34.6 | 67 | 37.2 | 1–3 | **0.030** |
| | | | | | | | | | | 1–4 | **0.034** |
| | | | | | | | | | | 2–3 | 0.36 |
| | | | | | | | | | | 2–4 | 0.49 |
| | | | | | | | | | | 3–4 | 0.76 |
| Material standard | Very Good/Good | 65 | 45.1 | 12 | 25.5 | 21 | 19.6 | 74 | 41.1 | 1–2 | 0.11 |
| | Mediocre | 52 | 36.1 | 21 | 44.7 | 38 | 35.5 | 74 | 41.1 | 1–3 | **0.00006** |
| | Poor/Very Poor | 27 | 18.8 | 14 | 29.8 | 48 | 44.9 | 32 | 17.8 | 1–4 | 0.78 |
| | | | | | | | | | | 2–3 | 0.34 |
| | | | | | | | | | | 2–4 | 0.15 |
| | | | | | | | | | | 3–4 | **0.00005** |
| Cause of Disability | Exclusively disease | 125 | 86.8 | 35 | 74.5 | 70 | 65.4 | 144 | 80.0 | 1–2 | 0.11 |
| | Injury/Congenital defect | 19 | 13.2 | 12 | 25.5 | 37 | 34.6 | 36 | 20.0 | 1–3 | **0.00055** |
| | | | | | | | | | | 1–4 | 0.19 |
| | | | | | | | | | | 2–3 | 0.40 |
| | | | | | | | | | | 2–4 | 0.56 |
| | | | | | | | | | | 3–4 | **0.027** |
| Self-reported health | Very Good/Good | 36 | 25.0 | 6 | 12.8 | 10 | 9.3 | 27 | 15.0 | 1–2 | 0.27 |
| | Mediocre | 64 | 44.4 | 27 | 57.4 | 33 | 30.8 | 75 | 41.7 | 1–3 | **0.00014** |
| | Poor/Very Poor | 44 | 30.6 | 14 | 29.8 | 64 | 59.8 | 78 | 43.3 | 1–4 | 0.059 |
| | | | | | | | | | | 2–3 | **0.014** |
| | | | | | | | | | | 2–4 | 0.26 |
| | | | | | | | | | | 3–4 | 0.065 |

[A] Evaluations of significance of differences corrected for multiple comparisons by Benjamini-Hochberg method (k = 48)

**Gender**. The structure of the groups compared did not differ by gender. In all groups, females constituted approximately 57%, and males the remaining 43%.

**Age**. The structure of the group of respondents who reported that their needs were fully satisfied did not differ by age from those who declared the lack of such needs: in both groups the percentage of the disabled aged 65 and over was high (58.4% and 47.3%, respectively), while the percentage of those aged under 50 was lower (8.3% and 16%). On the contrary, in the groups reporting lack of satisfaction of needs or their incomplete satisfaction, a higher percentages of respondents aged under 50 was found (29.8% and 23.4%), and at the same time, a lower percentage of those aged 65 and over (29.8% and 33.6%, respectively). Significant differences were noted between the disabled who declared that their needs were fully satisfied, and the groups: Needs Not Met (p = 0.00034) and Needs Partially Met (p = 0.001).

**Place of residence**. Respondents from the group Needs Not Met less often lived in Residential Homes (RH) (12%), compared to those who reported that they had no needs (36.1%; p = 0.031) or that their needs were fully satisfied (39.4%; p = 0.016). Also, in the group Needs Partly Satisfied the percentage of RH residents was lower than in the last group (20.6%; p = 0.02).

**Marital status**. Respondents from the group Needs Partly Met were more often never married (31.8%), compared to those who declared that they had no needs (14.6%; p = 0.007), or those who reported that their needs were fully satisfied (16.7%; p = 0.03), and were more rarely married (27.1%), compared to the last two groups.

**Education level**. The group No Needs was the only group in which a half of the respondents had a secondary/university education level, and significantly differed from the groups: Needs Partially Met (p = 0.031), and Needs Fully Met (p = 0.037), where respondents with elementary/elementary vocational education level constituted more than 60%.

**Material standard**. The least favourable situation was observed in the group Needs Partially Met, where nearly 45% evaluated their material standard as Poor/Very Poor, and less than 20% – as Very Good/Good. A significantly better situation was reported by respondents from the groups No Needs (p = 0,00006), and Needs Fully Met (p = 0.00004). In these groups, the evaluations Very Good/Good constituted more than 40%, whereas the evaluations Poor/Very Poor – less than 19%.

**Cause of disability**. In the groups with unsatisfied or only partly satisfied needs for equipment, a higher percentage of respondents were disabled due to injury or congenital defect. An especially high percentage of the latter – as much as 34.6% – was noted in the group Needs Partially Met – significantly more than in the group No Needs (p = 0.0005) – 13.2%, and more than in the group Needs Fully Met (p = 0.03).

**Self-reported health**. In the group Needs Partially Met, more than 59% of respondents evaluated their state of health as Poor/Very Poor, while only 9.2% – as Very Good/Good, whereas in the group No Needs –30.6% and 25%, respectively (p = 0.00012). The group Needs Partially Met additionally differed with respect to evaluation of the state of health from the group Needs Not Met (p = 0.012), where the percentage of evaluations Poor/Very Poor was approximately 30%.

**Multivariable analyses.** In multivariable analyses, logistic regression was used, where the dependent variable was affiliation to a specified group of satisfaction of needs. A three-step scheme of including explanatory variables and backward elimination model of analysis was used. At the first step, Gender, Place of Residence and Age were included into the analysis. Algorithm of backward elimination removed insignificant variables from the model. At the second step, into the set of significant variables were included Material Standard, Education, and Martial Status. Again, insignificant variables were removed from this set. At the third step, variables of the state of health were included: cause of disability and self-reported health, and again insignificant variables were eliminated from the model. The variables which remained after the elimination at step 3 were the final result of the analysis.

**Table 2.** Needs for orthopaedic equipment and technical aids – significant effects

| Explained Variable | Explaining Variables (Reference Category) | P | OR | 95% CI | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| No Needs | | | | | |
| | Education Secondary/University (Elementary/Vocational) | 0.017 | 1.66 | 1.10 | 2.50 |
| | Cause of disability Disease (Injury) | 0.002 | 2.51 | 1.41 | 4.45 |
| | Self-reported health | 0.011 | | | |
| | Good/Very good (Mediocre) | 0.037 | 1.85 | 1.04 | 3.28 |
| | Good/Very Good (Poor/Very Poor) | 0.003 | 2.53 | 1.38 | 4.62 |
| Needs Not Met[A] | | | | | |
| | Age | 0.020 | 0.98 | 0.96 | 1.00 |
| Needs Partially Met[B] | | | | | |
| | Place of residence: | 0.012 | | | |
| | Rural (Residential Home) | 0.008 | 2.35 | 1.25 | 4.42 |
| | Urban (Residential Home) | 0.006 | 2.44 | 1.29 | 4.61 |
| | Material Standard: | 0.004 | | | |
| | Poor/Very Poor (Very Good/Good) | 0.001 | 2.93 | 1.52 | 5.64 |
| | Poor/Very Poor (Mediocre) | 0.027 | 1.86 | 1.07 | 3.23 |
| | Marital Status: | 0.006 | | | |
| | Never married (Married) | 0.002 | 2.74 | 1.43 | 5.25 |
| | Divorced/Widowed/Separated (Married) | 0.019 | 1.99 | 1.12 | 3.52 |
| | Cause of disability Injury (Exclusively Disease) | 0.014 | 1.97 | 1.15 | 3.39 |
| | Self-reported Health: | 0.042 | | | |
| | Poor/Very Poor (Mediocre) | 0.037 | 1.74 | 1.03 | 2.92 |
| Needs Fully Met | | | | | |
| | Age | 0.00004 | 1.03 | 1.02 | 1.04 |
| | Material Standard | 0.023 | | | |
| | Very Good/Good (Poor/Very Poor) | 0.007 | 2.02 | 1.21 | 3.38 |
| | Mediocre (Poor/Very Poor) | 0.028 | 1.77 | 1.06 | 2.93 |

**No Needs group.** The lack of needs was most frequently declared by respondents who had no injury as a cause of disability (OR = 2.6), and who evaluated their state of health as Good/Very Good (OR=2.5 vs. Poor/Very Poor), with secondary school/university education level (OR = 1.7 vs. elementary/vocational).

**Needs Not Met group.** The only variable which significantly increased the risk of inclusion into his group was younger age (OR = 1.02 per each year of life).

**Needs Partially Met group.** In this group there were more frequently respondents with injury as a cause of disability (OR = 1.97 vs. Exclusively Disease), and those with low self-reported health (OR = 1.74 vs. Mediocre). They more often lived independently in urban or rural areas than in RH (urban area: OR = 2.4 vs. RH, rural area: OR = 2.3 vs. RH), more frequently evaluated their material status as Poor/Very Poor (OR = 2.9 vs. Good/Very Good), and more often remained single: never married (OR = 2.7 vs. married) or widowed/separated (OR = 2.0 vs. married).

**Needs Fully Met group.** Age (OR = 1.03) and a higher material status (Very good/Good: OR = 2.02 vs. Poor/Very poor) increased the chance of being qualified into this group.

**Table 3.** Orthopaedic equipment possessed in groups with various degree of meeting the needs for equipment

| | Needs Partially Met | | Needs Fully Met | | Total | | P |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | |
| Walking sticks. crutches | 54 | 50.5 | 98 | 54.4 | 152 | 53.0 | 0.54 |
| Dental prostheses | 29 | 27.1 | 60 | 33.3 | 89 | 31.0 | 0.27 |
| Wheelchair | 28 | 26.2 | 33 | 18.3 | 61 | 21.3 | 0.12 |
| Zimmer frame | 17 | 15.9 | 25 | 13.9 | 42 | 14.6 | 0.64 |
| Footwear. orthopaedic insoles | 24 | 22.4 | 13 | 7.2 | 37 | 12.9 | **0.002** |
| Gymnastics bike and training equipment | 10 | 9.3 | 18 | 10.0 | 28 | 9.8 | 0.86 |
| Braces and other stabilizers | 14 | 13.1 | 12 | 6.7 | 26 | 9.1 | 0.07 |
| Hearing aid | 10 | 9.3 | 8 | 4.4 | 18 | 6.3 | 0.10 |
| Limb prostheses | 8 | 7.5 | 2 | 1.1 | 10 | 3.5 | **0.007**[F] |
| Orthopaedic collar | 4 | 3.7 | 4 | 2.2 | 8 | 2.8 | - |
| Orthopaedic bed. mattress | 4 | 3.7 | 3 | 1.7 | 7 | 2.4 | - |
| Private car | 0 | 0.0 | 5 | 2.8 | 5 | 1.7 | - |
| Small technical aids | 2 | 1.9 | 2 | 1.1 | 4 | 1.4 | - |
| Orthopaedic apparatuses | 3 | 2.8 | 0 | 0.0 | 3 | 1.0 | - |
| Items concealing anatomical loss | 1 | 0.9 | 2 | 1.1 | 3 | 1.0 | - |
| Others | 1 | 0.9 | 1 | 0.6 | 2 | 0.7 | - |
| **Total** | **107** | **100.0** | **180** | **100.0** | **287** | **100.0** | |

[F] Fisher's Exact Test

The equipment possessed by at least 20% of respondents were: walking sticks, crutches (53.0%), dental prostheses (31%), and wheelchair (21.3%). The percentages of the equipment possessed in the groups Needs Partially Met and Needs Fully Met were generally similar, in two cases significantly higher in the group Needs Partially Met. This concerned: footwear and orthopaedic insoles possessed in the groups Needs Partially Met and Needs Fully Met – by 22.4% and 7.2%, respectively (p = 0.002), and limb prostheses possessed by 7.5% and 1.1% (2 respondents) (p = 0.007). The only clear, although statistically insignificant difference to the benefit of the group Needs Fully Met, was the fact that 5 disabled in this group possessed a private car, while in the group Needs Partially Met nobody possessed a car.

**Table 4.** Orthopaedic equipment needed in groups with various degree of meeting the needs for equipment

| | Needs Not Met | | Needs Partially Met | | Total | | P |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | |
| Gymnastics bike and training equipment | 19 | 40.4 | 15 | 14.0 | 34 | 22.1 | **0.0003** |
| Walking sticks. crutches | 16 | 34.0 | 6 | 5.6 | 22 | 14.3 | **0.000003** |
| Zimmer frame | 8 | 17.0 | 14 | 13.1 | 22 | 14.3 | 0.52 |
| Dental prostheses | 1 | 2.1 | 17 | 15.9 | 18 | 11.7 | 0.014 |
| Wheelchair | 3 | 6.4 | 14 | 13.1 | 17 | 11.0 | 0.22 |
| Braces and other stabilizers | 5 | 10.6 | 12 | 11.2 | 17 | 11.0 | 0.91 |
| Footwear. orthopaedic insoles | 2 | 4.3 | 12 | 11.2 | 14 | 9.1 | 0.23[F] |
| Orthopaedic bed. mattress | 2 | 4.3 | 12 | 11.2 | 14 | 9.1 | 0.23[F] |
| Hearing aid | 2 | 4.3 | 11 | 10.3 | 13 | 8.4 | 0.35[F] |
| Private car | 0 | 0.0 | 7 | 6.5 | 7 | 4.5 | - |
| Limb prostheses | 1 | 2.1 | 3 | 2.8 | 4 | 2.6 | - |
| Small technical aids | 0 | 0.0 | 4 | 3.7 | 4 | 2.6 | - |
| Guide | 2 | 4.3 | 2 | 1.9 | 4 | 2.6 | - |
| Orthopaedic collar | 0 | 0.0 | 1 | 0.9 | 1 | 0.6 | - |
| **Total** | **47** | **100** | **107** | **100** | **154** | **100** | |

[F] Fisher's Exact Test

In the group of the disabled who did not possess any rehabilitation equipment, the most frequently desired aids, mentioned by at least 10% of respondents, were as follows: gymnastics bike and training equipment (40%), walking sticks and crutches (34%), Zimmer frame (17%), braces and other stabilizers (10.6%). In the group Needs Partially Met, more than 10% of respondents mentioned: dental prostheses (15.9%), gymnastics bike and training equipment (14%), Zimmer frame (13.1%), wheelchair (13.1%), and 11.2% each indicated: braces and other stabilizers, footwear and orthopaedic insoles, orthopaedic bed, mattress, and 10.3% mentioned hearing aid. In the group Needs Not Met, more often than in the group Needs Partially Met, the respondents reported gymnastics bike and training equipment (p = 0.0003), sticks and crutches (p = 0.000003), and more rarely dental prostheses (p = 0.014). It is noteworthy that the list of 'popular' equipment reported by at least 10% of respondents, in the group Needs Partially Met, covered 8 categories, while in the group Needs Not Met – only 4. In the latter group, the 4 most popular items of equipment constituted 78% of all the equipment mentioned, whereas in the group Needs Partially Met – 46%.

The respondents mentioned from 1–3 items of desired equipment, a total of 191. In the group Needs Not Met, the number of items of equipment mentioned was insignificantly higher than in the group Needs Partially Met – 1.3 vs. 1.2 (p=0.52). The respondents mentioned 1–5 items of equipment possessed, a total of 495. In the group Needs Partially Met, i.e.

in the group where respondents considered their provision with equipment as insufficient, a larger number of items of equipment per person was declared, on average, as 1.95, compared to the group Needs Fully Met, where the mean value was 1.59 (p = 0.001).

**Home adjustments.** In the population examined, the group No Needs constituted 59.6%, while the group Needs Not Met – 15.9%, and the group Needs Met – 24.7%.

**Table 5.** Home adjustments possessed and desired

| Needs Met | | | Needs not Met | | |
|---|---|---|---|---|---|
| Home Adjustments Possessed | n | % | Home Adjustments Desired | n | % |
| Bathrooms adjusted | 88 | 75.2 | Bathrooms adjusted | 42 | 55.3 |
| Doorsteps removed | 72 | 61.5 | Rails | 29 | 38.2 |
| Rails | 55 | 47.0 | Doorsteps removed | 16 | 21.1 |
| Anti-slip flooring | 28 | 23.9 | Anti-slip flooring | 14 | 18.4 |
| Driveways. lift | 3 | 2.6 | Driveways. lift | 6 | 7.9 |
| | | | Moving to a lower floor | 4 | 5.3 |
| | | | Others | 2 | 2.6 |
| Total | 117 | 100 | Total | 76 | 100.0 |

An adjusted bathroom was the convenience most frequently possessed (75.2%), and at the same time, most often reported as desired (55.3%), followed by removal of doorsteps (61.5%), rails (47%), and anti-slip flooring (23.9%). The last 3 adjustments were most frequently mentioned as desired, as follows: rails (38%), removed doorsteps, and anti-slip flooring (18.4%). Apart from the adjustments reported, other categories were rarely mentioned: 3 respondents possessed driveways and a lift (2.6%), while 6 disabled wanted to possess them (7.9%).

**Gender**. The groups compared did not significantly differ with respect to the structure by gender: females constituted from 55.1% – 61.5%, whereas males – 38.5% – 44.9%.

**Age**. The groups No Needs and Needs Not Met did not significantly differ with respect to structure by age. Compared to these groups, the group Needs Met was older – 26.5%, and constituted the disabled aged 65 and over, while in the group No Needs – 10.9% (p = 0.0011), and in the group Needs Not Met – 9.2% (p = 0.0031).

**Place of residence**. In the group Needs Met more than 45% were RH residents, and only 15.4% rural inhabitants, whereas in the group Needs Not Met the percentage of the RH residents was 11.8%, and those living independently: in rural areas – 47.4%, or in urban areas – 40.8% (p = 0.000002). Compared to the group Needs Met, also in the group No Needs the percentage of rural inhabitants was higher (37.9%), and that of RH residents – lower (31.2%; p = 0.00030).

**Marital status**. Statistically significant differences were observed only between the group No Needs and Needs Met (0.0027). In the first of the above-mentioned groups, 46.0% were married, while in the second – only 25,6%. In the group 'Needs Met', a higher percentage than in the group 'No Needs' constituted those divorced/widowed/separated (51.3% and 36.8%, respectively).

**Table 6.** Needs for home adjustments

| Variable | Category | 1 No Needs | | 2 Needs Not Met | | 3 Needs Met | | PA | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | % | n | % | n | % | | |
| | | 285 | 59.6 | 76 | 15.9 | 117 | 24.5 | | |
| Gender | Males | 128 | 44.9 | 31 | 40.8 | 45 | 38.5 | 1–2 | 0.57 |
| | Females | 157 | 55.1 | 45 | 59.2 | 72 | 61.5 | 1–3 | 0.31 |
| | | | | | | | | 2–3 | 0.78 |
| Age | < 50 yrs | 45 | 15.8 | 8 | 10.5 | 24 | 20.5 | 1–2 | 0.32 |
| | 50–64 yrs | 106 | 37.2 | 38 | 50.0 | 33 | 28.2 | 1–3 | 0.0011 |
| | 65–79 yrs | 103 | 36.1 | 23 | 30.3 | 29 | 24.8 | 2–3 | 0.0031 |
| | 80 yrs and older | 31 | 10.9 | 7 | 9.2 | 31 | 26.5 | | |
| Place of Residence | Rural Area | 108 | 37.9 | 36 | 47.4 | 18 | 15.4 | 1–2 | 0.0087 |
| | Urban Area | 88 | 30.9 | 31 | 40.8 | 46 | 39.3 | 1–3 | 0.00030 |
| | Residential Home | 89 | 31.2 | 9 | 11.8 | 53 | 45.3 | 2–3 | 0.000002 |
| Marital Status | Never-married | 49 | 17.2 | 19 | 25.0 | 27 | 23.1 | 1–2 | 0.17 |
| | Married/ Partnership | 131 | 46.0 | 25 | 32.9 | 30 | 25.6 | 1–3 | 0.0027 |
| | Divorced/ Widowed/ Separated | 105 | 36.8 | 32 | 42.1 | 60 | 51.3 | 2–3 | 0.50 |
| Education Level | Elementary/ Vocational | 165 | 57.9 | 51 | 67.1 | 63 | 53.8 | 1–2 | 0.22 |
| | Secondary/ University | 120 | 42.1 | 25 | 32.9 | 54 | 46.2 | 1–3 | 0.52 |
| | | | | | | | | 2–3 | 0.13 |
| Material standard | Very Good/ Good | 106 | 37.2 | 12 | 15.8 | 54 | 46.2 | 1–2 | 0.00013 |
| | Mediocre | 115 | 40.4 | 28 | 36.8 | 42 | 35.9 | 1–3 | 0.30 |
| | Poor/Very Poor | 64 | 22.5 | 36 | 47.4 | 21 | 17.9 | 2–3 | 0.00003 |
| Cause of Disability | Exclusively disease | 238 | 83.5 | 53 | 69.7 | 83 | 70.9 | 1–2 | 0.0152 |
| | Injury/ Congenital defect | 47 | 16.5 | 23 | 30.3 | 34 | 29.1 | 1–3 | 0.0104 |
| | | | | | | | | 2–3 | 0.86 |
| Self-reported health | Very Good/ Good | 57 | 20.0 | 5 | 6.6 | 17 | 14.5 | 1–2 | 0.0012 |
| | Mediocre | 127 | 44.6 | 26 | 34.2 | 46 | 39.3 | 1–3 | 0.18 |
| | Poor/Very Poor | 101 | 35.4 | 45 | 59.2 | 54 | 46.2 | 2–3 | 0.19 |

[A] Evaluations of significance of differences corrected for multiple comparisons by Benjamini-Hochberg method (k = 24).

**Education level**. In the group Needs Not Met, more than 67% were respondents with Elementary/Vocational education level. In the remaining two groups, the percentages of this category were: in the group No Needs – 57.9%, and in the group Needs Met – 53.8%. However, after correction, these differences were insignificant.

**Material status**. The situation of the group Needs Not Met was the least favourable, where nearly 47.4% evaluated their material status as Poor/Very Poor, and only 15.8% – as Very Good/Good. In the remaining two groups, the percentage of evaluations Poor/Very poor was more than twice as low, and that of evaluations Very Good/Good – more than twice as high.

**Cause of disability**. In the group of respondents who declared No Needs, in only 16% the cause of disability was injury or congenital disease, nearly twice lower than in the remaining two groups.

**Self-reported health**. Statistically significant differences were observed between the group No Needs and Needs Not Met (p = 0.0012). In the first group, the percentages of evaluations Poor/Very Poor were lower (35.4% and 59.2%, respectively), and the percentages of evaluations Very Good/Good were higher (20% and 6.6%, respectively).

**Table 7.** Needs for home adjustments – significant effects

| Explained Variable | Explaining Variables category (reference category) | p | O.R. | 95% C.I. | |
|---|---|---|---|---|---|
| No Needs | Total Population | | | lower | Upper |
| | Place of residence | 0.010 | | | |
| | Rural (Urban) | 0.004 | 2.02 | 1.26 | 3.24 |
| | Residential Home (Urban) | 0.029 | 1.75 | 1.06 | 2.89 |
| | Marital status | 0.001 | | | |
| | Married (Never Married) | 0.009 | 2.11 | 1.21 | 3.69 |
| | Divorced/Widowed/Separated) | 0.001 | 2.29 | 1.43 | 3.68 |
| | Cause of disability exclusively disease (Injury) | 0.002 | 2.10 | 1.31 | 3.38 |
| | Self-reported health | 0.002 | | | |
| | Good/Very Good (Poor/Very Poor) | 0.001 | 2.74 | 1.51 | 4.95 |
| | Mediocre (Poor/Very Poor) | 0.028 | 1.61 | 1.05 | 2.45 |
| Needs Not Met | Total Population | | | | |
| | Place of residence | 0.002 | | | |
| | Rural (Residential Home) | 0.001 | 3.86 | 1.76 | 8.47 |
| | Urban (Residential Home) | 0.002 | 3.51 | 1.59 | 7.78 |
| | Material standard | 0.00002 | | | |
| | Mediocre (Very Good/Good) | 0.049 | 2.06 | 1.00 | 4.23 |
| | Poor/Very Poor (Very Good/Good) | 0.00001 | 5.04 | 2.46 | 10.31 |
| | Poor/Very Poor (Mediocre) | 0.002 | 2.45 | 1.38 | 4.34 |
| Needs Met | Total Population | | | | |
| | Place of residence | 0.0002 | | | |
| | Urban (Rural) | 0.0002 | 3.19 | 1.73 | 5.87 |
| | Residential Home (Rural) | 0.0002 | 3.31 | 1.75 | 6.26 |
| | Material standard | 0.010 | | | |
| | Very Good/Good (Poor/Very Poor) | 0.003 | 2.70 | 1.42 | 5.15 |

**No Needs group.** The characteristics of this group were positive indicators of the state of health: no injury among the causes of disability (OR = 2.1), and self-reported state of health Good/Very Good (OR=2.7 vs. Poor/Very Poor). Among demographic and social variables this was: rural place of residence or in RH (OR=2.10, OR=1.8, respectively vs. urban); being married (OR=2.1 vs. Never Married; OR=2.3 vs. divorced/widowed/separated).

**Needs Not Met group.** The qualification to this group, unfavourable from the aspect of satisfaction of the need for home adjustments, was strongly dependent on the material standard – the worse the material standard, the greater the chance for qualification to this group: the respondents who evaluated this standard as Poor/Very Poor were qualified to this group more frequently than those who evaluated their material standard as mediocre (OR = 2.4), while the latter belonged to this group more often (OR = 2.1) than those who described their material standard as Very Good/Good. In addition, residents of RH were qualified into this group more rarely than respondents who lived independently in rural areas (OR = 3.8 vs. RH) or in urban areas (OR = 3.5 vs. RH).

**Needs Met group.** Urban inhabitants had home adjustments considerably more often than rural inhabitants (OR = 3.2 vs. rural), and compared to residents of RH (OR = 3.3 vs. rural). The odds of affiliation to this group was also higher among those who evaluated their material standard as Very Good/Good (OR = 2.7 vs. Poor/Very Poor), and the lowest among respondents who evaluated it as Poor/Very Poor.

From the aspect of provision with orthopaedic equipment, respondents from various environments of residence, in only a few cases differed by the type of equipment. Residents of RH were best equipped with wheelchairs, while rural inhabitants – the worst. The percentage of dental prostheses possessed was the highest among rural inhabitants, whereas it was the lowest in the group of residents of RHs. Gymnastics bike and training equipment were possessed mainly by urban inhabitants (22.%), whereas in RH such equipment was possessed by only 2 respondents, and in rural areas – only by 4 (4.2%) (p=0.0000011).

## DISCUSSION

Analysis of data concerning the size of disability and demographic trends for the next 25 years shows that the problems of the disabled, especially in rural areas, will become more intense and increasingly more varied. This results mainly from the social, economic and political changes which have taken place in Poland within the last 25 years. There occurred great limitations in access to many services for his population group, including widely understood rehabilitation actions.

The Lublin Region is characterized by the highest intensity of the phenomenon of disability in Poland (approximately 19% of the population of the entire region). This results, among other things, from the agricultural character of economy of the region, limited access to basic public services, such as education, including heath education, specialist treatment, rehabilitation, recruitment agencies, small number of social organizations acting on behalf of the disabled, insufficient social support, also for family members of the disabled with various types of dysfunctions. The problem of barriers hindering independent locomotion should be emphasized, which are more numerous and more varied in the rural than urban environments [6]. For example, architectural barriers exclude or marginalize the disabled with deficits concerning the motor organs. Such obstacles are most frequently the lack of adjustment of objects, mainly buildings and their surroundings, streets, pavements and public roads [7, 8]. Here, the problems of home adjustment to the type of disability are of the greatest importance. A high level of provision with the indispensable conveniences, and an adequate scope of provision with orthopaedic and rehabilitation equipment and technical aids, make it possible to improve the quality of life of a disabled person in every sphere of life. Many studies show

that the disabled most often possess the simplest orthopaedic and rehabilitation orthopaedic, or rehabilitation equipment, which limits their self-care capabilities and performance of more complicated daily living tasks.

The situation has hardly changed in the last 25 years. All-Polish studies of the adult rural inhabitants conducted in 1990 showed that among the disabled who possessed any type of equipment, the largest number were those who mentioned walking sticks and crutches (69.2%), i.e. the simplest aids facilitating locomotor activities. Despite the fact that they were all rural inhabitants, a significant difference occurred in the frequency of provision with this equipment to the disadvantage of farmers (90.5%), compared to non-farmers (49.3%). Here, it should also be emphasized that the majority of respondents not only possessed the basic equipment, but also a single assortment of aids. It should also be underlined that the majority of respondents possessed not only basic equipment, but also an individual assortment of items [1]. In turn, studies conducted in the Lublin Region during the period 2007 – 2008 showed that there were only slightly less disabled (61.1%; 55.7%, respectively) who possessed the basic equipment, compared to 1990; however, they possessed two or three orthopaedic and rehabilitation aids [9, 10]. E. Kamusińska presented in her studies the importance of the level of provision with the discussed aids, and elimination of various barriers. Her studies showed that nearly 62% of the disabled declared willingness to participate in social life, provided that they possessed adequate orthopaedic and rehabilitation equipment and technical aids, and the elimination of the most troublesome barriers [11]. There are various causes for this difficult situation, including a frequently indicated lack of information concerning the procedure of purchasing various aids, although many of them belong to guaranteed services [12].

The needs for provision of orthopaedic and rehabilitation equipment are closely related with the type and degree of disability, which is generated by the cause or causes of the dysfunction. Most frequently, the causes of disability are diseases, but people who experienced injuries, especially multiple injuries, have the greatest needs for rehabilitation [13]. This problem especially concerns young males living in both rural and urban areas; however, the largest variety of these events occur among rural inhabitants [1, 14, 15, 16]. The results of studies of inequalities in the state of health are to the disadvantage of inhabitants of rural areas and small towns [17, 18]. They also have fewer possibilities to eliminate barriers occurring at home and in its surroundings. Nearly all the disabled struggle with the lack of or considerably hindered access to public administration buildings. Studies under the patronage of the Government Plenipotentiary for Disabled People show that for this reason it is necessary to eliminate barriers in 3 spheres, i.e. legal, mental and financial [2].

In the group examined, the subpopulation especially distinct from the aspect of needs, both medical and social, are the disabled living in RHs. Many studies show that the reasons for the stay of residents in these facilities may be divided into several groups: loneliness (often even when they have families), multi-morbidity, disability and difficult economic situation [19, 20]. Own studies indicate that the majority of the disabled living in RHs could successfully live in their own environment, provided that they receive minimum medical, nursing and social care [10]. The benefits from living in an RH should also be emphasized, e.g. in the form of provision of elementary therapeutic rehabilitation and provision with orthopaedic and rehabilitation equipment and technical aids [21].

It should be emphasized that the above-mentioned types of problems of the disabled rural inhabitants, both health and social, are often different, compared to those of the disabled from other environments. An increasingly larger number of researchers pay attention to the quality of life measured by medical and social needs, not only of the disabled, but also of their caregivers [22, 23, 24, 25, 26, 27].

Understanding of the essence of the problems and needs of the disabled by their family members, primary heath care staff, members of rehabilitation teams, and employees of State institutions, is the best and the quickest way to improve the situation in the area of provision with orthopaedic and rehabilitation equipment and technical aids for the disabled, especially those living in rural areas. The disabled increasingly more often find support in informal groups – organized self-help groups, which are especially needed by the elderly who are not so independent, with low income, hardly occupationally active, or active in life [4, 28].

Within the last 25 years in Poland, changes have been observed in the demographic situation of society, with the ageing of the population as the most characteristic feature. Among the elderly, a change is observed in the structure of chronic diseases, mainly as a result of decreasing morbidity due to cardiovascular diseases, as well as an increasing morbidity due to cancerous diseases. These health problems and frequently occurring injuries cause an increase in the number of the disabled who require targeted individual care [28, 29, 30].

The World Health Organization experts recommend regular studies which would concern the current health situation and the character of its changes, as well as the needs of various population groups [3]. The differences in health, economic, cultural and political needs found between population groups, e.g. rural and urban, individual regions or countries, may be a reliable basis for the development of directions of actions, both current and in the future.

Summing up, it should be presumed that in order to improve the capabilities for independent functioning of the disabled in many activities of daily living in their environment, it is necessary to provide them with early and late rehabilitation, with particular consideration of the provision of orthopaedic and rehabilitation equipment and technical aids. The elimination of widely understood technical, social and psychological barriers is of great importance. An effective performance of these tasks is protection against secondary disability.

## CONCLUSIONS

1. The provision of orthopaedic and rehabilitation equipment and technical aids should be considered as insufficient, considering the fact that one-third of disabled respondents declared unmet needs in this respect.
2. Lack or incomplete satisfaction of the needs in the area of provision of rehabilitation equipment is related with a relatively younger age, independent, lonely residence and low material standard.
3. The level of meeting the needs concerning home adjustments is highly insufficient: in nearly 40% of the

respondents who declared such needs, these needs were not met.

4. The system of health care does not provide an equal access to the provision with rehabilitation and orthopaedic equipment, and to the resources enabling the elimination of architectural barriers at home and within the household. The meeting of these needs is significantly conditioned by high or very high material standard.
5. Living in an RH means better adjustment of the living environment, and better provision with orthopaedic and rehabilitation equipment, such as home wheelchairs and Zimmer frames. This results not only from the respondents' needs, but also from the Act in the Matter of Residential Homes.
6. It is noteworthy that a large group of the disabled reported the need for possessing various types of equipment for physical exercises, especially those who were not provided with orthopaedic and rehabilitation equipment, and in the group of young disabled. This may be associated with an increased awareness of respondents concerning the benefits from locomotor rehabilitation.

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