

Investigation of User Satisfaction and Associated Factors in Geriatrics Using Walking Aids: A Cross Sectional Study

Yürüme Yardımcısı Kullanan Geriatrik Bireylerde Kullanıcı Memnuniyeti ve İlişkili Faktörlerin İncelenmesi: Kesitsel Bir Çalışma

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ABSTRACT Objective: We aimed to investigate user satisfaction and associated factors in geriatrics using a walking aid. **Material and Methods:** The Quebec User Evaluation of Satisfaction with Assistive Technology 2.0 was used to assess the satisfaction of 269 individuals aged ≥ 65 years using any walking aid. The relationships between satisfaction and age, years of use, body mass index, number of falls in the last year, physical activity level and health-related quality of life were analyzed. **Results:** The most commonly used walking aid was cane (78.8%). Ease of use was the most satisfied feature, while adjustments was the least satisfied feature. The three most important features were safety, ease of use and weight. Walking aid satisfaction had weak negative correlations with physical activity ($r=-0.246$) and quality of life ($r=-0.131$) ($p<0.05$). In addition, 41.6% of the participants stated that they had fallen at least once in the last year and 70.7% of them did not use a walking aid during the fall. **Conclusion:** Geriatrics with lower quality of life and physical activity values tend to have higher user satisfaction with walking aids with a weak relationship. Satisfaction results may contribute to the design and selection of appropriate walking aids for this population.

ÖZET Amaç: Yürüme yardımcıları kullanan geriatrik bireylerde kullanıcı memnuniyeti ve ilişkili faktörleri araştırmayı amaçladık. **Gereç ve Yöntemler:** Herhangi bir yürüme yardımcıları kullanan 65 yaş ve üstü 269 bireyin memnuniyeti Quebec Yardımcı Teknoloji Kullanıcı Memnuniyeti Değerlendirme 2.0 ile değerlendirildi. Memnuniyet ile yaş, kullanım yılı, beden kitle indeksi, son bir yıldaki düşme sayısı, fiziksel aktivite seviyesi ve sağlıklı yaşam kalitesi arasındaki ilişkiler incelendi. **Bulgular:** En sık kullanılan yürüme yardımcıları bastondu (%78,8). En çok memnun olunan özellik kullanım kolaylığı iken en az memnun olunan özellik ayarlamaya kolaylığıydı. En önemli görülen üç özellik ise sağlamlık ve güvenliği, kullanım kolaylığı ve ağırlık olarak belirlendi. Yürüme yardımcıları memnuniyeti, fiziksel aktivite ($r=-0,246$) ve yaşam kalitesi ($r=-0,131$) değerleri ile negatif yönde zayıf ilişkiye sahipti ($p<0,05$). Ayrıca katılımcıların %41,6'sı son bir yılda en az bir kez düştüğünü, bunların %70,7'si düşme sırasında yürüme yardımcıları kullanmadığını belirtmiştir. **Sonuç:** Yaşam kalitesi ve fiziksel aktivite değerleri düşük olan geriatrik bireylerin, zayıf bir ilişki ile yürüme yardımcılarından memnuniyetleri daha yüksektir. Memnuniyet sonuçları, bu popülasyon için uygun yürüme yardımcıları tasarımına ve seçimine katkıda bulunabilir.

Keywords: Canes; satisfaction; geriatrics; physical activity; quality of life

Anahtar Kelimeler: Baston; memnuniyet; geriatrikler; fiziksel aktivite; yaşam kalitesi

Walking aids have been used in different ways to support ambulation since the Neolithic period.¹ Today, it is known that approximately 22-24% of individuals over 65 years of age use different walking aids to support mobility.^{2,3} The rate of walking aid

use is higher, especially in the elderly whose walking speed falls below 1 m/sec. It has been determined that most of these individuals acquire walking aids on their own without applying to any healthcare institution.²

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Although an increase in walking speed and improvement in balance is observed in the elderly with the use of walking aids, it is also known that they cannot reach the gait quality and functional level of individuals in the same age group who can walk without support.^{4,5} On the other hand, it has been reported that although walking aids increase mobility capacity, they do not reduce the risk of falls and even improper use may increase this risk.⁶⁻¹⁰ With the recent increase in the elderly population, fall-related health problems have become a public health problem.¹¹ In the fall prevention guidelines for the elderly, the use of walking aids is among the risk factors for falls with a high level of evidence.¹² The chance of tripping over obstacles such as carpets, armchairs, doors, and coffee tables, especially in the home, increases as the base of support enlarges with the walking aid. There is also a risk of tripping over the walking aid.¹⁰ For these reasons, proper selection and appropriate use of walking aid are very important in preventing secondary problems.¹³

It has been observed that not all people who have a walking aid use it regularly.^{3,14} The reasons for not using the walking aid are the poor indoor and outdoor environments, obstacles in the use of public transportation, high stairs, and aesthetic concerns.^{6,15} On the other hand, the number of individuals who consider their walking aids as an integral part of their lives and state that they use them effectively in every environment is considerably high.¹⁵⁻¹⁷

Studies examining assistive device use in geriatrics have mostly focused on mobility skills and falls.^{2,9,18} The inclusion of other devices such as wheelchairs and hearing aids in addition to walking aids in studies examining assistive device satisfaction limits the interpretation of results.^{16,19} Knowing individuals' satisfaction with walking aids and factors associated with satisfaction is important in selecting the appropriate walking aid. Therefore, our study aimed to examine walking aid satisfaction and also its relationship with the age, duration of aid use, body mass index, health related quality of life, physical activity level and number of falls in individuals aged ≥ 65 years who use walking aids. We hypothesized that there is a relationship between satisfaction with the walking aid and the factors listed above.

MATERIAL AND METHODS

The study was conducted between May 2021 and April 2022. Data were collected using one-to-one interview (face-to-face or video call) method with people aged ≥ 65 years who use any walking aid. The participants included in this study were reached with the help of university students. The students reached out to their relatives, neighbors and people living in nursing homes and directed eligible people to participate in the study. The study method was approved by the Ethics Committee for Scientific Research and Publication of the Eastern Mediterranean University with decision number ETK00-2020-0284 (date: December 23, 2020). The study was conducted in accordance with the Helsinki Declaration principles and informed consent was obtained from all participants. Inclusion criteria were defined as individuals who were ≥ 65 years of age, had been using a walking aid for at least six months, could walk at least 30 meters independently with a walking aid, could understand and respond to what they read or were read to, and had a good cognitive level (Mini-Mental State Examination score of 24 and above); exclusion criteria were defined as individuals who could not walk with a walking aid, who did not volunteer to participate in the study, and who had undergone any surgical operation that could affect walking activity in the last six months.

In the sample size calculation, the number of individuals 65 years and older living in Türkiye, which is known to be 7,776,923 people according to Türkiye Statistics Institute 2020 data, was taken into account. Considering the data that 15% of geriatrics need a walking aid, 271 individuals were planned to be included in the study to represent the population, using the OpenEpi version 3.01 (Andrew G. Dean and Kevin M. Sullivan, Atlanta, GA, USA) open source to estimate with a 90% confidence interval under the assumptions that the margin of error would be $\pm 2\%$ and the pattern effect would be 1.¹⁸

Age, height, body weight, chronic diseases, and the number of medications used regularly were questioned. History of falls was evaluated by asking questions about the number of falls in the last year, during which activity and in which environment they fell,

and the use of a walking aid during falls. The Turkish version of the Physical Activity Scale for the Elderly (PASE), which was developed for geriatric individuals, was used to determine the physical activity level.²⁰ The 12-question PASE assesses the frequency and duration of leisure, home and work-related activities in the past week with a good reliability (ICC: 0.995). The overall PASE score ranges from 0 to 400 or more, with higher scores indicating better physical activity levels. The Turkish version of the Short Form-36 (SF-36) scale was used to assess health-related quality of life.²¹ This scale, which evaluates the quality of life with general health, physical functioning, physical role, mental health, emotional role, social functioning, bodily pain, vitality sub-dimensions, gives a total score out of 100 with higher score means better health-related quality of life value of the person. The Cronbach's alpha value of each sub-dimension varies between 0.732-0.761.

The walking aid assessment included questions about the type of device used and the number of years of use. Individual satisfaction with the walking aid was assessed using the Turkish version of the Quebec User Evaluation of Satisfaction with Assistive Technology 2.0 (QUEST-2) questionnaire. It is a 5-point Likert scale that assesses different aspects of device satisfaction with eight questions about dimensions, weight, adjustment, safety, durability, ease of use, comfort and effectiveness. The questionnaire has a good test-retest reliability (ICC: 0.96). It gives an average total score between zero and five and the higher the score, the greater the satisfaction.²² In addition, it asks about the three features of the assistive device that are most important to the individual.²³

STATISTICAL ANALYSIS

SPSS 22.0 (Statistical Package for Social Sciences, IBM, USA) was used for data analysis. Normality of data was analyzed by Shapiro-Wilk test, and correlation analysis was performed by Pearson correlation test. Statistical significance was set at $p < 0.05$. Correlation coefficients (r) were interpreted as 0.90-1.00 very strong, 0.70-0.89 strong, 0.40-0.69 moderate, 0.10-0.39 weak, 0-0.9 negligible.²⁴ Descriptive data were expressed as mean \pm standard deviation ($X \pm SD$),

and frequency values were expressed as numbers and percentages (n %).

RESULTS

The study was completed by a total of 269 individuals, 149 females (55.4%) and 120 males (44.6%) (Figure 1). It was found that individuals had been using a walking aid for an average of 4.81 years, and the most commonly used walking aid was a wooden cane (53.2%) (Table 1). Among the participants, 86.6% had at least one chronic disease and the most common disease was hypertension (52.8%). In addition, 92.2% were taking at least one medication regularly. 79.9% had a fear of falls and 58.4% had at least one fall in the past year. Most falls occurred while walking (72.5%). 70.7% of the individuals reported that they did not use a walking aid when they fell (Table 1). Results for physical activity (PASE) and health-related quality of life (SF-36) are shown in Table 1.

According to the walking aid satisfaction results, the 3 features that individuals are most satisfied with are ease of use, effectiveness, and comfort, while the 3 features they consider most important are safety, ease of use, and weight (Table 2).

Walking aid satisfaction had a weak negative correlation with physical activity ($r = -0.246$) and quality of life ($r = -0.131$) ($p < 0.05$). A similar relationship

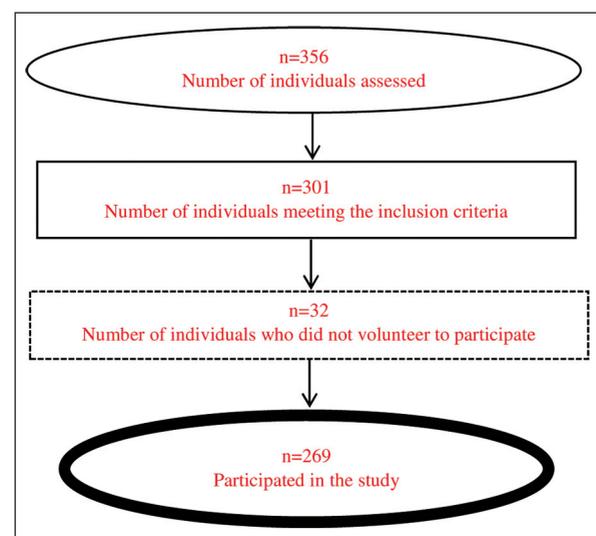


FIGURE 1: Flowchart of the study.

TABLE 1: Characteristics of participants (n=269).

Age (year) \bar{X} (SD)	73.89 (7.54)
Gender n (%)	
Male	120 (44.6)
Female	149 (55.4)
Height (cm) \bar{X} (SD)	165.58 (9.08)
Body mass (kg) \bar{X} (SD)	75.49 (13.18)
Body mass index (kg/m²) \bar{X} (SD)	27.58 (4.69)
Walking aid use time (years) \bar{X} (SD)	4.81 (4.61)
Type of walking aid n (%)	
Wooden cane	143 (53.2)
Aluminum cane	30 (11.2)
Tripod cane	20 (7.4)
Quadripod cane	3 (1.1)
Foldable cane	16 (5.9)
Forearm crutch	19 (7.1)
Underarm crutch	6 (2.2)
Walker (no wheel)	22 (8.2)
Walker, two wheeled	4 (1.5)
Walker, four wheeled	6 (2.2)
Frequency of use of walking aid n (%)	
Always	64 (23.8)
Usually	95 (35.3)
Sometimes	86 (32.0)
Rarely	24 (8.9)
Chronic disease n (%)	
No	36 (13.4)
Yes	233 (86.6)
Hypertension	142 (52.8)
Diabetes	70 (26.0)
Knee osteoarthritis	94 (34.9)
Osteoporosis	60 (22.3)
Hemiplegia	28 (10.4)
Chronic obstructive pulmonary disease	19 (7.1)
Others (Chronic kidney failure, disc hernia)	2 (0.8)
Number of medications used regularly n (%)	
0	21 (7.8)
1	30 (11.2)
2	72 (26.9)
3	55 (20.5)
4	41 (15.3)
5	14 (5.2)
5<	35 (13.1)
Having fear of falling n (%)	
Yes	215 (79.9)
No	54 (20.1)
Did you fall in the last year? n (%)	
No	112 (41.6)
Yes	157 (58.4)
Number of falls in the last year	
1	41 (15.4)
2	54 (20.1)
3	31 (11.5)
3<	31 (11.5) <i>continues →</i>

TABLE 1: Characteristics of participants (n=269) (continuing).

What were you doing during the fall (n=157) n (%)	
Walking	129 (72.5)
Stair ascending/descending	16 (9.0)
Sitting to or standing from somewhere	18 (10.1)
Turning	15 (8.4)
Were you using the walking aid when you fell? (n=157) n (%)	
Yes	46 (29.3)
No	111 (70.7)
Physical Activity Score (PASE) \bar{X} (SD)	64.33 (60.16)
Health Related Quality of Life (SF-36) \bar{X} (SD)	
General health	43.94 (19.75)
Physical functioning	36.18 (25.68)
Physical role	29.57 (37.07)
Mental health	56.88 (16.43)
Emotional role	41.40 (42.15)
Social functioning	54.12 (25.13)
Bodily pain	56.15 (45.56)
Vitality	40.26 (21.86)

SD: Standard deviation; PASE: Physical Activity Scale for the Elderly; SF: Short Form-36.

TABLE 2: Walking aid user satisfaction (QUEST-2) (n=269).

	Score \bar{X} (SD)	Most important features n (%)
Dimensions	3.83 (0.96)	74 (9.5)
Weight	3.83 (0.98)	110 (14.1)
Adjustment	3.75 (1.16)	28 (3.6)
Safety	3.87 (0.98)	157 (20.2)
Durability	3.88 (0.92)	82 (10.5)
Ease of Use	3.95 (0.98)	149 (19.2)
Comfort	3.90 (0.99)	86 (11.1)
Effectiveness	3.91 (1.00)	92 (11.8)
Total	3.85 (0.84)	

SD: Standard deviation; QUEST-2: Quebec User Evaluation of Satisfaction with Assistive Technology 2.0.

existed between age and physical activity ($r=-0.216$) and quality of life ($r=-0.196$) values ($p<0.05$). The year of walking aid use had a moderate positive correlation with age ($r=0.424$), and a weak positive correlation ($r=0.248$) with the number of falls in the last year ($p<0.05$) (Table 3).

DISCUSSION

In our study, we found the walking aid features that geriatrics were most satisfied with and considered most important. User satisfaction was weakly asso-

TABLE 3: Correlation between user satisfaction and related factors.

	Duration of aid use r (p)	Age	BMI	SF-36	Physical activity	Number of falls in last year
User satisfaction	0.090 (0.143)	0.102 (0.096)	0.105 (0.086)	-0.131 (0.032)*	-0.246 (<0.001)*	-0.028 (0.728)
Duration of aid use		0.424 (<0.001)*	0.073 (0.233)	-0.082 (0.184)	-0.119 (0.051)	0.248 (0.002)*
Age			-0.059 (0.333)	-0.196 (0.001)*	-0.216 (<0.001)*	0.147 (0.066)
BMI				-0.084 (0.168)	-0.081 (0.188)	-0.115 (0.153)
SF-36					0.115 (0.059)	-0.153 (0.056)
Physical activity						-0.101 (0.206)

*p<0.05; BMI: Body mass index; SF-36: Short Form-36.

ciated with health-related quality of life and physical activity level in geriatrics using a walking aid.

The most frequently used walking aid among the participants in our study were cane types, with the wooden cane being the most common. Similarly, cane was found to be the most commonly used walking aid in previous studies.^{2,25} Edwards and Jones, found that 87.9% of 523 geriatrics who used walking aids had cane types, 9.7% had walkers, and 2.2% had crutches in the English and Wales population. They also showed that increasing age and disability increased the rate of assistive device use. Similarly, Suwannarat et al. and Şimşek et al. found a positive relationship between age and walking aid use, indicating that individuals should be evaluated in terms of the need for appropriate walking aids with increasing age.^{2,3,25}

Although there are studies examining the factors associated with the use of commonly used walking aids and their effects on mobility, studies evaluating the satisfaction of users are quite limited. Wressle and Samuelsson found that the three most satisfied features according to QUEST-2 results in individuals with different disabilities using walkers were effectiveness, ease of use, and safety, respectively.¹⁶ Similarly, ease of use and effectiveness were the first two most satisfied features followed by comfort in our study. This difference is probably because they only evaluated individuals using a walker as a walking aid. Individuals who all used a walker may have felt safer. On the other hand, the three most important features of the individuals questioned in our study were safety, ease of use, and weight. Although safety and weight were found to be important, their satisfaction was relatively low, indicating that improvements can be carried out on these topics in the design of walking aids

used in geriatrics. Another important issue is how the type, size, and adjustment of the aids used are appropriate for the individual. Although it was not evaluated in our study, it is known that most of the elderly did not receive professional support when acquiring a walking aid.^{2,26} The fact that the least satisfied feature in our study was the adjustments is probably due to the fact that most of them were using wooden canes without the possibility of height adjustment.

We found that, geriatrics with lower quality of life and physical activity values tend to have higher user satisfaction with walking aids with a weak relationship. This result may have resulted from the fact that individuals with low functional capacity benefited more from walking aids. Previous studies have also shown that low mobility levels and decreased physical activity increased the use of walking aids.^{2,8,25} In addition, it is known that individuals using a walking aid have better mobility skills with the device.^{4,17} On the other hand, there is no scientific report showing that the use of walking aids increases physical activity levels in geriatric individuals. This may be due to different physical activity barriers in the elderly. Moschny et al. reported that the most frequently mentioned physical activity barriers of the elderly were poor health, lack of friends, and lack of interest.²⁷ In addition, Resnik et al. reported that individuals' reluctance to use walking aids because they cause a negative image in society may also negatively affect activity and participation.²⁶ The fact that only 24.8% of the individuals in our study stated that they always use walking aids may be a result of this issue.

The use of inappropriate types of walking aids that are not adjusted according to the person and are not used correctly may reduce the benefit and may

cause significant harm to individuals by causing falls.¹² It was determined that 79.9% of the individuals who participated in our study had a fear of falling and 41.6% had fallen at least once in the last year. Similarly, Suwannarat et al. showed that 85% of 74 geriatric individuals using walking aids had a fear of falling, and regression analysis showed that this fear was an important determinant of walking aid use.² Although individuals need a walking aid because of fear of falling, it is known that inappropriate walking aid use may also be a cause of falls. Stevens et al. reported that 47,312 geriatric individuals were admitted to the U.S. Emergency Departments between 2001 and 2006 after a fall caused by a walking aid.⁸ With an 87.3% rate of walker use, the risk of injury due to falls with a walker was found to be 7 times higher than with a cane. Although the rate of walker users is low in our study, the rate of falls is not low. Data obtained from studies conducted in our country show that the fall rate in the geriatric population is 33-36%.²⁸ The relatively high rate in our study may be due to the fact that we included only individuals using walking aids. The increased rate of falls among walking aid users found in previous studies supports this finding.^{7,9,18} On the other hand, 70.7% of the participants, 72.5% of whom stated that they fell while walking, did not use a walking aid during the fall. The reason for the fall of the individuals may also be that they did not use a walking aid even though they needed one. Liu et al. found that kyphotic posture increased the risk of falls in geriatric individuals using a cane and stated that individuals adapted to this posture may have difficulty in controlling the center of gravity without a cane and may tend to fall.⁹ In our study, the fact that falls occurred mostly when there was no walking aid supports this view. In addition, the positive correlation we found between the number of falls and the year of walking aid use may reflect the difficulty experienced by the individual who has adapted to the walking aid when there is no support.

User satisfaction results related to walking aids, which are widely used by geriatrics, provide a new contribution to the literature since previous studies on this subject are insufficient. The data obtained from our study, which addresses the satisfaction with the eight features about dimensions, weight, adjustment,

safety, durability, ease of use, comfort and effectiveness of walking aid in geriatric users will contribute to health professionals and product designers. Our limitations are that whether individuals received professional support while acquiring a walking aid and the fit of the support they used were not evaluated in our study. In addition, having no control group of non-user geriatric population limited the interpretation of data. In future studies, investigating the satisfaction of geriatric individuals by following up with a suitable walking aid and evaluating the health related changes in time will provide a better understanding of the effects of the walking aid in this population.

CONCLUSION

For geriatric individuals who use walking aids, the feature they are most satisfied with is the ease of use, while the feature they are least satisfied with is adjustments. The top three features they consider most important are safety, ease of use, and weight. When individuals have lower quality of life and physical activity values, their satisfaction with walking aids tends to be higher with a weak relationship.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Yasin Yurt, Ender Ayvat; **Design:** Yasin Yurt, Ender Ayvat; **Control/Supervision:** Yasin Yurt; **Data Collection and/or Processing:** Yasin Yurt, Ender Ayvat; **Analysis and/or Interpretation:** Yasin Yurt, Ender Ayvat; **Literature Review:** Yasin Yurt; **Writing the Article:** Yasin Yurt, Ender Ayvat; **Critical Review:** Yasin Yurt, Ender Ayvat; **References and Fundings:** Yasin Yurt, Ender Ayvat.

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