

Association of Assistive Device User Satisfaction and Participation in Manual Wheelchair Users with Chronic Spinal Cord Injury

Tekerlekli Sandalye Kullanan Kronik Omurilik Hasarlı Kişilerde Yardımcı Cihaz Kullanıcısının Memnuniyetinin Topluma Katılımı ile İlişkisi

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Geliş Tarihi/Received: 13.06.2016
Kabul Tarihi/Accepted: 03.10.2017

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ABSTRACT Objective: Wheelchair is the most widely used assistive technology (AT) device to promote activity and participation in people with spinal cord injury (SCI). There is not much information available on the perceived impact of wheel chair on participation and user satisfaction. This study was done to find out the association between assistive device users perceived satisfaction and participation and community integration in manual wheelchair users with chronic SCI. **Material and Methods:** A sample of 41 adults (36 males and 5 females) with chronic SCI using wheel chairs participated in the study. It was an observational cross section study. A series of questionnaires were administered by face to face interview. The Quebec user evaluation of satisfaction with assistive technology (QUEST 2.0), was used to assess the user perceived satisfaction of the assistive device (wheel chair). The impact on participation and autonomy questionnaire (IPA) was used to assess the participation and autonomy. The community integration questionnaire (CIQ) was used to assess the community reintegration. Karl Pearson's correlation test (2 tailed) was used to find the correlation between QUEST 2.0 and CIQ. The correlation between QUEST 2.0 and IPA was also analysed. A significance level of $p \leq 0.05$ was fixed. **Results:** There was significant moderate positive correlation between QUEST 2.0 and CIQ, and a significant moderate positive correlation between QUEST 2.0 and IPA. **Conclusion:** The assistive device user satisfaction is an important determinant of community integration, participation and autonomy in people with spinal cord injury.

Keywords: Rehabilitation; limitation; satisfaction; assistive technology; rehabilitation

ÖZET Amaç: Omurga hasarı olan hastaların aktivite ve katılımını artırmak için en yaygın kullanılan yardımcı teknoloji cihazı tekerlekli sandalyedir. Tekerlekli sandalyenin katılım ve kullanıcı memnuniyetine etkisine dair yeterli çalışma yoktur. Bu çalışma, kronik omurilik hasarı olan, yardımcı teknoloji kullanıcılarının memnuniyet, katılım ve toplum bütünleşmesi açısından tekerlekli sandalye kullanmalarının etkilerini araştırmak için yapılmıştır. **Gereç ve Yöntemler:** Kronik omurilik hasarı olan ve tekerlekli sandalye kullanan 41 hasta (36 erkek, 5 kadın) bu gözlemsel çapraz kesit çalışmasına katıldı. Yardımcı cihazın kullanıcı tarafından algılanan memnuniyetini değerlendirmek için yardımcı cihaz kullanıcılarına, Quebec (QUEST 2.0) kullanıcı memnuniyeti değerlendirmesi yapıldı. Katılım ve özerkliği değerlendirmek için Katılım ve Özerklik Anketi etki kullanıldı. Toplumsal Katılım Anketi, topluluğun yeniden bütünleşmesini değerlendirmek için kullanıldı. QUEST 2.0 ve Toplumsal Katılım Anketi arasındaki korelasyonu bulmak için Karl Pearson korelasyon testi (2 kuyruklu) kullanıldı. QUEST ve Katılım ve Özerklik anketi arasındaki korelasyona da ayrıca bakıldı. Anlamlılık değeri $p \leq 0,05$ olarak alındı. **Bulgular:** QUEST 2.0 ve Toplumsal Katılım Anketi arasında belirgin orta düzeyde pozitif korelasyon mevcuttu ve QUEST 2.0 ile Katılım ve Özerklik Anketi arasında anlamlı derecede pozitif bir korelasyon bulunmakta idi. **Sonuç:** Yardımcı cihazın kullanıcı memnuniyeti, omurilik hasarı olan insanlarda topluma entegrasyon, katılım ve özerkliğin önemli bir belirleyicisidir.

Anahtar Kelimeler: Rehabilitasyon; limitler; memnuniyet; yardımcı teknoloji; rehabilitasyon

Improving participation in various activities of life is a central goal of rehabilitation among people with spinal cord injury (SCI).¹ It is found that people with SCI report significant disruptions in their participation in home maintenance, recreation and physical activities, employment, sexual activity, family role and education.^{2,3} Assistive technology (AT) is an indispensable component for people with SCI, to maximize independence and participation in activities of daily living in the community.⁴ The wheelchair is the most important AT device used to enhance activity and participation for individuals with SCI.⁵ Wheelchairs are usually recommended with an aim to improve the quality of life of individuals with limited mobility. The assessment of impact of wheelchair on participation and independence is an integral component of rehabilitation process.⁶ The wheelchair user satisfaction is another important factor in deciding the success of wheelchair use in rehabilitation.

It was observed that wheel chair users reported positive changes in daily activities and improved participation. The problems were mainly related to outdoor mobility and the impacts on social roles and emotional changes.⁷ It was reported that people with SCI were satisfied with wheelchairs.⁸ People with complete SCI were slightly less satisfied than people with incomplete lesion. The participation and human environment is more related to quality of life than, than users satisfaction with a wheelchair.⁹

Clinically, it is important to carefully document the perceived impact of wheelchair on the user's daily life.¹⁰ There are various evaluation tools to assess the impact of the assistive technology on participation, independence and user satisfaction. There is lack of information regarding the impact of wheelchair on participation and satisfaction level in wheel chair users with SCI. This study was undertaken to find out the association between assistive device user perceived satisfaction and participation and community integration in people with chronic SCI. The study results may be critical in identifying the extent of association of user satisfaction with participation and community integration in wheelchair bound people with SCI.

MATERIAL AND METHODS

SAMPLE

A sample of 41 adults (36 males and 5 females) with chronic SCI using wheel chairs participated in the study. The set inclusion criteria was any level of injury with either complete or incomplete SCI. The subjects included were using manual wheelchair as their primary means of mobility (at least 4 hours each day). The subjects with any other medical problems, any progressive disease or psychiatric problem were excluded from the study. It was an observational cross section study. The study protocol was approved by research ethics committee of the institute where the study was carried out.

PROTOCOL

The medical records of the participants of the study were retrieved from the medical record office of Indian spinal injuries centre, New Delhi, India, to obtain information on relevant demographic data. Subjects were then contacted through telephone. After the nature and objectives of the study was explained to each subjects, their verbal consent was obtained. The updated information, including functional status, and length of time of wheelchair use were obtained. Then a series of questionnaires were administered by face-to-face interview. The study consisted of single session lasted for 45 minutes to 1 hour.

The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0)

The QUEST 2.0 provides practitioners with a means of collecting perceived satisfaction to document the real-life benefits of assistive technology and to justify the need for these devices. It was designed to evaluate a person's satisfaction with a wide range of AT. Current version of the scale covers two dimensions, satisfaction with the service from the vendor/manufacturer and satisfaction with the devices.¹¹

The questionnaire has 12 items and each item is scored on a 5 point scale [ranging from not satisfied at all (0) to very satisfied (5)]. Items in the satisfaction with the device domain include di-

mensions, weight, adjustments, safety, durability, simplicity of use, comfort and effectiveness. The satisfaction with the service from the vendor/manufacturer domain includes service delivery, repairs and service of the device, professionalism of service, and follow-up service. The total score was calculated by adding the ratings of the valid responses and divided this sum by number of valid items. The same procedure is followed for device subscale and services subscale scoring¹¹

Impact on Participation and Autonomy Questionnaire (IPA)

Impact on participation and autonomy questionnaire (IPA) quantifies limitations in participation and autonomy. It has 39 questions in 5 domains such as autonomy indoors, autonomy outdoors, family roles, social relationships, paid work and education. Higher scores represent poorer participation and autonomy. Each question is scored from 0 (very good) to 4 (very poor). The scores that relate to each domain are averaged to get an overall score for that domain. The IPA is a valid and reliable tool.^{12,13}

Community Integration Questionnaire (CIQ)

It is a common measure of participation, used to assess the social role limitations and community interaction of people with chronic SCI. It can be self-administered or administered over the phone. The questionnaire consists of 15 items assessing community integrations across three domains. Home integration (e.g. meal preparation, housework, child care), social integration (e.g., shopping, visiting friends, leisure activities) and productive activity (e.g., full versus part-time work, school, volunteer activities). Total scores can range from 0 to 29 points. High scores represent greater independence and better community integration.^{14,15}

DATA ANALYSIS

The data was managed on excel spreadsheet and was analysed using SPSS software version 16. The mean \pm SD of age (years), height (cm), weight (kg), frequency distribution of level of injury, QUEST 2.0 with its sub domain scores, CIQ and IPA with each of the sub domain scores was calculated. Karl Pearson's correlation test (2 tailed) was used for finding the correlation between QUEST 2.0 and

CIQ. The correlation between QUEST 2.0 and IPA was also analysed. A significant level of $p \leq 0.05$ was fixed.

RESULTS

The main characteristics of the subjects, the mean \pm SD of age (years), height (cm), weight (kg), and frequency distribution of level of injury is given in Table 1. The mean \pm SD, of QUEST 2.0 with its sub domain scores, CIQ and IPA with each of the sub domain scores is tabulated in Table 2.

A significant moderate positive correlation between QUEST 2.0 and CIQ was seen ($r=0.44$, $p=0.004$). A significant weak positive correlation with QUEST assistive device domain and home integration ($r=0.15$, $p=0.02$), social integration (0.29 , $p=0.05$) was found and a non significant moderate positive correlation was observed for productivity component of CIQ ($r=0.46$, $p=0.07$). In service sub domain of QUEST 2.0, only social integration component showed a significant moderate positive correlation ($r=0.29$, $p=0.05$) (Table 3).

A significant moderate positive correlation between QUEST 2.0 and IPA was seen ($r=0.30$, $p=0.05$). The results of the sub domains of both the scales showed a significant moderate correlation between QUEST assistive device domains and education and training (ET), components of IPA ($r=0.31$, $p=0.01$). There was also a significant moderate correlation between QUEST services domains with leisure (L) ($r=-0.22$, $p=0.03$) and with helping

TABLE 1: Demographic characteristics of the sample.

Variable	N (%)
Gender	
Male	36 (87.80)
Female	5 (12.19)
Level of injury	
High paraplegia (T2-T7)	15 (36.58)
Low paraplegia (T8-L4)	26 (63.41)
	Mean \pm SD
Age (years)	29.78 \pm 6.80
Height (cms)	164.78 \pm 9.65
Weight (kg)	61.34 \pm 13.45
Duration (years)	6.51 \pm 3.73

TABLE 2: Mean scores of subjects on Quebec User Evaluation of Satisfaction with assistive technology (QUEST 2.0), Community Integration Questionnaires (CIQ) and Impact on Participation (IPA).

Instrument	Subdomains	Mean±standard deviation
QUEST (n= 41)	Assistive device (AD)	3.64±0.98
	Services (S)	2.01±1.35
	Total	5.66±1.72
CIQ (n= 41)	Home Integration'(HI)	2.73±1.84
	Social Integration'(SI)	7.68±2.66
	Integration into Productive Activities (IIPA)	4.04±2.44
	Total	14.4±3.82
IPA (n=41)	Mobility (M)	1.27±1.01
	Self-care (SC)	1.37±0.78
	Activities in and around the house (AAH)	1.97±1.30
	Looking after your money (LAYM)	0.86±0.88
	Leisure (L)	1.06±0.95
	Self-life and relationship (SLR)	1.22±0.67
	Helping and supporting other people (HSP)	1.37±1.29
	Pain or voluntary work (PVW)	1.76±0.97
	Education and training (ET)	1.76±0.97
	Total	16.9±0.96
		12.6±4.71

QUEST: Quebec User Evaluation of Satisfaction with assistive technology (QUEST 2.0); CIQ: Community Integration Questionnaires; IPA: Impact on participation and Autonomy; n: number of subjects; SD: Standard deviation.

TABLE 3: Relationship between Quebec User Evaluation of Satisfaction with assistive technology (QUEST 2.0) and Community Integration Questionnaire (CIQ).

Quebec User Evaluation of Satisfaction with assistive technology (QUEST 2.0)		CIQ Integration into productive Activities (IIPA)		
		CIQ home integration (HI)	CIQ Social Integration (SI)	Activities (IIPA)
QUEST assistive device (AD)	r	0.15**	0.29**	0.46
	p	0.02	0.05	0.07
QUEST service (S)	r	0.05**	0.34**	0.09
	p	0.002	0.03	0.55

r: Correlation coefficient; **: Correlation is significant at 0.05 levels (2 tailed); p: Level of significance.

and supporting other people (HSP) components of IPA ($r=0.54$, $p=0.01$). A negative significant moderate correlation was observed between the QUEST service sub domain and social life and relationship (SLR) of IPA ($r=-0.45$, $p=0.04$) (Table 4). Other than this associations there was no correlations was observed between any of the subdomains of QUEST 2.0, CIQ and IPA (Table 3, 4).

DISCUSSION

The aim of the present study was to correlate user evaluation satisfaction of AT device used by peo-

ple with SCI with participation & autonomy and with community reintegration. The present study findings suggests that there is correlation between satisfaction and community reintegration indicating increased social integration, home integration and integration into productive activities. The assistive device satisfaction scores are related with impact on participation and autonomy scores. Our study findings are in agreement with previous findings for participation and user satisfaction in wheel chair users.⁷⁻⁹ A study on Dutch population showed that there was a relatively high overall

TABLE 4: Quebec User Evaluation of Satisfaction with assistive technology (QUEST 2.0) and Impact on participation and Autonomy (IPA).

Impact on participation and Autonomy		QUEST assistive device (AD)	QUEST service (S)
IPA. Mobility (M)	r	-0.23	-0.15
	p	0.07	0.34
IPA. Self-care (SC)	r	-0.03	0.06
	p	0.81	0.68
IPA. Activities in and around the house (AAH)	r	-0.61	-0.25
	p	0.74	0.11
IPA. Looking after your money (LAYM)	r	-0.15	-0.18
	p	0.32	0.24
IPA. Leisure (L)	r	-0.35	0.22**
	p	0.06	0.03
IPA. Social Life and Relationship (SLR)	r	-0.13	-0.45
	p	0.41	0.04
IPA. Help and supporting other People (HSP)	r	-0.09**	0.54**
	p	0.04	0.01
IPA. Paid or voluntary Work (PVW)	r	-0.02	0.01
	p	0.87	0.94
IPA. Education and Training (ET)	r	0.31**	-0.23
	p	0.01	0.13

r: Correlation coefficient; **: Correlation is significant at 0.05 levels (2 tailed); p: Level of significance.

level of satisfaction of the different characteristics of the wheelchair but the service delivery procedure was very low.⁷ Most dissatisfaction was caused by the slowness of the procedures owing to the number of organisations and officials involved in the whole procedure. The extent of user satisfaction with wheelchair and seating systems was shown not to have strong association with their perception of participation in the community. Wheelchair technology was reported as the most important cited factor, limiting participation, more so than physical impairment and physical environment. Involvement in social and home integration was primarily characterised by the respondent's satisfaction with the support they receive from family members and friends and this support was significantly identified with both life satisfaction and happiness.¹⁶

It's found that both participation and life satisfaction is a subjective feeling of contentment with his or her life in people with SCI.¹⁷ AT facilitates myriad treatment goals for rehabilitation. Users of AT experience delays in functional decline

and report greater reductions in difficulty that people relying only on personal assistance.^{5,18} Studies also have suggested that assistive device use may have psychological benefits. There has been an increase in the types of technologies and supportive living environments available to help people with disabilities to live independently and participate in daily activities.^{19,20}

There is little documentation regarding the impact on participation, especially from a holistic perspective, i.e., one that considers person-occupation-environment interactions. There is no uniformity in the way wheelchair users' participation is measured. It's been reported that wheelchair use can improve the social participation.⁶ This study by providing the quantitative data tried to bring about a correlation of assistive device user satisfaction with participation and community reintegration in wheelchair users with chronic SCI. The findings of this study brings an insight to the factors affecting the satisfaction, community integration and impact on participation and autonomy in people with SCI.

Future research can focus on understanding the others components affected in the subjects satisfaction, participation and their reintegration in the community. All the scales used in the study were original versions, since the translated versions with proven psychometric properties were available for the study population. The strength of the study was all the participants in the study were using manual wheelchair. Limitation of the study was the specifications and features wheelchair used by the participants was not taken into consideration for QUEST scoring. Future studies should be done with people using wheelchairs based on specifications and features of wheelchairs used and

can be done on a large sample to obtain data for generalization.

CONCLUSION

The assistive device user satisfaction is important determinant of community integration, participation and autonomy in people with spinal cord injury. The outcome of rehabilitation process may be influenced by user satisfaction of the prescribed assistive device.

Acknowledgements

We would like to thank Chitra Kataria, Principal, and all the supporting staff of ISIC institute of rehabilitation sciences, New Delhi, for extending their support.

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