ORIGINAL ARTICLE

RESILIENCE, SELF-EFFICACY AND QUALITY OF LIFE AMONG ASSISTIVE AND NON-ASSISTIVE TECHNOLOGY USERS: A MIXED METHOD STUDY

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ABSTRACT

Objective: To compare the resilience, self-efficacy and quality of life among assistive and non-assistive technology users.

Material & Methods: A mixed-method research design was used to collect the data. The quantitative data was collected from a total of 154 (Male n = 63; Female n = 91) individuals with disabilities by using the translated version of Self-efficacy Scale, Brief resilience Scale and Quality of Life Scale. The qualitative data was collected by conducting interviews with six individuals including two male and four females.

Results: The quantitative findings showed a significant difference between assistive and non-assistive technology users in terms of resilience and self-efficacy ($p<.01$). Further, the themes emerged from interviews including 1) self-empowerment, 2) influence on psychological health, 3) satisfaction in life and 4) facilitation in life, subsequently supported the quantitative results.

Conclusion: Assistive technology not only improves physical functioning, but it also improves psychological health and well-being of people with disabilities.

Key Words: Assistive Technology, Resilience, Self-Efficacy, Quality of Life.

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INTRODUCTION

Approximately 15% of the global population lives with disabilities.[1] Assistive technology and related products offer avenues for these individuals to engage with contemporary devices.[2] Disability, by definition, is a chronic condition that impedes daily activities and affects an individual's capacity for independent living. Specifically, physical disability refers to enduring impairments resulting in limitations in physical function and movement. As a result of these functional constraints, affected individuals might struggle with walking, sitting, or standing, lack control over body movements, and face challenges in executing daily tasks.[3] Similarly, along with physical health, disability significantly affects psychological health of an individual including quality of life which is defined as living a good and high-quality life[4] and self-efficacy[5] which is describes as a person's ability to successfully carry out a task.[6] Furthermore, disability affects resilience,[7] the capacity to rebound from adversity and cultivate positive behaviors beneficial during stressful events.[8]

Importantly, self-efficacy is shaped by an individual's beliefs about their abilities. Within the context of disability or chronic illness, such beliefs can influence perceptions about their condition, potentially impacting their psychological health. For example, lower self-efficacy levels might predispose individuals to depression. A study on those with disabilities resulting from spinal cord injuries found these individuals exhibited reduced self-efficacy due to pain.[5] In contrast, individuals with robust self-

efficacy often set loftier goals, confident in their ability to achieve them. Conversely, those with diminished self-efficacy may set more modest objectives, anticipating challenges in their fulfillment.[9] Consequently, disabled individuals face stigmatization and exclusion around the world. Such stigmatization has potential negative impact on their psychological well-being and self-worth.[10] They have few opportunities for job and they have health problems and financial constraints as compare to their peer without disabilities. When individuals with disabilities provide opportunities and facilities to progress like other individuals, they can live a better life and they can work for the betterment of their society and their country. Assistive technology is one of the most important requirements of the individuals with disability.[11] Assistive technology is related with lesser psychological disturbances and lesser depressive symptoms among people with disability.[12]

Information and communication technology and assistive technology brought new hopes for people with disabilities.[13] It is a general understanding that individuals with disabilities faces hurdles and different kind of problems more than people without disabilities like healthcare problems, fewer opportunities for education and employment. Equal access to information and communication can remove these barriers and can make these individuals part of mainstream society. People living in developing countries don't have access to assistive and information and communication technology because of lack of resources. ICTs can empower people with disabilities and helps them to utilize their potential and skills and in this way they can remove barriers in activities of their daily life and can also contribute in the socio-economic development of their country.[14] Research shows that in developing countries disabled people don't have proper access to ICTs and assistive technology, this create a digital divide. Individual with disability who accesses to ICTs experience significant change in their life, because of ICTs there is reduction in existing social and physical barriers and increased in social interaction. Through ICTs disabled individuals experience sense of belongingness and this reduce isolation.[15]

With the help of ICTs People with disabilities can communicate worldwide and can overcome social barriers that are caused by lifelong impairment. ICTs improves quality of life and wellbeing of people with disabilities as it makes them more self-reliant and improved their physical, social and emotional adjustment through social interaction and independent living.[16]

Assistive technology helps individuals to live an independent life and helps them to participate in different activities of life. Person can make interactions with others. Assistive technology is helping individuals with disability to accept their disability and face challenges of life and improve their overall working of their daily life.[17] Assistive technology provides facilities to people with disabilities therefore increase self-efficacy and sense of worth of people with disabilities and lessen the burden on care giver and family members of these individuals.[18] Assistive technology significantly influences self-efficacy of people with disability. Assistive technology helps them to successfully complete most of their tasks and once they complete it takes away their disability and highlights abilities of these people.[19]

As evident from the literature, in past researches there has been too much emphasis on technical side of assistive technology and has been little focus on the role it plays in psychological adjustment of people with disabilities.[2,17,20] Further, the associations between the use of assistive technology and the resultant physical, social, and psychological adjustments are primarily established in Western and industrialized societies. However, eastern region particularly Pakistan did not establish the associations between the use of assistive technology and the resultant physical, social, and psychological adjustments. Consequently, the current research is geared towards examining psychological outcomes, including self-efficacy, resilience, and quality of life, among individuals with physical disabilities. Additionally, this study seeks to determine whether assistive technology serves as a pivotal factor in boosting the well-being and psychological acclimatization of those with physical disabilities.

MATERIAL AND METHODS

This study employs a convergent mixed-method research design. Within this framework, the researcher gathers both quantitative and qualitative data concurrently. Following collection, each data type is analyzed independently, with results then interpreted.[21] Ethical approval was obtained from the Department of Psychology's Ethical Review Board at International Islamic University Islamabad.

QUANTITATIVE ARM

A total of 154 participants (*n*= 63 male, *n*=91 female) were recruited. Data were collected using purposive sampling technique. For quantitative study, data were collected from 154 individuals. For qualitative study, 6 people were interviewed including 4 female participants and 2 male participant. People with visual, hearing impairment and handicapped were included in this study. Those having disability because of some psychological or neurological problems were not included in this study and served as exclusion criteria of this study.

Instruments

Demographic Sheet

To collect specific demographic details from the respondents, a demographic form was utilized. This form gathered data regarding the participants' gender, age, type of disability, origin of their disability, educational institution, educational level, socio-economic standing, and primary caregiver.

Checklist for Assistive Technology

A checklist was developed to differentiate between users and non-users of assistive technology. In the checklist assistive devices were mentioned that were commonly used by handicapped, visually impaired and hearing-impaired individuals. Participants marked “yes” if they were using that device and “No” if they were not using it. Participants who marked “yes” were considered as users of assistive technology those who marked “no” were considered as non-users of assistive technology.

New General Self-Efficacy Scale

The New General Self-Efficacy Scale, formulated by Chen, Gully, and Eden in 2001,[22] was employed to assess self-efficacy. This scale encompasses 8 items, rated on a five-point Likert scale with the following options: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The possible score spectrum is between 8 and 40. An illustrative item from the scale reads, “I believe I can attain most of the objectives I set for myself.” A composite score can be derived by summing the scores from all items and then dividing by the total number of items.

Brief Resilience Scale

The Brief Resilience Scale, crafted by Smith and colleagues in 2008,[23] serves to gauge resilience. This instrument consists of 6 items, evaluated on a five-point Likert scale as follows: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Scores can vary from 6 to 30. It's notable that items 2, 4, and 6 require reverse coding. The scale's reliability coefficient oscillates between α .80 and .91. A representative item from the scale is, “I typically recover swiftly from challenging times.” To determine a composite score, one divides the cumulative score by the count of answered items.

Quality of Life Scale

The Q-LES-Q-SF (Quality of Life Enjoyment and Satisfaction Questionnaire Short Form), as designed by Blumenthal, Endicott, and Harrison in 1993,[24] serves as an instrument for assessing the quality of life. This questionnaire features 16 items. Respondents evaluate statements like, “Over the past week, how content have you been with your physical health?” based on a five-point Likert scale, where 1= Very Poor, 2= Poor, 3= Fair, 4= Good, and 5= Very Good. It's pivotal to note that items 15 and 16 aren't incorporated into the cumulative score; they stand as individual assessments. The total raw score can vary between 14 and 70, and the scale showcases a reliability of α .90. To interpret the score in terms of satisfaction percentage, one can transform the raw score. For instance, a score of 14 equates to 0% satisfaction, whereas a score of 70 implies complete 100% satisfaction with one's quality of life.

QUALITATIVE ARM

We interviewed a total of six participants, comprising four females and two males. The age bracket for these individuals spanned from 25 to 28 years.

Interview Schedule and Procedure

Interview schedule addressed questions regarding the participants' experience of using assistive technology, difficulties they faced before using assistive technology and its impact on their quality of life, on their well-being and self-esteem. For example, "What change assistive technology brings in improving your life"? "What change you feel in yourself after using assistive technology"? Semi-structured interviews were conducted on phone that lasted 20-25 minutes. Participants were briefed about the purpose of study and their consent was obtained.

Data Analysis

Interview transcripts were thoroughly analyzed using thematic analysis. Purpose of this approach was to study participants' experience of using assistive technology in greater depth. This analysis helped in capturing participants' experience in their own words. Themes were labelled in the way that best describe the data in their own words.

RESULTS

Among 154 individuals with disabilities were almost equal number in using assistive technology and non-assistive technology users. More than half (59%) were female and were form middle income class (77%). Most of them (44%) were visually impaired followed by physically handicapped (31%). Further, most of them (30%) had 18 years of education and parents (72%) were their primary caregivers. **(Table 1)**

To assess the mean difference between users and non-users of assistive technology on Self-Efficacy, Resilience and Quality of Life an independent sample t-test was used. Analysis produce significant results for Resilience t (149) = 4.84, $p < .001$ and Self-Efficacy t (149) = 3.21, $p < .001$. Users of assistive technology have higher score on Resilience (M = 20.38, SD = 4.18) than non-users of assistive technology (M = 17.39, SD = 3.64). Similarly, the users of assistive technology have higher score on Self-efficacy (M = 31.48, SD = 4.38) than non-users of assistive technology (M = 28.89, SD = 5.25). However, results indicated non-significant mean differences on Quality of Life t (127) = 1.63, $p>.05$ between both groups. **(Table 2)**

In order to study the participants' experience of using assistive technology devices, three participants were interviewed, Interview transcripts were analyzed using Thematic Analysis. Themes were identified from the data as "Self-empowerment", "Influence on psychological heath", "Satisfaction with life", "facilitation in life". Following table provides an overview of key words and themes identify during data analysis. **(Table 3)**

Theme 1: Self-empowerment. This theme captured participants' self-confidence and increased self-esteem after using assistive technology. They feel relaxed, confident and productive when they used assistive technology. For example, one participant said they feel sense of empowerment and independence when they use assistive technology:

"Assistive devices effectively improve my self-confidence by providing me easier path to walk and compete with the individuals living in the society".

Another participant said that:

"I always feel proud whenever I use assistive technology at home or at workplace, even I feel superior to my able fellows, family member because I am using more technology then them. I consider myself a dignified person even though".

Research shows that disability negatively influences wellbeing and self-efficacy and assistive technology helps individuals with disabilities to live life independently and helps them to participate in different activities of life.

Theme 2: Influence on psychological health. This theme captured impact of assistive technology use on mental health. According to participants they feel relaxed when use assistive technology. For instance, one participant said that:

"I feel relax while using assistive devices. The intensity of stress and depression of doing work is lesser when using assistive devices".

Another participant said that she feels relaxed and confident whilst using assistive technology and she further adds that strong belief on Allah helps her to face the difficulty associated with disability:

"I am always thankful to Allah. I have a strong belief. I think my disability as a blessing although I face a lot of problems before using assistive

technology but I was thankful to Allah for everything".

In Pakistani society stigma associated with disability causes greater distress for these individuals and put them at risk for developing psychological disturbances. Research indicates that assistive technology is related with lesser psychological disturbances and lesser depressive symptoms among people with disability.[12]

Theme 3: Satisfaction with life. This theme shows participants' satisfaction with the quality of their lives after using assistive technology. There is an improvement in their quality of life after using assistive technology. According to participants they feel they got a new life as they are independent and they can do everything they want and they don't ask others for help. They feel change in their personalities and their live are easy now. One participant said that her life completely changed after using assistive technology

"The assistive technology has changed my life totally. I am independent now. The vital change in my life with the help of this technology is that I am the independent person of the society. I can do each and every task without depending on any person like moving from one place to another with the help of white cane. I can operate my computer, my education task, each and every thing".

She further said that:

"After using this assistive technology, the change that I am feeling in my personality is that I am more positive and more optimistic or above all more independent, more exploring the whole world accurately right after using this technology".

Theme 4: Facilitation in life. Participants said that their life was very difficult and tough before using assistive technology as they were dependent on others for everything, but assistive technology brings facilities in their life and made them competent. Assistive technology removed barriers in the activities of their daily life. For example, a participant said that:

"I was not able to perform my tasks. I was not able to communicate. I was not confident enough to compete with the society".

Another participant said that

"I had difficulty in listening. I feel headache and noise all the time. I was dependent on others because I can't listen properly but now everything is good and I can listen very well without any problem. It feels good".

Table 1: Demographic characteristics of study participants (n = 154)

Variable	Category	*f*	%
Gender	Male	63	40.9
	Female	91	59.1
Assistive Technology	Users of assistive technology	78	50.6
	Non-users of assistive technology	75	48.7
Disability Type	Physically handicapped	49	31.8
	Visually impaired	68	44.2
	Hearing impaired	37	24.0
Social Economic Status	Lower middle class	18	11.7
	Middle class	119	77.3
	Upper class	16	10.4
Education	Metric	37	24
	Intermediate	31	20.1
	Bachelor	26	16.9
	Masters/BS	46	29.9
	M.Phil/PhD	12	7.8
Primary Caregiver	Parents	111	72.2
	Independent	20	13.0
	Single parent	16	10.4

Table 2: Comparison between users and non-users of assistive technology on Resilience, Self-Efficacy and Quality of Life (n= 154)

Variables	Users of AT *(n=78)* *M(SD)*	Non-users of AT *(n=75)* *M(SD)*	*t(149)*	*P*	*95% CI* *LL*	*UL*	*Cohen's d*
Resilience	20.38(4.18)	17.39(3.64)	4.84	.000	1.76	4.20	0.69
Self-efficacy	31.48(4.38)	28.89(5.25)	3.21	.002	0.98	4.13	0.33
Quality of life	53.48(6.64)	51.15(9.65)	1.63	.104	-0.48	5.14	0.26

CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit, AT= Assistive Technology

Table 3: Table of key words and themes

Key Words	Themes Emerged
• Feel good and pleasure • Feel relax and confident • Feel productive and independent	Self-empowerment
• It does not have effect on mental health • I have strong belief on Allah • The intensity of stress and depression of doing work is lesser when using assistive devices. • I am more positive, optimistic and above all independent.	Influence On psychological health
• My life is easy now • I feel I got a new life • I think I am living a normal life like others. • AT changed my life totally • I felt progressive change in my personality.	Satisfaction with life
• I feel headache and noise all the time. I was dependent on others • Not confident enough to compete with the society. • a lot of problem disable person faced because before this he or she is not aware of this technology or gadgets	Facilitation in life

DISCUSSION

The current study aimed to compare the resilience, self-efficacy and quality of life among assistive and non-assistive technology users. In order to have a greater understanding about the influence of assistive technology use on resilience, self-efficacy and quality of life of physical disabilities, convergent mix method research design has been used in this research. It was hypothesized that individual with physical disability using assistive technology will score higher on self-efficacy, resilience and quality of life as compared to those who do not use assistive technology. The findings indicated that the users of assistive technology have higher score on resilience and self-efficacy than non-users of assistive technology. The hypotheses related to self-efficacy and resilience are supported by the findings and in consistence with existing literature.[16,17] Such as, self-efficacy is among one of the factors that make people resilient and give confidence to adjust in face of adversity and protect a person from psychopathologies. A high level of resilience is related with high self-efficacy despite of traumatic situation.[7]

Moreover, Resilience play major role in quality of life of a person. A study shows that resilience has strong positive relationship with quality of life. It helps people with physical disability to overcome their adversity and thus enhance quality of life.[25] Although, in our study there was no significant mean difference between assistive and non-assistive technology users ($p>.05$), which is contrary to the existing literature. However, findings from the qualitative part support the hypothesis as elaborated below in the qualitative part of the study. Many jurisdictions reported that resilience helps individual to face the disability and overcome the adversity and thus improve quality of life.[25] High level of resilience may lead to good quality of life and active coping efforts in sufferer.[26] Another study shows that self-efficacy influences all quality of life domains like social and physical quality of life. High self-efficacy is related with better quality of life.[27]

Assistive technology influence psychological outcomes such as self-efficacy, resilience and quality of life in people with disabilities. Assistive technology helps individuals to live an independent life and helps them to participate in different activities of life,[28] and can make interactions with others. Assistive technology is helping disabled individuals to accept their disability and face challenges of life and improve their overall working of their daily life.[17] ICTs make them more self-reliant and improved their physical, social and emotional adjustment through social interaction and independent living.[16]

Similarly, findings from qualitative part also indicated that assistive technology improves self-confidence and increase independence. Their quality of life also improves after using assistive technology. The themes emerged from qualitative data are "self-empowerment, "influence on psychological health", "satisfaction in life" and "facilitation in life". An interview the participants reported that they feel a positive change in their life after using assistive technology. They feel more productive, independent and relaxed. They are satisfied with their life. They faced a lot of difficulties before using assistive technology because they were dependent on other but after using assistive technology, they think they can do everything and can go everywhere. Assistive technology brought ease and comfort in their life. Assistive technology has a positive impact on their psychological health. Assistive technology helps them to compete in society and helps them to become a productive member of society. They feel confident after using it. Theme labelled as "satisfaction with life" and "facilitation in life" shows that there is an improvement in quality of life of people with disability.

CONCLUSION

The study aimed to compare the resilience, self-efficacy, and quality of life between users of assistive and non-assistive technologies. The research underscored the pivotal influence of assistive technology in the lives of individuals with physical disabilities. Beyond enhancing physical capabilities, assistive technology also bolsters the psychological well-being of those with disabilities. Consequently, promoting the widespread use of assistive technology is recommended, enabling individuals with disabilities to realize their full potential and integrate seamlessly into mainstream society.

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