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AURUM SAĞLIK BİLİMLERİ DERGİSİ
AURUM JOURNAL OF HEALTH SCIENCES

Cilt 5, Sayı 2 | Yaz 2023
Volume 5, No 2 | Summer 2023, 61-68

INVESTIGATING THE SATISFACTION LEVELS OF INDIVIDUALS WITH STROKE USING KINESIO-WRISTBAND

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Received: 05.05.2023
Accepted: 24.05.2023
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Research Article

Abstract

Aim: Kinesio-Wristband was developed using the principles of neuroplasticity and biofeedback mechanism to prevent neglect of the hemiparatic upper extremity and to encourage the use of the hemiparetic upper extremity in stroke patients. If active movement does not appear in the hemiparatic upper extremity of the individual within one hour, the Kinesio Wristband will give a warning in the form of vibration. Thus, the individual will be aware that he/she should move the affected side upper extremity and use it in activities. The aim of the current study is to investigate the satisfaction levels of individuals with stroke using Kinesio Wristband.

Method: The cross-sectional study was conducted at the Safir Medical Center. The study included 20 stroke patients (9 females, 11 males) with a mean age of 51.50±15.37 (mean ± standard deviation) years who voluntarily received the Kinesio-Wristband. Before the study, the level of knowledge about Kinesio-Wristband and the level of belief in its functionality were questioned with the Visual Analog Scale (VAS). The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0) questionnaire was used to question the satisfaction of the individuals after using the Kinesio-Wristband for 4 weeks.

Results: The mean level of knowledge about the Kinesio-Wristband was 2.95±1.39 (min 0-max 7) and the mean level of belief in its functionality was 3.65±1.27 (min 1-max 5). The mean score of the 'assistive device' heading of QUEST was 28.55± (7.42) (min 21-max 40) out of 40 points; the mean score of the 'service' heading of QUEST was 16.10± (2.99) (min 12-max 20) out of 20 points. As a result of the participants' selection of the 3 items that they considered the most important among the 12 items related to satisfaction with QUEST, it was found that individuals selected regular follow-up services with 30% (n:12), professional service with 20% (n:8), weight, ease of use and comfort with 12.5% (n:5).

Conclusion: Individuals with stroke reported high assistive device and service satisfaction with Kinesio-Wristband. The appearance, weight, ease of use, durability and satisfaction of the assistive devices used in rehabilitation positively affect the success of rehabilitation. The Kinesio-Wristband has the potential to be used in individuals with stroke, but there is a need to improve the current version of the device.

Keywords: Kinesio-Wristband, Stroke, Satisfaction, Rehabilitation, Assistive Device.

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1. Introduction

Stroke is defined as acute focal damage of the central nervous system resulting from a vascular cause such as cerebral infarction, intracerebral hemorrhage or subarachnoid hemorrhage (Sacco et al., 2013). Stroke is the second leading cause of death worldwide (Roger, 2011);(Johnson et al., 2019). Over the last three decades, global stroke incidence has increased by 85% and mortality by 43% (Feigin et al., 2021). Stroke can be classified into two types: The first type is ischemic stroke, which is more common and accounts for 85% of all acute strokes. An ischemic stroke is caused by the interruption of blood flow to a specific area of the brain. The second type is hemorrhagic stroke, which accounts for 15% of acute strokes and is caused by the rupture of a blood vessel (Feigin et al., 2021);(Qureshi et al., 2001); (Musmar et al., 2022). The incidence of stroke in both sexes is age-dependent. In women, the incidence is higher at younger ages, whereas in men, the incidence increases with age (Boehme et al., 2017); (Appelros et al., 2009); (Reeves et al., 2008).

The effects of stroke vary according to the localization and size of the affected brain tissue. Motor problems are the most common stroke-induced impairment. Motor problems can also be found at different levels of severity, such as loss of control of a certain muscle group, mobility limitation. Many different symptoms such as hemiplegia, depressive symptoms, walking problems, dependency in activities of daily living, swallowing problems, incontinence, speech problems, balance problems, spasticity, postural disorders can be observed after stroke. (Grundy et al., 2005).

Stroke is an important cause of upper limb motor impairment (Go et al., 2014). Upper limb impairment usually leads to functional limitations and affects activities of daily living. (Alt Murphy et al., 2011). Muscle spasticity caused by upper motor neuron lesion is a common complication and has been reported to be the most common clinical challenge. (Dymarek et al., 2016). Up to 50% of people experience upper limb pain in the first 12 months after stroke, especially shoulder pain and complex regional pain syndrome. Post-stroke pain can limit activities of daily living and reduce quality of life (Jönsson et al., 2006). In recent years, researchers have investigated indicators of ischemic stroke and neuroplasticity to determine effective diagnosis, prognostic assessment and treatment. (Jickling & Sharp, 2011); (Burke & Cramer, 2013). The brain is a complex network of diverse subsets of cells that have the ability to be reprogrammed and also structurally rebuilt (Götz & Jarriault, 2017). The key point of neuroplasticity is the ability to be stimulated by various stimuli for modulation of brain activity (Voss et al., 2017). The brain compensates for damage by reorganizing and creating new connections between undamaged neurons (Lin & Liebeskind, 2016). Among different rehabilitation approaches, biofeedback is used to facilitate normal movement patterns (Fernando & Basmajian, 1978); (Tate & Milner, 2010). The biofeedback method in rehabilitation is based on well-established motor learning theories that provide augmented information or "signal" about biomechanical or physiological parameters obtained by measuring body movement and strength, cardiovascular or neurological parameters (Schmidt & Wrisberg, 1991).

The Kinesio-Wristband was designed by an electrical and electronic engineer and a physiotherapist to prevent neglect of the use of the hemiparatic arm in stroke patients and to encourage the use of the hemiparetic arm. This

Cilt 5, Sayı 2 | Yaz 2023
Volume 5, No 2 | Summer 2023, 61-68

lightweight, easy-to-use, easily portable device was developed on the basis of neuroplasticity and biofeedback method. The Kinesio- Wristband is designed to stimulate the wrist with vibration after one hour of immobilization.

If active movement does not occur in the hemiparatic arm within one hour, the kinesio bracelet will give a warning in the form of vibration. Thus, the individual will be aware that he/she should move the affected side upper extremity and use it in activities. The aim of the present study is to investigate the level of satisfaction with the use of Kinesio -Wristband in individuals with stroke.

2. Materıals and Methods

Participants and Setting

The cross-sectional study was conducted with 20 individuals diagnosed with stroke who volunteered to participate in the study and who continued to receive outpatient physical therapy at Safir Medical Center between July and December 2022.

The inclusion criteria were; having been diagnosed with stroke at least 6 months ago, being between the ages of 18-75, having upper extremity and hand Brunnstrom motor stage 3-6, and having no cooperation problems.

Exclusion criteria were; the presence of orthopedic problems such as surgical intervention or history of fracture that would block movement in the upper extremity, and skin sensitivity.

Data Collection Tools

The data collection tools used in the study were; clinical and socio-demographic information form specially prepared for the study and including the patient's age, gender, height, weight, medical history, etc., Visual Analog Scale (VAS) to question the level of knowledge and belief in the functionality of the Kinesio Bracelet before the study, and QUEBEC The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0) questionnaire to evaluate the satisfaction after using the Kinesio-Wristband for 4 weeks.

Clinical and Socio-Demographic Information Form

Socio-demographic information (age, height, weight, etc.) and clinical information (medical history, affected side, use of assistive devices, etc.) were collected on this form.

Visual Analog Scale (VAS)

To determine the level of knowledge of individuals with stroke about the Kinesio Wristband before using the wristband and their level of belief in the functionality of the wristband, they were asked to mark the appropriate section on a horizontal line with an actual length of 10 cm. (0: no knowledge - 10: maximum level of knowledge; 0: no belief - 10: maximum level of belief)(Aydın et al., 2011).

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

Cilt 5, Sayı 2 | Yaz 2023
Volume 5, No 2 | Summer 2023, 61-68

A widely used questionnaire to assess individuals' satisfaction with various technological assistive devices (Demers et al., 1996). Satisfaction as defined in the survey is the individual's critical evaluation of the technological device. The individual's expectations, perceptions, attitudes and personal characteristics influence this evaluation (Holz et al., 2013). The QUEST questionnaire has undergone validity, reliability and applicability studies by its developers and has previously been used to measure user satisfaction in individuals using various assistive devices (Demers et al., 2002). The questionnaire was originally developed in English and French and subsequently translated into many languages (Norwegian, German, Japanese, Arab, Greek, Greek, Chinese, Italian, Korean, Korean, Taiwanese, Portuguese, Afghan) and adaptations have been made The QUEST questionnaire includes questions on device characteristics (8 items) and assistive technology service (4 items). The 8 questions measure user satisfaction with the characteristics of the device and the 4 questions assess the service provided in relation to the assistive technology. The administration time is approximately 15 minutes. The Turkish validity and reliability study of the questionnaire was conducted by Yakut et al. (Yakut et al., 2020).

In the study, the participants were asked to answer the questions in the questionnaire in terms of their satisfaction with the assistive device they use (Kinesio-Wristband) and the service they receive in this process. The surveys were conducted in person The surveys were conducted in person. The answers were scored for satisfaction on a 5-point Likert scale (1=not at all satisfied and 5=very satisfied). The QUEST questionnaire has 3 scores: device satisfaction, service satisfaction and total score. Finally, participants were asked to select 3 important items from the 12 items that were important to them. (Yakut et al., 2020).

Statistical Analysis

All data were recorded and analyzed on computer using SPSS (statistical package for social sciences) for Windows 22 program. Shapiro-Wilk test was used to determine the normality of the data and kurtosis and skewness values, which are other assumptions of normal distribution, were evaluated Man-Whitney-U test was used for two independent group comparisons. The relationship between numerical variables was analyzed by Spearman correlation coefficient. Categorical variables were expressed as percentage frequency and numerical variables were expressed as mean standard deviation median minimum and maximum values. Statistical significance was accepted as $p< 0.05$.

3. Results

Table 1. Socio-Demographic and Clinical Data

Variable	Group	%(n)	Mean±SD (min-max)
Age (year)			51,50±15,37 (19,00-75.00)
Height (m)		100(20)	1,66±0,09 (1,50-1,75)
Weight (kg)			72,10±13,47 (40,00-98,00)

BMI (kg/m^2)			26,27±5,07 (16,44-37,78)
Gender	Female	45(9)	
	Male	55(11)	
Education Level	Secondary School	25(5)	
	High School	30(6)	
	Other	45(9)	
Affected Side	Right	35(7)	
	Left	65(13)	
Use Of Assistive Devices (except Kenesi Wristband)	Yes	70(14)	
	No	30(6)	

n: number of persons, %: Percentage, SD: Standard Deviation, min: minimum, max: maximum, m: meter, kg: kilogram, BMI: Body Mass Index

Socio-demographic and clinical characteristics of the individuals are shown in **Table 1**. The mean age was 51.50±15.37 years and mean BMI was 26.27±5.07 kg/m^2.

Table 2. Level Of Knowledge About Kinesio-Wristband, Level Of Belief İn The Functionality Of The Device And QUEST Questionnaire Scores

	%(n)	Mean±SD (min-max)
Level Of Knowledge (VAS)	100(20)	2,95±1,39 (0,00-7,00)
Belief in the Functionality of The Device (VAS)		3,65±1,27 (1,00-5,00)
QUEST (total)		44,65±10,05 (35,00-60,00)
QUEST (assistive device)		28,55±7,42 (21,00-70,00)
QUEST (service)		16,10±2,99 (12,00-20,00)

VAS: Visual Analog Scale, QUEST: QUEBEC The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0)

The level of knowledge about Kinesio-Wristband, level of belief in functionality and QUEST scores of the individuals participating in the study are shown in **Table 2.** The mean QUEST score of the individuals was 44.65±10.05; mean QUEST assistive device score was 28.55±7.42; mean QUEST service score was 16.10±2.99.

Table 3. Distribution of QUEST Survey Items Selected as Important

	n	%
Weight	5,00	12,50
Durability	1,00	2,50
Easy to Use	5,00	12,50
Comfort	5,00	12,50
Effectiveness	1,00	2,50
Service Delivery	3,00	7,50
Professional Service	8,00	20,00
Follow-up Service	12,00	30,00

Cilt 5, Sayı 2 | Yaz 2023
Volume 5, No 2 | Summer 2023, 61-68

n: number of persons, %: Percentage

Table 3 shows the data generated by asking individuals to select the items they considered most important to them. It was found that 30% (n:12) of the patients chose regular follow-up services, 20% (n:8) chose professional service, and 12.5% (n:5) chose weight, ease of use and comfort.

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