Arab American University

Faculty of Graduate Studies

Department of Health Sciences

Master Program in Occupational Therapy

"Validation of the Arabic Version of the Upper Extremity Functional Status Module of the "Orthotics and Prosthetics Users" Survey Among Unilateral Upper Extremity Prostheses Users in Palestine and Jordan."

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Declaration

I declare that, except where explicit reference is made to the contribution of others, this thesis is substantially my own work and has not been submitted for any other degree at the Arab American University or any other institution.

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Dedication

My heartfelt gratitude goes to my family, whose constant love, patience, and encouragement have been my greatest source of strength. My inspiration has always come from your faith in me, My Mother “Ola”. My siblings, “Maram, Malak, Abdallah, and Borhan”, have been a blessing throughout this journey with your consistent support.

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Abstract

Background: Orthotic and prosthetic user survey (OPUS) is an outcome measure to evaluate patient practices with orthosis and prostheses. It contains five modules: satisfaction with devices (CSD), satisfaction with services (CSS), Health-Related Quality of Life Index (HR-QOL), Upper Extremity Functional Status (UEFS), and Lower Extremity Functional Status (LEFS).

The Upper Extremity Functional Status module (UEFS) is a self-reported assessment for upper prosthetic users that covers self-care and instrumental activity of daily living, specifically designed to evaluate upper extremity prostheses users. It usually takes 10-15 minutes to complete.

As yet, the psychometric properties of an Arabic version of UEFS with upper extremity prosthetic users haven’t been evaluated.

Objective: This study was conducted to translate the Upper Extremity Functional Status (UEFS) module of the “Orthotics and Prosthetics Users” Survey (OPUS) into

an Arabic version and establish psychometric properties among upper extremity prosthetic users in Palestine and Jordan.

Methods: The UEFS was translated to the Arabic language follow-up Beaton, Bombardier et al. strategy, conducted with 50 participants who used upper extremity prostheses, and established the psychometric proprieties of an Arabic version of (UEFS), the test-retest reliability and Internal consistency of the translated Arabic version was conducted, and examined concurrent validity between the DASH and (UEFS).

Study design: This is a Multicenter, cross-sectional validation study to assess the psychometric properties of the new Arabic version of UEFS.

Results: Construct validity of the Arabic UEFS with DASH-Arabic was statistically significant (p <.005), and Test-retest reliability was excellent with an ICC of 0.976. Cronbach's alpha of the Arabic UEFS was 0.95, indicating excellent internal

Conclusion: The Arabic version of UEFS was valid and reliable for evaluating upper extremity prosthetic users for Arabic native-speaker patients, and can be used to assess and evaluate the patients, within the evidence-based practice.

Keywords: Reliability, Validity, Amputation, Upper Extremity, Prosthetic.

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List of Definitions of Abbreviations

Abbreviations	Title
AAUP	Arab American University-Palestine
AT	Assistive Technology
ADL	The Activity of Daily Living
AM-ULA	The Activities Measure for Adults with Upper Limb Amputation
ALPC	Artificial Limbs and Polio Center
BB	Box and Blocks Test of Manual Dexterity
BPP	Body-Powered Prosthesis
DASH	The Disabilities of the Arm, Shoulder, and Hand Questionnaire
EMG	Electromyographic
JHFT	The Jebsen-Taylor Hand Function Test
JOD	Jordanian Dinar
HR-QoL	Health-Related Quality of Life
IADL	Instrumental Activity of Daily Living
IRB	The Institutional Review Board
NIS	New Israeli Shekel
O&P	Orthotics and Prosthetic

OPUS	Orthotic and prosthetic user survey
PCS	Palestinian Central Statistics
SPSS	Statistical Package for the Social Sciences
UEFS	Upper Extremity Functional status module
UNB	University of New Brunswick (UNB) Measure of Prosthetic Skills and Spontaneity
WHO	World Health Organization

Chapter One: Introduction

1.1 Background

The human hand plays a critical role in performing an infinite number of daily living tasks. It plays a major social interaction role and integration of individuals within their environment Cordella et al. (2016). The loss of an upper limb is a catastrophic event that significantly affects all aspects of an individual's life; as it necessitates Mohammed and Shebl (2014) (Tennent et al., 2014, Shahsavari et al., 2020), upper limb amputation has significantly affected an individual's independence in Activities of Daily Living (ADL) (Saradjian et al., 2008) and return to work (Tennent et al., 2014). In addition to the effects on psychological, and social well-being, and overall life satisfaction (Pomares et al., 2020)

Replacing hand functions is difficult due to the complexity of hand movements and skills that take years of practice and use to develop. Upper extremity prostheses can assist with everyday tasks (Roche et al., 2015). Prosthesis (plural: prostheses) is "*a prosthetic device externally applied device used to replace wholly, or in part, an absent or deficient limb segment*" page No. 1 (ISO, 2020). Examples are transtibial and transfemoral prostheses for lower limb amputations and transradial or transhumeral prostheses for upper limb amputations (Healy et al., 2018). Prostheses are designed to fit an individual's function, enhance independence, and restore needed skills (Johnson et al., 2014). There are five different types of prostheses; cosmetic (passive functional), body-powered (cable driven), electrically powered (myoelectric or switch-controlled), hybrid (combination of body-powered and electric), and activity-specific (designed for a specific task) (Johnson et al., 2014).

Prosthetic rehabilitation is critical in enhancing prosthetic acceptance, independence, restoring skills, and returning to work (Resnik et al., 2012b). Prosthetic rehabilitation of

upper limb amputation is done through a multidisciplinary team, including psychologists, certified prosthetists, physiotherapists, and occupational therapists (Chui et al., 2019). Resnik et al, (2012) indicated that prosthetic training programs are more meaningful and useful using real-life activities, and occupational therapists are experts in delivering such interventions (Resnik et al., 2012b). Occupational therapists participate in the early rehabilitation stages, working with patients to set their goals, select appropriate prostheses, and train them to use their prostheses in ADL, and everyday life tasks (Johnson et al., 2014). Occupational therapists use multiple evaluation methods to help formulate the intervention plan and assess individual needs. Of these evaluation methods, standardized assessments are used to provide objective data regarding challenges an individual faces in everyday performance. Psychometrically sound standardized assessments with established validity and reliability can also be used as an outcome measures to assess baseline performance as well as progress following rehabilitation (OTPF) (Association, 2020).

1.2 Research Significance

According to the Palestinian Central Statistics (PCS), The percentage of individuals who had at least one type of disability in 2017 was 6%, with 1.1% having physical disabilities and hand impairment (PCS).

According to the General Palestinian Federation for Persons with Disabilities, 40 % of people with physical disabilities and hand impairment (PCS) are patients with amputations distributed between upper and lower amputation, with a 1:10 ratio, respectively. The amputation ratio is high in Palestinians, mainly due to Israeli occupational violence acts, in addition to well-known global causes such as accidents and congenital anomalies.

Occupational therapists play a critical role in prosthetic training. By identifying the client's goals and aiming to achieve independence, occupational therapists are the most effective trainers. Therefore, there is a critical need for valid and reliable assessments,

specifically for Arabic speakers to assess upper extremity prosthetic users in their functional capabilities and independence.

1.3 Research Problem

While Prosthetic training improves satisfaction and purposeful use of upper limb prostheses, and occupational therapists play a critical role in prosthetic training, they are the most effective trainers because they identify clients' goals and work to achieve them to be independent, there is a critical need for valid and reliable assessments in Arabic language, specific to who speak Arabic to assess functionality and independency of upper extremity prosthetic user.

Occupational therapists use various standardized assessment tools to comprehensively present the client's clinical condition, and to formulate an accurate occupation-based treatment plan, in addition to measuring progress during and at the end of the rehabilitation process. Available standardized assessment tools vary in purpose and focus; some are impairment-based focusing on single or several basic performance components, while others are occupation-based focusing on activities and participation and aim at understanding the occupational functioning of the client. Some standardized tools can only be used at the beginning of the rehabilitation process as they are not sensitive to change and have low responsiveness while others can be used as outcome measures.

Due to the limited number of specific prosthetic assessments, the occupational therapist usually used non-specific hand assessments for upper extremities prosthetic users, such as the Box and Block Test of Manual Dexterity (BB) (Resnik et al., 2012a), the Jebsen-Taylor Hand Function Test (JHFT) (Resnik, Borgia et al. 2016), and the Southampton Hand Assessment Procedure (Roche, Vujaklija et al. 2015).

However, there are few assessments designed to evaluate upper extremity prosthetic users, for example, the Activities Measure for Adults with Upper Limb Amputation (AM-ULA) (Resnik et al., 2013a), the University of New Brunswick (UNB) Measure of Prosthetic Skills and Spontaneity (Resnik et al., 2013b), Upper Extremity Functional Status (UEFS) module of Orthotic and Prosthetics User Survey (OPUS) (Burger, Franchignoni et al. 2008).

While the AM-ULA is designed to evaluate the performance of various tasks relevant to daily living and uses a combination of observational assessment and self-report. Tasks are rated on a scale considering both the quality of performance and the level of independence, it requires a trainee therapist to administrate and it is considered as a time-consuming assessment.

The UNB measure is designed to evaluate the skill level and spontaneous use of prosthetic devices in individuals with upper limb amputations. Focuses on the use of prosthetics in performing tasks and measures both the proficiency in using the prosthesis and the spontaneity with which it is used. However, it does not fully capture non-prosthetic hand use. In addition, it relies on both self-report and observed performance, which can be subjective and does not reflect the patient's perspective

On the other hand, the OPUS questionnaires are self-reported assessments, no specific training is required, providing a broad overview from the user's perspective. The UEFS module is designed to assess the functional status of individuals with upper limb prostheses and evaluate the difficulty of each task using a Likert scale, covering daily living activities, instrumental activities of daily living (IADLs), and recreational activities. The upper extremity prosthetic user’s assessments weren’t translated and validated in the Arabic language, and the Orthotic and Prosthetics User Survey (OPUS), each of the sub-tests translated to Arabic and examined the psychometric properties, (The validation of the Arabic version of the client satisfaction with the device (Bakhsh, Franchignoni et al. 2014), the Test-retest reliability of the Arabic translation of the Lower Extremity Functional Status of the Orthotics and Prosthetics Users' Survey, (Alhowimel, Alodaibi et al. 2022), The Health-related quality of Life translated and established the psychometric properties by Mr. Waleed

Abo Samra in 2021 as a Master's thesis in JUST University.), However, the upper extremity functional status module of OPUS does not have an Arabic version up until now.

1.4 Research Aim, Objectives, and Questions

This study aims to cross-culturally validate the Arabic translation of the Upper Extremity Functional Status (UEFS) module of the Orthotics and Prosthetics Users Survey (OPUS) for prosthetic users in Palestine and Jordan.

Research objectives:

1. To translate the UEFS module of the OPUS to the Arabic language.
2. To examine the construct validity of the UEFS.
3. To examine the cultural appropriateness of the UEFS for prosthetic users in Palestine and Jordan.
4. To examine the internal consistency and test-retest reliability of the Arabic version of the UEFS.
5. To evaluate the association between personal factors (i.e. Age, gender) with UEFS

Chapter Two: Literature Review

2.1 Chapter Overview

This chapter provides a comprehensive literature review on upper limb amputationand upper limb prosthesis, including prosthetic technology and its benefits, the factors that affect upper limb prosthesis users, on various aspects that impact users' experiences and outcomes. Also, this chapter discusses the rehabilitation services and occupational therapy's role in the rehabilitation training program. this chapter aims to identify gaps in the literature and how this research will help to improve the overall user assessment and functionality of upper extremity prostheses.

2.2 Background

Assistive technology (AT) is an umbrella term covering all systems and services related to providing assistive products and services to enhance the functioning and independence of individuals with disabilities which also reflect their overall well-being, quality of life, and satisfaction integral to occupational therapy philosophy. Assistive devices include wheelchairs, hearing aids, spectacles, prostheses, communication aids, pill organizers, and memory aids. With assistive technology, people with disabilities can better engage in everyday tasks such as education, work, and leisure activities of their choice allowing for enhanced integration in their societies.

Assistive technology decreases the demand for formal health and support services, long-term care, and the effort of caregivers. With the lack of assistive technology, people

with disabilities frequently experience exclusion, isolation, and poverty, which increases the effects of illness and disability on the individual, their families, and society as a whole (WHO, 2018).

2.3. Upper limb amputation

Amputations of the upper limb are devastating events that have a significant impact on a person's functional and occupational prospects. Etiologies of upper limb loss vary. Trauma is the most prevalent cause of upper limb loss in adults, followed by cancer (Ziegler-Graham et al., 2008). Traumatic upper limb amputations are most frequently caused by machinery, power tools (that involve saws or blades), explosions, self-inflicted injuries, and attacks (Barmparas et al., 2010). Males are approximately 6.6 times more vulnerable to traumatic amputation than women, while women are more vulnerable to minor amputations of the finger and hand than men (Dillingham et al., 2002a). Burns, congenital malformations, and infections are other reasons for upper limb loss (Dillingham et al., 1998) (Dillingham et al., 2002b).According to the National Trauma Data Bank in the UK, data from 2009 to 2012, for patients undergoing major upper-limb amputations caused by trauma, a total of 1,386 patients underwent major upper-extremity amputations, which is about 46 per 100,000 trauma admissions. The most common types of amputations were through the humerus (35%), forearm (30%), and hand (14%).(Inkellis et al., 2018)

Globally, 57.7 million people had limbs amputated as a result of traumatic events in 2017. The most common causes were mechanical forces (10.4%), falls (36.2%), traffic injuries (15.7%), and other transportation injuries (11.2%). East Asia and South Asia had the highest rate of traumatic amputations, followed by high-income North America, Western Europe, North Africa, and the Middle East (McDonald et al., 2021).

According to Yuan et al. research, from 1990 to 2019, the global incidence and prevalence of traumatic amputations increased from 11.37 million to 13.23 million (a 16.4% increase) and from 370.25 million to 552.45 million (a 49.2% increase),

respectively. The incidence and prevalence were higher in older age groups, with traumatic amputations being most common in the fingers and the leading causes of traumatic amputations were exposure to mechanical forces and falls (Yuan et al., 2023).

In the United States, the number of Americans who were living with limb loss was estimated to be 1.6 million in 2005. By 2050, this number is predicted to have more than doubled to 3.6 million people. Non-White people made up a sizable portion (42%) of individuals who had lost a limb. In 38% of cases, dysvascular disease—which is frequently linked to diabetes mellitus—was the primary cause of amputations. (Ziegler-Graham et al., 2008).

2.4. Upper limb prostheses

"**Prosthesis**," derived from the Greek words "pro-" for "instead of" and "thesis" for "placing," is defined as the replacement of all or parts of a damaged or diseased anatomical organ by an artificial device", Williams and Biology (1980).

Prosthetic Technology is attributed to the impact that upper prosthetic users experience. Such technology includes Passive and Active prosthesis designs, each presenting advantages and disadvantages as the following:

1. Passive prosthetic devices (Cosmetic)

Cosmetic Prostheses are utilized when comfort and physical attractiveness are essential priorities. Despite their practical limitations, users continue to favor cosmetic prostheses. They have an attractive cosmetic look and are reasonably priced. Cosmetic prostheses can only perform primitive tasks like pushing, pulling, and transporting objectives (Ovadia and Askari, 2015).

Nonetheless, because they promote one's confidence, they are frequently worn in social settings. Around one in three amputees makes use of a passive prosthesis(Maat et al., 2018). It is typically advised for individuals who have recently had an amputation to use the

device. Once users become comfortable with it, they usually move on to utilizing active prostheses.(Brack and Amalu, 2021)

2. Active prosthetic devices

The main feature that sets active prosthetic devices apart from passive ones is their ability to produce motion. (Dabiri et al., 2010) Active prostheses can be further classified into myoelectric and body-powered prostheses. There are advantages as well as disadvantages to each.

I. Body-powered Prostheses (BPP)

Body-powered upper extremity prostheses are operated utilizing a harness that is wired to another area of the patient's body, like the shoulder that is still in good health (Huinink et al., 2016). To control the terminal device of the prosthesis, various movements are performed with the shoulder that is then transferred through a control cable (Uellendahl, 2021). A typical upper extremity BPP consists of a terminal device, wrist, control cable, harness, and socket (Hussain et al., 2019).

This gives hooks a significant advantage in that they are incredibly useful for a range of tasks. Compared to myoelectric prostheses, they are more suited for prolonged, demanding tasks since they are less vulnerable to damage in volatile situations like corrosive and moist surroundings. This is a result of their battery exclusion or another kind of energy (Uellendahl, 2017). Furthermore, “intuitive control of the prosthetic device, along with force prosthetic device as well as force feedback via the cable tensioning” are features of body-powered Prostheses (Beckerle et al., 2019). The fact that the cost to the user is comparatively minimal when compared to myoelectric is another positive feature (Cordella et al., 2016). Because of their extensive functionality and affordable price, body-powered prostheses remain to be a popular choice among users (Brack and Amalu, 2021).

II. Myoelectric Prosthesis

Externally powered electric motors are used to power myoelectric upper extremity prostheses. Contraction from the residual limb muscles directs the terminal device movement.

Surface electrodes pick up electromyographic (EMG) impulses from the limb stump, which are then amplified, filtered, and processed by a controller to power

motors that move the hand, wrist, or elbow with the help of batteries (Fougner et al., 2012).

Improving the device's appearance is one of the intentions of a myoelectric upper extremity prosthesis, as it influences many users' choice of device (Carey et al., 2015). Since losing a limb causes extreme trauma for the patient, attending to their social-psychological needs should come first. Devices that don't give the user a more realistic appearance are frequently rejected (Billock, 1986).

Myoelectric prostheses also have the advantage of functioning in a way that is physiologically natural. The muscles used in a transradial prosthesis are the same as those used in the natural hand to open and close the myoelectric hand (Uellendahl, 2017). Furthermore, compared to a body-powered prosthesis, the grip strength of a myoelectric device is usually several times greater. Because only little muscle contractions are needed to provide the maximal grip force, this is accomplished with essentially no extra force (Uellendahl, 2017).

Myoelectric prostheses are more advanced in terms of functionality and aesthetics than passive or body-powered prostheses, but their cost restricts user access. This is particularly common in nations with weak healthcare systems. The high cost of myoelectrical prostheses prevents those with lower incomes from receiving the best possible care; several technologies are being researched to see if the price of myoelectric prostheses could be reduced (Ku et al., 2019). The daily battery recharge required by myoelectric prostheses is a further limitation. Environmental elements like water and dirt may damage the battery, and maintaining and repairing it often costs more than manufacturing other ones (Uellendahl, 2017).

3. Hybrid prostheses

A Hybrid prosthetic device is created by combining myoelectric and body-powered components. This takes into account the advantages of each specific device; however, hybrid prosthetics are less popular. Hybrid designs are generally not used at the transradial level because there aren't many devices with the appropriate technology (Uellendahl, 2017).

Nonetheless, Europe has been using a "cable-operated, body-powered elbow with myoelectric control from the biceps (closing) and triceps (opening)" for over 25 years with great success when it comes to transhumeral prostheses (Childress and principles, 1992).

Certain hybrid controls allow for the simultaneous sequential control of the prosthetic hand and elbow; nevertheless, the harnessing process can be laborious and difficult, particularly at the short transhumeral level where the user may not have sufficient strength to operate the elbow (Uellendahl, 2017).

Even though great attempts have been made to get over the challenges faced by upper limb amputees with prosthetic technology, Resnik et al. conducted research to compare the results of patient-reported measures of activity difficulties, disability, and health-related quality of life (HRQoL) according to the use and design of prosthetic devices, their results indicated that upper limb amputees without a prosthesis faced more challenges in activities, experienced greater overall disability, and had lower physical function compared to those using any active prosthesis. Additionally, individuals without a prosthesis were more likely to require assistance with ADLs compared to those using a body-powered prosthesis (Resnik et al., 2020).

While the findings of (Roche et al., 2015) research indicates that a systematic training strategy positively impacted the individual's ability to use a multifunctional prosthetic hand in a single session. The participant in this structured program struggled with hand movements with his usual prosthetic hand, therefore the training combined imitation, repetition, and reinforcement of those movements, and improved functional use of upper limb prosthesis.

This corresponds with the result of (Resnik et al., 2020) that underscored the positive impact of active prostheses on HRQoL. They emphasized the clinical importance of promoting prosthesis use through factors like early training to enhance device satisfaction and reduce abandonment.

2.5. Factors Affect Upper Limb Prosthetic Users

Over the last 25 years, there have been fluctuations in the use of upper limb prostheses due to various factors, such as advancements in prosthetic technology, changes in healthcare policies, socioeconomic disparities, personal preferences, and the level of amputation.

Level of amputation:

The level of amputation determines the functional implication. Without a prosthetic, those who have lost fingers (except for the thumb) are quite functional. Individuals who have lost their thumb are unable to hold heavy things or perform fine motor tasks that need the use of a second finger in opposition (Diane W. Braza, 2020).

Amputees who have a transradial or transhumeral amputation experience losing hand function and limitations, which include the basic and instrumental activity of daily living, for example: dressing. Jang et al surveyed upper-limb amputees regarding the impact on activities of daily living. Subjects reported difficulty with complex tasks and either changed jobs or became unemployed. The most common difficulties in daily living were lacing shoes, using scissors, and removing bottle tops." Upper limb amputees frequently sustain new vocational limitations that can preclude a return to their previous work activities. Most persons can adapt to almost all basic daily activities with use of the intact contralateral hand and upper limb.(Jang et al., 2011)

Personal preferences

Most people who have had unilateral upper limbs amputated believe that a prosthetic limb serves only as a supplemental aid because most everyday activities need the use of the intact upper extremity (Smurr et al., 2008).

Among amputees of the upper limb, rejection rates of prosthetic devices are significant (Resnik et al., 2012b). According to reports, 60% of users who have shoulder disarticulation give up on their device; the costly expense of repairs and insufficient training are among the causes. (Resnik et al., 2012b).

2.6. Upper limb prostheses and functionality level

The analysis of task difficulty ratings with and without a prosthesis highlighted the value of active prostheses in tasks involving fine motor activities, especially in unilateral activities. Cosmetic devices, while preferred by some female amputees for enhancing body image and psychosocial adjustment, were found less suitable for specific functional activities. Multi-Degree of freedom terminal devices, despite their promise, showed higher disability levels compared to other types of prostheses. (Resnik et al., 2020)

Years since amputation were independently associated with better physical function, lower disability, and reduced likelihood of needing ADL assistance, illustrating the adaptability and skill development of amputees over time, regardless of prosthesis use. (Resnik et al., 2020).

2.7. Rehabilitation services for upper limb amputation

Individuals who have had their upper limbs amputated require sophisticated rehabilitation, which is best served by a multidisciplinary team consisting of physicians, occupational therapists, physiotherapists, and prosthetists with advanced and specific training (Johnson et al., 2014).

A comfortable and useful prosthesis combined with appropriate rehabilitation will enable functional improvements. Since this ailment typically affects young, productive adults, mostly men, occupational counseling and retraining are essential components of any program. An ongoing care plan is essential for a patient's effective recovery (Diane W. Braza, 2020).

The purpose of rehabilitation for upper extremity prosthetic users is to assist patients in achieving their therapeutic goals and improving their independence (Watve et al., 2011).

Orthotics and prosthetics (O&P) practices are increasingly recognizing the importance of measuring and evaluating their procedures. Therefore, the evaluation of the patient's outcome needs valid and reliable self-reported assessments (Heinemann et al., 2003).

2.8. Self-reported assessment versus Performance-based assessment

Self-reported assessment: reports directly from the patient without interpretation of the patient's response, and conceptualization of the patient's real-world physical status and functional ability (Nelson et al., 2015). Commonly used Likert-style format for responses to items in terms of subjective experience, it also reflects the frequency of specific symptoms/degree of impairment (Demetriou, 2015).

Performance-based assessment: A measurement based on a task(s) performed by a patient according to instructions that a healthcare professional administers, and that require patient cooperation and motivation (Richardson et al., 2019).That increases the potential to provide objective and reliable evaluations (Wang et al., 2018).

In comparing the self-reported and performance-based assessments, Performance-based measures, which assess individuals' ability to understand and use health information through objective testing, often show lower levels of health literacy and numeracy than self-reported measures. Self-reported measures, which rely on individuals' perception of their abilities, generally result in higher reported levels of literacy and numeracy but are more prone to biases such as overestimating one's skills (Kiechle et al., 2015). The advantages of self-reported assessments expand to include administration to a large sample – A large amount of data –, quick, slight effort, slight financial cost, high generalization possibility (Demetriou, 2015), shifting from focusing on clinicians' actions to results experienced by patients (Lee and Porter, 2013), strengthen patients' voices which aligns with client-centeredness in occupational therapy practice (Mroz et al., 2015), meaningful means of assessing symptoms (e.g., pain, fatigue), and can illuminate aspects of participation outside of the clinic (Chandwani et al., 2017).

On the other hand, Performance-based assessment is characterized as a time-consuming, resource-intensive, limited scope - It may only assess a specific set of skills or knowledge-, inefficiency -may require excessive resources and time to carry out - (Harvey et al., 2007).

2.9. Orthotics and Prosthetics Users' Survey (OPUS)

Heinemann and the advisor committee which included professionals from different specialties such as occupational and physiotherapists, prosthetists and orthopedists, physiatrists, psychologists, social workers, and clients, have conducted a comprehensive literature review of the assessments that have been used to evaluate the Orthotic and Prosthetic users, for developing an assessment that covers different areas that are related to the Orthotic and Prosthetic users including the evaluation of the functionality status of upper and lower extremities, health-related quality of life, and the satisfaction of the client. Which is known as “the Orthotics and Prosthetics Users' Survey (OPUS)” (Heinemann et al., 2003).k

OPUS is developed to evaluate a variety of patients who are using orthotics or prosthetics. It consisted of 4-subtests: Lower limb functional measure, Health-related quality of life, Follow-up evaluation of satisfaction with the device, and Follow-up evaluation of satisfaction with services, in the early developmental stage (Heinemann et al., 2003).

In 2008, (Burger et al., 2008) updated a new module for upper extremity functional status (UEFS) of OPUS, consisting of 23 items for self-care and instrumental activity of daily living (IADL), and it got updated to become consisting of 28 items (Jarl et al., 2012), each item scored on a 5-point rating scale, that range 0 (unable to perform) – 4 (easy to perform), each item the patient is asked if they use their prosthesis in the activity.

2.10. Related Research in Palestine

Heszlein-Lossius, Al-Borno, and his colleagues researched to investigate the factors associated with pain and psychological distress in Gaza patients who experienced serious amputation of an extremity.

They found that over half of traumatic amputees experience significant psychological distress, this distress is strongly linked to financial difficulties following job loss due to limb amputations. The frequency of pain is more prominent in poorer patients. The lesser the income of the family, the more pain is experienced. Interestingly, the severity of the initial amputation trauma does not impact psychological distress or pain frequency.

The study shows that three out of four participants were unemployed, with nearly half attributing their unemployment to their physical disabilities. Unemployment is a major risk factor for depression and anxiety, these findings match with a study done for Jordanian amputees findings in Jordanian amputee study (Hawamdeh et al., 2008). The study also identifies low family income as a key predictor of pain frequency among amputees, with lower incomes correlating with higher pain levels. Economic hardship following severe limb amputation appears more detrimental to psychological well-being than the extent of the physical trauma itself.

The broader context of Gaza, including siege, occupation, and recurrent military attacks, plays a critical role in the psychosocial determinants of pain and distress (Heszlein-Lossius et al., 2019).

Mr. Mousa researched to evaluate amputee rehabilitation services in Gaza Governorates, where conflicts and deteriorating health conditions have led to a significant number of amputations. The research employed both quantitative and qualitative methods, with a high response rate.

The result indicated that conflict-related incidents and uncontrolled Diabetes Mellitus were the primary causes of amputations. Most participants received hospital care before amputation, with varied lengths of hospitalization. After discharge, many continued rehabilitation programs elsewhere.

However, the provision of rehabilitation services did not fully meet clinical guidelines. Despite this, participants expressed overall satisfaction. ALPC (Artificial Limbs and Polio Center), a key provider, received positive feedback for prosthetic services. Evaluation of prostheses showed generally high satisfaction. Daily life for amputees posed significant challenges, with societal support deemed inadequate. Quality of life measures indicated varying levels of impact across different domains.

In conclusion, while rehabilitation services showed good effectiveness and satisfaction, there is room for improvement in coordination among providers and referral pathways (Mousa, 2020).

2.11. Related Research in Jordan

The students of Alzarqa University researched to look into various factors related to how people interact with prostheses, how these factors relate to each other, and how well amputees who have artificial limbs react to them.

The result of the research was the reaction to prostheses varies widely among individuals, influenced by factors such as age, gender, type of prosthesis, experience, rehabilitation program, and social circumstances.

Females tend to exhibit a more positive reaction to prostheses compared to males. Surprisingly, acceptance rates between upper and lower limb prostheses were similar in the study. Comfort and functionality significantly influence prosthesis acceptance, with discomfort and poor function leading to rejection.

The type of prosthesis also impacts acceptance, with myoelectric prostheses generally being better accepted due to their enhanced functionality. Younger individuals (20-40 years old) tend to accept prostheses more readily than children (0-20 years old), echoing earlier findings correlating acceptance with increasing age.

Children, particularly those fitted with conventional upper-limb prostheses at a young age, often exhibit poor acceptance rates. Rehabilitation and training programs play a crucial role in the acceptance or rejection of prostheses.

In summary, acceptance of prostheses is a multifaceted issue influenced by various factors, including gender, age, type of prosthesis, comfort, functionality, and the effectiveness of rehabilitation programs. Understanding these factors is essential for improving prosthetic acceptance rates and enhancing the overall quality of life for prosthesis users (Al-Adwan et al., 2017).

Ms. Abu Ismail and Ms. Aldawood researched to assess upper limb prostheses in Amman, Jordan, and to provide a general overview of their fundamental characteristics. Additionally, they aim to explore patients' perceptions of prosthetic features and how they prioritize their preferences and requirements for accepting upper limb prostheses.

The findings of the research conclude that Amman-Jordan upper limb amputees have certain priorities when they relate to accepting prostheses. The participants rated " fitting and suspension" as the first priority, followed by "comfort", "appearance", "the comfort of wearing and doffing", and "cost, function, and durability" respectively.

While some patients prioritized comfort, others valued appearance over the prosthesis's functionality, and still others thought appearance was the most significant factor of all. This variation in preference suggests that several medical, socioeconomic, and personal factors influence the type of prosthesis that is chosen (Ismail et al., 2020).

2.12. Concluding Summary

This chapter has provided a comprehensive overview of the current literature related to upper limb amputation and prosthetics, emphasizing the benefits and limitations of various prosthetic technologies and the factors influencing their use. It explored different types of prostheses, such as passive, active, and hybrid devices, and examined their impact on users' experiences, functionality, and quality of life. The review also highlighted the significance of rehabilitation services and occupational therapy in enhancing prosthesis usage and promoting better outcomes for upper limb amputees.

The chapter identified several gaps in the existing literature, particularly in understanding the factors affecting prosthesis adoption, user satisfaction, and long-term functionality. Furthermore, it underscored the need for further research to improve assessment methodologies, such as the integration of both self-reported and performance-based evaluations, to provide a more holistic understanding of user experiences and outcomes. This research aims to address these gaps by developing more effective user assessment tools and enhancing the functionality and usability of upper extremity prostheses, ultimately contributing to improved rehabilitation outcomes and quality of life for prosthesis users.

Chapter Three: Methodology

3.1. Introduction

This chapter discusses the detailed methodology employed in this study, including study design, approvals, measures, translation, participants, procedure, and data analyses. Study design.

3.1.1. Research Type

This multicenter, cross-sectional study assessed the validity and reliability of the new Arabic version of the Upper Extremity Functional Status module of the "Orthotics and Prosthetics Users" Survey with upper extremity prosthetic users in Palestine and Jordan. The cross-sectional design is the most appropriate design for this study because it clarifies the relationships between variables, and data collection can be conducted in one single session for each participant Olsen and St George (2004).

3.2. Approvals

3.2.1. Ethical Approval

Ethical approval was granted by the Institutional Review Board (IRB) committee at AAUP (# R-2024/A/15/N) on January 12^{th,} 2024 (Appendix No.1). All measures were taken to ensure that the research adhered to all of the ethical requirements of the AAUP

ethical committee. The clear and comprehensible language was used for consent forms. Voluntary participation was ensured and participants were able to freely withdraw at any given time. Coding participant's responses ensured confidentiality. The data was secured on a password-protected computer which can be only accessed by the researchers. The research had no risk or adverse health effects on the participants.

3.2.2. Translation permission.

Permission to translate the UEFS to Arabic for validation purposes was granted by Allen Heinemann, the author of the OPUS questionnaire. Dr. Heinemann welcomed the request, attached a PDF copy of each Upper Extremity Function and Upper Extremity Function Scoring Guide, and offered his collaboration to answer any question about the OPUS questionnaire (Appendix No. 2).

3.3. Study assessments

3.3.1. Upper Extremity Functional Scale Module of the OPUS

The Upper Extremity Functional Scale Module (UEFS) of the Orthotics and Prosthetics Users' Survey (OPUS) is an assessment designed to evaluate the Self-care and instrumental activity of daily living (IADL) for upper extremity prosthetic or orthotic users, consisting of 28 items. (Jarl et al., 2012). The UEFS uses a 5-point rating scale, starting from 4: very easy to 0: cannot perform activity to measure the functionality level, consequently, it reflects the effectiveness of the orthotic and prosthetic intervention.

All OPUS modules including the UEFS have been translated and linguistically validated into the Swedish language. (Jarl et al., 2009), each of the OPUS modules was valid and reliable for Swedish speakers. The purpose of this study was to validate the Arabic version of the UEFS. The translation and validation procedure will be explained in the following sections of this methodology chapter.

3.3.2. Disability of the Arm, Shoulder, and Hand (DASH)

The Disability of the Arm, Shoulder, and Hand (DASH) is a self-report questionnaire to evaluate upper limb disability, and symptoms, as well as evaluate changes over time. It consists of 30 items that cover various instrumental activities of daily living (IADL), such as physical functioning, work, and social activities, as well as pain and other symptoms; each item scored on a 5-Likert scale, and the total score ranges from 0 (no difficulty) to 100 (disability). Moreover, there are two optional modules, the Work Module consists of 4 items, and the Sports/Performing Arts Module consists of 4 items (Hudak, Amadio et al. (1996)). It was published by Hudak, Amadio et al. (1996) using a validation study in which the DASH was found to be valid and reliable.

The DASH is used worldwide and has been cross-cultured adapted and translated into different languages including the Arabic language. (Alotaibi, 2010). The Arabic version of the DASH was found to be a valid, reliable, and responsive upper-limb outcome measure. It can be applied to assist evidence-based practice by documenting patient status and results for whom their mother language is Arabic. (Alotaibi et al., 2016)

DASH was used for the validation study because the DASH outcome measure is being used as intended according to Kennedy et al, e.g. the DASH can be useful in clinical practice and research for patients with a variety of diseases affecting the whole limb (Kennedy and Beaton, 2017), it assessed self-care and IADL as well as the UEFS assessment. Consequently, many of the studies that related to upper extremity prosthetic users used the DASH assessment as a study outcome measure, such as (Østlie et al., 2011), (Pet et al., 2016), (Zhang et al., 2021).

3.3.3. Demographics

A demographic section was created to add to our understanding of the validation sample. Demographics included the participant's age, gender, educational level, employment status, economic status, marital status, hand dominance, and amputation-related information; affected upper extremity, date of amputation, level of amputation, type of used prosthesis, and any received therapeutic interventions.

3.4. Translation

The translation was conducted following the guidelines of the cross-cultural validation process by Beaton et al. (2000) which includes five stages as follows: (Beaton et al., 2000).

Stage I: Initial Translation

The initial phase of adaptation involves the process of forward translation from the source language (i.e. English) to the target language (Arabic). As per Beaton et al. (2000) recommendation, it is advised to create at least two forward translations and then compare the translations for any disparities that may arise from uncertain wording in the original text or from errors in the translation process which are recognized and rectified through a conversation between the translators.

The two independent translations are produced by bilingual translators who have the target language as their mother tongue, however, have different profiles. Translator (1) should be well acquainted with the concepts being translated. Translator (2) should not be aware nor informed of the original tools' concepts.

In our study, the first translator was an assistant professor of Allied Medical Sciences who was bilingual and was well acquainted with UEFS concepts, while the second translator was a bilingual English teacher who had no health or medical background and had no previous contact with the tool.

Stage II: Synthesis (T12)

This stage was conducted by the translators and a recording observer, who met and synthesized one common translation (T12), by working from the two translations and the original questionnaire. The observer carefully documented the synthesis process, addressed any contention, and how the translators solved it.

Stage III: Back translation

This stage was conducted using (T12) to return to the original language of the questionnaire (English), by another two translators who were blind to the original version

of the questionnaire. The first back translation (BT1) was conducted by a physician who specialized in family medicine, and the second translation (BT2) was conducted by an Occupational therapist, both of them, have English as their mother language, and have excellent Arabic skills.

Stage IV: Expert Committee

The expert committee of this study included an assistant Professor and a lecturer of Allied Medical Sciences. They consolidated each translation (T1, T2, T12, BT1, BT2) to synthesize the prefinal Arabic version of UEFS for testing. They reviewed each translation in the light of the original language and the reports of previous stages.

Stage V: Test of the Prefinal Version

This study was conducted in Palestine and Jordan; therefore, the piloting phase was conducted in both countries. In Palestine, five participants were interviewed in person at the Al-Shefa Medical Rehabilitation Center for Prosthetics and Orthotics, Jenin-Palestine, to complete the research questionnaire. In Jordan, in collaboration with a research assistant, five participants were interviewed via Zoom meeting and filled out the research questionnaire.

Develop the final version of the thesis questionnaire (Shown in Appendix No. 3)

1. Demographic questionnaire
2. The Disabilities of the Arm, Shoulder, and Hand (DASH)
3. Final Arabic Version of UEFS.

3.5. Participants

The target population for this study is adults with unilateral upper extremity amputation using a prosthesis. The inclusion criteria were: have unilateral upper limb

amputation, use prostheses, have reviewed with the prosthetic clinic at least one year before the study, read and write the Arabic language, age between 18- 65 years. (persons above 65 years old were excluded because hand functions decline above this age(Carmeli et al., 2003)).

Patients were excluded in this research based on these exclusion criteria: those with lower limb amputation, those with unilateral upper limb amputation who didn't use prostheses, those with bilateral upper limb amputation, those with cognitive impairment, more than 65 or less than 18.

3.6. Procedure

The research began by getting the AAUP-IRB approval afterward it received that got the translation approval from the author of the UEFS assessment, followed by the translation process just started following Beaton et al. (2000) guidelines, research sampling, and setting as mentioned below:

3.6.1. Sampling method:

Convenience sampling design is the most common design used in Cross-cultural validation studies, we used convenience sampling when the population is very large, and self-random selection increases bias (Farrokhi et al., 2012). For a validation study, it's recommended to use a sample size of at least 30-50 participants, as this allows for a more robust analysis and better generalizability of results (Gunawan et al., 2021).

There are no particular statistics about upper extremity amputation or upper extremity prosthetic users either in Palestine or Jordan. A total of 50 participants using upper extremity prostheses were conveniently recruited, 27 participants from Palestine, and 23 participants from Jordan, who voluntarily agreed to participate in this research.

The sampling process started with the piloting phase, the first center connected with was the Al-Shefa Medical Rehabilitation Center for Prosthetics and Orthotics, Jenin-

Palestine, we acquired a list of their clients who met the inclusion criteria and got their contacts, then connected with 5 of them for an interview and gave them a brief description about the research, participants were interviewed at the Al-Shefa Center in Jenin- Palestine.

At the same time, the research assistant in Jordan connected with the prosthetic centers in Amman and got a list of their client with contact numbers, then connected with 5 clients from different centers and got appointments for interviews after providing a brief description about the research, the interviews were online via Zoom.

In parallel, the sampling process was conducted in both countries. We started by connecting with prosthetic centers and gathering lists of clients who met the inclusion criteria, connecting with them, and introducing to them the research proposal and questionnaire. After agreeing to join, some participants chose to get the questionnaire from the prosthetic center during their visit, and some participants chose to get the questionnaire in person and return it afterward.

Due to the duration the data collection takes, the retest process , which including refill of the UEFS after two weeks of the first assessment session, it took place simultaneously as data collection. In both countries, participants were retested two weeks after their first session with the same methods used in their first time.

3.6.2. Study setting:

Palestinian patients with upper extremity amputation, who used upper extremity prostheses, were identified from the prosthetic clinics in the West Bank. whilst, this study was conducted at the AAUP Artificial Limbs factory- Jenin, Al-Shefa Medical Rehabilitation Center for Prosthetics and Orthotics- Jenin, Al-Jaleel Association- Jenin, Al-Amal Hospital-Nablus, Qalqilya prosthetic manufactory, Pal Orthopedics Center -AlRam, Bethlehem Arab Society for Rehabilitation | BASR, Palestine Military Medical Hospital-Bethlehem.

Jordanian patients with upper extremity amputation, who used upper extremity prostheses, were identified from the prosthetic clinics in Jordan. Whilst, this study was conducted at “MaFaZ for Prosthetics, Orthotics & Mobility Solutions Co. Ltd”, “Medical

Engineering for Orthopedic Equipment", "OBK Center for Logistics, Technology, and Medical Supplies", and "School of Rehabilitation, University of Jordan".

3.7. Data Collection Method

This research was conducted in two countries, each of them having its circumstances. In Palestine, piloting patients were interviewed face-to-face. After the piloting phase, the questionnaire was sent to the participants as a hard copy and they returned it back after filling it out, some patients received a PDF copy of the questionnaire, printed it out, filled it out, and returned it as pictures through WhatsApp.

In Jordan, the collection process was in collaboration with a research assistant, a Prosthetist, who graduated with a bachelor's degree from the University of Jordan in September 2023. The first meeting with the research assistant was a Zoom meeting, to give her an overview of the research proposal and inform her about the research hypothesis, questions, participant's inclusion and exclusion criteria, and study questionnaire.

After the research assistant connected with the prosthetic clinics in Amman-Jordan, and identifying some eligible participants, the piloting phase started in Jordan through Zoom meetings, the first Zoom meeting was in the presence of the researcher to check the quality of the interviewing and make sure that the research assistant got the collection procedure and her role as a research assistant.

The research assistant continued the piloting phase through Zoom meetings, and then participants got the research questionnaire during their visit to the prosthetic clinic, filled it out, and retained it back. The Retest process occurred at the same time as the data collection process, the participant was reassessed two weeks after the first session, and this criterion was applied in both countries.

3.8. Data Analysis Methods/Techniques

Data was entered directly to SPPS version 23 for analyses (IBM, 2014). Descriptive statistics were used to analyze participant's demographics. Inferential statistics were used for validation by measuring the correlation between the DASH and UEFS. Additionally, Intraclass correlations were computed for test-re-test reliability. Internal consistency was measured using Cronbach's alpha.

P-value was set at 0.05. Correlation strength was evaluated between the correlation of the total score of the DASH and the total score of the UEFS assessment, the correlation between the gender and age of the participant with the total score of the UEFS and DASH's total score. (Thiese et al., 2016)

Spearman's Rank of Correlation was used to measure the correlation between the total score of the DASH and the total score of the UEFS. Its ranges from (-1 to 1), Spearman's rho of r_s=1 indicates a strong positive correlation, r_s=-1 indicates a strong negative correlation, and r_s= 0 suggests no monotonic relationship between the variables (MacFarland et al., 2016). The interpretation of the correlation strength follows this guideline: (0.00 to ±0.10): Negligible, (±0.10 to ±0.39): Weak, (±0.40 to ±0.69): Moderate (±0.70 to ±0.89): Strong, (±0.90 to ±1.00): Very strong (Mukaka, 2012).

The Intraclass Correlation Coefficient (ICC) indicates the reliability, and it is used to assess the test-retest reliability of the UEFS, following these levels: ICC < 0.5: poor reliability, 0.5 < ICC <0.75: moderate reliability, 0.75 < ICC < 0.9: Good reliability, ICC > 0.9: Excellent reliability. (Koo and Li, 2016).

The Cronbach alpha was used to measure the internal consistency, indicating the significance of the set of items' relatedness. When Cronbach's alpha was used for measuring the internal consistency, the following rules were usually followed: If $\alpha < 0.9$, it indicates excellent internal consistency; if $0.8 \leq \alpha < 0.9$, it indicates good internal consistency; if $0.7 \leq \alpha < 0.8$, it indicates acceptable internal consistency; if $0.6 \leq \alpha < 0.7$, it indicates questionable internal consistency; if $0.5 \leq \alpha < 0.6$, it indicates poor internal consistency; and if $\alpha < 0.5$, it indicates unacceptable internal consistency. (Tavakol and Dennick, 2011).

Chapter Four: Results

4.1. Introduction

This chapter presents the descriptive and analytical results of the study on “The Arabic version of the Upper Extremity Functional Status module” of the “Orthotics and Prosthetics Users” to establish its psychometric properties. The researcher used non-parametric tests because the data was checked for normality, using Shapiro-Wilk, and the data is non-normal distributed.

4.2. Translation

Following Beaton et al. (2000)'s standards for the cross-cultural validation process, results for each stage were as follows:

Stage I, which was conducted by two independent translators; an assistant professor at the Allied Medical Faculty and an English teacher.

The first translator comments were as follows:

- (Not applicable) and (Cannot perform the activity) should be merged in one items as bot mean that the client was not able or did not do the activity.
- “Comb hair” use “comb hair” without using a brush
- Use the term "wear" instead of “put on”, “take off” instead of “remove”, and “dish” instead of a bowl.
- For item 12, I prefer to use the amount in ml instead of oz since this scale is not frequently used in Arabic countries”.

The second translator did not have any comments and found the survey easy to translate.

Stage II: Synthesis (T12)

The translators conducted stage I and the researcher, who presented as a recording observer, synthesis (T12), modified the following items and justified these changes. (see Table 4.1)

Table 4.1: Modified item in the UEFS

# of item	*Item title in the original version*	*Modified item*	*Justification*
11.	tr	Cut fruit/ vegetables with knife.	In Arabic culture, the use of a knife and fork is unusual.
12.	Pour from a 12 oz can.	Pour from a 250ml can (small can of cola)	The ml amount scale is most frequently used in Arabic countries.
18.	Dial a touch tone phone	Dial a number on mobile phone.	This changed to generalize the task for different mobile phones which have been used in the Arabic countries

In conclusion**,** Item 11: "Cut the meat with a knife and fork", was adapted to "Cut fruit/ vegetables with a knife", which was for adapting the item to the Arabic food rituals, as eating with hands is a common practice in traditional meals, food utensils like spoons and forks, particularly in more formal situations or for certain dishes like soups or rice. Since meat is usually cooked in bite-sized portions, knives are used less frequently (Heine, 2004).

Item 12: "Pour from a 12 oz can", was changed the unit of quantifier to "Pour from a 250ml can (small can of cola), because the "oz" uncommonly used unit in Arabic society, and the "ml" is the most common unit that is used, and the phrase "small can of cola" was added for more clarity.

Item 18: “Dial a touch-tone phone” to be “Dial a number on a mobile phone”, which generalized the task for different mobile phones which have been used by the Arabic population, which is highly recommended even in the original version of the UEFS assessment.

Stage III: Back translation

Back translators were native English speakers, they came out with an identical translation to the original questionnaire, except for the following items. (see Table 4.2)

Table 4.2: Modified items in Backward translation

# of item	*Item title in the original version*	*Backward translation*	*Justification*
22.	Stir in a bowel	Stir food	The same meaning\ synonyms.
25.	Twisted a lid off a small bottle.	Open a bottle cap of a small bottle.	The same meaning\ synonyms.
28.	Take bank note out of the wallet.	Take a bank card out of a wallet.	Synonyms.

However, the first back translator used continuous verbs (i.e. with “ing”) and justified his decision by commenting “We should use verbs with (ing) to be more formal”, and the second one justified her decision by commenting “Infinitive verbs are easier to be understood by patients, and formal language is not a priority”. However, these differences did not make any semantic changes to the items.

Stage IV: Expert committee.

The expert committee members were an assistant Professor and a lecturer of Allied Medical Sciences. After reviewing each translation (T1, T2, T12, BT1, BT2), they confirmed that (T12) is to be used as an Arabic final version of the UEFS. They also reviewed the study questionnaires and recommended excluding item 21 in the DASH questionnaire related to “sexual activity” because it is a sensitive topic to talk about in Arabic culture and it does not affect scoring.

Stage V: Test of the Prefinal Version

While the piloting phase was conducted in Palestine and Jordan in parallel, the participants from both countries, reported the terms and instructions of the assessments were clear, simple, and understood easily, and they didn't face any issues during filling out the questionnaires. Finally, this version was approved as the official Arabic translation of the UEFS since no significant issues were raised during the Prefinal version's testing.

4.3. Participants

The total participants were 50 from Palestine and Jordan, 27 of them (54%) were Palestinian, and 23 (46%) were Jordanian. The Characteristics of Participants showed that most participants (38, 76%) were male and married (32, 64%). Over half of the participants (27, 54%) have a school education or less. The participants' characteristics showed that most of them (32, 64%) were right-handed before their amputation, and accidents or trauma were the most frequent leading cause of amputation (34, 68 %).

Cosmetic prosthetics, focused on appearance, were the most popular choice in Palestine and Jordan (39, 78%), and more than three-quarters reported that they used their prostheses for more than one year (42, 84%). About the period between the onset and early fitting, almost half of the participants reported they had the first prosthesis within 1-2 years after the onset (24, 48%).

The age of participants, and duration since onset closed between the Palestinian and Jordanian Participants. The mean age among the Palestinian participants was 39.24(14.32) years old, and it was 34.26(12.83) years old for the Jordanian participants. The mean duration since onset for Palestinians was 187.22(156.69) months (15 years), and it was 199.26(149.57) months for Jordanians (16.5 years). (see Table 4.3).

Table 4.3: Illustration of the Descriptive data of the participants**.**

Variables		Total N	Palestine		Jordan	
			N	%	N	%
Gender of Participant	Male	38	22	81.50%	16	69.60%
	Female	12	5	18.50%	7	30.40%
Marital status	Single	18	7	25.90%	11	47.80%
	Married	32	20	74.10%	12	52.20%
Academic Achievement	School or less	27	14	51.90%	13	56.50%
	Diploma	9	7	25.90%	2	8.70%
	Bachelor	13	6	22.20%	7	30.40%
	Postgraduate	1	0	0%	1	4.30%
Work Type	Full time	15	6	22.2%	9	39.1%
	Part-time	4	1	3.7%	3	13%
	Free job	11	8	29.6%	3	13%
	Don’t work	20	12	44.5%	8	34.9%
Monthly income	Less than 700 NIS* (=135 JOD**)	12	7	25.90%	5	21.70%
	800- 1600 NIS (150- 300 JOD)	15	7	25.90%	8	34.80%
	1700- 2500 NIS (325- 480 JOD)	10	7	25.90%	3	13%
	2600- 3400 NIS (500- 650 JOD)	6	4	14.80%	2	8.70%

Variables		Total N	Palestine		Jordan	
			N	%	N	%
	More than 3500 NIS (=670 JOD)	7	2	7.40%	5	21.70%
Hand Dominance	Right	32	24	88.90%	18	78.30%
	Left	8	3	11.10%	5	21.70%
Cause of Amputation	Vascular diseases	5	4	14.80%	1	4.30%
	Accident or trauma	34	21	77.80%	13	56.50%
	Cancer or tumor	2	1	3.70%	1	4.30%
	Congenital Malformation	9	1	3.70%	8	34.80%
Level of Amputation	Partial hand	13	10	37%	3	13%
	Wrist articulation	8	5	18.50%	3	13%
	Transradial	16	5	18.50%	11	47.80%
	Elbow articulation	4	4	5%	0	0%
	Transhumeral	6	3	11.10%	3	13%
	Shoulder articulation	3	0	0%	3	13%
Rehabilitation Services	Yes***	29	15	55.60%	14	60.90%
	No	21	12	44.40%	9	39.10%
Prosthetic Type	Cosmetics	39	24	88.90%	15	65.20%
	Body-Power	2	1	3.70%	1	4.30%
	Electrical	9	2	7.40%	7	30.40%

Variables		Total N	Palestine		Jordan	
			N	%	N	%
Duration of Prosthetic Use	Less than 1 year	8	4	14.80%	4	17.40%
	More than a year	42	23	85.20%	19	82.60%
The period between the onset and early fitting	Less than 1 year	4	2	7.40%	2	8.70%
	1-2 years	24	13	48.10%	11	47.80%
	3-5 years	12	6	22.20%	6	26.10%
	More than 5 years	10	6	22.20%	4	17.40%
		Total N	N	M (SD)	N	M (SD)
	Age of participant	50	27	39.24(14.32)	23	34.26(12.83)
	Duration since the onset	50	27	187.22(156.69)	23	199.26(149.57)

*NIS: New Israeli Shekel (currency used in Palestine)

** JOD: Jordanian Dinar

***: Rehabilitation services: occupational therapy, physiotherapy, psychological therapy in combination with prosthetic services.

4.4. Construct Validity between DASH total score and UEFS total score

Spearman's Rank correlation coefficient investigates the relationship's strength and direction between two variables. It was used to determine the Construct Validity between the total score of the DASH score and the UEFS assessment's total score. The r_s = -0.84 (p = < 0.001), which shows a strong negative significant correlation between the total scores of the two assessments.

4.5. Test-Retest Reliability of UEFS

The Retest of the UEFS assessment was investigated in 30 participants after two weeks, 50% from each country, and the participants were selected randomly.

The intraclass correlation coefficient (ICC) was conducted to assess the test-retest reliability of the UEFS assessment over a two-week interval, and a high degree of reliability was found, the ICC for the UEFS total score was (0.976), indicating excellent reliability. This suggests that the UEFS assessment has high test-retest reliability over two weeks, indicating high stability over time.

4.6. Scale reliability

With a Cronbach's alpha of 0.950, the UEFS showed excellent internal consistency. This score exceeded the cutoff point of 0.90.

The majority of the items have a strong positive correlation with the overall scale, according to the item-total correlations, indicating that they contribute significantly to the

UEFS assessment, except item 23 “Put on and take off prosthesis or orthosis” has a low correlation (0.177), show that it isn’t consistent with the rest of the assessment.

The Cronbach's alpha values, if each item were deleted, suggest that the overall reliability of the scale slightly decreases by removing any single item, as all values are lower than 0.950, which indicates the items are contributing positively to the overall reliability.

Except for items: 8. “Tie shoelaces”, 19. “Use a hammer and nail”, 22. “Stir food”, and 23 “Put on and take off prosthesis or orthosis”, which slightly increased the Cronbach's alpha values over 0.950, indicated the items aren’t consistent with the rest of the assessment and may be lowering the overall reliability. (see table 4.4).

Table 4.4: Scale reliability if the items of the UEFS

# of item	Label of item	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	Wash face	45.82	0.642	0.949
2	Put toothpaste on brush and brush teeth	45.34	0.779	0.947
3	Brush/comb hair	45.66	0.758	0.948
4	Put on and take off shirt	45.5	0.637	0.949
5	Button shirt with front buttons	45	0.706	0.948
6	Attach zipper and zip jacket	44.68	0.813	0.946
7	Put on socks	45.56	0.655	0.948
8	Tie shoelaces	44.12	0.597	0.951
9	Drink from a paper cup	45.56	0.703	0.948
10	Use fork or spoon	45.16	0.72	0.947
11	Cut fruit/vegetables with knife	44.56	0.841	0.946
12	Pour from a 250 ml can (small can of cola)	45.52	0.724	0.947

13	Write name legibly	45.76	0.687	0.948
14	Use scissors	44.86	0.748	0.947
15	Open door with knob	45.68	0.706	0.948
16	Use a key in a lock	45.4	0.776	0.947
17	Carry laundry basket	45.36	0.75	0.947
18	Dial number on cell phone	45.94	0.675	0.949
19	Use a hammer and nail	44.24	0.537	0.951
20	Fold bath towel	45.38	0.72	0.947
21	Open an envelope	45.44	0.579	0.949
22	Stir food	45.96	0.509	0.95
23	Put on and take off prosthesis or orthosis	45.86	0.177	0.953

4.7. UEFS assessment (USE percentage)

The UEFS assessment had a part to indicate if the patient used their prosthesis, while they were performing the identified activities. According to the participants of this study, all of them reported they didn't use their prostheses to put them on, because all of the participants were unilateral amputees.

Over half of the participants reported that they use their prostheses to take bank cards out of their wallet (56%) and to carry a laundry basket (52%), in combination, 44% of participants reported using their prostheses to sharpen a pencil and open a cap on the small bottle. While 40% of participants used their prostheses to cut fruit\vegetables with a knife, use scissors, fold a bath towel, open an envelope, and peel potatoes (or fruit) with a knife \peeler. The item "Wash face" has a high percentage of not using according to the participants (96%), followed by "Brush\comb hair" and "Dial number on cell phone" with a percentage (86%), and "Put on socks", "Use a fork or spoon" and "Write name legibly" with a percentage (82%). Shown in Figure 4.1.

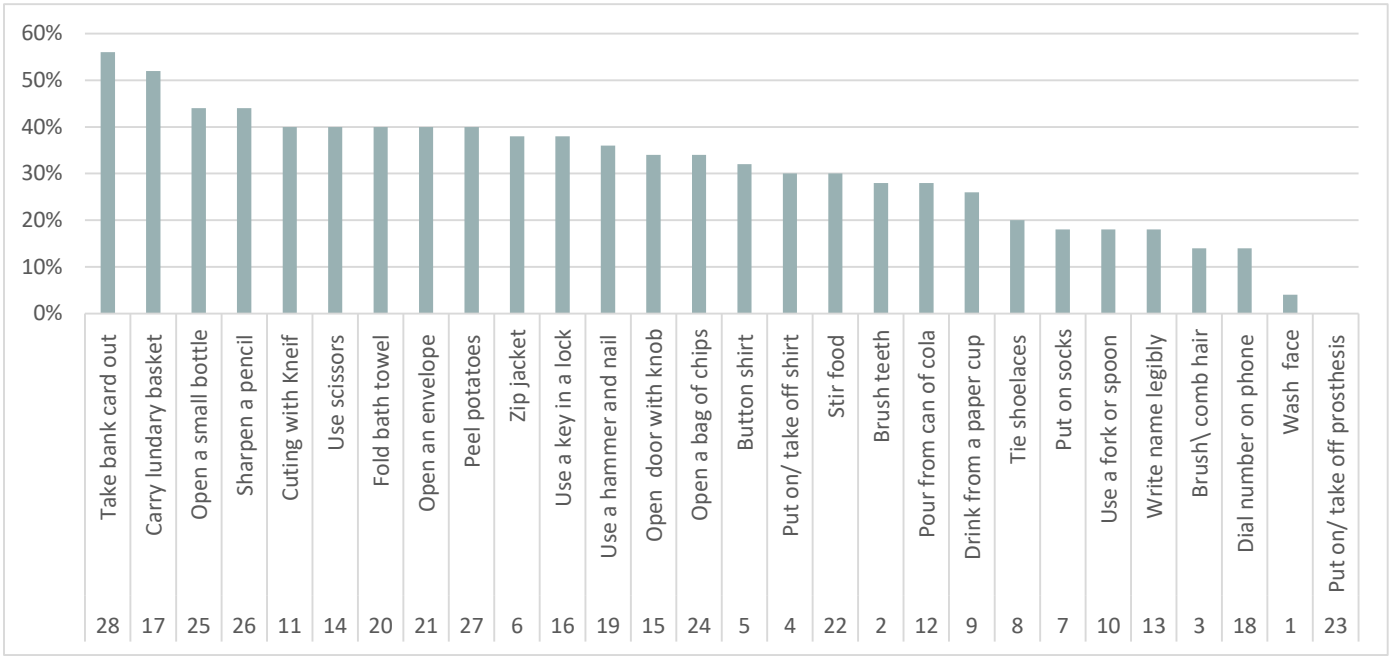

Figure 4.1: UEFS assessment (Use Percentage)

4.8. Participants characteristics in correlation with the total score of UEFS

4.8.1. Gender of the participants

The independent sample t-test was used to compare the males and females for differences in the total score of the DASH and the UEFS total score. For the Total score of the DASH, there were no significant differences between the two groups (t (48) = 1.537, *p* = 0.131) in the scores with a mean score of males (M= 62.5, SD= 25.53), and for the female (M=49.91, SD=21.76).

While the total score of the UEFS showed significant differences between the two groups, (t (48) = -2.466, p = 0.017) in the scores with a mean score of the male group was (M= 64.34, SD= 17.41), and for the female (M=78, SD=14.18). (see Table 4.5)

Table 4.5: Gender Differences on the DASH and UEFS Total Scores

		Mean	t	f	Mean Difference	P value
Total score of DASH	Male	62.50	1.537	48	12.58333	0.131
	Female	49.91				
Total score of UEFS	Male	64.34	-2.466	48	-13.658	0.017
	Female	78.00				

Note: DASH = Disabilities of the Arm, Shoulder, and Hand; UEFS = Upper Extremity Functional Scale

4.8.2. Age of participants

The total score of the UEFS assessment was assessed in the correlation of participant's age, to investigate the relationship between them, and the result indicates that there is a moderate negative significant correlation between them (r_s= -0.43, p=0,002 <0.05), as the age increases the total score of the UEFS decreases.

Chapter Five: Discussion

This study aimed to describe the cross-culture validation and translation of the UEFS into the Arabic language and to establish the psychometric properties of the new version. The findings of this study found that the Arabic UEFS was reliable and valid among Arabic – speaking clients with unilateral upper extremity amputees who used prostheses.

The rigorous process of translation by Beaton et al (2000) resulted in few discrepancies between the translated version and the original English version. The mismatch between the back translated items and the English version were related primarily to synonyms in the English language. These types of issues are expected to arise in the process of translation of an assessment tool (Geisinger, 1994). All discrepancies that were identified in the back translation and pilot study were resolved prior to data collection. Some adaptations of items were also required to ensure cultural validity such as using "ml" instead of "oz" as the metric system is more popular in the Arabic region. The changes that were made reflected on the appropriateness of the Arabic UEFS survey as no comments regarding clarity or relevance of the items aroused during data collection.

The result of the study shows that the percentage of males who had an upper limb amputation was more than females in both countries, Palestine and Jordan, which correlated with many studies that indicate that males are more vulnerable to having an upper limb amputation. Dillingham et al. found that Men are considerably more susceptible to traumatic amputation around 6.6 times more frequently than women (Dillingham et al., 2002a), which matched the study of Kurucan et al., who found that men are 4 times more vulnerable to upper limb amputation (Kurucan et al., 2020). In the United States of America,65% of amputation prevalence in men (Ziegler-Graham et al., 2008).

The results of the study showed that more than half of the participants were school-educated or less, while the main cause of amputation was trauma or accident (Ziegler-Graham et al., 2008) because those who had a school-educated or less, commonly chose vocational work as their main income source. This was mentioned by Crowe et al. in their systematic review study which was conducted to provide a comprehensive overview of the

prevalence, incidence, and trends of hand, wrist, and digit amputations worldwide, and he found that the risk of digit amputation, hand and wrist injuries is significantly increased in the job environment that involving physical labor, and machinery (Crowe et al., 2020).

The most common prosthetic type among the participants of this study was cosmetic prosthesis because it enhances the body image and is the cheapest choice, even thus the limited range of freedom affordable by cosmetic prosthesis, and that is compatible with the result of Dudkiewicz et al.'s study, 31 (73.9%) patients use of a cosmetic prosthesis (Dudkiewicz et al., 2004).

For the rehabilitation services combined with the prosthetic services, 44.40% of the participants in this study reported they didn't receive any rehabilitation services, and just connected with their prosthetist for fitting, which affected the level of functionality, and minimized the effectiveness of the prosthesis. According to Brack and Amalu, many challenges faced upper extremity prosthetic users include addressing problems with the devices' long-term wearability and maintenance and refining the prosthetics' intuitive control and sensory feedback systems. To overcome these challenges the researcher emphasizes the significance of an interdisciplinary approach combining engineers, medical specialists, and users themselves. (Brack and Amalu, 2021). Besides, the systematic review conducted by Soyer et al., whose findings suggest that prosthetic rehabilitation is particularly promising, offering significant benefits in terms of physical and psychological recovery for those affected (Soyer et al., 2016).

According to the participants of this study, 48% reported they had their prosthesis within 1-2 years after the onset, on the other hand, 20% of the participants had their prosthesis after more than 5 years because 18% of the participants had a congenital malformation in the hand. Even thus, contrary to the previous studies, when the kids were old enough to sit on their own, upper-limb prosthetics were fitted for them. Developmentally, this happens most often between the ages of six and ten months. Two Fitting before the age of two years is less likely to result in prosthesis rejection than fitting after the age of two, according to studies (Shaperman et al., 2003).

5.1. Construct Validity between DASH total score and UEFS total score

The negative significant strong correlation between the total scores of the Arabic UEFS and the DASH's total score - which is a valid and reliable measure in the Arabic language-, positively indicated that the UEFS reflects the clinical picture of the client similar to the DASH. The negative sign is due to the score direction of each tool as higher scores on the DASH indicates higher levels of disability which are reflected by lower scores on the UFES.

5.2. Test-Retest Reliability of UEFS

The test re-test of Arabic UEFS had a high degree of reliability (ICC = 0.976), following the guidelines of Koo and Li, which indicated a high test-retest reliability because the ICC score was close to 1 (Koo and Li, 2016), these results match the Swedish validation study, as the ICC = 0.89 for the UEFS module of the Swedish OPUS, indicating good reliability in the Koo and Li reporting reliability guidelines (Jarl et al., 2014). That reflects the reliability of the Arabic version of the UEFS assessment to use in the clinic and indicates the functionality level change over time.

5.3. Scale reliability

Also, the Scale reliability of the Arabic version of UEFS was tested, it had a score of $\alpha = 0.950$, which reflects the consistency between the items of the Arabic version of the UEFS, except the item 23 "Put on and take off prosthesis or orthosis" has a low correlation

(0.177), but it can be justified because the participants of this research were unilateral amputee, so the participants didn't use the prosthesis in this activity.

The Cronbach's alpha values for each item- if deleted indicate that items of the Arabic UEFS were contributing positively to the overall reliability. Expect items: 8. "Tie shoelaces", 19. "Use a hammer and nail", 22. "Stir food", which are bilateral activity and is reported as the most difficult activity by the upper extremity amputees (Jang et al., 2011).

5.4. UEFS assessment (USE percentage)

Examining the items that revealed high-frequency use such as "take bank cards out of their wallet", "carry a laundry basket" and "25- sharpen a pencil", revealed that most of these items require bilateral use of the upper extremity and it would be very difficult to carry out these items with only one upper extremity. While items with low percentage use such as "Brush\comb hair", "Use a fork or spoon" and "Write name legibly" are activities commonly done unilaterally.

5.5. Participant's characteristics in correlation with the total score of UEFS

2.3.1. Gender of the participants

By comparing, differences in the total score of the DASH and the UEFS total score based on gender, the total score of DASH showed no significant differences, while the total score of the Arabic UEFS showed significant differences based on gender, as the female had a higher score than males, which indicate a higher level of independency. The contrary to the Mohammed and Shebl study. According to their study, physical and psychological elements of limb amputation are greatly affected, and gender and the site of the amputation

play important roles. The experiences of men and women differed, with males often having a higher quality of life (QOL) than women (Mohammed and Shebl, 2014).

2.3.2. Age of participants

The correlation between the total score of the UEFS and age was assessed, the results of this study indicate a moderate negative significant correlation, as the age increases the total score of the UEFS decreases. These results could be explained as the younger population's prosthetic functionality impacts job performance and independence, focusing on enhancing productivity and autonomy. For the older one, age-related health issues such as arthritis or reduced physical strength may affect prosthesis use and the prosthetic use to support independence (Cordella et al., 2016). As the most of the cases involved upper limb amputation of middle-aged men (Pomares et al., 2018).

5.6. Limitation

The main Limitation is a small sample size, that affects the variation in the prosthetic types, and the variation of present amputees with different amputation levels. The variation in the prosthetics type isn’t sufficient to assess the effects of each type on the level of functionality, which is reflected by the total score of the UEFS assessment. The functionality level of an amputee of an upper limb is determined by the level of amputation (Diane W. Braza, 2020). In this research, due to the small sample size which limits the variation, the correlation between the level of amputation and functionality shows no significant differences.

5.7. Future Research Recommendations

The research recommendation is to validate the UEFS assessment with a large sample (>100) to conduct a Factorial and Rach analysis and find out the factors that affect the functionality and independence level of the upper limb prosthetic users.

5.8. Conclusion

The New Arabic version of the UEFS assessment is valid and reliable among Arabic-speaking patients with unilateral upper extremity prosthetic users. The psychometric properties of the Arabic version of the UEFS indicate its promising tool for assessing the aspects of self-care and IADL from the patient's perspective, and it showed a high degree of reliability that indicates the assessment's ability to monitor the progress and change in the functionality throw the rehabilitation process.

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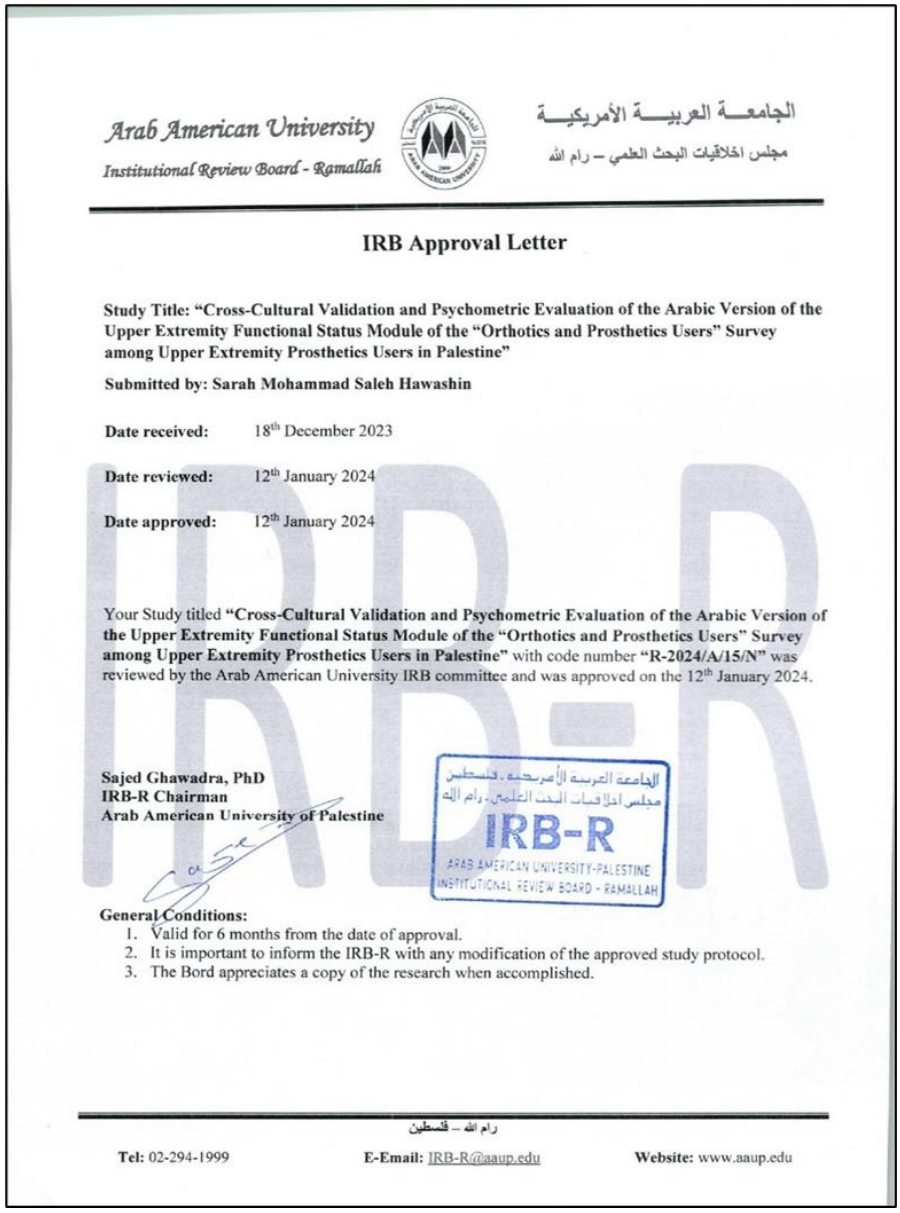
Appendices

Appendix 1: IRB approval



Arab American University
Institutional Review Board - Ramallah

الجامعـــة العربيـــة الأمريكيـــة
مجلس اخلاقيات البحث العلمي – رام الله

IRB Approval Letter

Study Title: "Cross-Cultural Validation and Psychometric Evaluation of the Arabic Version of the Upper Extremity Functional Status Module of the "Orthotics and Prosthetics Users" Survey among Upper Extremity Prosthetics Users in Palestine"

Submitted by: Sarah Mohammad Saleh Hawashin

Date received: 18th December 2023

Date reviewed: 12th January 2024

Date approved: 12th January 2024

Your Study titled **"Cross-Cultural Validation and Psychometric Evaluation of the Arabic Version of the Upper Extremity Functional Status Module of the "Orthotics and Prosthetics Users" Survey among Upper Extremity Prosthetics Users in Palestine"** with code number **"R-2024/A/15/N"** was reviewed by the Arab American University IRB committee and was approved on the 12th January 2024.

Sajed Ghawadra, PhD
IRB-R Chairman
Arab American University of Palestine

الجامعة العربية الأمريكية - فلسطين
مجلس اخلاقيات البحث العلمي - رام الله
IRB-R
ARAB AMERICAN UNIVERSITY-PALESTINE
INSTITUTIONAL REVIEW BOARD - RAMALLAH

General Conditions:
1. Valid for 6 months from the date of approval.
2. It is important to inform the IRB-R with any modification of the approved study protocol.
3. The Bord appreciates a copy of the research when accomplished.

رام الله – فلسطين
Tel: 02-294-1999 **E-Email:** IRB-R@aaup.edu **Website:** www.aaup.edu

Appendix 2: The UEFS's translation permission

RE: Permission to translation of UEFS module of OPUS into Arabic language

Allen Heinemann <aheinemann@sralab.org>

Tue 2023-05-09 0:52

To:Sarah Mohammad Saleh Hawashin <s.hawashin1@student.aaup.edu>

3 attachments (1 MB)

OPUS UP Scoring Guide 6 June 2016.pdf; OPUS Upper Extremity Functional Status.pdf; DDT-15-Attachment-1.pdf;

Dear Sarah,
Thank you for your interest in the Orthotics Prosthetics User Survey (OPUS). I am happy to have you use OPUS for your clinical and research needs without charge. In exchange, I would appreciate acknowledgement by including the copyright symbol on each form and your feedback on the utility of OPUS and information on how you have used it. We report this information to our funding agency, the National Institute on Disability, Independent Living, and Rehabilitation Research in anonymous form. If you change the items, don't call the form "OPUS."
Attached to this email are PDF versions of the OPUS modules, including:

1. Upper Extremity Function
2. Upper Extremity Function Scoring Guide

Because OPUS upper extremity modules has undergone recent revision, we do not yet have a large enough sample to calculate new norms for all the items. Use only the items listed on the scoring guide when computing a score. We will revise the scoring guide once we have additional data. We would be glad to include any data you collect in a new sample.

I encourage you to adopt the translation and cultural adaptation procedures used by PROMIS. "If translated into another language, translation of items and instruments should include both forward and backward translations of all items and response choices as well as instructions. Translation of items, response choices and instructions should be obtained through an iterative process of forward and back-translation, bilingual expert review, and pre-testing with cognitive debriefing. Harmonization across all languages and a universal approach to translation should guide the process." See Appendix 14 of the attached document.

Again, thank you for your interest in OPUS. I welcome the opportunity to answer your questions and explore collaborative opportunities.
Sincerely,

Allen Heinemann, PhD
Director, Center for Rehabilitation Outcomes Research @ Shirley Ryan AbilityLab
Professor, Physical Medicine and Rehabilitation, Feinberg School of Medicine @ Northwestern University

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Pronouns | He, Him, His

Appendix 3: Research Questionnaires

رقم المشترك	
التاريخ	
الموقع	

التحقق عبر الثقافات و قياس مؤشرات التقنين للنسخة العربية من تقييم الحالة الوظيفية للطرف العلوي في استطلاع "مستخدمي الأجهزة التقويمية والأطراف الاصطناعية" بين مستخدمي الأطراف الاصطناعية العلوية في فلسطين والأردن.

استبيانات الدراسة

سارة حواشين , طالبة ماجستير

الجامعة العربية الامريكية -فلسطين

R-2024/A/15/N

القسم الأول: استبيان المعلومات الديموغرافية

قم بوضع إشارة ✓ داخل ☐ الذي يمثل الإجابة المناسبة.

أ. الجنس

☐ ذكر

☐ أنثى

ب. العمر: _____

ت. ما هي حالتك الاجتماعية:

☐ أعزب \ عزباء

☐ متزوج \ة

☐ مطلق\ة

☐ أرمل\ة

ث. التحصيل الأكاديمي:

☐ الشهادة الثانوية (توجيهي) أو أقل

☐ درجة الدبلوم أو معهد

☐ درجة البكالوريوس

☐ درجة الماجستير

☐ درجة الدكتورة أو أعلى

ج. ما هي طبيعة عملك في الوقت الحالي:

☐ وظيفة بدوام كامل

☐ وظيفة بدوام جزئي

☐ عمل خاص أو حُر

☐ طالب جامعي

☐ ربة منزل

☐ لا أعمل حالياً

ح. ما هو مقدار الدخل الشهري لك:

☐ أقل من 700 ₪ (135 دينار أردني).

☐ 800–1600 ₪ (150-300 دينار أردني).

☐ 1700–2500 ₪ (325-480 دينار أردني).

☐ 2600–3400 ₪ (500-650 دينار أردني).

☐ أكثر من 3500 ₪ (670 دينار أردني).

خ. حدد يَدك الرئيسية (اليد المستخدمة للكتابة قبل الإصابة):

☐ اليد اليمنى

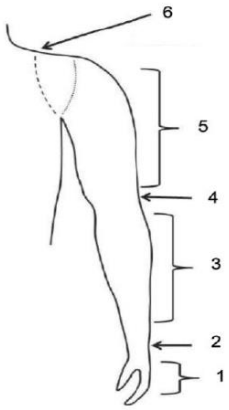
☐ اليد اليسرى

R-2024/A/15/N

د. ما هو سبب الإصابة:

☐ حروق
☐ أمراض الأوعية الدموية
☐ إصابة أو حادث
☐ مرض السكري
☐ ورم أو سرطان
☐ تشوهات خلقية
☐ أخرى

الرجاء التحديد: _____



ذ. درجة الإصابة (مكان البتر):

☐ 1. البتر في جزء من اليد (أصابع)
☐ 2. البتر في مستوى رسغ اليد
☐ 3. البتر في منطقة الساعد
☐ 4. البتر في مستوى مرفق اليد
☐ 5. البتر في منطقة الذراع
☐ 6. البتر في مستوى الكتف

ر. تاريخ حدوث الإصابة؟: _____

ز. المدة بين الإصابة وتركيب الطرف الاصطناعي؟: _____ (أسبوع/ شهر/ سنة)

س. ما هي خدمات التأهيل التي تلقيتها (يمكنك اختيار أكثر من خيار):

☐ علاج وظيفي
☐ علاج طبيعي
☐ علاج نفسي
☐ خدمات الأطراف الصناعية

ش. ما نوع الطرف المستخدم؟

☐ طرف تجميلي

☐ طرف يعمل بطاقة الجسم

☐ طرف كهربائي

ص. كم من الزمن وأنت تستخدم\ي الطرف الصناعي؟

☐ أقل من أسبوع
☐ أسبوع – ثلاثة أسابيع
☐ شهر – شهرين
☐ ثلاث أشهر- أربع شهور
☐ أربعة أشهر – ستة أشهر
☐ ستة أشهر – سنة
☐ أكثر من سنة

R-2024/A/15/N

القسم الثاني: استبيان إعاقات الذراع والكتف واليد

الرجاء أن تقيّم قدرتك على فعل النشاطات التالية خلال الأسبوع الماضي، وذلك بوضع دائرة حول الرقم الذي يقع تحت الجواب المناسب.

	بلا صعوبة	بصعوبة خفيفة	بصعوبة متوسطة	بصعوبة شديدة	غير قادر
1. أن تفتح علبة جديدةً أو مُحكَمةَ الإغلاق.	1	2	3	4	5
2. أن تكتب.	1	2	3	4	5
3. أن تبرمَ/ تدير مفتاحا (مثل أن تدير مفتاح السيارة لتشغيلها).	1	2	3	4	5
4. أن تُحضرّ/ تعد وجبةَ طعام.	1	2	3	4	5
5. أن تدفع لتفتحَ باباً ثقيلاً.	1	2	3	4	5
6. أن تضع شيئاً ما على رف فوق مستوى رأسك.	1	2	3	4	5
7. أن تقوم بأعمال المنزل الثقيلة (مثل غسل الحيطان أو إزاحة الأثاث أو سواها من الأشياء الثقيلة)	1	2	3	4	5
8. أن تعملَ في الحديقة أو في فناء الدار.	1	2	3	4	5
9. أن ترتب السرير.	1	2	3	4	5
10. أن تحمل كيس التسوق أو حقيبة الوثائق.	1	2	3	4	5
11. أن تحمل غرضاً ثقيلاً (يزيد وزنه عن عشرة أرطال، أو أربعة كيلوغرامات و نصف)	1	2	3	4	5
12. أن تغيّر لمبة المصباح مِن فوقِ رأسك.	1	2	3	4	5
13. أن تغسل شعرك أو تنشفه بالمجفف الهوائي.	1	2	3	4	5
14. أن تغسل ظهرك.	1	2	3	4	5
15. أن تلبس كنزه/ثوب/بلوزه (سترةً ذات أكمام طويلة)	1	2	3	4	5
16. أن تستخدم سكيناً لتقطيع الطعام.	1	2	3	4	5
17. أن تقوم بنشاطات ترفيهية تتطلب جهداً خفيفاً(مثل لعب الشطرنج أو سواها من الألعاب الأخرى)	1	2	3	4	5

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18.أن تقوم بنشاطات ترفيهية تبذل فيها بعض القوة أو الدفع عبر ذراعك أو كتفك أو يدك (مثل لعب التنس أو سواها من الألعاب الأخرى).	1	2	3	4	5
19.أن تقوم بنشاطات ترفيهية تحرك فيها ذراعك بحرية (مثل لعب رمي القرص أو الفريسبي أو سواهما من ألعاب مماثلة)	1	2	3	4	5
20.أن تتنقل بالمواصلات من مكان لآخر (أن تتنقل بمساعدة أعضاء جسدك العلوية الإمساك بمقود السيارة)	1	2	3	4	5

	لا أبداً على الإطلاق	بشكل طفيف	بشكل متوسط	كثيراً	بشكل بالغ للغاية
21.خلال الأسبوع الماضي، هل أثرت المشكلة في ذراعك أو كتفك أو يدك بنشاطاتك الاجتماعية العادية مع عائلتك، أو أصدقائك، أو جيرانك، أو زملائك بالمهنة/النادي الاجتماعي؟ (ضع دائرة حول الرقم المناسب)	1	2	3	4	5

	غير محدود على الإطلاق	محدود بشكل طفيف	محدود بشكل متوسط	محدود جداً	غير قادر
22.خلال الأسبوع الماضي، هل أثرت المشكلة في ذراعك أو كتفك أو يدك بنشاط عملك أو أي نشاطات يومية اعتيادية أخرى؟ (ضع دائرة حول الرقم المناسب)	1	2	3	4	5

الرجاء تقدير شدة العوارض التالية التي أحسست بها خلال الأسبوع الماضي (ضع دائرة حول الرقم المناسب).

	لا يوجد	قليلاً	بشكل متوسط	بشدة	بشدة بالغة للغاية
	1	2	3	4	5
23. وجع/ ألم/عوار في الذراع، أو الكتف، أو اليد.					
24. وجع/ ألم/ عوار في الذراع، أو الكتف، أو اليد حينما أدّيت أي نشاط مُعيّـن.	1	2	3	4	5
25. وخز (مثل وخز الدبابيس و الإبر) في ذراعك، أو كتفك، أو يدك.	1	2	3	4	5
26. ضعف في ذراعك، أو كتفك، أو يدك.	1	2	3	4	5
27. تيبّس/ تصلب في ذراعك، أو كتفك، أو يدك.	1	2	3	4	5

	لا صعوبة	صعوبة خفيفة	صعوبة متوسطة	صعوبة شديدة	صعوبة بالغة الشدة بحيث لا أقدر على النوم
28.خلال الأسبوع الماضي، كم كانت صعوبة نومك بسبب الوجع/ألم/عوار في ذراعك، أو كتفك، أو يدك؟ (ضع دائرة حول الرقم المناسب)	1	2	3	4	5

	لا أوافق بشدة	لا أوافق	لستُ موافقاً ولا مُعترضِاً	أوافق	أوافق بشدة
29.أشعر بأني أقلُّ ثقةً بنفسي وذلك بسبب مشكلة ذراعي، أو كتفي، أو يدي (ضع دائرةً حول الرقم المناسب).	1	2	3	4	5

لا يمكن حساب إجمالي الدرجات في مقياس إعاقات الذراع والكتف واليد إذا تجاوز عدد البنود الناقصة ثلاثة بنود.

القسم الثالث: دراسة لمستخدمي تقويم العظام والاطراف الاصطناعية الوضع الوظيفي المتطرف العلوي

I. يرجى الإشارة إلى الطرف (الأطراف) المصابة: ❍ذراع أيسر ❍ذراع أيمن ❍كلا الذراعين

II. كم ساعة في اليوم ترتدي في الوقت الحالي طرفك الاصطناعي أو جهاز التقويم؟

III .باستخدام المقياس على اليمين، من فضلك وضح كيف يمكنك بسهولة أداء الأنشطة التالية.	سهل جدا	سهل	صعب بعض الشيء	صعب جدا	لا يمكن أن يؤدي نشاط	غير قابل للتطبيق	IV .هل بالعادة تقوم بهذا النشاط باستخدام الطرف الاصطناعي الخاص بك أو الدعامة؟	
							يستخدم	لا يستخدم
1.غسل الوجه								
2.وضع معجون الأسنان على الفرشاة وتنظيف الأسنان								
3. تمشيط الشعر								
4.إرتداء القميص وخلعه								
5.تزرير الأزرار الأمامية للقميص								
6.شبك سحاب السترة بمكانه وسحبه								
7.لبس الجوارب								
8.ربط الحذاء								
9.الشرب باستخدام كوب ورقي								
10.استخدام الشوكة أو المعلقة								
11.تقطيع الفواكه\ الخضار باستخدام السكين								
12.صب من علبة 250 مل (علبة كولا صغيرة)								
13.يكتب اسم بشكل مقروء								
14.استخدام المقص								
15.فتح الباب بالمقبض								
16.استخدام المفتاح في القفل								
17.حمل سلة الغسيل								
18.طلب رقم باستخدام الهاتف المحمول								
19.استخدام المطرقة ومسمار								
20. طيّ منشفة حمام								
21.فتح مغلف								
22.تحريك الطعام								

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III .باستخدام المقياس على اليمين، من فضلك وضح كيف يمكنك بسهولة أداء الأنشطة التالية.	سهل جدا	سهل	صعب بعض الشيء	صعب جدا	لا يمكن أن يؤدي نشاط	غير قابل للتطبيق	IV. هل بالعادة تقوم بهذا النشاط باستخدام الطرف الاصطناعي الخاص بك أو الدعامة؟	
							يستخدم	لا يستخدم
23.ارتداء الطرف الصناعي أو الجبيرة ونزعها								
24.فتح كيس رقائق الشبس باستخدام كلتا اليدين								
25.فتح غطاء قنينة صغيرة								
26.برّي قلم رصاص								
27.تقشير البطاطس (أو الفواكه) باستخدام سكين \مقشرة.								
28.إخراج بطاقات البنك من المحفظة.								

"التحقق من صحة النسخة العربية من وحدة الحالة الوظيفية للطرف العلوي في استبيان "مستخدمي الأجهزة التقويمية والأطراف الاصطناعية" بين مستخدمي الأطراف الاصطناعية أحادية الجانب للطرف العلوي في فلسطين والأردن".

سارة محمد صالح حواشين

أسماء أعضاء اللجنة:

البروفيسورة سناء أبو ذهب

الدكتورة مجد جرار

الدكتور هشام عرب الكعبية

ملخص

الخلفية: استبيان مستخدمي التقويمات والأطراف الاصطناعية (OPUS) هو مقياس نتائج لتقييم ممارسات المرضى مع التقويمات والأطراف الاصطناعية. يحتوي على خمس وحدات: الرضا عن الأجهزة (CSD)، والرضا عن الخدمات (CSS)، ومؤشر جودة الحياة المرتبطة بالصحة (HR-QOL)، والحالة الوظيفية للطرف العلوي (UEFS)، والحالة الوظيفية للطرف السفلي (LEFS).

وحدة الحالة الوظيفية للطرف العلوي (UEFS) هي تقييم ذاتي لمستخدمي الأطراف الاصطناعية العلوية يغطي الرعاية الذاتية والنشاط الآلي للحياة اليومية، مصمم خصيصًا لتقييم مستخدمي الأطراف الاصطناعية العلوية. يستغرق إكماله عادةً من 10 إلى 15 دقيقة.

حتى الآن، لم يتم تقييم الخصائص السيكومترية للنسخة العربية من استبيان الحالة الوظيفية للطرف العلوي مع مستخدمي الأطراف الاصطناعية العلوية.

الهدف: أجريت هذه الدراسة لترجمة وحدة الحالة الوظيفية للطرف العلوي (UEFS) من استبيان "مستخدمي تقويم العظام والأطراف الصناعية" (OPUS) إلى نسخة عربية وتأسيس خصائص سيكومترية بين مستخدمي الأطراف الصناعية للطرف العلوي في فلسطين والأردن.

الطرق: تمت ترجمة وحدة الحالة الوظيفية للطرف العلوي إلى استراتيجية المتابعة باللغة العربية Beaton, Bombardier et al.، التي أجريت مع 50 مشاركًا استخدموا أطرافًا صناعية للطرف العلوي، وتم تحديد الخصائص السيكومترية للنسخة العربية من وحدة الحالة الوظيفية للطرف العلوي (UEFS)، وتم إجراء اختبار إعادة الاختبار وموثوقية الاتساق الداخلي للنسخة العربية المترجمة، وفحص الصلاحية المتزامنة بين وحدة DASH ووحدة الحالة الوظيفية للطرف العلوي (UEFS).

تصميم الدراسة: هذه دراسة تحقق مقطعية متعددة المراكز لتقييم الخصائص السيكومترية للنسخة العربية الجديدة من وحدة الحالة الوظيفية للطرف العلوي (UEFS).

النتائج: كانت صلاحية بناء UEFS العربية باستخدام DASH–English ذات دلالة إحصائية ($p < .005$)، وكانت موثوقية إعادة الاختبار ممتازة مع ICC 0.976. وكان ألفا كرونباخ لـ UEFS العربية 0.95، مما يشير إلى ثبات داخلي ممتاز.

الاستنتاج: كانت النسخة العربية من UEFS صالحة وموثوقة لتقييم مستخدمي الأطراف الاصطناعية في الأطراف العلوية للمرضى الناطقين باللغة العربية، ويمكن استخدامها لتقييم المرضى، ضمن الممارسة القائمة على الأدلة.

الكلمات المفتاحية: الموثوقية، الصلاحية، البتر، الطرف العلوي، الأطراف الاصطناعية.