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THE ADOPTION OF UPPER EXTREMITY PROSTHESIS OF UNILATERAL UPPER EXTREMITY AMPUTEES

SUCHITPORN SEEPHAN

With compliments
of
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

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Suchitporn Seephan

Miss Suchitporn Seephan
Candidate

Pimpa Kachondha

Lect. Pimpa Kachondham, Ph.D
Major – Advisor

Wilai Kusolvisitkul

Assoc. Prof. Wilai Kusolvisitkul, M.Sc.
Co – Advisor

Piyavit Sorachaimaetha

Dr. Piyavit Sorrachaimaetha, M.D.
Co – Advisor

Liangchai Limlomwongse

Prof. Liangchai Limlomwongse, Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

Pimpa Kachondha

Lect. Pimpa Kachondham, Ph.D
Chair
Master of Arts Programme in Rehabilitation Service for Persons with disabilities
Ratchasuda College
Mahidol University

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was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Arts (Rehabilitation Service for persons with disabilities)
on May 16, 2002

Suchitporn Seephan

Miss Suchitporn Seephan
Candidate

Pimpa Kachondha

Lect. Pimpa Kachondham, Ph.D
Chair

Wilai Kusolvisitkul

Assoc. Prof. Wilai Kusolvisitkul, M.Sc.
Member

Kamontip Harnphadungkit

Assoc. Prof. Dr. Kamontip Harnphadungkit
M.Sc.
Member

Piyavit Sorachaimetha

Dr. Piyavit Sorrachaimaet, M.D.
Member

Liangchai Limlomwongse

Prof. Liangchai Limlomwongse, Ph.D.
Dean
Faculty of Graduate Studies

Jitprapa Sri-on

Lect. Jitprapa Sri-on, Ph.D
Director
Ratchasuda College
Mahidol University

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Suchitporn Seephan

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This research is a survey study aimed at understanding the adoption of an upper extremity prosthesis by unilateral upper extremity amputees and the factors associated with this adoption. The study was conducted on 155 samples, selected by a simple random sampling method from the lists of unilateral amputees with workable correspondence addresses who used to received the services for fitting the upper extremity prosthesis from the Prosthesis-Orthosis Unit of Lerdsin Hospital, Siriraj Hospital, King Mongkut Hospital, and Workers' Rehabilitation Center. The data were collected by questionnaire. The questionnaire was adapted from Everette M. Rogers' Theory and the US National Survey on the Abandonment of Assistive Technology for the Persons with Disabilities. Data analyses were performed in terms of percentage means, standard deviation, Chi-square statistics, and binary logistic regression statistics.

The results showed that the majority of the unilateral amputees (63.2% of the samples under study) adopted the use of an upper extremity prosthesis while the remaining 36.8% were non-adopters. The factors associated with the adoption of upper extremity prosthesis of unilateral amputees were found to be the numbers of prosthetics received, the perception about the relative advantages, and the complexity in the device used. Meanwhile, the compatibility, trialability, observability, consumer involvement and change in the consumers had no correlation to the adoption of an upper extremity prosthesis by unilateral upper extremity amputees.

Certain recommendations are drawn from the implications of these research findings. Particular consideration should be given to various factors related to providing assistive devices to unilateral amputees, especially the relative advantage in terms of performance of daily activities and conducting normal living in the community including the weight of the prosthesis, wearing and removing the prosthesis, and care and convenience in having it repaired.

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การวิจัยครั้งนี้เป็นการวิจัยเชิงสำรวจ โดยมีวัตถุประสงค์เพื่อศึกษาสภาพการยอมรับแขนเทียมของคนพิการแขนขาดข้างเดียว และเพื่อศึกษาปัจจัยที่มีความสัมพันธ์กับการยอมรับแขนเทียมของคนพิการแขนขาดข้างเดียว ที่เข้ารับบริการแขนเทียมจากหน่วยกายอุปกรณ์ของโรงพยาบาลเลิดสิน โรงพยาบาลศิริราช โรงพยาบาลพระมงกุฎเกล้า และศูนย์ฟื้นฟูสมรรถภาพคนงาน จำนวนทั้งสิ้น 155 คน โดยใช้วิธีสุ่มตัวอย่างแบบมีระบบ (Systematic Sampling) จากรายชื่อคนพิการแขนขาดข้างเดียวที่มีชื่อและที่อยู่ที่สามารถติดต่อได้ เก็บข้อมูลโดยการส่งแบบสอบถามด้วยตนเองบางส่วนและส่งทางไปรษณีย์เป็นส่วนใหญ่ ซึ่งเป็นแบบสอบถามที่สร้างขึ้นจากการประยุกต์ทฤษฎีของ Everett M. Rogers และแบบสำรวจแห่งชาติของประเทศสหรัฐอเมริกาเกี่ยวกับการเลิกใช้อุปกรณ์ช่วยของคนพิการ วิเคราะห์ข้อมูลด้วยสถิติค่าร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตราฐาน สถิติไคว์สแควร์ และสถิติถดถอยโลจิสติกแบบไบนารี่

ผลการวิจัยพบว่าคนพิการแขนขาดข้างเดียวส่วนใหญ่ยอมรับแขนเทียมมากกว่าไม่ยอมรับแขนเทียม คิดเป็นร้อยละ 63.2 และ 36.8 ตามลำดับ โดยปัจจัยที่มีความสัมพันธ์กับการยอมรับแขนเทียมของคนพิการแขนขาดข้างเดียวคือจำนวนครั้งที่ได้รับแขนเทียม ความคิดเห็นด้านประโยชน์เชิงเทียบ และความยุ่งยากซับซ้อน ส่วนความเข้ากันได้ การได้ทดลองใช้ การสังเกตเห็นผลได้ การมีส่วนร่วมและการเปลี่ยนแปลงความต้องการ ไม่มีความสัมพันธ์กับการยอมรับแขนเทียมของคนพิการแขนขาดข้างเดียว

ข้อเสนอแนะในการวิจัยครั้งนี้ คือ ในการพิจารณาให้แขนเทียมแก่คนพิการแขนขาดข้างเดียว ควรพิจารณาถึงปัจจัยต่างๆ โดยเฉพาะอย่างยิ่งปัจจัยด้านประโยชน์เชิงเทียบในการทำงาน การทำกิจวัตรประวันและการดำเนินวิถีชีวิตในชุมชน รวมทั้งด้านความยุ่งยากซับซ้อน เกี่ยวกับน้ำหนัก การใส่-ถอด ความทนทาน การดูแลรักษา และความสะดวกในการในไปซ่อมแซมเมื่อเกิดการชำรุด

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CHAPTER I

INTRODUCTION

1. Background and significance of the problems

National and social development needs to have a "human resource" as a primary mechanism. Any society that contains a good quality and efficient human resource will progress accordingly. Nevertheless, generally existing in every society is a group of people, "the persons with disability", who are deficient either physically, mentally or intelligently. Because all humans have the value of humanness and several physical characteristic combine the characteristic which we call "Disability" is something that humans cannot avoid. Thus, disability is not a standard for measuring human value. Calling someone "a person with disability" is only a definition by social condition of the person who have difference of physical characteristic from other persons. That means each kind of the persons with disability has the capacity and ability to develop the same as a normal person. But the difference in physical characteristic might bring about the difference problem and requirement (Ratchasuda College, 1999: 9). These people need acceptance, love, happiness, safety, assistance, and support to provide them the opportunity to develop themselves to be capable of self-reliant and able to live with other ordinary people.

Despite their defect and limitation, the persons with disability are still human beings who want to be realize of their basic needs in living like any other persons in the society. They also have completely human rights and want to live their daily lives in their own capability. Consequently, rehabilitation of the persons with disability shall enable these people to live with esteem, self-reliance without creating any burden to the society, or at least to be capable of helping themselves in undertaking their daily routines. Furthermore, the provisions under the National Constitution and

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the Human Rights Agreement advise that the persons with disability be protected for their rights, equality and opportunity as well as be provided with support to enhance their quality of life to the level average people enjoy. To these ends, some persons with disability may need certain assistive device which will be adapted for use suitable to the problems and needs of the persons with disability in each different nature. In this way they can improve the ability of their body organs to function adequately enough for them to live at home and in the community fruitfully and self-dependently. (Arthur and Robert, 1995: 722)

Among different types of persons with disability, those who lost their limbs in the upper extremity suffer relatively more problems in undertaking activities in daily life, at work and for leisure. Particularly, the ones who no longer have hands and arms, the primary organs for carrying out daily routines and work of human beings. Hands compared with legs have relatively more complex and delicate functioning. (The Association of Remedial Medicines of Thailand, 2539: 277). A survey conducted in the United States in 1984 disclosed that the upper extremity amputees, excluding the cases losing their fingers, accounted for 15% of all upper and lower extremity amputees (not including those persons with disability due to congenital abnormally). The loss of the upper extremity in men often occurs among people in 15-45 year-old age group and 75% of the cases are caused by accidents (The Association of Remedial Medicines of Thailand, 2539: 797). Although in Thailand there exists no definite statistics of this type of disability, the National Statistical Office in 1996 did conduct a national survey on health and welfare conditions which also covered the survey of the persons with disability, classified by type. It was found that 66,200 people were categorized as upper extremity amputees and they accounted for 6.5% of all the physically disabled in the country (National Statistical Office, 1999).

The acquired disabled persons are different from the congenitally disabled persons. Because they had good health, knowledge and skill of their work or activity when they suddenly lost the limb or the function of the limb, the loss effects physical, mental and social status. Thus, the persons with disability will have decreased potential and depend on other persons, which causes to a decrease of self worth and

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self esteem, for example losing their personality, role/function and independence in living (Nittaya Sombutkaew,1997 cited in Wiramol Kasiwong, 1998). It is normal for person who has part of his/her limb missing to wish for a complete restoration. However, this is impossible in reality and the best solution is to provide him an artificial limb or assistive device as replacement even though the substitute cannot function as fully as the biological ones. Nevertheless, if those who are fitted with assistive device have undergone a systematic process of rehabilitation, assessment, training, and monitoring of the result to prepare for remedial measures, these persons can learn and adapt to live in new condition with the change in their physical limb.

Although there are Acts and provisions in effect to help the persons with disability to be able to undergo the rehabilitation process and be provided with assistive device for daily living, most of the persons with disability are found to abandon the devices or use them either inefficiently or not to the full technological potential. As 75% of the persons with disability still depend on their family members and only 20% of them can be independent (Thamrongrat Kaewkan, 2535: 27). Furthermore, there are a large number of the persons with disability who obviously avoid the use of assistive device while some have tried it only once before abandonment. This causes the loss of productive resources, and the persons with disability to fail to use their ability to the possible greatest potential (Schurer & Galvin, 1994 cited in Arthur and Robert, 1995: 722). A National Survey on Abandonment of Technology Final Report found that almost one-third (29.3%) of all the devices initially used were completely abandoned. Abandonment rates were found to be most significant during the first year and after five years of use (Phillips & Zhoa, 1993: 36). The literature on assistive technology cites the following reasons for abandonment: lack of consideration of user opinion, poor device performance, changes in users' needs, failure to meet individuals' needs (Kohn, Le Blance & Mortola, 1994; Mann, Hurren, & Tomita, 1993; Phillips, 1993 cited in Riemer-Reiss, 1999:17), lack of meaningful training, environmental obstacles, lack of access to information about repair and maintenance, no need for the device, device aesthetics (Schuer & Galvin, 1996 cited in Riemer-Reiss, 1999: 17), difficulty leaning to use the device, physical discomfort associated with using the device (Galvin, 1990 cited in

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Riemer-Reiss, 1999: 17), preference for human help as opposed to technical assistance, and inappropriate or incorrect assistive technology device selection (Holm & rogers, 1991 cited in Riemer-Reiss, 1999: 17).

In Thailand, the Association of Rehabilitation of Thailand (1996: 277) noted the reason why artificial organ particularly the arm is quite unsuccessful in gaining popularity among the amputees is that once a person lost part of his hands or arms, he would try to make the best use of the remaining counterpart limb instead. However, there exist no studies in detail about the problems in different aspects. It is at this juncture that relevant studies are urgently needed. Otherwise, the full support of the government and the great efforts of various agencies trying to turn out the most modern, efficient and excellent assistive device or technology will become worthless when substantial resources are wasted and the persons with disability fail to receive rehabilitation to fullest potential.

From the aforementioned rationale, this research is intended to study the adoption of the prosthesis of the unilateral upper extremity amputees, specifically those who have lost their arms for at least 30 days. The 30 days period was chosen because it is the average time that the stump of the arm begins to stabilize and the assistive device can be installed (Daly, 2000: 187). The study subjects were selected from those unilateral upper extremity amputees who receive the services from 4 health units; Siriraj Hospital, King Mongkutkloa's Hospital, Lerdsin Hospital, and Workers' Physical Rehabilitation Center which are the highly popular places among the amputees for services. The results from this study will be used as guidelines to prepare for the suitable remedy and improvement in the persons with disability's rehabilitation process, as well as for the improvement in the design of assistive device to satisfy the needs of the amputees in a meaningful and efficient way.

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2. The Objectives of the Study

1. To study the extent of the adoption of upper extremity prosthesis of the unilateral amputees.
2. To study the factors associated with such adoption.

3. The Research Questions

1. To what extent would the unilateral upper extremity amputees adopt the use of the prosthesis?
2. What are the factors associated with the adoption of the prosthesis of the upper extremity unilateral amputees?

4. The Scope of the Research

1. The samples for this study are unilateral upper extremity amputees for at least 30 days who received the fitting of upper extremity prosthesis from the four health units; Siriraj Hospital, King Mongkutkloa's Hospital, Lerdsin Hospital and Workers' Physical Rehabilitation Center.
2. The samples are only the persons with acquired disability because they have different knowledge and have been intimately acquainted with using the prosthesis in their daily activity as opposed to the persons with congenital disability that require prosthesis adoption.
3. Factors associated with the adoption of assistive devices are determined according to Roger's theoretical framework.

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5. Limitation of Research

1. This study is of a monitoring nature, asking about the results after the assistive device have been fitted. Some qualified samples might have changed their addresses making it difficult to follow up. The number of samples responding to the questionnaires is expected to be quite low.

2. Each of the health units under the present study has a different timeframe for keeping patients' records, giving rise to the inproportional sample size in each place which makes a difference in the quantity of inquiry form that was returned. Each place have timeframe as following :

2.1 Lerdsin Hospital, the data of persons with disability record from 2000-2001 (2 years)

2.2 Siriraj Hospital, the data of persons with disability record from 1995-2001 (7 years)

2.3 King Mongkutkloa's Hospital the data of persons with disability record from 1992-2001 (10 years)

2.4 Workers' Physical Rehabilitation Center the data of persons with disability record from 1995-2001 (10 years)

3. This research has control over neither the type of materials used nor the standard of quality in the production of assistive device in each health unit to assure the similar or identical features of the device.

6. Definitions

1. **Unilateral Upper Extremity Amputee** means the person who had an accident or trauma to the point that one of his/her hands or arms lost ability to function, was judged by the physician to have that part of his/her organs removed (regardless of the level of arm to be amputated) and still has the other hand and arm functioning normally physical. This loss is not a congenital abnormally but must have been lost more than 30 days.

2. **The Adoption of Upper Extremity Prosthesis** means the situation in which the unilateral upper extremity amputee has consistently used the prosthesis in carrying

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out his/her routine activities after he/she was fitted with such assistive device up to the time this study was conducted. The meaning of carry out in this case covers all the time from when they get up, the using it when go out, only use it when working and using it when they prefer to use but it dose not cover the persons with disability who never use the prosthesis which is assume as a rejection the prosthesis.

3. **Upper Extremity Prosthesis** means the device to replace the missing part of hand and/or arm.

7. Benefits of the Study

1. The understanding of the extent of adoption of the prosthesis of the unilateral upper extremity amputees.

2. The understanding of factors which are related to, or are problems and obstacles in the adoption of the prosthesis of the unilateral upper extremity amputees.

3. The use of research result as suggestion and guidelines for individuals involved in providing services about artificial limb to recognize the factors affecting the adoption such that they can respond appropriately to the personality and socio-psychological needs of the persons with disability in the most meaningful and effective way.

4. The motivation for individuals involved in providing rehabilitation services for the persons with disability particularly in providing assistive technology to be aware of various factors having a bearing on the adoption of such technology, apart from the specific focus on physical disability.

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CHAPTER II

LITERATURE REVIEW

The literature review of this research study has been itemized into the following topics.

1. Fundamental knowledge of Unilateral Upper Extremity Amputees.
2. Fundamental knowledge of Upper Extremity Prosthesis.
3. Concepts and theories of adoption.
4. Conceptual framework, theories and relevant studies as supportive factors to the hypothesis.
5. Hypothesis.
6. Relevant studies.

1. Fundamental Knowledge of Unilateral Upper Extremity Amputees

1.1 Definition

According to the Rehabilitation of Disable Persons Act B.E. 2543, the type of "Unilateral Upper Extremity Amputees" was addressed in the category of physical or mobility disabilities. This includes any person who has obviously abnormal physical conditions and is unable to perform activities of daily living due to abnormality or loss of ability in arm/hand/leg/body movements. Paralysis illness, Rheumatism or chronic pain/illness of limbs which caused disabilities to daily functional living or social activities like ordinary persons. (Association of Rehabilitation in Thailand, 2537:15)

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1.2 Occurrence and Cause

In childhood, the major cause occurs from congenital abnormally. In adolescence to manhood, the major causes are accident on the road and at work and cancer. In old age the cause is generally result of complication from diabetes and blood vessel disease.

In 1984, cases of amputees that did not combine digits amputation in U.S.A. found that 15 % amputees lost their arm/leg (this number does not include the amputees who were deformed because of congenital abnormally) and upper extremity amputation in males were found mostly in 15-45 years old and 75% of the arm amputation occur because of accident. However in children below 10 years, the most frequent cause of arm amputation occur from deforming since they were born. And the age 10-20 years old, the cause was cancers.

1.3 Level of Amputation

The levels of amputation (Figure 2.1) are remarkably important as they effect functioning the rest of arm. Classification has generally been specified as below.

1.3.1 Digits and Partial Hand Amputation

The important aim for amputating the digits and partial hand is supporting the remaining arm for what its function can do. The principle for amputation is 'keeping the most partial hand that can be kept'. The important cause of hand amputation is accident. Thirty years ago, in Thailand many factories were set up and most of the operator who used the machine in these factories came from the villages with low education and they did not understand with the machines very well. There was not a good system for protecting against the accident which frequently occur in the factories. These caused many operators to have digits and partial hand amputation. Combining the machines that agriculturist prefer to use and utensils that are used in home or store for example meat grinding machine, is also the cause of digits amputation (Domrong Kitkusoln, 1983).

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1.3.2 Wrist Disarticulation

Leaving the Pronation-Supination Function of the forearm that is very important for arm working (Association of rehabilitation in Thailand, 1996) but the blood can not flow well in this area. Therefor, if the skin which is in the end of arm is not in the good condition, there will easily occur wounds that will be difficult to treat.

1.3.3 Below Elbow Amputation or Forearm Amputation

These levels can classify the amputation as Long, Medium, Short and Very Short. If the amputation is shorter, the Pronation-Supination Function of the forearm will decrease. In the case of the patients who have Below Elbow Amputation in very short level (the remaining arm estimate 35% or less of the length of the forearm) the Pronation-Supination Function will be lost (Sherr & Cook,1990 as defined in Renaissance Medicine Association, 1996). For elbow movement, if there is no complicated condition, the elbow would move normally. But there will be problem about the power of elbow.

1.3.4 Elbow Disarticulation

In the past, it was prefer to not do an Elbow Disarticulation because there was difficulty in making a prosthesis. But at present, it is preferable to do an Elbow Disarticulation because this operation will retain a long and powerful arm and the end of remaining arm is big. But there is a proviso that the skin which is seem to close the end of arm must is in the good condition and must adjust the protrusion of the bone.

1.3.5 Above Elbow Amputation

If keeping more than 90% of the length of the top of the arm to have the function the as same as the patient who has an elbow disarticulation but if the length of the top of the arm is less than 30% it will be the as same as the patient who has shoulder disarticulation.

1.3.6 Shoulder Disarticulation

The operation for this level might occur when is the necessary and only when not able to keep partial upper bone, the arm example if there are cancer in the forearm

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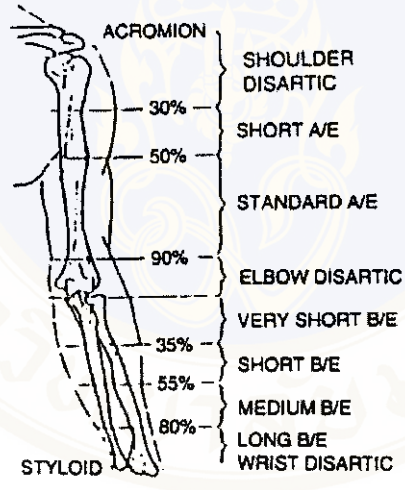
bone or a severe strong accident. The deforming or abnormal characteristic after operation can be clearly observed.

1.3.7 Forequarter amputation

This case is the minority operation. The cause of this operation is cancer in the forequarter and spread to near area. This amputation must remove operate all the Scapula and some of the Clavicle (Association of Rehabilitation in Thailand, 1996:277-279)

Figure 2.1 Level of Amputation (Wilson AB., 1989 referred to by Association of Rehabilitation in Thailand, B.E. 2539:277)



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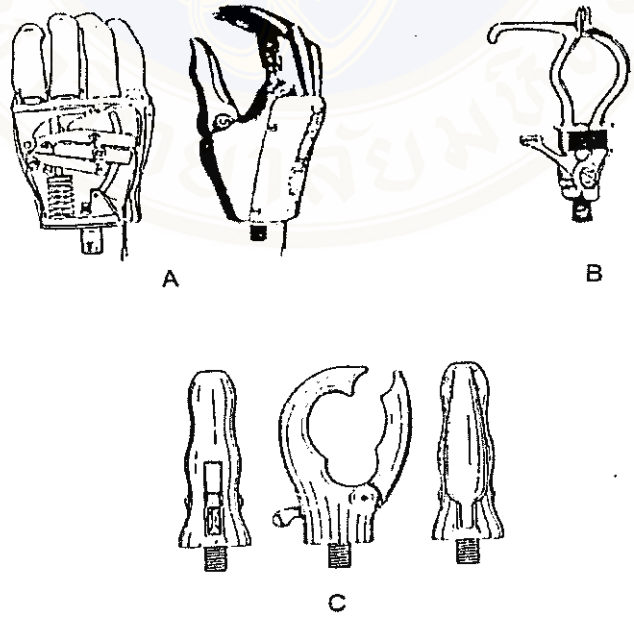
2. Fundamental Knowledge of Upper Extremity Prosthesis

2.1 Definition.

" Prosthesis" is a technical term refering to every artificial organ such as leg prosthesis, arm prosthesis, cardiac prosthesis and kidney prosthesis. However, within the area of Rehabilitation, it relates to rehabilitation of arm or leg prosthesis only (Association of Rehabilitation in Thailand, B.E. 2539). The purpose is to substitute the lost arm or leg in order to function or for cosmetic purpose and mostly for both aspects. (Supatra Leamwaranggul, B.E. 2540)

Therefore, "Upper Extremity Prosthesis" is a built materiality in compensation of the lost part of arm in order to make use of it as an aid device for daily living, working and leisure activities or for socially cosmetic purpose.

Figure 2.2 The Categories of Terminal Device



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2.2 Components of Upper Extremity Prosthesis. (Rehabilitation Association of Thailand, B.E. 2539: 279-286)

2.2.1 Terminal Devices

Terminal devices are the most important point in consideration the use of Upper Extremity Prosthesis, divided into 2 groups as follows.

(1) Hook or other Non-anatomic Shaped Device.

It is the most popular artificial hand, made from metal, simply functioning and very practical for daily living activities. It is considered the most efficient performance in comparison with the other types.

(2) Hand-shaped Device or Passive Hand.

It is made of soft sponge with a metal core inside, probably covered by gloves for a natural look. In Thailand we use gloves directly without the "Passive Hand" in order to save costs.

(3) Mechanical Hand Covered with Cosmetic Glove.

It is built to imitate the natural hand. At present this model is rather popular. It is produced with a metal core inside with a thumb, index and middle fingers. Mechanical action is controlled by a "Three Jaw Chuck" system. The edge of the thumb will make opposition between the index and the middle fingers.

All of the three groups have the operate control two types are following:

(1) Voluntary-Opening : The user will move the muscles to control the hook opening.

(2) Voluntary-Closing : The user will move the muscles to control the hook closing.

The choice a hook or hand prosthesis type depends on function and beauty needed. If they prefer a functional one, a hook type will be the most appropriate focusing on working with tiny objects in narrow spaces. Moreover, it is strong and light. However, for cylinder type objects, the hand prosthesis can perform a better job and looks more beautiful which gives mental support in psychological sense.

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2.2.2 Socket

The function of the socket is transfer the movement of the bone to control the prosthesis in the right position.

2.2.3 Joint

(1) Wrist: To hold between the terminal device and the forearm for the function of Pronation and Supination of the forearm.

(2) Elbow: To hold between arm and forearm of the prosthesis. It has many devices for appropriate working i.e. manual lock, positive locking elbow, single pivot hinge, step up hinge and outside locking hinge.

2.2.4 Harness and Controls

The harness helps to spread the weight of the objects for stability and convenience of movement and work. The control of the harness has two types which are the external power sources and the conventional power sources

2.3 Special Characteristic of Prosthesis. (Supattra Leamwaranggul, 2540)

1) Function: It must be easy to use and not complicated to learn or do it by oneself.

2) Comfort: fit right, easy to wear and take off, light weight and adaptable.

3) Cosmetic: good condition, no unusual scent or sound and easy to clean.

4) Fabrication: fast, modern, ready and convenient to use.

5) Economic: reasonable price.

2.4 Categories of the Upper Extremity Prosthesis

(1) Below Wrist Prosthesis

1.1 Cosmetic Glove

Cosmetic Glove made of Poly Vinyl Chloride (P.V.C) to look like the natural hand (i.e it has nails, hair and natural color for male and female etc.) for wear on the hand prosthesis.

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1.2 Hand Prosthesis

Hand Prosthesis has three types which are Passive or Cosmetic Hand, Hook and Cosmetic and Functional Hand.

(2) Wrist Disarticulation Prosthesis

This level has to cast the socket about 2/3 of the length of the stump.

(3) Below Elbow Prosthesis

(4) Elbow Disarticulation Prosthesis

(5) Above Elbow Prosthesis

Generally the prosthesis fits the length of the stump 50 %-90% of the arm bone for stability and easy use.

(6) Shoulder Prosthesis

This level has the objective cosmetics, the light weight, balance and psychological support.

There is one more type of the upper extremity prosthesis that is developing quickly, Myoelectricly Controlled Artificial Arm. It uses electronic technology with the principal of signal amplification of arm muscle. However it is not appropriate in Thailand because it is very expensive and there are no trained technicians.

2.5 Considerations for Selection of Arm Prosthesis.

An amputee should receive upper extremity prosthesis as soon as possible or not longer than 30 days after surgery. A physical check up and job characteristics of the disabled persons should also be taken into consideration.

Failure in using upper extremity prosthesis is often caused by the disableds feeling that they gained less benefit or had no benefits from the upper extremity prosthesis. Therefore, the disabled persons may not cooperate in know-how methods training courses. In order to obtain cooperation from the amputees, it is essential to arrange personal interviews for them to realize their requirements in reaching goals of their professional careers. Explanation in details of problems incurred in terms of i) working with the remaining arm; and ii) using the upper extremity prosthesis without having training. It is also important for them to understand the obligation of self-care

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for daily life activities at the home, at work place and in public as well. The afore-mentioned should help the amputees better understand and of course, be psychologically ready to participate in the training courses. The trainees should be encouraged with praise and a feeling pride when he finishes each program successfully. Both programs on using and non-using of the prosthesis should be emphasized integrally.(Association of Rehabilitation in Thailand, 2539:287)

3. Concepts and Theories of Adoption.

3.1 Definitions of Adoption

Spence (1994: 55) talks about adoption in the context of innovation. It is normally referring to the outcome of a system of personal decision-making which leads, eventually, to the acceptance or rejection of something which is seen as new. To qualify as acceptance the adoption behavior must be that of intended continued use. Despite this there may be subsequent later rejection just as, in the case of initial rejection, there may be subsequent later acceptance.

Umadee Tanapolpadungkul (2538) stated that "Adoption" is a person's behavior in adopting anything considered "better" in both figurative and abstractive meanings that will lead to practice pleasantly. Prior to this adoption, it is assumed that a process of learning and practicing had already been undergone for a considerable period of time. As such, the adoption may need a certain period of years in the process of making the decision.

For this study of adoption of unilateral upper extremity prosthesis, the perception of the amputees who have never experienced the use of arm prosthesis before, will consider it as "new thing" or "innovation". The amputees have to understand the proper types of performance and maintenance including other necessities concerned at a certain level in order to adapt the life styles to suit the change of physical conditions.

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Therefore, "the adoption of upper extremity prosthesis" means a behavior from the result of decision making process towards using arm prosthesis. After a trial, if they consider it useful then this will lead to the use in the near future. However, after adoption and utilization of the device for quite some time, refusal or termination may possibly happen.

3.2 Concepts of Innovation

Rogers and Shoemaker (1971:18) indicated that "innovation" is a "new concept and practice" or "new thing" in which the majority of society consider or think 'it's new' regardless whether it deals with new knowledge. Someone might have heard about an "innovation" before but never realized his feelings towards that "innovation".

3.3 Theory of the Adoption of Innovation

Rogers (1995) indicated that 'optional innovation decision' of a person depends on factors in line with the process of innovation dissemination (Figure 2.2).

3.3.1 Characteristics of Innovation

1) Relative Advantage is the degree to which an innovation is perceived as being better than the idea it supersedes.

2) Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.

3) Complexity is the degree to which an innovation is perceived as difficult to understand and use.

4) Trialability is the degree to which an innovation may be experimented with on a limited basis.

5) Observability is the degree to which the results of an innovation are visible to others.

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3.3.2 Communication Channels

A communication channel is the means by which messages get from one individual to another.

(1) Mass media channels are often the most rapid and efficient means to inform an audience of potential adopters about the existence of an innovation, that is, to create awareness-knowledge.

(2) Interpersonal channels are more effective in persuading an individual to accept a new idea, especially if the interpersonal channel links two or more individual who are similar in socioeconomic status education, or other important ways.

3.3.3 Time

Time relates to the process of dicision-making to the adoption of an innovation.

(1) **Knowledge Stage** occurs when an individual (or other decision-making unit) learns of the innovation's existence and gains some understanding of how it functions.

(2) **Persuasion Stage** occurs when an individual (or other decision-making unit) form a favorable or unfavorable attitude toward the innovation.

(3) **Decision Stage** occurs when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation. Adoption is a decision to make full use of an innovation as the best course of action available. Rejection is a decision not to adopt an innovation.

The innovation-decision process can just as logically lead to a rejection decision as to adoption. In fact, each stage in the innovation-decision process is a potential rejection point. For instance, it is possible to reject an innovation at the knowledge stage by simply forgetting about it after gaining initial awareness-knowledge. And of course, rejection can occur even after a prior decision to adopt. This is discontinuance, which usually occurs in the confirmation stage of the innovation-decision process. Two different types of rejection are:

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a. *Active rejection*, which consists of considering adoption of the innovation (include even its trial) but then deciding not to adopt it.

b. *Passive rejection* (also called non-adoption), which consists of never really considering the use of the innovation.

(4) **Implementation Stage** occurs when an individual (or other decision-making unit) puts an innovation into use.

(5) **Confirmation Stage** occurs when an individual (or other decision-making unit) seeks reinforcement of the innovation-decision already made or reverses a previous decision to adopt or reject the innovation if he receives a conflicting messages about the innovation.

3.3.4 A Social System

A social system is defined as a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal. The social system has yet another important kind to influence in the diffusion of new ideas. Innovations can be adopted or rejected by an individual member of a system, or by the entire social system, which can decide to adopt an innovation by a collective or an authority decision.

(1) Optional innovation-decisions are choices to adopt or reject an innovation that are made by an individual independent of the decisions of the other members of the system.

(2) Collective innovation-decisions are choices to adopt or reject an innovation that are made by consensus among the members of a system.

(3) Authority innovation-decisions are choices to adopt or reject an innovation that are made by a relatively few individuals in a system who possess power, status, or technical expertise.

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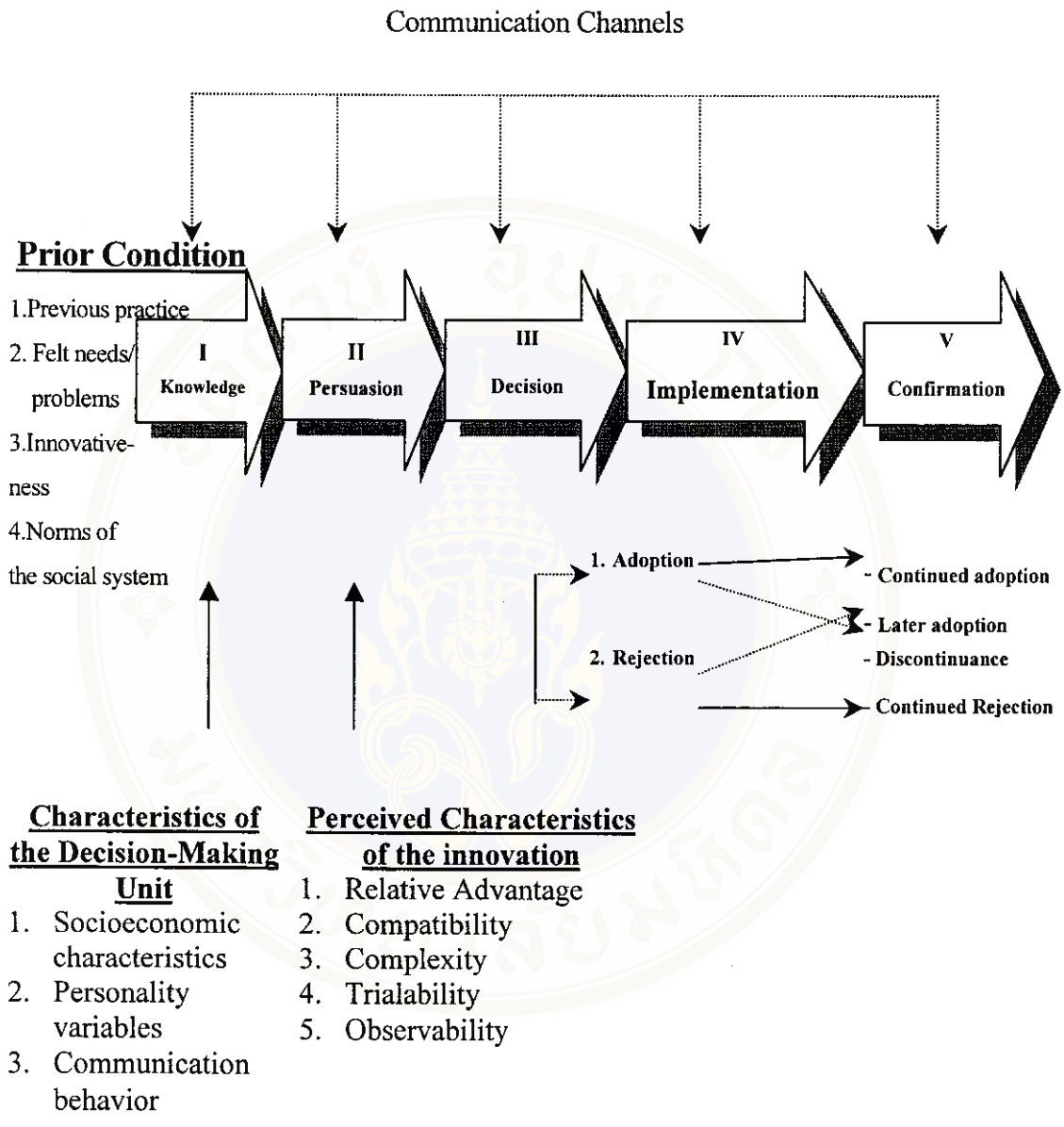
Figure 2.3 A Model of Stage in the Innovation-Decision Process (Everett M. Rogers, 1995: 163)



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4. Related Research Studies

4.1 Research Studies Related to the Disabled.

Saowapa Wichitwatee (2534) studied the relation concerning self esteem, social support and behavior in care taking among a sampling group at the physical device units of Siriraj , King Monkut's and Lertsin hospitals. The study found that self-esteem and social support indicated a positive relationship with the behavior in self care taking. Meanwhile, factors of age and period of amputation indicated a negative relationship with the behavior in self care taking.

Supattra Leamwaranggul (2540) studied the service qualification of the Physical Device Unit at Sirindhorn Centre for Medical Rehabilition of Thailand from perception of 255 amputees. It was found that if considered as a whole, the service was justified in a 'good level'. If consideration was based on diversity of age, marital status, education, income, profession, type of prosthesis and service frequency, the service qualification was statistically different ($p < 0.05$). For the samples who only differed in age, current address and source of information no difference was found in the perception of service qualification. Further study found various problems experienced by the sample group, namely over queuing, delayed appointments, short-lived devices and an unnatural look. Apart from these, the service unit has an insufficient number of technical staff.

4.2 Research Studies on Factors Related to Adoption.

Weerawut Peangchareon (2539) studied the components related to adoption of innovation in the area of educational technology. The sampling group were 371 teachers at several primary schools under Board of National Primary School Region 5, who handled the second semester for year 2538. The study showed that the relation between components and the adoption of an innovation in educational technology, there existed 19 positive variables related statistically at level 0.05. There were 9 variables regarded as top priorities i.e. 1) innovation value 2) convenience 3)

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harmonization with society 4) teachers' academic experience 5) support from the board of management 6) software innovation 7) policy supporting training method 8) teachers' acquisition of knowledge and 9) cost of the innovation.

Ong-art Litthongpitak (2539) studied behavior of communications via World Wide Web among 393 college students from 5 institutes in Bangkok. The study found a positive relationship in qualification of WWW against relative advantage, complexity of performance and compatibility statistically.

Pussadee Subsaan (2526) studied the qualifications of innovation that had the most effect towards the adoption of the target group. The research specifically studied the case of adoption on products made from water weeds. 58 samples of Baan Sun Pa Moung women's group at Tambon Ban Tom, Phayao Province involved in this study. It is found that all 5 qualifications of innovation created different effects towards the adoption. The first was the relative advantage, followed by the compatibility, the observability and the complexity or complication respectively. The qualifications of trialability had no effect towards the adoption.

Fusaet Jongferngpariya (2534) concluded the results from the questionnaires on the use of prosthesis and walking aids in accordance with the program on Improvement the Quality of Life under the King's patronage (Nam Pratai Jark Nai Luang Project) implemented at King Mongkut's Hospital. The total sampling group of 237, composed of 193 males and 44 females. 2 aspects were evaluated i.e. feelings of the handicaps and advantages towards the utilization of devices. The study found that 67 samples (28.27%) felt very good, 98 samples felt good (41.25%), 74 samples (31.22%) felt medium, and 3 samples felt not good (1.27%). For the advantages, 140 samples (59.27%) found it helped make more convenient in travelling, 230 samples (97.05%) felt that the devices provided better self-help. 178 samples (75.11%) felt that they were able to do jobs better. 219 samples (92.41%) felt that their mental health were better and 1 sample (0.42%) felt that did not see any advantage (This was the amputee who received arm prosthesis without any training. However after received the advise this amputee was pleased to continue using).

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Marti L. Riemer-Reiss (1999) studies to determine the factors that are associated with discontinuance of assistive technology by individuals with disabilities. A quantitative, correlation research design was used to determine if there was a relationship among the variables (derived primarily from Rogers' diffusion of innovation theory), and discontinuance of assistive technology. Results demonstrated that the variables of relative advantage and consumer involvement had a significant effect on predicting discontinuance of assistive technology.

Phillips&Zhao (1993) study to determine how technology users decide to accept or reject assistive devices. Two hundred twenty-seven adults with various disabilities responded to a survey on device selection, acquisition, performance, and use. Results showed that 29.3% of all devices were completely abandoned. Abandonment rates were highest during the first year and after 5 years of use. Four factors were significantly related to abandonment – lack of consideration of user opinion in selection, easy device procurement, poor device performance, and change in user needs or priorities. These findings suggest that technology-related policies and services need to emphasize consumers to reduce device abandonment and enhance consumer satisfaction.

Goldman (1992 refer in Rogers, 1995) investigated the perceived attributes of a Campaign for Healthier Babies that was promoted by a national organization, the March of Dimes, to its local chapters for their implementation. Some 116 directors of local chapters reported their perceptions of the campaign 5 months after it was launched. Four attributes perceived compatibility with the local chapter's needs, simplicity, relative advantage, and observability were related to the degree of implementation of the Campaign for Healthier Babies.

Kearn (1989 and 1992 refer in Rogers, 1995) studied the adoption of eight computer innovations among the 127 suburban municipalities of Pittsburgh, Pennsylvania. The eight innovations were identified by contacting computer

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consultants and city officials. This study found that the perceived characteristics of innovation, include five characteristics in Rogers' Theory, had a relation to the adoption.

Teisberg (1992 refer in Rogers, 1995) studied about the adoption of cellular telephones in the United States found that the perceived characteristics of cellular telephone cause the quickly adoption in United States. That perceived characteristics are Relative Advantage, Compatability, Complexity, Observability, and Trialability.

5. Hypothesis

The study of the adoption of upper extremity prosthesis of unilateral upper extremity amputees built the hypothesis from the adoption of innovation theory of Rogers (Rogers, 1995) and the research in Thailand and foreign countries that can separate the variables follow:

5.1 Relative Advantage is the degree to which an innovation is perceived as being better than the idea it supersedes. Relative Advantage refers to the benefits and costs resulting from adoption of an innovation. The degree of relative advantage is often expressed as the degree of economic profitability, initial cost, comfort, social prestige, savings in time and effort and the immediacy of the reward. Diffusion scholars found relative advantage to be one of the best predictors of an innovation's rate of adoption. An innovation with high relative advantage would have a fast rate of adoption and a slow rate of discontinuance (Rogers, 1995: 216). The first hypothesis is Relative Advantage has positive relation to the adoption of upper extremity prosthesis.

5.2 Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An innovation can be compatible or incompatible (1) with socio-cultural values and beliefs, (2) with previously introduced ideas, or (3) with client needs for the

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innovation. Compatibility of an innovation as perceived by the potential adopter is positively related to its rate of adoption and negatively related to its rate of discontinuance. Although past diffusion research suggests that compatibility may be of relatively less importance in predicting rate of adoption than relative advantage (Rogers, 1995: 234). The second hypothesis is Compatability has positive relation to the adoption of upper extremity prosthesis.

5.3 Complexity is the degree to which an innovation is perceived as difficult to understand and use. Any new idea may be classified on the complexity-simplicity continuum. Some innovations are clear in their meaning to potential adopters whereas others are not. Although the research evidence is not conclusive, we suggest the complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption. Rogers Daley and Wu (1980 refer in Rogers, 1995: 243) study about the adoption of home computers in the United States found that the perceived complexity of home computers was an important negative force in their rate of adoption. This study agree with the research of Sermsin Ninparn (1993 refer in Suthipa Santhorn, 1995: 46) found that the complex innovation impacts to the adoption of innovation. The third hypothesis is Complexity has negative relation to the adoption of upper extremity prosthesis.

5.4 Trialability is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried on the installment plan are generally adopted more rapidly than innovations that are nor divisible. Some innovations are more difficult to devide for trial than are others. The personal trying-out of an innovation is a way to give meaning to an innovation, to find out how it works under one's own conditions. This trial is a means to dispel uncertainty about the new idea. The trialability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption (Rogers, 1995). Relatively earlier adopters of an innovation perceive trialability as more important than do later adopters (Gross, (1942 and Ryan, 1948 refer in Rogers, 1995). The fourth hypothesis is Trialability has positive relation to the adoption of upper extremity prosthesis.

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5.5 Observability is the degree to which the results of an innovation are visible to others. The results of some ideas are easily observed and communicated to others, whereas some innovations are difficult to observe or to describe to others. The observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. Relatively to Alongkorn Laongam (1991: 108 refer in Prin Sereepong, 1998: 47) found that the obsevability has a relation to the adoption of new technology. The fifth hypothesis is Observability has positive relation to the adoption of upper extremity prosthesis.

5.6 Consumer Involvement. Phillips & Zhoa (1993) determined that lack of consideration of the users' opinion in the selection process was a strong predictive variable to abandonment of assistive technology. Likewise Tewey, et al. (1994 refer in Riemer-Reiss, 1999) indicated that the single most important thing an individual with a disability can do to guarantee success with assistive technology is to become involved in the selection process. Especially a review of the literature revealed that there is consensus among writers in regards to the importance of consumer involvement in the selection, acquisition, use and maintenance of assistive technology devices (Carroll & Phillips, 1993; Freeman & Field, 1994; Phillips & Broadnax, 1992; Tewey, Barnicle,& Perr, 1994; Turner et al., 1995 refer in Riemer-Reiss, 1999). The sixth hypothesis is Consumer Involvement has positive relation to the adoption of upper extremity prosthesis

5.7 Change in Consumer's Needs means after the amputees received the prosthesis then their physical function or life experience changed which caused to change their goal too. Many researchs result indicated that devices are discontinued less frequently when users believe their opinions are taken into consideration in the selection process (Parker & Thorslund, 1991; Phillips & Briadnax, 1992; Scherer & Galvin, 1996 refer in Riemer-Reiss, 1999) The seventh hypothesis is Change in Consumer's Needs has relation to the adoption of upper extremity prosthesis.

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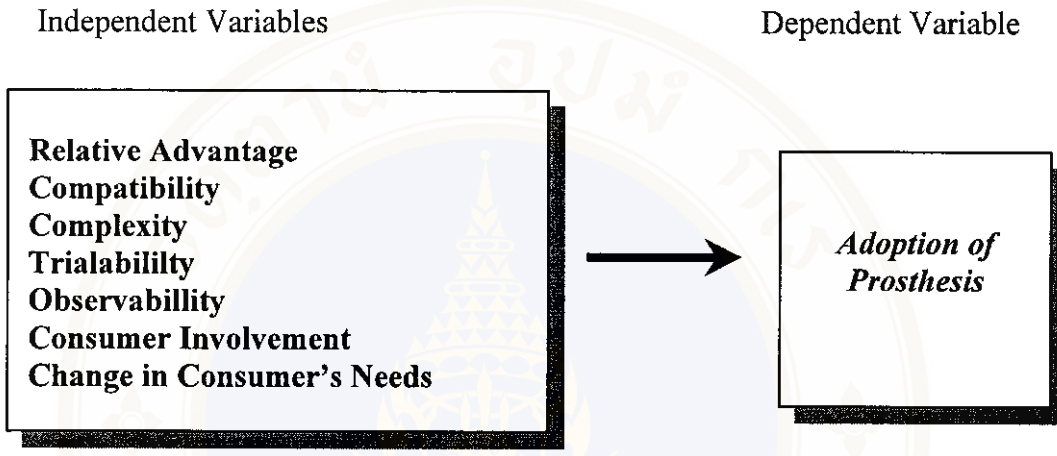
Conceptual fr Riemer-Reiss, 1999). The sixth hypothesis is Consumer Involvement has a positive relation to the adoption of upper extremity prosthesis

6. Conceptual framework



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CHAPTER III

RESEARCH METHODOLOGY

This study's methods were based on the quantitative approach focusing on condition of adoption upper extremity prosthesis of the unilateral amputees and significant factors associated with this adoption in lines of innovation expanding in Everett M. Roger's theory. Data were collected by means of questionnaire integrated from study papers, relevant documents and other information. Direction of this study is itemized below.

1. Population and Sample

1.1 The population of this study were the unilateral amputees who received the upper extremity prostheses from 3 hospitals and 1 Rehabilitation Center. The total number of the population was 378 amputees.

- 25 amputees from Lerdsin Hospital
- 35 amputees from Siriraj Hospital
- 246 amputees from King Mongkutkloa's Hospital
- 72 amputees from Worker's Physical Rehabilitation Center

1.2 The sample was selected by using systematic sampling technique based on the sample size formula:

$$n = \frac{n_0}{1 + \frac{n_0}{N}}, \quad n_0 = \frac{Z^2_{\alpha/2}\, pq}{d^2}$$

n = number of sample

N = number of population

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p = proportion of adopted amputees from a pilot study of 20 unilateral amputees who were provided the upper extremity prosthesis by Maharaj Chiang Mai Hospital, it was found that 15 or 75% adopted the devices while 5 or 25% refused to do so. Therefore, the calculation indicated that p=0.75

q = proportion of rejected amputees = 1 – p = 0.25

α = probability of estimate value will miss from true value, set $\alpha = 0.05$ so $Z_{\alpha/2} = 1.960$.

d = the allowable absolute error, set d = 0.0525

$$n_0 = \frac{1.960^2\,(0.75)(0.25)}{(0.0525)^2} = 261.33$$

$$n = \frac{261.33}{1 + \frac{261.33}{378}} = 154.5 = 155 \text{ persons}$$

Finds the sampling interval based on $I = \frac{N}{n} = \frac{378}{155} = \frac{2.43}{} = 3$

From list frame, select random start and skip every 2 persons until the number of group required was obtained i.e. 155

2. The Research Instrument

This study used the questionnaire which was designed by the researcher to collect the information based on Everett M. Rogers' theory together with various relevant research outcomes. The questionnaire was divided into 3 parts:

Part 1: Part 1 was composed of general information of the respondents such as sex, age when lost hand/arm, age when upper extremity prosthesis installed, educational background, former career when lost organs, current career, former

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income, present income, cause of accident, type of assistive technology device needed, level/part of hand/arm lost, skill in using the device, source of financial support and provision of detailed information on assistive technology device.

Part 2: Part 2 was composed of factors related to the decision to adopt or abandon the prosthesis.

Part 2.1: Main objective in request of the assistive technology device.

Part 2.2: Opinion in areas of :

-relative advantage, 5 items starting from nos. 2.1-2.5,

-compatibility (good fit), 5 items starting from nos. 3.1-3.3, 4 and 5,

-complexity in use, 5 items starting from nos.6.1-6.4 and 7,

-trialability, 5 items starting from nos. 9.1-9.2 and 10.1–10.2,

-observability of outcomes, 4 items starting from nos. 11-14,

-consumer involvement, 4 items starting from nos. 15.1 – 15.4

-change of users' needs, 1 item shown on no. 16.

There exist 5 rating levels for checking, they were:

Level 5 = highest (match to opinion and feeling)

Level 4 = high (match to opinion and feeling)

Level 3 = medium/moderate (match to opinion and feeling)

Level 2 = lower (match to opinion and feeling)

Level 1 = lowest (match to opinion and feeling)

Part 3: Part 3 was composed of 6 items on installation of the upper extremity prosthesis, frequency in use and expectation in use continuously.

Process in building content of questionnaires:

1) Studied various documents and research outcomes relevant to variables utilized in his research as guidelines for appropriate structure and boundary of it.

2) Built questionnaire details as per specification planned and to ascertain the coverage of all selected variables.

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3) Submitted the initial questionnaires to the professionals for examination the correctness of data information and language understanding. Finally, correction and improvement was made according to suggestions obtained.

4) Applied the improved questionnaires to the group of unilateral amputees who received the upper extremity prosthesis from Maharaj Chiang Mai Hospital in order to achieve its reliability value based on method of Cronbach. Calculated by the statistical package for the social science, the result of 0.92.

5) Corrected the weak points found and developed the questions prior to utilizing them with the target group.

3. Data Collection: It was processed in the following manners.

1) Requested an official letters signed by the director of Ratchasuda College, Mahidol University to the directors of 4 target hospitals, i.e. Maharaj Chiang Mai, King Mongkut's, Lerdsin and Workers' Physical Rehabilitation Center to request institutional cooperation. Detail of research implementation, dates and time for making contacts with their staff for data accessibility.

2) Distributed the questionnaires individually to the unilateral amputees who currently accommodated at the rehabilitation centers and to the ones whose homes were not accessible. Quite a number of questionnaires were mailed to homes due to some impossible reasons in approaching personally. A month later, followed up by postcards as a reminder to the target group. This process took about three months to accomplish, from June-September 2001. Nevertheless, it is found that only 45.32% responded the forms. Some of the sample group unfortunately passed away and a number changed address or moved to new places.

3) Examined the completeness of all data prior to carrying out the analyses for each issue.

4) Variables and Interval Scales

4.1 Independent variables

4.1.1 Relative advantage	Interval Scale (Provided 5 levels)
4.1.2 Compatibility	Interval Scale (Provided 5 levels)
4.1.3 Complexity	Interval Scale (Provided 5 levels)

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4.1.4 Trialability	Interval Scale (Provided 5 levels)
4.1.5 Observability	Interval Scale (Provided 5 levels)
4.1.6 Consumer involvement	Interval Scale (Provided 5 levels)
4.1.7 Change of user need	Nominal Scale (no change = 0, change = 1 levels)

4.2 Dependent Variable:

4.2.1 Adoption of upper extremity prosthesis	Nominal Scale (Not adopted to use = 0 Adopted to use =1 levels)

5) Data Analyses:

Data information was grouped orderly and coded for further analyses by using the program of statistical package and other statistics for presentation as itemized below.

5.1 General information of the target group was presented in terms of number, percentage, mean, and standard deviation.

5.2 Opinion about the upper extremity prosthesis was analyzed in terms of number, percentage, mean, and standard deviation.

5.3 Adoption of upper extremity prosthesis of the unilateral amputees was analyzed in terms of frequency and percentage.

5.4 Relation on opinion and adoption of the unilateral amputees against upper extremity prosthesis was carried out by bivariate analysis with Chi-square test.

5.5 A number of variables associated with adoption of upper extremity prosthesis was analyzed by considering various influential variables in order to analyze "dummies" of both adoption and non-adoption issues. This was conducted under binary logistic regression analysis.

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CHAPTER IV

RESULTS

This research is a survey research implemented by collecting data using the random sampling method through the list of the unilateral upper extremity amputees. The 155 subjects of this research have received the upper extremity prosthesis service from 4 Physical Devices Units.

The results of the research and the data analysis have been divided into 4 parts as follows:-

1. General characteristics of the Unilateral Upper Extremity Amputees
2. Opinion on Upper Extremity Prosthesis
3. Adoption of Upper extremity prosthesis
4. Factors related to the adoption of Upper extremity prosthesis

1. General Characteristics of the Unilateral Upper Extremity Amputee

The sample of this study were 155 Unilateral Upper Extremity Amputee from 4 Physical Devices Units; Lerdsin Hospital, Siriraj Hospital, King Mongkutkloa's Hospital, and Workers' Physical Rehabilitation Center (as shown in Table 1). The study was found that most of the sample were male (76.8%) and female (23.2%). The majority was of working age, which was between 26 - 40 years old. However, the youngest amputee found was 11 years old, while the oldest one was 90 years old. The mean of the amputee's age was 40.2 years of age and standard deviation = 15.0 (as shown in Table 1)

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In term of education level, almost half (45.5%) of the unilateral amputees completed 4th grade level, while the smallest group of the amputees graduated in the post high-school level (as shown in Table 1). Therefore it can be implied that most of the amputees had a minimum level of formal education. This might effect the decision to adopt the upper extremity prosthesis in terms of understanding and the benefit of adoption. This makes it necessary that the person involving in this field of work be concerned with this limitation and choose the proper way to explain and advise to the amputees from the beginning of amputation until after the adoption. This should be done in various ways according to individual background.

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Table 1 Demographic characteristic of Unilateral Upper Extremity Amputees

Characteristics	Numbers	Percentage
Sex		
male	119	76.8
female	36	23.2
Total	**155**	**100.0**
Age (years old)		
less than 25	28	18.3
25-39	63	41.2
40-64	50	32.7
more than 64	12	7.8
Total	**153***	**100.0**
minimum age = 11		
maximum age = 90		
mean = 40.2 and standard deviation = 15.0		
Education Level		
no education	8	5.2
grade 4	70	45.5
grade 6	39	25.3
grade 9	18	11.7
grade 12	16	10.4
more than grade 12	3	1.9
Total	**154***	**100.0**

* The numbers vary due to missing answers.

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The amputation occurred mostly in the working age group, which is between 21-40 years old. The youngest amputee was a 1 year-old baby, while the oldest was 62. The mean of the age of the amputees was 25 years old and standard deviation = 11.0, which corresponds to the survey of the Association of Rehabilitation in Thailand (1996: 797). It stated that the amputees mostly lose their arm between the age of 15 - 45 years old, and most of the amputees who adopted the device had it done at the age of 21 - 40 years of age. The youngest adopter was 9 years old, while the oldest was 77 years old. The mean of the adoption was at 32.9 years old and standard deviation = 13.5. When considering the age of having an amputation together with the age of prosthesis adoption, it was found that most of the amputee got their prosthesis soon after their amputation (as shown in Table 2). It could be implied that right after those people had lost their arms, most of them tend to receive the upper extremity prosthesis service after a continuous medical treatment. While only a small number of them received the service after the amputation for some period of time. An exception to this fact was when the amputation occurred be cause of the pathological condition of a disease, which several factors have to be taken in considering putting the amputee under the service.

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Table 2 The age of having upper extremity amputation and the age of prosthesis receiving of unilateral upper extremity amputees.

Age of having amputation (years old)	**Age of receiving prosthesis** (years old)			**Total**
	less than 21	21 – 40	more than 40	
less than 20	20 (33.3)	32 (53.3)	8 (13.3)	60 (100.0)
21 – 39	0 (0.0)	63 (82.9)	13 (17.1)	76 (100.0)
more than 39	0 (0.0)	0 (0.0)	14 (100.0)	14 (100.0)
Total	20 (13.3)	95 (63.3)	35 (23.4)	150* (100.0)

Age of having amputation (years old)

minimum age = 1

maximum age = 62

mean = 25.0 and standard deviation = 11.0

Age of prosthesis receiving (years old)

minimum age = 9

maximum age = 77

mean = 32.9 and standard deviation = 13.5

* The numbers vary due to missing answers.

When studying the occupation of the unilateral amputee, it was discovered that the amputees' occupations before the adoption were factory workers, agriculturists, and jobless respectively. However, 46.7% of the amputees stopped working after the amputation. When examining the former jobs and the job they were doing at the time the research was conducted, it was found that those who formerly worked as factory or company workers tend to change their occupation or becoming jobless with an equally high rate. It was the opposite to those who were agriculturists and other kind of occupation such as hiring themselves out, personal business, governmental and private organizations under the government patronage officers who, later, tend not to work in a high rate. After observing details in the questionnaires that are not included in the result

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tables of this research, it was revealed that the occupation facing the most changes was the company or factory worker. Those amputees mostly changed their job to be agriculturists. Also, they changed from one department to another in the factory and company workers' group, and from worker to merchant or hiring themselves out were also done respectively. Moreover, in the employed group, the degree of job change seemed to be higher than working in the same occupation.

Another interesting aspect that should be observed closely was the amputees who were jobless prior to the amputation seemed not to be employed nor work in a very high degree (72.7%)(as shown in Table 3). When considering the mean age of amputation, it was found that it was 11 years old, as has been stated above, which was young and still in the school age. Therefore, it reflected that though the amputees lose their arms at the very young age, and had been through compulsory education, they tend not to be employed nor work later. This caused most of the disabled to lack a major income. Most of their expense load falls on their parents, their spouses, children, and the Public Welfare Department respectively. Thus the policy or measure used in aiding the disabled should not emphasize only daily expenses. The supporting plan on working arrangement for the disabled should be considered. This might have to be done to develop the ability in body function to be able to survive in their homes and community effectively. They are also expected to be self-reliant eventually (Arthur and Robert, 1995: 722).

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Table 3 The prior occupation and present occupation of unilateral upper extremity amputees.

The prior occupation	The present occupation			Total
	Jobless	Same occupation	Change occupation	
Jobless	16 (72.7)	0 (0.0)	6 (27.3)	22 (100.0)
Company / Factory workers	20 (37.7)	12 (22.6)	21 (39.7)	53 (100.0)
Agriculturists	18 (43.9)	15 (36.6)	8 (19.5)	41 (100.0)
Other (employee, personal business, governmental and private organizations under the government patronage officers)	10 (43.5)	8 (34.8)	5 (21.7)	23 (100.0)
Total	70 (46.7)	24.0 (36)	44 (29.3)	100.0 (150*)

* The numbers vary due to missing answers.

In terms of the monthly income prior to the amputation, it was found that most of them had a major income of 3,000 - 6,000 Baht/month. The lowest income found was 50 Baht/month, while the highest was 30,000 Baht/month. The mean of income prior to amputation was 3,000 Baht/month. However, the largest group of subjects (39.0%) had no income after losing their arms. The lowest income received was 200 Baht/month, and the highest was 23,000 Baht/month. From the study, the mean of the income after losing their arms was 900 Baht/month (as shown in Table 4). When taking a closes look at the statistic of the income prior to the amputation and their current incomes, it was shown that the levels of income in both situations were in the same level. However, the study showed that the number of the jobless unilateral amputees was very high. Thus, it revealed that losing part of their arms had a very high effect on income generation of the amputees. It is certain that the daily and living expenses of the amputees would fall to others surrounding them. The long-term effect of this fact was the feeling of insecurity,

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lack of confidence in their value and loss of dignity (Saowapa Wichitwatee, 1991). This could be a cause of a profound social problem that is difficult to cure.

Table 4 Prior incomes and present incomes of unilateral upper extremity amputees.

Prior incomes (Baht/month)	**Present incomes** (Baht/month)				**Total**
	no income	less than 3,000	3,000 – 6,000	more than 6,000	
no income	17 (73.9)	2 (8.7)	3 (13.0)	1 (4.3)	23 (100.0)
less than 3,000	13 (40.6)	15 (46.9)	4 (12.5)	0 (0.0)	32 (100.0)
3,000 – 6,000	11 (24.4)	17 (37.8)	12 (26.7)	5 (11.1)	45 (100.0)
more than 6,000	7 (30.4)	3 (13.1)	5 (21.7)	8 (34.8)	23 (100.0)
Total	48 (39.0)	37 (30.1)	24 (19.5)	11.4 (14)	123 (100.0)

Prior income (Baht/month)

The lowest prior income was 50 baht/month

The highest prior income was 30,000 baht/month

The median of prior income was 3,000 baht/month

Present income (Baht/month)

The lowest present income was 200 baht/month

The highest present income was 23,000 baht/month

The median of present income was 900 baht/month

* The numbers vary due to missing answers.

When the causes of the amputation were considered, it was found the main cause of amputation (45.5%) was the mechanical accident followed by vehicle accident and accident from an explosion which were also the major causes respectively. The most frequent level of amputation was the below elbow amputation (35.3%), then above elbow amputation, wrist disarticulation, elbow disarticulation, and shoulder disarticulation or forequarter amputation respectively (as shown in Table 5). The fact found in this research was in agreement with the study of the Physical Rehabilitation Association of

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Thailand that 75% of the amputation was caused by accident. The expansion of the industrial sector caused the increasing in numbers of factories open to in the country. This provided more risky work to the workers. Moreover, most of the workers operating the machines in those factories were from the agricultural sector, and rural areas. Those people did not receive a high level of education and had lack of familiarity, understanding and skills in operating the machines, while the factory itself did not provide enough security system in machinery operation. These, as well as the operation of agricultural machinery, and household machinery such as a meat grinder, caused a major accident that ended up with injury requiring. (Damrong Kijkusol, 1983: 23)

Table 5 Cause of Amputation and Level of amputation of unilateral upper extremity amputees.

Characteristics	Numbers	Percentage
Cause of Amputation		
Mechanical accident	69	45.4
Vehicle accident	34	22.4
Accident from an explosion	23	15.1
Electrical accident	16	10.5
Trauma	6	3.9
Accident from falling	4	2.6
Total	**152***	**100.0**
Level of Amputation		
Below Elbow	54	35.3
Above Elbow	34	22.2
Wrist Disarticulation	31	20.3
Elbow Disarticulation	18	11.8
Shoulder Disarticulation	16	10.5
Total	**153***	**100.0**

* The numbers vary due to missing answers.

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Moreover, the study revealed that most of the lost arms was the dexterous side and was right arms rather than left ones (Table 6). The dexterity of the lost arm was one of the major factor in adoption decision.

Table 6 Domination of amputation side of amputation of unilateral upper extremity amputees.

Characteristics	Numbers	Percentage
Domination of Amputation		
Dominant	104	68.0
Non-Dominant	49	32.0
Total	**153***	**100.0**
Side of Amputation		
Left	66	42.9
Right	88	57.1
Total	**154***	**100.0**

* The numbers vary due to missing answers.

Most of the amputees required their upper extremity prosthesis to be both cosmetic and functional. It was also found that the hook device was the least desirable. Many of the researchers (Schurer & Galvin, 1996 referred in Riemer-Reiss, 1999: 17, and Daly, 2000: 187) have also stated that a good design and the appearance of the device was one of the most important factors the amputees took in making a decision for adoption. However, when comparing the type of the prosthesis required with the one that was actually received, it was found that those who required a hook device and the cosmetic devices usually received the type they asked for. While those who required the device which was both cosmetic and functional they usually got a cosmetic one only. Furthermore, 14.0% of the person with disability did not want the device at all. The reasons given were because they thought it seemed not to be convenient for them when wearing the prosthesis. The device itself also looked so heavy that they did not want to

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use it. Moreover, it could not really be used in working. Those person with disability also believed they would be able to survive in the society without adopting the device. The amputees in this group mostly got the cosmetic type of prosthesis later (as shown in Table 7). The reasons of those arrangements might be because the device that was both cosmetic and functional had a higher price than others which made the patient not wear them to all of the amputees, especially those who could still to use their other arm in doing things. Therefore, it can be seen that the adoption of the prosthesis would emphasize only on the psychological side of the person with disability. In choosing the prosthesis, besides considering price and expenses of purchasing the device, the characteristic of the amputee's job, look of the device, and function in working of the device are other things that should be keep in mind. For example, if the person with disability would use the device in holding small things in a limited space, while the coordination between both hands and arms is needed, the hook device would be the most suitable type since it provides a lighter weight with a high duration. For the teen person with disability re-entering the society, the cosmetic prosthesis would give them better psychological effect in adapting themselves.

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Table 7 The type of the prosthesis requirement and the type of the prosthesis received of unilateral upper extremity amputees.

Type of the prosthesis requirement	**Type of the prosthesis received**			Total
	Hook hand	Cosmetic hand	Functional and cosmetic hand	
No want	4 (28.6)	9 (64.3)	1 (7.1)	14 (100.0)
Hook hand	8 (80.0)	0 (0.0)	2 (20.0)	10 (100.0)
Cosmetic hand	2 (14.3)	11 (78.6)	1 (7.1)	14 (100.0)
Functional and cosmetic hand	41 (37.3)	46 (41.8)	23 (20.9)	110 (100.0)
Total	55 (37.2)	66 (44.6)	27 (18.2)	148* (100.0)

* The numbers vary due to missing answers.

The majority of the amputees had the prosthesis received only one time. However, the highest frequency receiving ever recorded was 8 times. Therefore, the mean of the number of times that the device was received to one person was 1.3 times. The length of use prosthesis was usually 1-5 years. The shortest adoption was 1 month, while the longest was 28 years. This made the mean of the length of device adoption 6.8 years (As shown in Table 8).

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Table 8 The number of prosthesis receiving and the length of use prosthesis of unilateral upper extremity amputees.

Characteristics	Numbers	Percentage
Number of prosthesis receiving (times)		
1	123	79.9
2	24	15.6
more than 2	7	4.5
Total	**154***	**100.0**
maximum = 8		
mean = 1.3 and standard deviation = 0.8		
Length of prosthesis use (years)		
less than 1	21	14.0
1-5	53	35.3
5-10	42	28.0
more than 10	34	22.7
Total	**150***	**100.0**
minimum = 1 month		
maximum = 28 years		
median = 5 years		

* The numbers vary due to missing answers.

As for the main reason the person with disability chose to receive the prosthesis, according to the study, the mean of the opinion rate showed that most of them adopted the upper extremity prosthesis in order to keep the balance of the body. Other aims for adoption were that they wanted to look like normal people, to be able to work or study, to keep their right of using the device because it was free, and to do their routine activities respectively. Nevertheless, when the numbers and percentage were studied, the subjects chose all purposes with the highest degree of opinion (as shown in Table 9).

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Table 9 Level of purpose of receiving prosthesis that made the person with disability chose to receive the prosthesis of unilateral upper extremity amputees.

Purpose	Level of opinion					Total	Mean (Standard Deviation)
	The least	Less	Average	More	The most		
To work / Study	24 (15.8)	14 (9.2)	33 (21.7)	32 (21.1)	49 (32.2)	152*(100.0)	3.45 (1.43)
To do activity of daily living	21 (13.9)	27 (17.9)	34 (22.5)	26 (17.2)	43 (28.5)	151*(100.0)	3.28 (1.41)
The balance of the body	8 (5.2)	8 (5.2)	34 (22.1)	39 (25.3)	65 (42.2)	154*(100.0)	3.94 (1.25)
To look like the non-amputee	10 (6.6)	10 (6.6)	27 (17.9)	39 (25.8)	65 (43.0)	151*(100.0)	3.92 (1.21)
For non-payable prosthesis	24 (15.7)	18 (11.8)	38 (24.8)	34 (22.2)	39 (25.5)	153*(100.0)	3.30 (1.38)

* The numbers vary due to missing answers.

2. Perceived attribute of the amputee on the upper extremity prosthesis

The survey on the perception characteristics of the prosthesis adoption of the unilateral amputees emphasized the attitudes or opinions towards the prosthesis after receiving the adoption and the medical service in terms of relative advantage, compatibility, complexity, trialability, observability, consumer involvement, and change in consumers' need, the results showed as follow:

2.1 Relative Advantage. This was the surveying of the perceived characteristics of the amputees who received the prosthesis in three major advantages of the device which were in terms of working, routine activities, and social participation. The study showed that most of the sample agreed on the fact that the prosthesis provided the least advantage in the working aspect, while the routine activities, and social participating advantage were rated at the average level (Table 10). This might be because the sample of this study were unilateral amputee. Naturally, human beings would use another arm in working as a substitution for the one that was lost. The exception of this fact might be in the group of those whose work needed handling and coordination of both hands. This

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occupation group appeared as a very small number of the samplings of this study. Moreover, it was found that most of the person with disability had received the cosmetic device, which gave them more advantage on social re-entry rather than working.

Table 10 Level of perceived characteristics in Relative Advantage of prosthesis of unilateral upper extremity amputees.

Relative Advantage	Level of perceived characteristics						Mean (Standard Deviation)
	The least	Less	Average	More	The most	Total	
Work	48 (31.6)	28 (18.4)	36 (23.7)	14 (9.2)	26 (17.1)	152* (100.0)	2.62 (1.45)
ADL	37 (24.0)	31 (20.1)	44 (28.6)	18 (11.7)	24 (15.6)	154* (100.0)	2.75 (1.36)
Social	14 (9.0)	22 (14.2)	50 (32.3)	35 (22.6)	34 (21.9)	155 (100.0)	3.34 (1.22)
Mean (Standard Deviation)							**2.90 (1.34)**

* The numbers vary due to missing answers.

2.2. Compatibility. This was the survey in terms of the necessity in receiving the upper extremity prosthesis to the level of the lost arm, and the physical appearance of the received prosthesis. The study found that the level of the amputation had the most influence on the need of prosthesis adoption. Nevertheless, most of the subjects perception agreed that the device used did not look like the natural part of body (Table 11). This perceived might derive from the fact that human beings usually rate their importance at the highest level. When any loss of part of arm occurred at any level, it affected to human's psychological function. This gave them a desire of prosthesis adoption with a very high expectation that the device must be able to help them in working, to improve their looks, and to increase their confidence in interacting with the society, as well as to maintain their health. However, in the Thai society, most of the person with disability lived in poverty, therefore the effectiveness and the looks of the device received could not, then, meet their expectations.

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Table 11 Level of perceived characteristics of Compatability of prosthesis of unilateral upper extremity amputees.

Compatability	Level of perceived characteristics					Total	Mean (Standard Deviation)
	The least	Less	Average	More	The most		
The necessity	10 (6.5)	5 (3.2)	30 (19.5)	(18.2)	28 (52.6)	154* (100.0)	4.07 (1.20)
The appearance	16 (10.5)	44 (28.8)	42 (27.5)	(13.7)	21 (19.6)	153* (100.0)	3.03 (1.28)
Mean (Standard Deviation)							**3.55 (1.24)**

* The numbers vary due to missing answers.

2.3. Complexity, focused on the perception of the amputee toward the problems of the prosthesis itself, for example the weight, level of difficulty in wearing/removing the device, the malfunction of the device, maintenance, and convenience in repairing. From the survey, the results showed the amputee felt that the prosthesis was not too heavy, easy to be broken, and difficult to keep in good condition. They rated the level of difficulty in wearing/removing of the device in the middle level. Above all, they all agreed that the level of convenience in repairing the prosthesis when the problems occur with the device was in the very low rate (Table 12). It can be implied that most of the person with disability received cosmetic devices, which did not have much weight, wearing/removing and maintenance were not too difficult to handle, and there were no complication mechanically. This made the malfunctioning problem not an important matter. However, most of the person with disability were in rural area, it was not easy for them to come to the physical device unit to get their device fixed. It might cost them some of money as well as consuming their time. Besides, they might not be able to receive their device back at the first time they came to the service unit. They might need to go back and forth for a couple of time to get it completely repaired.

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Table 12 Level of perceived characteristics in Complexity of prosthesis of unilateral upper extremity amputees.

Complexity	Level of perceived characteristics					Total	Mean (Standard Deviation)
	The least	Less	Average	More	The most		
Weight	11 (7.3)	19 (12.7)	67 (44.7)	28 (18.7)	25 (16.7)	150* (100.0)	2.25 (1.10)**
Difficulty to wear/remove	10 (6.6)	16 (10.5)	54 (35.5)	38 (25.0)	34 (22.4)	152* (100.0)	3.46 (1.14)
Malfunction of the device	18 (12.0)	23 (15.3)	59 (39.3)	35 (23.3)	15 (10.0)	150* (100.0)	2.04 (1.13)**
Difficulty of maintenance	19 (12.8)	23 (15.4)	61 (40.9)	25 (16.8)	21 (14.1)	149* (100.0)	2.04(1.18)**
Convenience to repair	59 (38.8)	46 (30.3)	28 (18.4)	9 (5.9)	10 (6.6)	152* (100.0)	2.11 (1.18)
Mean (Standard Deviation)							**2.85(1.15)**

* The numbers vary due to missing answers.

** There is the negative meaning so the value of The least = 5, Less = 4, Average = 3, More = 2 and The most = 1

2.4. Trialability. Trialability includes the procedure of trial and adjusting the device before giving the prosthesis to the amputees, training the amputees to use the prosthesis for doing ADL and working. It also includes giving advice about the prosthesis to the amputees before they are discharged from the hospital and afterward (at home). The result showed that the amputees felt that they had been given advice before going home at high level ($\bar{x}$ = 3.28) as compare to the advice or information afterward ($\bar{x}$ = 2.36) (as shown in Table 13). That might be caused by, as has been stated earlier, the fact that those person with disability were unilateral amputees, so that their other arm functioned in working and doing routine activities instead of the lost one. The decision on giving of the device was made more for the purpose of psychological and social matters. Nevertheless, according to the fact that most of the amputees lived in the rural areas and some of them lost part of their arms on the job, after they received treatments and adoption they might not be able to work in the same position any longer. They would either change jobs and work places, or move back to their home. The limitation in budget,

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personnel and time frame of each medical center made it more difficult to trace and keep up with their condition after adoption. In addition, the training on using of prosthesis usually practice on those who received the hook device, if the given device was for the better looks purpose, there is usually no training before using.

Table 13 Level of perception on Trialability of prosthesis of unilateral upper extremity amputees.

Trialability	Level of perceived characteristics						Mean (Standard Deviation)
	The least	Less	Average	More	The most	Total	
Trial and adjust before receiving	25 (16.1)	31 (20.0)	57 (36.8)	28 (18.1)	14 (9.0)	155 (100.0)	2.84 (1.17)
Train for ADL	34 (22.1)	34 (22.1)	29 (18.8)	28 (18.2)	29 (18.8)	154* (100.0)	2.90 (1.37)
Train for work	41 (26.8)	39 (25.5)	26 (17.0)	28 (18.3)	19 (12.4)	153* (100.0)	2.64 (1.43)
Prior suggestion	23 (15.1)	18 (11.8)	39 (25.7)	38 (25.0)	34 (22.4)	152* (100.0)	3.28 (1.34)
Further information	44 (29.5)	48 (32.2)	28 (18.8)	18 (12.1)	11 (7.4)	149* (100.0)	2.36 (1.23)
Mean (Standard Deviation)							**2.80(1.31)**

* The numbers vary due to missing answers.

2.5. Observability. This part asked the respondents how they perceived the prosthesis on term of observability such as being an eye-catcher, and personality enhancing. The results of the study showed that the unilateral amputees viewed that having a prosthesis making them outstanding in a low level, which means they felt that the prosthesis make them mingled with others in the society in the high rate. It also gave them a better personality in the middle level (as shown in Table 14). This might be because most of the amputees received the prosthesis that look quite similar to the natural arm. It would also be less noticeable when they wear requlars clothes.

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Table 14 Level of perception on Observability of prosthesis of unilateral upper extremity amputees.

Observability	Level of perceived characteristics						Mean (Standard Deviation)
	The least	Less	Average	More	The most	Total	
Being an eye-catcher	31 (20.3)	45 (29.4)	40 (26.1)	16 (10.5)	21 (13.7)	153* (100.0)	3.32 (1.29)**
Personality enhancing	12 (7.8)	23 (15.0)	45 (29.4)	42 (27.5)	31 (20.3)	153* (100.0)	3.37 (1.19)
Mean (Standard Deviation)							**3.35 (1.24)**

* The numbers vary due to missing answers.

** This has a negative meaning so the value of The least = 5, Less = 4, Average = 3, More = 2 and The most = 1

2.6. Consumer involvement. This part focused on asking the opinion of the amputees who received the device about their involvement in choosing and receiving the type of the prosthesis. From the study, it was found that most of the unilateral amputees decided to choose and received the type of prosthesis themselves in the highest degree (Table 15). The reason might be that the group of person with disability in this study was the unilateral amputees with independent living. Therefore they were able to make their own decisions in choose and received the type of device according to their own needs.

Table 15 Level of perception on Consumer Involvement of prosthesis of unilateral upper extremity amputees.

Consumer Involvement	Level of perception					Total	Mean (Standard Deviation)
	The least	Less	Average	More	The most		
Receiving	2 (1.3)	7 (4.5)	28 (18.1)	27 (17.4)	91 (58.7)	155 (100.0)	4.28(1.00)
Choosing	12 (7.9)	20 (13.2)	45 (29.6)	27 (17.8)	48 (31.6)	152* (100.0)	3.52 (1.28)
Mean (Standard Deviation)							**3.9 (1.14)**

* The numbers vary due to missing answers.

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2.7. Change in consumer's needs. This part of the survey aimed at studying the attitude of the amputees towards the change in their need of upper extremity prosthesis after they had received it. The term "Change in consumer's needs" meant that the respondents currently do not need the prosthesis anymore. The study found that most of the persons with disability have not changed their needs or requirement of the devices in doing any kind of activities (62.5%) (as shown in Table 16). It could be implied that after the amputation no matter how long it takes, the need of a new arm always occurs. However, as the arm would never been replaced, there would still be the need of a prosthesis. This desire would grow more when the new prosthesis, which could function more similar to the real one, is introduced.

Table 16 Change in Consumer's need of prosthesis of unilateral upper extremity amputees.

Change in Consumer's Need	Numbers	Percentage
No Change	95	62.5
Change	57	37.5
Total	**152***	**100.0**

* The numbers vary due to missing answers.

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3. Adoption

The adoption was considered from the fact that the unilateral amputees use the upper extremity prosthesis in the daily life activities. When this research was conducted, it was found that most of the amputees has adopted the prosthesis. The percentage of this group was 63.2% compared to the 36.8% of the group of persons who rejected the prosthesis (as shown in Table 17). This rate of rejection correlated to the National Survey of the United States about the discontinuance of using aiding device. It was found that 29.3% of the US disabled discontinued using aiding device (Phillips & Broadnax, 1993: 14). However, the number of rejection in Thailand is still lower than that of the United States. In the United States, it was found that 50% of the person with disability rejected the adoption (Daly, 2000). These two surveys included similar reasons of the prosthesis rejection to the reasons stated in this research, which were the appearance and potential of the device. The passive rejection group gave the reasons that the devices made them feel uncomfortable and inconvenient in working. They felt that the prosthesis device was heavy, painful and irritated their stump when wearing it. Moreover, it did not look as good as the real arm. Some of the devices also did not fit to the stump of the amputees, and some were broken. Some of the amputees said they did not adapt the device because they did not like it, some said they were too old that they did not need it (Phillips & Broadnax, 1993: 14).

Table 17 The adoption of upper extremity prosthesis of unilateral upper extremity amputees.

Adoption of Upper Extremity Prosthesis	Numbers	Percentage
Adopt	98	63.2
Reject	57	36.8
Total	**155**	**100.0**

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In order to substitute for their lost arm, most of the amputees in the rejection group used parts of their body such as the other arm, and their mouth. There was only a small number of them that would ask other people for help. The reason behind this fact might be because most of the person with disability had the same basic needs as other people, therefore, they wanted to live their lives by being as much independent as they could (Poonpit Amardtayakul, 1999: 1.). It could also be said they wanted to feel that they still valuable in the society with pride and dignity. This, according to psychological theory, is the highest need of all human beings.

For the prosthesis that has been disused, most of them were kept (Table 18). The maintenance of the device would mostly be done once in a while (as shown in Table 19). Most of them were kept clean by using a clean cloth.

However, it was discovered that when the prosthesis was out of order, most of the amputees did not get it fixed. The reason was that they felt they could not use it so that it did not need to be fixed. Moreover, they thought it was not convenient for them to go to the place where the device was repaired, and some of them also said they did not know where to get it done. In addition, the price for maintenance was too high, the condition of the device could not be fixed, and dissatisfaction on the service of the medical center when they came to get their device repaired were also examples of the causes that made them refuse to repair their devices. The similar fact has been stated by Schure & Galvin that one of the problems found in using aiding devices in amputees was the lack of access to maintenance of the device (Schure & Galvin, 1996 as referred to in Riemer-Reiss, 1999: 17). Especially, if it was the first time of adoption and the amputees did not feel impressed with the device, they tended not to get it fixed when it was out of order. If the amputees were older, even though they felt impressed to the adoption, they could not go and have the maintenance service due to inconvenience in traveling. Sometimes their children might not have time to help them in getting it repaired because they had their

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own job to do. In addition they might think that the routine activities of those elders no longer need the adoption of the upper extremity prosthesis.

Table 18 Number and percentage distribution of the respondents by method of compensation with the lost arm and managing of the unused device.

Behavior	Numbers	Percentage
The ways were compensated to the amputation		
The remainder of body	48	96.0
Human help	2	4.0
Total	**50**	**100.0**
The management to the discontinuance prosthesis		
Keep	47	85.5
Throw away	5	9.1
Give to the others	3	5.4
Total	**55**	**100.0**

Table 19 The maintenance of the prosthesis of unilateral upper extremity amputees.

The maintenance of the prosthesis	Numbers	Percentage
Never	26	18.6
Seldom	72	51.4
Almost everyday	23	16.4
Everyday	19	13.6
Total	**140***	**100.0**

* The numbers vary due to missing answers.

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When studying on the group of the amputees who got their prosthesis repaired, it was found that most of them received the service at the medical center where they first adopted the prosthesis, and at any blacksmith. Furthermore, it revealed that most of the amputees (83.2 %) required more information on the prosthesis. The information they required most was the update on the new type of prosthesis with more potential than the one they had adopted. This data shows that the most amputees, even if they are discontined the prosthesis, need the information about the development and efficiency of the prosthesis. When they find the new type of the prosthesis that can meet their need and is not expensive they may try to use and adopt the prosthesis again. This opinion is supported with the adoption of innovation theory of Rogers which said that when the persons rejected the innovation the first time then they may change to adopt one when they received the new information about the innovation (Rogers, 1995: 163). Then asked about the expectation in the future of using the prosthesis, most of them agreed that they still need to adopt the prosthesis and would recommend the adoption to other amputees (as shown in Table 20).

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Table 20 Number and percentage distribution of the respondents on behavior and opinion about the prosthesis.

Behavior	Numbers	Percentage
The prosthesis repairing		
Repaired	44	30.1
Not repaired	102	69.9
Total	**146***	**100.0**
Information required		
Required	124	83.2
Not required	25	16.8
Total	**149***	**100.0**
The expectation		
Continue to use	116	75.8
Discontinue use	37	24.2
Total	**153***	**100.0**
The Recommendation		
Recommend to others	140	91.5
Not recommend to others	13	8.5
Total	**153***	**100.0**

* The numbers vary due to missing answers.

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4. Factors Related to the Adoption of the Upper Extremity Prosthesis.

The study of the factors related to the adoption of the prosthesis was conducted according to the general characteristics of the population, characteristics of the amputation, conditions of the adoption, and the perceived characteristics of the prosthesis. All variables concerning the respondents perception about the prosthesis were separated into 2 groups according to the level of their perception. The first group comprised of the respondents who had lower than average score (less than the mean) regarding their perception about the prosthesis while the second group comprised of those with higher than average score (more than the mean). They were the lower and the higher average groups. The lower average group composed of the amputees who considered and felt "positive" with wearing of upper extremity prosthesis lower than average. The higher average group composed of the amputees who considered or felt "positive" with wearing of upper extremity prosthesis higher than average. It was explained in the following items.

(1) Relative Advantage
- The below average group meant the group who considered the prosthesis was less useful compare to the group with higher than average score.
- The above average group meant the group who considered the prosthesis was more useful compare to the group with lower than average score.

(2) Compatibility
- The below average group meant the group who considered the prosthesis was less useful compare to the group with higher than average score.
- The above average group meant the group who considered the prosthesis was more useful compare to the group with lower than average score.

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(3) Complexity

- The below average group meant the group who considered the prosthesis was rather complicated compared to the group with higher than average score.
- The above average group meant the group who considered the prosthesis was rather complicated compared to the group with lower than average score.

(4) Trialability

- The below average group meant the group who considered the prosthesis was rather complicated compared to the group with higher than average score.
- The above average group meant the group who considered the prosthesis was rather complicated compared to the group with lower than average score.

(5) Observability

- The below average group meant the group who considered the prosthesis was rather complicated compared to the group with higher than average score.
- The above average group meant the group who considered the prosthesis was rather complicated compared to the group with lower than average score.

(6) Consumer Involvement

- The below average group meant the group who considered the prosthesis was rather complicated compared to the group with higher than average score.
- The above average group meant the group who considered the prosthesis was rather complicated compared to the group with lower than average score.

The results were as follows:-

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4.1 General characteristics of the population and the adoption of the prosthesis

The general characteristics of the samples were sex, age, educational level, work prior to loss of arm, current occupation, monthly income prior to arm loss, and average monthly income after losing arm. The relation was analyzed by using Chi-square test. The result of the analysis showed that only the education level was significant to the adoption with the statistical significance of P-value < 0.01. While the other characteristics such as sex, age, work prior to loss of arm, current occupation, monthly income prior to arm loss, and average monthly income after the amputation were not statistically related to the adoption of the prosthesis at the 0.05 level of significant (P-value > 0.05) (as shown in Table 21). The reason the level of education influenced the adoption of the prosthesis might be because those who had higher education knew and understood the advantages of adopting the device. Moreover, this group of people usually had good social and economical status, therefore they could afford the type of prosthesis with a higher potential and fit their needs. This finding was similar to the research of Namkang Wongjessada (1997: abstract) that education level was another important factors related to the life-style supporting to the health of the amputees. Adoption of the prosthesis could also be counted as a kind of activity contributing to the health of the amputees, for the adoption could prevent further health problems due to using only one arm (The Association of Rehabilitation in Thailand, 1996: 287) such as problems in balancing, movement, and body equilibrium (The Association of Rehabilitation in Thailand, 1996: 287).

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Table 21 Relationship between sociodemographic characteristics and the adoption of prosthesis of upper extremity amputees by Chi-square test.

Sociodemographic characteristics	Adoption		Total number (%)	χ^2 (df)	P - value
	Reject number (%)	Adopt number (%)			
1. Sex					
Female	14 (38.9)	22 (61.1)	36 (100.0)		
Male	43 (36.1)	76 (63.9)	119 (100.0)	0.09	
Total	**57 (36.8)**	**98 (63.2)**	**155 (100.0)**	(df = 1)	0.764
2.Age (years)					
less than or equal to 40	28 (30.8)	63 (69.2)	91 (100.0)		
more than 40	28 (45.2)	34 (54.8)	62 (100.0)	3.292	
Total	**56 (36.6)**	**97 (63.4)**	**153* (100.0)**	(df = 1)	0.070
3.Education Level					
less than or equal to grade 4	38 (48.7)	40 (51.3)	78 (100.0)		
more than grade 4	18 (23.7)	58 (76.3)	76 (100.0)	10.425	
Total	**56 (36.4)**	**98 (63.6)**	**154* (100.0)**	(df = 1)	**0.010***
4. Prior Occupation					
Not working	9 (40.9)	13 (59.1)	22 (100.0)		
Working	45 (34.9)	84 (65.1)	129 (100.0)	0.297	
Total	**54 (35.8)**	**97 (64.2)**	**151* (100.0)**	(df = 1)	0.586
5. Current Occupation					
Jobless	25 (34.2)	48 (65.8)	73 (100.0)		
Working	32 (39.0)	50 (61.0)	82 (100.0)	0.379	
Total	**57 (36.8)**	**98 (63.2)**	**155 (100.0)**	(df = 1)	0.538
6. Prior income					
no income	10 (43.5)	13 (56.5)	23 (100.0)		
have income	37 (32.5)	77 (67.5)	114 (100.0)	1.032	
Total	**47 (34.3)**	**90 (65.7)**	**137* (100.0)**	(df = 1)	0.310
7. Current Income					
no income	21 (39.6)	32 (60.4)	53 (100.0)		
have income	20 (25.6)	58 (74.4)	78 (100.0)	2.869	
Total	**41 (31.3)**	**90 (68.7)**	**131* (100.0)**	(df = 1)	0.090

* The missing numbers are no answers.

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4.2. Characteristic of the Amputation and the adoption of the prosthesis

The characteristic of the amputation studied in this research consisted of age when losing part of the arm, cause of the loss, level of amputation, and dexterity of the lost arm. The relationship was analyzed by using Chi-square test. It was found that the characteristic of amputation in all aspects were not statistically related to the adoption at the 0.05 level of significant (P-value > 0.05) (Table 22). No matter what the characteristic of the amputation was, it made the individual turned to be an amputee. Therefore, the feeling of loss and need of a substitute arm always occurs. In addition, any kind of loss caused the arm to lose its potential in functioning at the same rate. This made the person with disability try to use the other arm or hand to function in substitution to the lost one immediately, which caused dexterity in the other arm later (the Physical Rehabilitation Association of Thailand, 1996: 277)

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Table 22 Relationship between sociodemographic characteristics and the adoption of prosthesis of upper extremity amputees by Chi-square test.

Perceived	Adoption		Total	χ^2 (df)	P - value
	Reject	Adopt			
1.Age when losing arm (year)					
less than 40	49 (35.3)	90 (64.7)	139 (100.0)		
more than 40	7 (50.0)	7 (50.0)	14 (100.0)	1.192	
Total	**56 (36.6)**	**97 (63.4)**	**153*(100.0)**	(df = 1)	0.275
2.Cause of Amputation					
Accident	51 (34.9)	95 (65.1)	146 (100.0)		
Trauma	3 (50.0)	3 (50.0)	6 (100.0)		
Total	**54 (35.5)**	**98 (64.5)**	**152* (100.0)**	(df = 1)	0.667
3.Level of Amputation					
Below Elbow	26 (30.6)	59 (69.4)	85 (100.0)		
Above Elbow	30 (44.1)	38 (55.9)	68 (100.0)	2.980	
Total	**56 (36.6)**	**97 (63.4)**	**153*(100.0)**	(df = 1)	0.084
4. Domination of Amputed Side					
non-dominant	18 (36.7)	31 (63.3)	49 (100.0)		
dominant	38 (36.5)	66 (63.5)	104 (100.0)	0.001	
Total	**56 (36.6)**	**97 (63.4)**	**153*(100.0)**	(df = 1)	0.981

* The numbers vary due to missing answers.

4.3 Characteristics of the prosthesis receiving and the adoption of the prosthesis

The characteristics of adoption of the upper extremity prosthesis studied in this research were age when adopting the device, type of device needed, type of device received, the side of the prosthesis received, number of times receiving the device, length of adoption, and expenses on adopting the device. The relationship analysis was done by the Chi-square test. It was discovered that only the number of times receiving the device and the length of receiving the prosthesis were significantly related to the adoption of the device at the 0.01 level of significantly (P-value < 0.001). On the other hand, age when receiving the device, type of device needed, type of device received, the side of the

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prosthesis received, and expenses of adopting the device were not statistically significant to the adoption at less than 0.001 level of significance (P-value < 0.01) (see Table 23). It might be that most of the amputees received the device immediately after losing that part of their body, and most of them needed a device that could be a substitute to the lost arm. Therefore, when the device was received, they learned and compared the results of having and not having the device. The amputees who felt the device gave them advantages, when the device broke they tended to change or looked for a new one. On the other hand, for those who felt the device did not give them advantages and benefits as they had expected, when their device broke they tended not to ask for a new one or to get it fixed. Some of them might even quit using the device before it broke. These facts were similar to that of the factor of the time length in using the device. When they adopted the prosthesis for the first time, it was a new experiment for them whether it could fully fulfill their needs and expectation. If the prosthesis could meet their requirements, they would continue using it in the future. On the other hand, if the device did not create a positive change to the life, they would certainly discontinue using it in the end. This was in accordance to the report of the national survey on the discontinuance of technology or aiding device of the United States. The discontinuance of the prosthesis reported in this survey mostly happened after 5 years of wearing the device (Phillips, 1993).

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Table 23 Relationship of Characteristics of the prosthesis receiving and the adoption of the prosthesis by Chi-square test

Perceived	Adoption		Total	χ^2 (df)	P - value
	Reject	Adopt			
1. Age of prosthesis receiving					
less than or equal to 40	38 (33.0)	77 (67.0)	115 (100.0)		
more than 40	16 (44.4)	20 (55.6)	36 (100.0)	1.551	
Total	**54 (35.8)**	**97 (64.2)**	**151* (100.0)**	(df = 1)	0.213
2. Type of prosthesis needed					
non cosmetic & functional prosthesis	42 (35.0)	78 (65.0)	120 (100.0)		
cosmetic & functional prosthesis	8 (28.6)	20 (71.4)	28 (100.0)	0.419	
Total	**50 (33.8)**	**98 (66.2)**	**148* (100.0)**	(df = 1)	0.517
3. Type of prosthesis received					
non cosmetic & functional prosthesis	20 (48.8)	21 (51.2)	41 (100.0)		
cosmetic & functional prosthesis	37 (32.7)	76 (67.3)	113 (100.0)	3.319	
Total	**57 (37.0)**	**97 (63.0)**	**154* (100.0)**	(df = 1)	0.068
4. Side of the prosthesis received					
Right	29 (33.0)	59 (67.0)	88 (100.0)		
Left	28 (42.4)	38 (57.6)	66 (100.0)	1.451	
Total	**57 (37.0)**	**97 (63.0)**	**154* (100.0)**	(df = 1)	0.228
5. expenses of prosthesis					
not pay by self	45 (34.9)	84 (65.1)	129 (100.0)		
pay by self	9 (40.9)	13 (59.1)	22 (100.0)	0.297	
Total	**54 (35.8)**	**97 (64.2)**	**151* (100.0)**	(df = 1)	0.586
6. number of times receiving device					
1	55 (44.7)	68 (55.3)	123 (100.0)		
more than 1	2 (6.5)	29 (93.5)	31 (100.0)	15.550	
Total	**57 (37.0)**	**97 (63.0)**	**154* (100.0)**	(df = 1)	**0.001****
7. length of received (years)					
less than 5	14 (18.4)	62 (81.6)	76 (100.0)		
more than 5	41 (54.7)	34 (45.3)	75 (100.0)	21.416	
Total	**55 (36.4)**	**96 (63.6)**	**151* (100.0)**	(df = 1)	**0.001****

* The numbers vary due to missing answers.

** P-value < 0.01

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4.4 Perception of the prosthesis and the adoption of the prosthesis

The analysis of relationship between the perception of the respondents towards the upper extremity prosthesis and the adoption was done by using the Chi-square test. Those 7 variables were Relative Advantage, Compatibility, Complexity, Trialability, Observability, Consumer Involvement, and Change in Consumer's Needs. The samples were, then, divided into two groups; the group with the score higher than the average, and the group with the lower score than average. Then the data were categorized according to the adoption. It could be divided into the group that adopted the prosthesis, and the rejection group. The results showed that the attitude towards the device in terms of Relative Advantage, Compatibility, Complexity, Trialability, Observability, and Change in Consumer's Needs were statistically related to the adoption at less than 0.001 level of significance (P-value < 0.01). But in term of Consumer Involvement were statistically related to the adoption at the 0.029 level of significance (P-value < 0.05). (as shown in Table 24).

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Table 24 Relation between Perceived Characteristics of Prosthesis and Adoption of the Prosthesis by Chi-square test

Perceived	Adoption		Total	χ^2 (df)	P - value
	Reject	Adopt			
1.Relative advantage					
(X = 2.90 , SD. = 1.34)					
less than or equal to mean	43 (61.4)	27 (38.6)	70 (100.0)		
more than mean	14 (17.1)	68 (82.9)	82 (100.0)	31.699	
Total	**57 (37.5)**	**95 (62.5)**	**152† (100.0)**	(df = 1)	**0.001***
2.Compatability					
(X = 3.55 , SD. = 1.24)					
less than or equal to mean	47 (53.4)	41 (46.6)	88 (100.0)		
more than mean	10 (15.4)	55 (84.6)	60 (100.0)	23.124	
Total	**57 (37.3)**	**96 (62.7)**	**153† (100.0)**	(df = 1)	**0.001***
3.Complexity					
(X = 2.85 ,SD. = 1.15)					
less than or equal to mean	42 (53.2)	37(46.8)	79 (100.0)		
more than mean	13 (19.1)	55(80.9)	68 (100.0)	18.091	
Total	**55 (37.4)**	**92(62.6)**	**147† (100.0)**	(df = 1)	**0.001***
4.Trialability					
(X = 2.80 , SD. = 1.31)					
less than or equal to mean	41 (56.9)	31 (43.1)	72 (100.0)		
more than mean	14 (18.9)	60 (81.1)	74 (100.0)	22.473	
Total	**55 (37.7)**	**91 (62.3)**	**146† (100.0)**	(df = 1)	**0.001***
5.Observability					
(X = 3.35 , SD. = 1.24)					
less than or equal to mean	35 (50.0)	35 (50.0)	70 (100.0)		
more than mean	22 (26.5)	61 (73.5)	83 (100.0)	8.967	
Total	**57 (37.3)**	**96 (62.7)**	**153† (100.0)**	(df = 1)	**0.003***
6.Consumer Involvement					
(X = 3.90 , SD. = 1.14)					
less than or equal to mean	32 (47.1)	36 (52.9)	68 (100.0)		
more than mean	25 (29.8)	59 (70.2)	84 (100.0)	4.797	
Total	**57 (37.5)**	**95 (62.5)**	**152 †(100.0)**	(df = 1)	**0.029****
7. Change in Consumer's Need					
No Change	28 (29.5)	67 (70.5)	95 (100.0)		
Change	29 (50.9)	28 (49.1)	57 (100.0)	6.963	
Total	**57 (37.5)**	**95 (62.5)**	**152† (100.0)**	(df = 1)	**0.008***

* P-value < 0.01 ** P-value < 0.05

† The numbers vary due to missing answers.

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According to the analysis using the Chi-square test to test the relationship was the analysis that not controlled the influence of other variables, therefore the relationship found might be a false relationship. Then the Logistic Regression Analysis was introduced to use in analyzing the factors truly related to the adoption in the amputees.

When examining the value of the Model Chi-square from the tables, it showed that the statistical significance was lower than 0.001 which is lower than 0.01. Thus, it could be concluded that the set of variables used in this test could explain the factors related to the adoption significantly. The results of the data analysis also showed the factors in term of Number of times received had the level of the relation to the adoption with the statistical significance at 0.05. But Relative Advantage, and Complexity had the level of the relation to the adoption with the statistical significance at 0.01 (as shown in Table 25). This proved the hypothesis that,

Hypothesis 1 Relative Advantage had the positive relation to the adoption

In relative analysis, it was discovered that the P-value < 0.01 with the positive B value. The Odds Ratio was equal to 7.2175. Thus, it could be said that the unilateral amputees with the higher attitude on the Relative Advantage (score higher than average) were 7.2 times more likely to adopt the device as compared to those who had lower attitude about the Relative Advantage of the device. Therefore, it proved the hypothesis that the Relative Advantage caused positive relation to the adoption of the unilateral amputees with the statistical significance. This finding was also in accordance with Rogers' theory (Rogers, 1999: 216) that the more an amputee perceives the Relative Advantage, the more the rate of adoption increased. Phussadee Sapsarn (1983), Teisber (1992 referred to in Rogers, 1995), and Riemer – Reiss (1999) have also expressed a similar idea in their research that the characteristics gave the most influence to the adoption and had the power in forecasting the discontinuance of using the prosthesis and the Relative Advantage statistically significant. This might be caused by the feeling of the amputees. When the persons with disability feel they could achieve more advantage by

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using the device, they tend to be more cooperative and try to learn more about adopting the device correctly (Physical Rehabilitation Association of Thailand, 1996: 287). This made the using of the device fulfill their needs and expectation effectively, and resulted to the feeling of self-esteem (Saowapa Wichitwatee, 1991). They, then, continue to adopt the device.

Hypothesis 2 The compatibility has a positive relation the adoption

The result of the relation analysis showed that the P-value > 0.05, therefore it denied the hypothesis stating that the compatibility has a positive relation with the adaptation of the amputees. That is the compatibility did not related significantly to the adoption. The reason behind this might be because the amputees of any degree of amputation level, whether they had adopted the device or not, usually foresee that the lost arm was important to them. After the amputation, that individual certainly expects the device received to be functional like the lost arm. The received device might be similar or different from the expectation of the amputees depending on the past experience and knowledge of the device, basic conception, and the previous value of the adoption, and etc. However, the new environment after losing the arm might make some of the persons with disability satisfied and accept the devices with the different look from the real arm but which works well in their daily lives.

Hypothesis 3 Complexity has a negative relation to the adoption

When analyzing the relationship of the complexity and the adoption, it was found that the p-value < 0.01, and the B value was positive with the Odds Ratio of 6.9222. Therefore, it could be concluded that the group of unilateral amputee who considered the prosthesis was less difficult in term of usage, maintenance, and repair were 6.9 times more likely to adopt their prosthesis (score lower than average) as compared to those who considered the prosthesis more complex and difficulty. This proved the hypothesis that the Complexity has a negative relation on the adoption in the unilateral amputee group with the statistical significance. A similar conclusion has been given earlier in the

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research of Weerawoot Puengcharoen (1996), Ong-Ard Rittongpithak (1996), Phussadee Sapsarn (1983), Mohaiadin (1996, as referred in Suthipa Saenton, 1997), Goldman (1992, referred in Rogers, 1995), Kern (1989 and 1992, referred in Rogers, 1995), and Tiesberg (1992, as referred in Rogers, 1995). The reason behind this finding might be that most of the Thai amputees did not receive a high level of education, therefore anything that was too difficult to understand or to practice in using the aiding device usually influence to the discontinuance of the use. Moreover, the population of this research was the group of unilateral amputees, that means, their other arm was still functional. If they found using the aiding device was too complex for them, it could be another important factor making them use the other hand to work instead. The samples might, later, discontinue using the device.

Hypothesis 4 The Trialability has the Positive Relation to the Adoption

From the study, the P-value > 0.05 when the relation was analyzed. This result was in contrast with the hypothesis that the trialability has the positive relation with the adoption in the unilateral amputee group. The trialability did not show a positive relation to the adoption of the device with any statistical significance. The reason for this might be that most of the amputees who received the medical treatment and the assistive service usually receive device trial and adjusting. This included advice on wearing and maintenance of the device before they returned home. Though the group remaining at the physical rehabilitation center has received additional training for working, there might not be any difference. When the rehabilitation ended some of them might not be able to get a job and had to return to their home. This made them have to learn and adjust for themselves into a new environment no matter whether they have or do not have used the device.

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Hypothesis 5 The Observability has the Positive Relation to the Adoption

From the study, the P-value > 0.05 when the relation was analyzed. This result disproved the hypothesis that the Observability has a positive relation to the adoption in the unilateral amputee group. The result of the study showed clearly that the observability did not have any relation to the adoption in terms of statistic significance. It could be observed that the amputation did not create many changes in their lives. The amputees might not feel much change in their personality when they adopted or rejected the devices. In addition, in Thai society, it is not polite to talk about one's disability openly, that made the person with disability not see the difference in term of others' attitude when adopting and not adopting the devices.

Hypothesis 6 Consumer Involvement Has the Positive Relation to the Adoption

The result of the relation analysis showed that P-Value > 0.05, therefore the hypothesis that the consumer involvement has the positive relation to the adoption in the amputees in terms of statistical significance was rejected. This disagreement might be according to Rogers' theory (Rogers, 1995) and other scholars' researches based on the samples in foreign countries where the human rights effort was the focus. That made their people (including the samples) able to express their attitudes and requirements freely, which was different to Thailand. In Thailand, though the provision of constitution law promoting the rights, equality, and opportunity in developing the quality of life of the person with disability was issued, including to the provision of law on the physical rehabilitation, for the person with disability in Thailand, these were considered as a quite new concept. In addition, most of the person with disability have quite low social and economic status and that causes them lack access to the information about their rights. Especially for the person with disability in the rural areas, they usually follow and believe in the knowledgeable persons with higher social and economic status, such as doctors, teachers or the priests/monks. This belief made the decision on receiving the medical treatment or the device adoption mostly depend on the doctors' or the prosthesis experts' considerations. The person with disability usually will not express his/her own opinion on

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this matter, or they might require only a few things due to the belief that the opinions of the doctors and the experts are the best and suitable for him/her.

Hypothesis 7 The Change in Consumer's Need has a Negative Relation to the Adoption

After analyzing the relation of the change in consumer's need to the adoption, it was found that P-value > 0.05. Therefore, the result of this study contradicted to the hypothesis that the change in consumer's need has a negative relation with the adoption in the amputees. That is the change in consumer's need did not have any relation to the adoption of the upper extremity prosthesis with a statistical significance. It might be that the Rogers' Theory (1995) was only a general theory on the acceptance of an innovation, not a specific theory on the aiding device acceptance. Though the theory stated that when human change their consumer's need they would quit using those particular devices and started to search for new ones that meet their changing requirements, it did not support to this research. The reason was that the amputation was a permanent disability, the thing that the person with disability need most was to get their arm back. If there is a new innovation that could possibly create a new arm, the need of the upper extremity prosthesis would still exist but changed to look for a device with more potential.

By using binary logistic statistics in testing the major hypothesis in this research study, one significant variable found associated with the roles in adopting of upper extremity prosthesis of unilateral amputees was numbers of prosthesis received from the service units. The numbers and frequency of service received during the past period reflected the actual use by amputees. Having use of it, they encountered problems of discomfort, poor performance or other critical issues that led to appropriate adjustments. Given the increase of adjustments, the amputees experienced convenience in having it repaired that led to having more pleasure. Given the increasing of pleasure, they kept returning to repair or replace the new one whenever problems arose. Consequently, more experience gained and learned advanced technique in handling the device comfortably and naturally. At any rate, this would certainly make the amputees realize the significance

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of usefulness of the upper extremity prosthesis. Moreover, current high technology will help improve future prosthesis better performance which contributed to build a positive impression and eagerness to explore further detailed information. As a whole it would lead to adoption of upper extremity prosthesis without hesitation.

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Table 25 Factors Relate Prosthesis Adoption of the Upper Extremity Amputees Binary Logistic Regression

Variables	B	Prob.	Exp. (B)
Personal Characteristics			
Education Level			
- less than grade 4 ®	0.9584	0.1065	2.6074
- more than grade 4			
Characteristics of prosthesis receiving			
Number of time of prosthesis received			
- 1 time ®	2.0103	**0.0344****	7.4659
- more than 1 time			
Length of prosthesis received			
- less than 5 years ®	-0.6974	0.2527	0.4979
-more than 5 years			
Perceived Characteristics of Prosthesis			
Relative Advantage			
- less than average ®	1.9765	**0.0013***	7.2175
- more than average			
Compatability			
- less than average ®	0.9620	0.1310	2.6168
- more than average			
Complexity			
- less than average ®	1.9347	**0.0019***	6.9222
- more than average			
Trialability			
- Less than average ®	0.5618	0.3736	1.7539
- more than average			
Observability			
- Less than average®	1.0075	0.0811	2.7387
- more than average			
Consumer Involvement			
- Less than average®	-0.5202	0.4013	0.5944
- more than average			
Change in Consumer's need			
- no change ®	-0.5726	0.2802	0.5640
- more than average			

* P-value < 0.01 ** P-value < 0.05 ® = the Reference Group

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CHAPTER V

CONCLUSION, DISCUSSION AND RECOMMENDATION

This research on "The Adoption of Upper Extremity Prosthesis of the Unilateral Amputees" aimed to make understanding the adoption and the major factors relevant to the adoption. The sample consist of 155 unilateral amputees whom received service provided by the Physical Devices Units from 4 well-known hospitals i.e. Lerdsin, Siriraj, King's Mongkutkloa and Workers Physical Rehabilitation Center. The research instrument used for data collection was prepared in the form of questionnaires designed by adapting after Rogers' theory (Rogers, 1995) and the National Survey on the Abandonment of Assistive Technology (Phillips & Broadnax, 1992). Collection of data was conducted by distribution of questionnaires to the target individuals by both approaching in person and mailing system. Data analyses were implemented by using descriptive statistics and logistic regression technique to test hypothesis.

1. Conclusion

1.1 General Conditions:

It is found that the majority of the unilateral amputees was males (76.8%), ranged between 26-40 years of age. Of those, 45.5% finished the compulsory school at grade Pratom 4. Age when lost and received the assistive devices ranged between 21-40. Former careers indicated as office staff and employees of various types of factory. Average income showed the figures around 3,000-6,000 baht per month. It was recorded that a large number of them was jobless and had no incomes after the loss of hand/arm. A high rate of changing to new jobs was also indicated. Among those changed careers, the highest rate of transforming themselves into agricultural careers remarkably shown.

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The major cause of amputation was from machinery accident (45.4%) of whom had accidents with machinery and 35.3% of those affected the loss below elbow level. It is further recorded that loss of skillful right arm was far more than the left.

The majority of amputees desired to own the most cosmetic and functional of assistive technology devices due to only 1 shot basis provision for a 5-year use. The main objective in having the upper extremity devices could be prioritized in harmony with their needs. They were: making balance of body, having the natural look of appearance, being able to perform work and study, maintaining the right of recipient due to free of charge service and being able to carry out daily living style respectively.

1.2 Opinion on Upper Extremity Prosthesis

In this part, the sample was asked to rate their opinion regarding the upper extremity prosthesis they had currently received. The average score was computed for every items and the result were as follow.

1.2.1 The average rating score was lowest in term of usefulness of prosthesis in carrying out office work. But medium in term of usefulness for activities of daily living including social activities.

1.2.2 The average rating score was high in term of necessity for having prosthesis regardless of the level of amputation .And low in term of the natural appearance as compared with the real arm.

1.2.3 The prosthesis was quite heavy, fragility, complexity in wearing/removing and maintenance of prosthesis. And lowest in term of convenience in the process of having them repaired.

1.2.4 The average rating score was medium in term of having opportunities in trying out and adjusting the devices perfectly fit. Lowest in term of being trained on know-how to use the device for activities of daily living. Medium in term of being advised on any necessary information prior to departure the service centers. And low: in term of receiving further advice/information sent to home after return to home.

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1.2.5 The average rating score was low in term of being eye-catcher if wore the upper extremity prosthesis in public. But medium in term of making the amputees look smart or better personality.

1.2.6 The majority of the unilateral amputees considered highest in term of making own decision in having and selecting the upper extremity prosthesis.

1.2.7 The majority of the unilateral amputees has never changed their minds in having or using the prosthesis. They have realized the importance and essential in using the devices since faced with critical situation after having accident.

1.3 Adoption of Upper Extremity Prosthesis

The majority of the unilateral amputees (63.2%) adopted the upper extremity prosthesis. It is shown that 51.4% looked after it by cleaning with clean cloth once in a while. Nevertheless, most of amputees (69.9%) did not care for having the broken upper extremity prostheses repaired. Most of amputees (83.2%) wanted to receive further information from time to time. Most of them (75.8%) expected to continue using it while 91.5% would certainly like to recommend the necessity of using to the peers.

1.4 Factors Associated With Adoption Based on Assumption Test

1.4.1 Numbers of prosthesis receiving has relations with the adoption of the device statistically.

1.4.2 Relative advantage has positive relations with the adoption of the device statistically.

1.4.3 Compatibility was not significantly related with the adoption of the prosthesis.

1.4.4 Complexity has a negative relation with the adoption statistically.

1.4.5 Trialability has no relation with the adoption statistically.

1.4.6 Observability has no relation with the adoption statistically.

1.4.7 Consumer involvement has no relation with the adoption statistically

1.4.8 Change of users' needs has no relation with the adoption statistically.

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2. Discussion

The study of this research has an explanation in accordance with Rogers' Theory. Only two factors were found to have significant relations with adoption i.e. relative advantage and complexity. This reflected that provision of the upper extremity prosthesis to amputees must be elaborated and realized its usefulness in performing work, daily living activities and social roles. Moreover, provision of relevant detailed information in terms of know-how and maintenance is a must. The information should be produced in a simplified version and have to make sure that understanding is correct. Apart from that, consideration in provision the upper extremity prosthesis must be conducted individually. Selection of the suitable device should also be implemented in lines with appropriateness and needing of each individuals. It is very important to assure that the unilateral amputees will never feel too complicated to have the upper extremity prosthesis fitted.

Upon considered the other variables under Rogers' theory, no significant relationship is obviously found within scope of this research, although some are of interesting and rather importance to users' adoption. At any rate, the limitation of this research prevented further study in depth. It is considered that should other research studies ever carried out in the future, further study on these existed variables be conducted in lights of different circumstances and obligations. It might be possible to face a big challenge in stating relations among those existed variables.

As previously mentioned, this study was somehow performed within the frame of Rogers' theory (Rogers 1995) that focused widely on adoption of upper extremity prosthesis. Besides, there apparently have no other research papers ever studies in this area. There exists only the issue on "giving up the use" in Marty Riemer Reiss' research, but not emphasized any particular assistive technology devices. Thus, it can be claimed that not a single research has ever yet been fully performed theoretically. In order to realize the accuracy of the tested questionnaires theoretically, it is necessary to repeat the exercise several times to compare the results from time to

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time. Further analysis and improvement of contents in questionnaires should be currently developed.

3. Recommendation

3.1 Recommendation from Research Study

3.1.1. Results from data analysis indicated that the relative advantage in terms of functioning careers, daily living style and social activities play a major role for the amputees in making decision to adopt the assistive technology device. Therefore, collaborative consideration should be focused on those significant concerns for each individuals.

3.1.2. Results from data analysis indicated that complexity in using the assistive technology device in terms of weight, wearing and removing, defect, maintenance and convenience in bringing the broken one to repair, is also the core factor in making decision to adopt the device. Therefore, further refinement and development should certainly be considered in weight lightening. This would reduce muscle stains for the elderly amputees who face problem with heavy devices. Wearing and removing the device must be easy and fast. For the capable amputees who undertake daily work, the material used in production should be strong, durable and simultaneously comfortable enough while performing work. The maintenance of device should not burden the amputees' daily living routine. In order to render service to meet requirement of those live in remote areas, the government agencies concerned should establish a number of the Physical Rehabilitation Centers nationwide.

3.1.3 After we meet the disabled, we should give the basic information before receive the prosthesis. And review the personal data to introduce the appropriate way for the individual. For the unilateral upper extremity amputees who have life style nearly the normal people about 90 % of hand function we can introduce them to go back to their community before decide to adopt or reject the prosthesis by themselves. In the same time the specialist has to follow up and continue to give the information. This way we can use the resource to be worthwhile and help the amputees meet their goal with proudly.

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3.1.4 Even though the factors of personal characteristics, the characteristics of the amputation, the characteristics of prosthesis receiving (except the numbers of prosthesis receiving) perceived characteristics of prosthesis in term of compatability trialability observability, consumer involvement and change in consumer's need didn't relate with the adoption of the prosthesis significantly the reason might be from the limitation of the study such as the low response rate from mailed questionnaires. Thus, these factors are important and have to review to service to the amputees.

3.2 Recommendation for Further Research Study

3.2.1. Although this research performed after Rogers' theory, only two significant factors found to have associations with adoption the upper extremity prosthesis. Data collection was conducted by means of questionnaires distributed to the amputees whose history recorded at the Physical Rehabilitation Centers. Noted that the incomplete addresses and the non-recipients were excluded from the mailing list. Assumingly, if those excluded key persons could be accessible, the more interesting data and vigorous information would help make a tremendous progress to all concerned.

3.2.2 The questionnaires distribution was carried out through mailing system. Undoubtedly, the minimum-educated amputees may not able to respond in both filling out and understanding the contents needed by the researcher. Therefore, it is suggested that interviewing should also be another important channel in the mentioned case.

3.2.3. Apart from the 4 hospitals involved in this research, it is suggested that research study should be expanded into other regions. There may have some other different issues appear in areas of service management, characteristic population, daily life styles and attractive context to be addressed as significant factors for adoption the upper extremity prosthesis of the unilateral upper extremity amputees in other regions.

3.2.4 Following the adoption of innovation theory of Rogers is interesting of the rejection of innovation that has two types. The first is the passive rejection and the second is the active rejection that useful to study the amputees who reject the prosthesis in the first time and the amputees who adopt in the first time and then discontinuance. Because in the future when they will receive the new information of the effective prosthesis, they may change the rejection to the adoption again.

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APPENDIX

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แบบสอบถามการยอมรับแขนเทียมสำหรับคนพิการแขนขาดข้างเดียว

คำชี้แจง

แบบสอบถามนี้เป็นส่วนหนึ่งของการศึกษาวิจัยด้านงานบริการฟื้นฟูสมรรถภาพคนพิการ โดยมีวัตถุประสงค์เพื่อศึกษาการยอมรับแขนเทียมสำหรับคนพิการแขนขาดข้างเดียว ซึ่งผลการวิจัยจะเป็นประโยชน์อย่างยิ่งต่อการวางแผน ปรับปรุง แก้ไขและเป็นแนวทางในการให้บริการแขนเทียมได้ตรงตามความต้องการและมีประสิทธิภาพยิ่งขึ้น ฉะนั้นผู้วิจัยจึงใคร่ขอความกรุณาจากท่านให้ช่วยตอบแบบสอบถามนี้และขอได้โปรดตอบทุกข้อตามความเป็นจริง เพื่อจะได้ก่อให้เกิดประโยชน์ดังกล่าว ผู้วิจัยขอรับรองว่าข้อมูลที่ท่านตอบทั้งหมดจะถือเป็นความลับและจะนำเสนอผลการวิจัยในลักษณะรวมๆเท่านั้น จะไม่เสนอเป็นรายบุคคล

แบบสอบถามฉบับนี้มี 3 ตอน ประกอบด้วย

ตอนที่1 แบบสอบถามเกี่ยวกับข้อมูลทั่วไป

ตอนที่2 แบบสอบถามความคิดเห็นเกี่ยวกับมือ-แขนเทียม

ตอนที่3 แบบสอบถามเกี่ยวกับการใส่มือ-แขนเทียม

ผู้วิจัยขอขอบพระคุณทุกท่านเป็นอย่างสูงที่ให้ความร่วมมือไว้ ณ โอกาสนี้

(นางสาวสุจิตรพร สีฝั้น)

นักศึกษาวิทยาลัยราชสุดา

มหาวิทยาลัยมหิดล

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ตอนที่1 แบบสอบถามเกี่ยวกับข้อมูลทั่วไป

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ❑ หรือเติมข้อความลงในช่องว่างที่ที่ตรงกับความสภาพความเป็นจริงของท่าน

1. เพศ ❑ ชาย ❑ หญิง
2. ขณะนี้ท่านอายุ ..... ปี
3. ท่านสูญเสียมือ-แขนเมื่ออายุ..... ปี
4. ท่านได้รับมือ-แขนเทียมครั้งปัจจุบันเมื่ออายุ..... ปี
5. การศึกษาสูงสุด
   ❑ ไม่ได้เรียนหนังสือ ❑ เรียนจบชั้น.....
6. อาชีพเดิมก่อนการสูญเสียมือ-แขน
   ❑ ไม่ได้ประกอบอาชีพ
   ❑ รับราชการ/รัฐวิสาหกิจ ตำแหน่ง-หน้าที่.....
   ❑ พนักงานบริษัท/โรงงานอุตสาหกรรม แผนก.....
   ❑ ธุรกิจส่วนตัว/ค้าขาย ประเภท.....
   ❑ อื่นๆ โปรดระบุ.....
7. อาชีพปัจจุบัน
   ❑ ประกอบอาชีพเดิมก่อนการสูญเสียมือ-แขน
   ❑ เปลี่ยนอาชีพใหม่ โปรดระบุ .....
   ❑ ไม่ได้ประกอบอาชีพ เพราะ.....
   ถ้าไม่ได้ประกอบอาชีพ ท่านได้รับการสนับสนุนด้านรายได้จากแหล่งใด
   ❑ เงินเก็บสะสมเดิมของท่านเอง ❑ พ่อแม่ / ผู้ปกครอง
   ❑ ญาติ โปรดระบุ..... ❑ หน่วยงานหรือสถานประกอบการเดิม
   ❑ กรมประชาสงเคราะห์ ❑ มูลนิธิ / องค์กรการกุศล โปรดระบุ.....
   ❑ อื่นๆ โปรดระบุ.....
8. *รายได้โดยเฉลี่ยต่อเดือนก่อนการสูญเสียมือ-แขน
   ❑ ไม่มีรายได้ ❑ มีรายได้ประมาณ.....บาท/เดือน
9. *รายได้โดยเฉลี่ยต่อเดือนหลังการสูญเสียมือ-แขน
   ❑ ไม่มีรายได้ ❑ มีรายได้ประมาณ.....บาท/เดือน

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* คำตอบในด้านรายได้ จะไม่มีผลใดๆต่ออัตราการเสียภาษีของท่านและครอบครัว

10. สาเหตุของการสูญเสียมือ-แขน

❑ ภาวะเจ็บป่วย เช่น โรคเบาหวาน โรคมะเร็ง ฯลฯ

❑ อุบัติเหตุจาก...

( )จากเครื่องจักรกล ( ) จากไฟฟ้าช็อต ( ) จากยานยนต์

( ) ตกจากที่สูง ( ) อุบัติเหตุอื่นๆ โปรดระบุ.....

❑ อื่นๆ โปรดระบุ.....

11. หลังจากที่สูญเสียมือ-แขน ท่านต้องการมือ-แขนเทียมที่มีลักษณะอย่างไร

❑ ไม่ต้องการมือ-แขนเทียม เพราะ.....

❑ ต้องการมือ-แขนเทียม

( ) แบบตะขอ

( ) แบบสวยงามที่ใช้งานไม่ได้

( ) แบบสวยงามที่ใช้งานได้ (ใช้หยิบจับได้)

12. ระดับของมือ-แขนที่สูญเสีย

❑ ระดับข้อมือ ❑ ระดับต่ำกว่าข้อศอก ❑ ระดับข้อศอก

❑ ระดับเหนือข้อศอก ❑ ระดับไหล่

13. มือ-แขนข้างที่สูญเสียเป็นข้างที่ถนัดหรือไม่ ❑ เป็นข้างที่ถนัด ❑ ไม่ใช่ข้างที่ถนัด

14. ท่านได้รับมือ-แขนเทียมข้างใด ❑ ซ้าย ❑ ขวา

15. ใครเป็นผู้ออกค่าใช้จ่าย มือ-แขนเทียมของท่าน

❑ ท่านจ่ายเองทั้งหมด

❑ ท่านจ่ายเองบางส่วน และได้รับค่าใช้จ่ายบางส่วนจาก.....

❑ ได้รับค่าใช้จ่ายทั้งหมดจาก องค์กรการกุศล/มูลนิธิ/บุคคลใด.....

❑ อื่นๆ โปรดระบุ.....

16. มือ-แขนเทียมที่ท่านได้รับในปัจจุบันเป็นครั้งที่เท่าใด.....

(16.1) โปรดระบุรายละเอียดของการรับมือ-แขนเทียมแต่ละครั้งรวมทั้งครั้งปัจจุบัน ในตารางข้างล่าง

ครั้งที่	พ.ศ. ที่ได้รับ	ระยะเวลา ที่ได้รับ	ชื่อโรงพยาบาล/สถานที่ได้รับ มือ-แขนเทียม	ประเภทแขนเทียม		
				มือ ตะขอ	สวยงาม	
					แบบใช้งานได้	แบบใช้งานไม่ได้
1.						
2.						
3.						

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(15.2) สาเหตุที่ท่านเปลี่ยนมือ-แขนเทียม (***ถ้าไม่เคยเปลี่ยนมือ-แขนเทียม ข้ามไปตอบตอนที่2***)

ครั้งที่ 2 เพราะ.....

ครั้งที่ 3 เพราะ.....

อื่นๆ โปรดระบุ.....

ตอนที่2 แบบสอบถามความคิดเห็นเกี่ยวกับมือ/แขนเทียม

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับ **ความรู้สึกหรือความคิดเห็นของท่าน** มากที่สุดเกี่ยวกับมือ-แขนเทียม **ครั้งปัจจุบัน** ตามข้อความต่อไปนี้

	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
1. วัตถุประสงค์หลักที่ท่านมาขอรับมือ-แขนเทียม					
1.1 เพื่อใช้ทำงาน/เรียนหนังสือ	.....	.....	.....	.....	.....
1.2 เพื่อใช้ทำกิจวัตรประจำวัน (เช่น รับประทานอาหาร เขียนหนังสือ ฯลฯ)	.....	.....	.....	.....	.....
1.3 เพื่อให้เกิดความสมดุลของร่างกาย	.....	.....	.....	.....	.....
1.4 เพื่อให้ดูเหมือนคนทั่วไปมากที่สุด	.....	.....	.....	.....	.....
1.5 ขอตามสิทธิเนื่องจากไม่ต้องเสียค่าใช้จ่าย	.....	.....	.....	.....	.....
2. เมื่อได้รับมือ-แขนเทียมแล้ว ท่านได้รับประโยชน์อย่างไรบ้าง					
2.1 ท่านทำงาน/เรียนหนังสือได้ใกล้เคียงกับปกติ	.....	.....	.....	.....	.....
2.2 ท่านทำกิจวัตรประจำวันได้ใกล้เคียงกับปกติ	.....	.....	.....	.....	.....
2.3 ท่านรู้สึกมั่นใจมากขึ้นในการเข้าร่วมกิจกรรมทางสังคม	.....	.....	.....	.....	.....
2.4 ท่านรู้สึกเจ็บปวดบริเวณตอแขน	.....	.....	.....	.....	.....
2.5 ท่านรู้สึกระคายเคือง ไม่มีความสบาย	.....	.....	.....	.....	.....

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	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
3. ท่านมาขอรับมือ-แขนเทียม เพราะ					
3.1 เป็นความต้องการของตัวท่านเอง	.....	.....	.....	.....	.....
3.2 เป็นความต้องการของญาติพี่น้อง/เพื่อนฝูง/นายจ้าง	.....	.....	.....	.....	.....
3.3 ตามคำแนะนำของแพทย์/ผู้เชี่ยวชาญ	.....	.....	.....	.....	.....
4 .ระดับมือ-แขนที่ท่านสูญเสีย จำเป็นจะต้องใส่มือ-แขนเทียมทดแทน	.....	.....	.....	.....	.....
5. รูปลักษณ์ภายนอกของมือ-แขนเทียมที่ได้รับใกล้เคียงกับความต้องการของท่าน	.....	.....	.....	.....	.....
6. ลักษณะของมือ-แขนเทียมที่ท่านได้รับ					
6.1 มีน้ำหนักมาก	.....	.....	.....	.....	.....
6.2 ใส่-ถอดได้ง่ายและสะดวก	.....	.....	.....	.....	.....
6.3 ชำรุดได้ง่าย	.....	.....	.....	.....	.....
6.4 ดูแลรักษายุ่งยาก	.....	.....	.....	.....	.....
7. ถ้ามือ-แขนเทียมชำรุด ท่านสามารถนำไปซ่อมที่สถานพยาบาลใกล้บ้านได้อย่างสะดวก	.....	.....	.....	.....	.....
8. ท่านมีโอกาสได้ทดลองใส่มือ-แขนเทียม เพื่อแก้ไขจนเกิดความพอดี	.....	.....	.....	.....	.....
9. ท่านได้รับการฝึกใช้มือ-แขนเทียม					
9.1 เพื่อการทำกิจวัตรประจำวัน	.....	.....	.....	.....	.....
9.2 เพื่อการทำงานประกอบอาชีพ/เรียนหนังสือ	.....	.....	.....	.....	.....
10. ท่านได้รับคำแนะนำในการดูแลรักษาและข้อมูลเกี่ยวกับมือ-แขนเทียม					
10.1 ก่อนออกจากสถานพยาบาล	.....	.....	.....	.....	.....
10.2 เมื่อกลับสู่ชุมชนแล้ว	.....	.....	.....	.....	.....

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	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
11. มือ-แขนเทียมทำให้ท่านเป็นจุดสนใจของคนทั่วไป	.....	.....	.....	.....	.....
12. คนใกล้ชิดของท่านเห็นว่ามือ-แขนเทียมช่วยให้บุคลิกของท่านดีขึ้น	.....	.....	.....	.....	.....
13. ท่านจะแนะนำบุคคลที่สูญเสียมือ-แขนเช่นเดียวกับท่านให้ใส่มือ-แขนเทียม	.....	.....	.....	.....	.....
14. ท่านสามารถให้ข้อมูลเกี่ยวกับมือ-แขนเทียมแก่บุคคลที่สูญเสียแขนเช่นเดียวกับท่านได้(เช่น สถานพยาบาล, วิธีการใส่, การดูแลรักษา ฯลฯ)	.....	.....	.....	.....	.....
15. ท่านเป็นผู้ตัดสินใจด้วยตัวเองในการ					
15.1 มาขอรับมือ-แขนเทียม	.....	.....	.....	.....	.....
15.2 เลือกประเภทของมือ-แขนเทียม	.....	.....	.....	.....	.....
15.3 ฝึกใช้มือ-เทียม	.....	.....	.....	.....	.....
15.4 ดูแลรักษา มือ-แขนเทียม	.....	.....	.....	.....	.....

16. ปัจจุบัน **ความจำเป็น/ความต้องการ มือ-แขนเทียมของท่านในการทำกิจกรรมต่างๆได้เปลี่ยนแปลงไปจากเดิมใช่หรือไม่ อย่างไร**

❑ **ไม่เปลี่ยนแปลง**

( ) **ในอดีต** ต้องการ → **ปัจจุบันยังคง** ต้องการ **มือ-แขนเทียม**

( ) **ในอดีต** ไม่ต้องการ → **ปัจจุบันยังคง** ไม่ต้องการ **มือ-แขนเทียม**

❑ **เปลี่ยนแปลง**

( ) **ในอดีต** ต้องการ → **ปัจจุบัน** ไม่ต้องการ **มือ-แขนเทียม**

( ) **ในอดีต** ไม่ต้องการ → **ปัจจุบัน** ต้องการ **มือ-แขนเทียม**

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ตอนที่3 แบบสอบถามเกี่ยวกับการใส่มือ-แขนเทียม

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ❑ ที่ตรงกับความสภาพความเป็นจริงเกี่ยวกับการใส่มือ-แขนเทียม **ครั้งปัจจุบัน**ของท่าน

1. ท่าน ใส่ มือ-แขนเทียมมาก-น้อยเพียงใด

❑ ใส่เกือบตลอดเวลาที่ตื่น ❑ ใส่เมื่อต้องออกนอกบ้าน ❑ ใส่เวลาทำงานเท่านั้น

❑ นานๆใส่ครั้ง ❑ ไม่ใส่เลย เพราะ.....

**** **ถ้าไม่ใส่มือ-แขนเทียมเลย** กรุณาตอบข้อ 1.1 – 1.2

1.1 ท่านใช้ สิ่งใด/วิธีใด ทดแทนในการทำกิจกรรมต่างๆ

❑ ใช้มือ-แขนข้างที่เหลือ ❑ ให้บุคคลอื่นช่วยเหลือ

❑ อื่นๆ โปรดระบุ.....

1.2 ท่านทำอย่างไรกับมือ-แขนเทียมที่ได้รับไป

❑ เก็บไว้ ❑ ทิ้งไป ❑ นำไปให้ผู้อื่น

❑ อื่นๆ โปรดระบุ.....

2. ท่านดูแลรักษามือ-แขนเทียมบ่อยเพียงใด

❑ ไม่ทำเลย (ข้ามไปตอบข้อ 3) ❑ ทำนานๆครั้ง

❑ ทำเกือบทุกวัน ❑ ทำทุกวัน

2.1 ถ้าท่านดูแลรักษามือ-แขนเทียม ท่านทำอย่างไรบ้าง (ตอบได้มากกว่า 1 ข้อ)

❑ เช็ดด้วยผ้าสะอาดทั้งภายในเบ้าและภายนอก หลังจากการใส่

❑ ตรวจซ่อมบำรุงเบื้องต้น

❑ ไม่ใช้แขนเทียมกับงานที่ผิดประเภท เช่น ไม่ใช้ทุบตะปู ฯลฯ

❑ ดูแลไม่ให้มือ-แขนเทียมเปื้อนหมึกปากกา

❑ อื่นๆ โปรดระบุ.....

3. เมื่อมือ-แขนเทียมชำรุดเสียหายหรือมีปัญหาเกี่ยวกับการใช้ ท่านได้นำไปซ่อมหรือปรึกษาผู้เชี่ยวชาญที่เกี่ยวข้องหรือไม่

❑ นำไปซ่อม ที่ใด (โปรดระบุ).....

❑ ไม่ได้นำไปซ่อม เพราะ.....

4. ท่านต้องการทราบข้อมูลข่าวสารเกี่ยวกับมือ-แขนเทียมเพิ่มเติมหรือไม่

❑ ต้องการ อะไรบ้าง (โปรดระบุ).....

❑ ไม่ต้องการ เพราะ.....

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5. ท่านคาดว่าจะใส่มือ-แขนเทียมต่อไปหรือไม่

❑ ใส่ต่อไป

❑ ไม่ใส่อีกต่อไป เพราะ.....

6. เมื่อมีโอกาสท่านจะแนะนำบุคคลอื่นๆ ที่สูญเสียแขนเช่นเดียวกับท่านให้ใส่มือ-แขนเทียมหรือไม่

❑ แนะนำให้ใส่

❑ ไม่แนะนำให้ใส่ เพราะ.....

********ขอขอบพระคุณทุกท่านเป็นอย่างสูงที่ให้ความร่วมมืออย่างดี*******

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BIOGRAPHY

NAME Miss Suchitporn Seephan

DATE OF BIRTH 25 October 1977

PLACE OF BIRTH Chiangmai, Thailand

INSTITUTION ATTENDED Chiangmai University, 1995-1998
Bachelor of Science
(Occupational Therapy)
Mahidol University, 1999-2002
Master of Arts
(Rehabilitation Service for Persons with Disabilities)

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