



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DESIGN AND DEVELOPMENT OF SHOWER WHEELCHAIR
FOR REHABILITATION PERSON**

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Technology
(Product Design) (Honours)

by

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FACULTY OF ENGINEERING TECHNOLOGY
2015

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: Design And Development Of Shower Wheelchair For Rehabilitation Person

SESI PENGAJIAN: 2014/15 Semester 1

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Technology (Product Design) (Honours.). The member of the supervisory is as follow:

.....

(Project Supervisor)

ABSTRACT

The purpose of this project was to design a new shower aid that can help ease the patient used by individual with rehabilitation and also disabilities person can get benefit from this unit. Design and Development of Shower Wheelchair for Rehabilitation Person is equipment that is design to ease the patient and can help the caregiver make their job easier. The need for this new design was consumer-driven. This unit have oval shape seat to give the comfortable to the patient for urinating. The special about this unit is patient can control the on off on the pipe valve of the water flow at her/him hand rest, water will flow and coming out from the shower head. This unit objective is to ease the patient and on the other hand to make the patient become more independent in daily life. Person with disabilities or in rehabilitation normally feel shy and inferiority complex to other because of their deficiency. Good equipment can make the patient improve day after day and can bring convenience to the user. This unit will improve from the existing in term of ease patient movement, ability, and can encourage the patient to bath by themselves. Design and Development of Shower Wheelchair for Rehabilitation Person can also be used by disabilities person, because it have pipe valve where the patient easy to control by its self. The special features of this unit are it have adjustable foot rest height. This unit doesn't take much space in the bathroom. This Shower Aid used concept selection to choose batter design and material to be use.

ABSTRAK

Tujuan projek ini adalah untuk mereka satu alatan mandi baru yang boleh membantu meringankan pesakit yang sesuai digunakan oleh individu yang sedang dalam pemulihan dan juga bagi orang kurang upaya boleh mendapat faedah dari produk ini. Design And Development Of Shower Wheelchair For Rehabilitation Person ialah peralatan yang direkabentuk bagi membantu dan meringankan pesakit dan boleh membantu penjaga membuat tugas mereka dengan lebih mudah. Keperluan untuk rekabentuk baru ini berasaskan pengguna. Unit ini mempunyai tempat duduk berbentuk bujur bagi memberikan keselesaan kepada pesakit apabila mandi. Keistimewaan tentang unit ini ialah pesakit boleh mengawal buka tutup di injab paip kemasukan air berhampiran tempat letak tangan, air akan melalui dan keluar dari kepala paip hujan. Objektif unit ini adalah, untuk meringankan pesakit dan dalam masa yang sama membuat pesakit menjadi lebih berdikari dalam kehidupan harian. Orang kurang upaya atau orang yang sedang dalam pemulihan biasanya berasa malu dan merasa rendah diri dengan orang lain disebabkan oleh kekurangan mereka. Peralatan yang baik boleh membuat kebolehan pesakit semakin hari semakin meningkatkan dan boleh memberi keselesaan kepada pengguna. Produk ini akan direka menjadi lebih baik dari yang sedia dalam ciri memudahkan pergerakan, keupayaan dan boleh menggalakkan pesakit mandi dengan sendiri. Design And Development Of Shower Wheelchair For Rehabilitation Person boleh juga digunakan oleh orang yang kurang upaya kerana ia mempunyai paip injab dimana pesakit dengan mudah boleh mengawalnya sendiri. Ciri istimewa produk ini ialah ia mempunyai tempat letak kaki yang boleh laras. Produk ini tidak memerlukan banyak ruang di dalam bilik air. Shower Aid for Disabilities menggunakan konsep pemilihan rekabentuk bagi memilih rekabentuk yang paling sesuai dan bahan yang sesuai digunakan.

DEDICATIONS

To my beloved parents, lectures and friend thank you for understanding and help that you have spent to me along this journey.

ACKNOWLEDGMENTS

Here, I would like to express my gratitude and appreciation to all those who gave me the possibility to complete this report.

A special thanks to our supervisor and advisor for this project, Mdm. Umi Hayati Binti Ahmad, whose help stimulating suggestions and encouragement, helped me to coordinate my project especially in writing this report. It is very pleasure and could not express how grateful I'm to have you along with me until this project finish. Once again thank you for your idea, knowledge and guidance that make me more understand and can develop further thinking to this project. You had opened my mind to so many new things. Thank you for your effort and time that you have spent to me along this journey.

Not forgotten too all my families and friends, thank you for all the spirit word, love, and helping me during the whole period which gave me the strength i need in order to carry on and finally finish this report.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

Wheelchair is standard aid that can be seen use in in medical field. Today many manufactures try to produce new product that can meet customer specification in order to follow time cycling. Many type of wheelchair has been creating such as spot wheelchair, work wheelchair, shower wheelchair and other.

1.1 Background

There are about 359203 individual with disability in Malaysia are registered at the Department of Social Welfare in December 2012, according to the international journal of social science and humanity on February 2015. People with disabilities whether it is physical or mental impairment that can make the person activities day to day become slower. The type of disabilities can be divided into sub categories that are mobility and physical impairments include upper limbs, lower limbs disability, manual dexterity, broken bone and the body co-ordination with different organs. This type of disability may be cause by age problem either an in-born. Second is spinal cord disability. This disability can lead to the long life disability. It mostly occur cause by an accidents. Third, brain disability that comes from head injuries. Two types of brain injuries is Acquired Brain Injury (ABI) and Traumatic Brain Injury (TBI). Ford category is vision and hearing disability.

Fifth, the person with cognitive or learning disability. This person is suffering the disease like dyslexia. The last one is psychological disorders, it have been divided into two classes that is Personality Disorders and Schizophrenia.

However, rehabilitation is a person that comes from a serious injury or surgery. They can be cure slowly day by day. They need to recharge their strength and relearn their skill back to make sure their life can be normal as other people. The person with rehabilitation is come from the serious injury, illness, amputations, arthritis, cancer, cardiac disease, neurological problem, orthopedic injuries, spinal cord injury, stroke, traumatic brain injuries and many more.

As can be seen the two group of this patient, some are able to go to the toilet for bath by it-self, but many need help. The patient need fully help from the caregiver or can bath by it-self using equipment that can help them for example by using a shower chair. Most of the existing shower chair are designed for the elderly and sometime do not meet the needs of physical of the younger patient. On the other hand, the existing product of shower chair cannot be move, to complicated and still need to hold the shower pipe to bath. From the survey, the existing product for patient are chair that has a hole on the seat so that water can flow under the seat or commode shower chair that had a wheel but all this product make patient still need a help to bath them. Young patient that are growing up would be shy went other people help to bath them. Some patient may have caregiver for health care. Basically, it is based on the function and need of the individual to perform activities.

When talk about caregiver, everyone know caregiver are person that are been paid to take care the patient. Some other more we need to know about caregivers is they are divided into two class of activities that is activities of daily living and instrumental activities of daily living. However caregiver has to follow the term and condition upon service plan.

According to Arizona (2011), when starting work care for any patient, ignoring of condition whether a regular client or family member, the caregiver must make him or her comfortable and allow the patient as much independence as possible. Patient should be encouraged to continue to do as much as they can for themselves. This is because when caregivers help them to do everything, this is not healthy for the patient also to the caregiver. Caregiver should ask and be alert to see what the patient or family to determine what they can do, caregiver can help but do not take over the task. Caregivers do provide physical and emotional supportive. In other word caregiver should help their patient but patient themselves must help their self for

better live style. This term and condition that had been guide from caregiver for it patient one of the guide that we must make sure not all thing we can use the caregiver to ask for help and also they have to make sure patient comfort ability. Hence, the equipment like this may be useful for disabilities people to make them more independence.

Today, there are many tools that had been design to help disability people bath, seat, use and other. If we look at the old people special care house, hospitalities, citizen house and children special care house they use chair or wheelchair as equipment for their client for shower.

1.2 Objective

There are several objectives that can be achieved from this project. The two objectives that had been focus are to:

- 1) To design and fabricate a prototype that will be proof concept to ease the patient during bath.
- 2) To design a product that can build independent life and respect disabilities person privacy.

1.3 Scope

The scopes of this project are listed as below:

- 1) Shower Aid will be used by rehabilitation person
- 2) Shower Aid shower can be install/uninstall
- 3) Shower Aid size is 700mm x 400mm.

1.4 Problem Statement

A Nowadays, most products that made for people with rehabilitation is sitting chair with a hole in the middle for ease their sit while bathing and urination / defecating. However there are no products that take into account the feelings of people with rehabilitation by creating a product that is able to facilitate rehabilitation person itself to bath without help from others or making the caregiver more easier to bathe their patients. Most of the people with rehabilitation used a wheelchair to shower. Not much special chair that enable the disabled to be used in shower easily. Furthermore, as we can see on the place like the old people special care house, hospitalities, citizen house and children special care house and many more there is not much such equipment that can make the patient easy to bath. They just use a wheelchair that the person uses to move around as the chair to bath. By using wheelchairs the person still have to hold the pipe or water container to shower themselves. On the other hand, went the user need to throw faeces, they need to go to the toilet bowl. In this case they might need their caregiver to help.

CHAPTER 2

THEORETICAL BACKGROUND

2.0 Introduction

Helping someone while bathing, dressing, shaving, and perform other personal activities can be difficult. Knowing, understanding or have equipment to handle these situations or condition will make thing and daily life activity easier for caregiver and the patient itself. The most importance part in daily life is bathing. Bathing can be very enjoyable part of the day. To the caregiver, giving a bath need skill, however many patient's family are able to provide this care. If the person lie on bed or used wheelchair in all along it may be difficult to be dealt. Family will need a tool that can make them easy to doing their job. Sometime, it might be difficult if the wife, sister or a mother had to take care their husband, son, brother and their grandfather because of the ability as a girl. While it will become more easy if otherwise. According to Sangeeta C. Ahluwalia, et al (2010), taking a shower is very important in daily life, especially for disability and rehabilitation people. This is because after the shower it will make the person feel good, clean and relaxed. The simple thing like this will simulate and give the patient more fresh that make them fell healthy and re-energized. Shower can make your body clear and reduce feeling of tired, lethargy, low spirit and brain more connected to another.

This is why designer try to help with a design to produce an ergonomic product that meet all specification need.

Today, there are many innovation of shower equipment had been made and are sold in the market. They do take into account for people with disabilities using the equipment however according to Audrey L. Nelson, et. al (2000) most of the existing commode shower chairs are designed for elderly and don't take into account the necessity of a younger spinal cord injury. Furthermore, how about other patient those have other illness that requires more help. Each of illness has their own

sensitivity and weakness. Patient with spinal cord injury will be sensitive on their back bone, while patient with long term injury is like bone fracture, wound, skin diseases and many more. Osteoarthritis is a degeneration of joint cartilage and the underlying bone, most common from middle age onward. It will causes pain and stiffness, especially in the hip, knee, and thumb joints.

From the research Audrey L. Nelson, et al (2000) of accidental deaths, there a high incidence of bathing and it related to the deaths. They also record the person over the age of 65 die because of the injury while bath. From the record it is cause from the wrong equipment and the condition of the shower situation. The bathroom is the area where user falls. Space that is small together with hard smooth surface create high risk for all people, this is due to their age or physical condition. Much danger in the bathroom is slipping and falling when entering and exiting the bathtub or shower. All of this cause must to take account in order to produce an innovative product.

2.1 Caregiver Principle

2.1.1 Caregiver

Service plan will develop by individual and their caregiver or health care provider, it will also call a care plan. For direct care assistance, this is part of an assessment process. Basically it is based on the functional ability and need of the individual to perform activities. Arizona (2011), said they are divided into activities of daily living (ADLs) and instrumental activities of daily living (IADLs). The caregiver had their own term and condition wish they could and could not do. Caregiver must follow the term upon service plan. Sometime, they might be opening themself and the agency to disciplinary and liability issues if their client wants them to do something that is not in the agreed plan. However, from the service plan that had been agreed they said when beginning a care for any patient or client, in any condition, whether she or he it is, a family member or other, must remember try to allow and believe the patient as much independence as possible.

According to Arizona (2011), Patient should be encouraged to continue to do what they can do as much as they can for themselves. In that case we should allow them to do it by themselves whether they have are caregiver to help or not. This will make them work hard and more independent in daily life. If the caregiver helps to do everything for them, their daily life improvement will become slower time to time because they always have a person to help them. This is not healthy for the patient or the direct care worker, ask the patient to identify what they can do. Make sure the caregiver help them but don't take over the task, at the same time, provide physical and emotional supportive to the patient to make them feel happy with their improvement. They also recorded, caregiver need to always prepare to become good listener and sympathetic with their lack.

They should also review the service back so that they can improve daily life activity with their patient. Caregiver should check to see if the person is independent or just need help for something only or need fully help for task and continue to communicate with the client and family. This need and abilities will always change day by day as the patient become more independent.

According to Pearlin, et.al (2007), sometimes the caregiver can be very stressful. They are human too, although they are caregiver they also have a filling to be moody, tired, boring, stress, filling stress because of the hormone cycle and many other more problem. The research from Family Doctor said common signs of caregiver stress include feeling sad and moody, crying more often than patient used to, have low energy level to conduct the patient, sometime they might be feeling that they do not have time for themselves, this will make them revolting, maybe they having trouble while sleeping or do not want to get out of bed in the morning, having trouble eating, they might be losing interest in their carrier hobby and they will be filing angry at the person they are caring for. In that case, that why the innovation had been made to meet customer requirement to make them easy and can help them while doing their job.

2.1.2 Nurse

Nurse is a person having huge amount of knowledge. They protect patients from risk due to disease, disability, and help patient that is weak, also help patient to become stronger by give some advice and make them believe that they will be good after treatment of diseases. They also protects patients from risk which occurred when illness become serious. Usually nurse will help the patient in daily life activity like breathe, movement, go to toilet, and taking care of patient nutrition.

The daily task that nurse should do is administering medications, Caring for patients, Observing and recording patients' conditions, providing emotional support to patients and their families, advising patients on how to self-administer medication and physical therapy and many more.

However nurse main purpose in giving expert's health care, is to support the well-being by improving or maintaining their physical and mental health. This can be avoid by reducing obstacle and support the person to continue to life in better condition. For example, teaching the patient skills to make them easy to bath or try to teach them how to wear a cloth. This activities will helping them to be more independent, more healthy life where they can do it by self. This statement prove that nurse will help the patient in many aspect, however nurse also have to make sure the patient try to be independent in order to make the batter quality of life.

Went talk about obstacle. The equipment that nurse used to help the patient bath or the patient itself use can be obstacle. To encourage patient must be start in slow activity. So the equipment for patient is not a same as the normal people use.

2.1.3 Patient Feeling

According to Kim Warchol (2010), professional and family caregivers report that bathing as one of the most challenging areas of dementia care. People with limited movement might be so sensitive. For most adults, washing is a personal and private activity and so it can be hard to adjust to this change. According to Konno, Rie (2011), when caregivers are helping someone to shower, it is importance to be sensitive and tactful and to respect their dignity. They are easily offended if ignored or are to controlled by their family or caregiver. This can be proved by one of the research report that the cause of a behavior problem causes by unmanaged pain, being cold, feeling frightened, vulnerable, and exposed, feeling a loss of control, not understanding what is happening, misperception and poor communication including feeling embarrassed when other people touch their body while bathing or see their body. They also report that, they often refuse, getting out, or revolt during a bath or shower.

To take care the disability person feeling is not simple. Other reasons for anxiety that disability or rehabilitation person worried around washing and bathing is deep bath water, this is because deep water can make some people feel worried. Second is overhead shower, they might find the rush of water from an overhead shower frightening or disorienting. Other is self-consciousness the person may find it embarrassing to be undressed in the presence of other people. And the last one is isolation, some patient may become anxious if they are left on their own and may want you to stay with them while they are washing.

There are many thing and ways that can trigger these unhealthy responses and many of this trigger can be control and avoid. According Kim Warchol (2010) to reduce their fear by change the bathing or shower environment to look and feel homelike and attract, make the shower or bath fun and relaxing by seating. It is batter let them do what they want and it also can help them be braver.