Introduction

Background and Need

In 2021, more than 1 in 7 Americans or 37 million people – had chronic kidney disease (Centers for Disease Control and Prevention, 2021). Chronic kidney disease is a progression of the loss of kidney function. As kidney disease progresses, the kidneys are no longer able to filter and clean the blood, which can lead to kidney failure. A failure of working kidneys can lead to toxic waste, extra fluids, high blood pressure, heart disease, stroke, and early death (Centers for Disease Control and Prevention, 2021). If the disease progresses to a total kidney failure, it is fatal unless a kidney transplant or a dialysis treatment is implemented (Mayo Clinic Staff, 2021). Dialysis treatment is used to keep the body in balance by removing waste and keeping a balanced level of chemicals in the blood. One option for dialysis treatment is a hemodialysis procedure.

Hemodialysis is performed with the use of a dialysis machine and a special filter. Some side effects to treatment include a drop in blood pressure, and anemia. Both can cause patients to feel symptoms of coldness and tiredness or weakness. Because of these symptoms, what a patient wears to treatment are important to their quality of life and treatment. In addition to this, many patients can feel over-exposed when having to remove clothing for treatment. Removal of clothing during treatment can be a nuisance, as well as also affect the quality of life during treatment.

Problem Statement

Despite how many Americans have chronic kidney disease, and how large the U.S. textile industry is, there are still very few adaptive clothing options on the market. Choosing what to wear during treatment can affect the quality of the treatment, in terms of comfort. Due to the need for vascular access during the treatment, long sleeve options are not ergonomic for patients. However, short sleeved clothing can lead to discomfort due to the side effects of treatment. There are very few manufactures who have adaptive clothing designs for people with disabilities. Because the market for adaptive wear is so niche, the prices are also essentially set at whatever the designer wants, since the demand is so great. In 2015, on average, Americans spent around \$142 per month, (Johnson, 2015). An example of adaptive clothing for hemodialysis patients on the market is the brand, HemoWear. On average, their price for a zip up hoodie is around \$60. For just one piece of clothing, that is nearly almost half of what the average person would spend on clothing in a month. In addition to the steep price, the variety between styles is minimal. Many of the hoodies and shirts come in only solid colors and no prints. Fashion should be inclusive for everyone, and part of fashion is about expressing oneself.

Purpose of the Study

The purpose of this study is to show how adaptative clothing for dialysis patients can be created that is affordable and stylish.

Research Objectives

The following research objectives guided this study:

- Identify the aesthetic wants and functional needs of hemodialysis patients.
- Design and develop a hoodie and jacket with an adaptable and functional closure to be used during treatment.

Literature Review

There are limited apparel options that meet the needs and wants of people with chronic kidney disease on dialysis, with some patients reporting feeling overlooked by the fashion

industry (Kabel, 2017). This review of literature will discuss the most recent and relevant studies related to these areas: an overview of chronic kidney disease, hemodialysis accommodations, and the relationship between clothing and self-identity.

Chronic Kidney Disease and Hemodialysis Procedures

Kidney disease is more common in people ages 65 and above (CDC, 2021). It also has a slightly more chance of occurring in women (14%) than in men (12%) (CDC, 2021). Hemodialysis is the most common form of treatment for kidney disease, in which the blood is filtered and then returned to the body (U.S. National Library of Medicine, n.d.). However, many side effects and barriers can come with this treatment. For the blood to be cleaned and filtered, there must be access to the veins. A physician will place either an arteriovenous (AV) fistula, AV graft, or a central venous catheter (U.S. National Library of Medicine, n.d.). At the start of treatment, a dialysis nurse or technician places two needles, and then connects them to the dialysis machine. The dialysis machine pumps and filters blood and returns the filtered blood back into the body. Treatment lasts for around four hours, three times a week (U.S. Department of Health and Human Services, n.d.). To access the area where the needles are placed, patients must remove clothing from the area.

Patients' Experiences with Clothing and Hemodialysis

A common side effect of treatment is high blood pressure. Medicine to treat high blood pressure can cause the patients to feel cold. In addition to this, the blood circulating in and out of the body can cause the patient to feel cold, which can be uncomfortable for the patient (Mayo Clinic, 2021). The current market lacks in providing adaptive clothing that meets the needs and wants of hemodialysis patients, according to recent studies. McAndrew (2020) found several clothing barriers, and discovered that many patients had their everyday clothes, and then their

'dialysis uniform'. Studies found that 64% of participants indicated that apparel issues have made them feel embarrassed or humiliated (Kabel, 2017). In addition to this, studies found that some of the patients feeling overlooked by the fashion industry (McAndrew, 2020).

Relationship between Clothing and Self-Concept or Identity

Clothing can play an important role in self-expression, communication, and quality of life. For dialysis patients, many accommodations need to be made for apparel to be functional during treatment. Adaptive clothing should be versatile and inclusive and should not only meet patients' functional needs, but aesthetic wants as well. Creating a garment that can meet these needs may help improve treatment for a patient, and the quality of both the treatment and the life of a patient. Studies have found that adaptive clothing on the market right now, have failed to meet a culturally defined threshold of acceptability, creating new obstacles for men and women facing headwinds of prejudice and ableism (Kabel, 2019). According to Kabel, some patients feel as though these specifically made adaptable garments draws attention, further leading to ableism. When designing the garments, it will be vital to keep a design in mind that be worn for both treatment, and everyday life.

Development Plan

People with chronic kidney disease have different treatment options, although many patients experience limitations and side effects. During treatment, there needs to be vascular access, in which normal clothes cannot accommodate this need. The adaptive garments created will also need to accommodate the ability to keep patients warm during treatment, while also meeting the aesthetic wants of patients.

The following steps were followed to create the prototype hoodie and jacket.

1. Perform pre-survey to identify aesthetic desires and the needs of functionality

- 2. Develop interview questions, and interview patients to understand the functional needs and aesthetical wants of patients. (Begin May 2022).
- 3. Begin developing the design (Aug. 2022).
- 4. Construction of hoodie (Sep.- Dec. 2022)
- 5. Construction of jacket (Sep.- Dec. 2022)
- 6. Post Survey and Garment fit (February 2023).

Based on my interview and surveys with hemodialysis patients, a design for the hoodie and jacket can be made. The garments will be made with the accommodations to the dialysis treatment. The mockup will need to be created to test out the closure method and will aid in figuring out what alterations are made. The final garment fit will aid the creation of the garments that are most functional and meet aesthetic needs in the end results.

References

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Budget

My budget for this research is \$350. This budget will be going towards the cost of fabric and different types of notions. Both these include the mockup and the final garments. On average, the cost of fabric for normal cotton ranges from \$5 to \$20 per yard. \$3 to \$12 per yard. Other notions include zippers, buttons, scissors, needles, seam ripper, rotary cutter (with replacements blades), and a cutting mat. All these items can range from prices of \$3 all the way to \$40. Travel includes gas money, to drive around Northwest Arkansas to interview patients in person. All these items are essential to making a garment. Travel is needed for the in-depth interview I will be conducted prior to the actual garment making.