Effects of Post-Operative Garment Design on Health Care of Patients with ECG Holter Monitors Study

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Abstract

The purpose of this study was to examine effects of wearing a new Post-Operative Garment, designed with carrying ECG Holter Monitors on patients' health care. There are 12 nursing personnel and 18 patients in a hospital in Northern Taiwan were the subjects in this study. Every subject provided feedback in a participated, questionnaire survey and in-depth interview on the effect of Post-Operative Garment. The researchers investigated what problems were encountered when wearing and carrying for patients' designed garments and collected ECG data. The findings of this study indicated that the new Post-Operative Garment had significant effects on traditional clothing, based on the satisfaction surveys and patient dignity estimation. More than 88% of the hospitalized patients showed satisfied and preference to the new design. Finally, the study confirms that the new Post-Operative Garment help patients in carrying ECG Holter Monitors for 24 hours with highly satisfying. In order to take advantage of this new design in better using experience, it's recommended that hospitals can offer smaller ECG Holter Monitors for patients in future.

Keywords: Post-operative garment, patients' dignity, ECG Holter Monitor

1. Introduction

This article describes and highlights the impact of patient garments design as part of health care and its significance to patients, nursing care givers, hospital care delivery and the healing process.

Hospital Background- Within Taipei, traditional patients' clothes used in hospitals are not different from clothes in daily lives in terms of pattern. They cannot satisfy the Post-operative patients' special physical state needs or wearing physical ECG monitoring devices. In many other European countries, access to hospital clothing is provided, but patients may choose to wear their own clothing during hospitalization (Bergbom, 2017). The most common reasons that hospitals began to provide, require or offer clothing to patients included improved hygiene and reduced risk of infection, as well as nursing that all patients were given access to acceptable clothing (Topo, 2010).

Research Outcomes: By improving the medical garment design, it can prevent post-operative patients from exposure, such as catching a cold, and provide care-centered design to lower physical and mental burden of patients and nursing personnel (Frampton & Charmel, 2009).

Hospital garment types: Hospital clothing for both patients and staffs can be a part of the environment due to cover requirements for good hygiene, procedures, and treatments including the care of the patient. Another reason for patient clothing is to signal equality in relation to care needs and to represent a basis for equivalent treatment (Edvardsson, 2009). The clothing also facilitates control within the health care system for patients, visitors and staff can all be readily identified. Problems and related Holter monitor usage: Patients wear ECG Holter through the side bag. The ECG Holter monitor has a single electrode application with lead wires, which can bog patients down by bulky equipment (Association, 2018).

2. Literature Review

2.1 Patients clothing

Clothing can satisfy people's high-level needs of love, self-esteem and self-realization. It enhances social identification and interpersonal relationship and interaction (Maslow, 1943). For instance, workers dress themselves according to rules of companies, students wear school uniforms according to school regulation and patients wear unified clothing as identify. Personalized clothing satisfies needs of self-realization and demonstrates personal taste and values (Bickman, 1974).

The word patient is often associated with a passive or dependent role – the role of the patient. The word "patient", by definition refers to "a person who suffers patiently". This state of human suffering can therefore be present without any disease or contact with the health care system. The word patient was also, during the seventeenth and eighteenth centuries, used as a designation for prisoners who were tortured and later executed (Foucault, 2012). Patients are not homogeneous and they thereby use a variety of clothes privately. Since hospital or patient (used synonymously) clothing is identical for all patients and also indicates an affiliation with an institution, an important question becomes what significance such clothing may have for the relationship between patients and personnel and for patient identity (Bergbom, 2017).

Comfort of clothing depends on interaction between body and environment. In different environments, people's demand for clothes is considerably varied (Givoni and Goldman 1972). People are conscious of their dressing all the time and their selection of clothes influences psychological health (Health Mark, 1991). Clothing can enhance psychological comfort. People's anxiety is mostly because they are shy, embarrassed and worried about their dressing. The psychological anxiety is caused by the difference of their clothing from others'. They draw others' attention and realize that their clothing is inappropriate and does not match social norm. The mental anxiety will result in various kinds of fear, such as fear of being unattractive, being mocked, being considered as poor people, being shameless, being lack of taste and being considered as patients (Dearborn 1918). Functions of clothes allow treated and after-operation patients to make up their disabled appearance and reconstruct and enhance their confidence (Feather, Kaiser et al. 1988).

Patients' privacy right includes the following:

1.Physical right to privacy: it includes the rights that the patients' bodies and personal space are not disturbed. For instance, in the examination or treatment, it relies on patients' agreement to practice visual communication design.

2. Psychological right to privacy: it respects the patients' dignity, personality, preference, autonomy and choice.
3. Social right to privacy: it respects patients' social, family, private life and intimate relationship which cannot be disclosed randomly.
4. Information's right to privacy: regarding patients' information, patients have the right to manage and control the use of information and confidentiality.
It means patients' right of confidentiality of physical, psychological, social and information privacy when receiving treatment in the hospitals (Woogara, 2005).
Many people find that traditional medical garments are generally embarrassing to wear. Poor fitting, comfort and appearance of a garment would make people less likely to wear it. Corresponding to rapid exploitation in biomedical science, there is a large space for new development and modification in the design of medical garments. With a great concern, user-oriented apparel for healthcare should be produced to fulfill the requirements for restorative care training and convenient long-term nursing, as well as to provide a better ameliorant and make people more likely to want to wear them than they to the conventional medical garments(Park, 2014).Universal Declaration of Human Rights (UDHR; United Nations, 1998) Article 25, which assesses the right to a decent life and includes adequate food, clothing, housing, and medical care service (Vijaya-lakshmi, Reddemma & Math, 2012). According to research on psychology, privacy is one of the key factors to maintain patients' dignity. Because of ex-elimination or treatment, patients in the hospitals usually must wear the clothes regulated by hospitals. They have more opportunities to be exposed by unfamiliar environments or they are simply separated by curtains. Besides physical pain, the patients should adapt to mental shyness and anxiety. From the patients' perspectives, dignified care is not simply proper clothes and coverage. It also includes an appropriate time arrangement and comprehension of patients' views and feelings. Patients' bodies should not be treated as objects. Clothes are a way of communicating social roles and personal identities (IL-Tanen-Tähkävuori, Wikberg & Topo, 2012). Some patients may have differed types of physical impairments. Their body dimensions may differ from those of the stipulated size of medical garments in the usual production line (Sau-Fun, Chi-Leung, & Lai-Fan, 2011). As to the issue of body privacy, most of nursing personnel have realized that inappropriate curtains and Post-operative garment type medical operation considerably influence patients' dignity and delay the Post-operative (Matiti & Trorey, 2008). Maintenance of patients' dignity results in strong emotional comfort. The sense of well-being reduces patients' Post-operative garment. There is a positive correlation among physical, psychological health and dignity. People who are more dignified are more energetic and they encounter less fatigue and emotional problems (Williams & Irurita, 2004). The body and its treatment were a central theme in the nurses' accounts. Much of the discussion of patient dignity re-evolved around the exposure of the body and the gaze of others. (Walsh & Kowanko, 2002). The phenomenon of 'wearing patient clothing' was found to consist being depersonalized, being stigmatized; and being devitalized (Edvardsson, 2009).
Many people find that traditional medical garments are generally embarrassing to wear. Poor fitting, comfort and appearance of a garment would make people less likely to wear it (Sau-Fun, Chi-Leung et al., 2011).

2.2 Review of smart medical clothing

Medical garments are apparel designed for people with medical problems and/or medical personnel for the functions within protection and treatment domains (Park, 2014)

Smart or intelligent clothing is a garment with sensing and actuation properties, that can sense external stimuli and respond with active control to those stimuli. The innovation of smart or intelligent textiles, new sensors, miniaturization, computing science and related technologies in recent years has enabled the development of intelligent clothing in the biomedical and healthcare fields. The intelligent medical garment, which is made by the integration of microelectronics and smart textiles, is generally used to collect physiological and/or biological data and provide risk assessment, diagnosis and function as health monitoring for particularly cases or individual needs (Sau-Fun, Chi-Leung et al. 2011).

Viewed as ambient intelligence that is closest to the human body, the vital-signs monitoring garment is a new kind of health-care clothing that blends biotechnology and information technology with fashion (Cho, Yang, and Sung 2008). In other words, this refers to clothing with embedded devices that can monitor vital signs, electrically converting the physical values measured from the body and expressing the resulting biological phenomena into electric signals. As such, it makes health management and remote treatment possible (Cho, Lee et al. 2009).

2.3 ECG Holter Monitor

Heart disease has been the first cause of death in the world. According to data by the Centers for Disease Control and Prevention, in 2016, 610,000 people were dying from heart disease (CDC, 2017). Ischemic heart disease and stroke are the world's biggest killers, accounting for a combined 15 million deaths in 2015. Of the top 10 causes diseases, heart diseases have remained the leading cause of death globally in the last 15 years (WHO, 2017). Based on statistical figures in 2017, the figures showed that heart disease patients were increasing year by year (CDC, 2017). In Taiwan, the 3 leading causes of death for 2016 were, in rank order, Malignant neoplasms (cancers), Diseases of the heart and Pneumonia (MOHW, 2017). One of the most important tools to diagnose heart disease is ECG Holter Monitor. The ECG is a recording of the electrical activity in the heart, recorded from selected points on the surface of the body. The electrocardiogram can be considered a signature of the heart's electrically induced movements (Norenberg 2013). The Holter monitor, first introduced in the late 1940s, remains the most commonly used methods for investigating patients in the ambulatory setting with suspected arrhythmias. (Barrett et al., 2014; Ajay K. Joshi et al.; Ajay K Joshi et al., 2005). A Holter monitor is a battery-operated portable device that measures and records patient heart's activity (ECG) continuously for 24 to 48 hours. The Holter monitor and other devices that record ECG as patients go about their daily activities are called ambulatory electrocardiograms (Association, 2018). The Holter monitor and other devices that record ECG as patients go about their daily activities. Regular electrocardiograms (ECGs or EKGs) let the doctors look at patient heart's activity at one point in time during the ECG test. Abnormal heart rhythms and cardiac symptoms may come and go (American Heart Association, 2018). The wearable Holter-accelerometer recording could help to identify impaired chronotropic response to physical activities in heart failure patients (Shen et al., 2017). Patients who are wearing Holter monitors are able to go about their daily routines. The device acts as a powerful diagnostic tool and takes critical records of heart function. This data is then used by doctors in hospital to make

essential diagnoses and patient care decisions.

3. Method

3.1 Experimental design

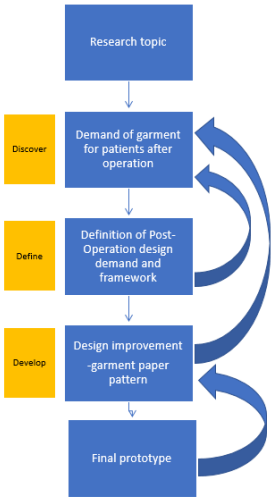


Fig 1. Design research process

In the first step, a research topic is 3 set up.

Discover: Demand of garment for patients after operation

Content of execution:

1. Domestic and foreign related studies and literature review
2. Participant observation and in-depth interview to recognize current situation of patients after operation, probe into their lifestyle and interview care givers regarding their needs
3. It probes into issues and demands related to patients after operation and care givers' care service and specifically proposes key questions of the whole research.
4. It accomplishes design research and group classification

Define: Definition of service design demand and framework

Content of execution:

1. According to research findings of the first phase, by planning and design thinking, it invites pattern makers and designers to participate in the design and develop the feasibility of care product.
2. By brainstorming, it analyzes different patterns and plans experimental situations to discover service gap.
3. It defines concept of design and proposes prototype design

Develop: Content of execution:

1. Try-on of "patients' clothes after operation"
2. Try-on of patients' clothes of service design and it evaluates and records operation of product in the ward and effectiveness of care.
3. Modification of pattern and material of care product.

This study investigated the effects of nine operational factors, including style suites, color, material, aesthetics, convenience, function, well covered in dignity, well protected and easy to clean.

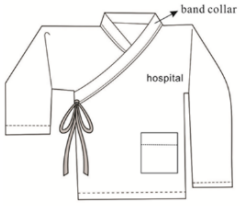
3.2 Subjects

12 nursing personnel subjects (aged 23–63, M=37.33, SD=11.758) and 18 patient subjects (aged 23–89, M=58.17, SD= 16.532) participated in this study. The protocol was explained, and informed consent was obtained from each subject and hospital Institutional review board to validate the usability (IRB approved No.600-106-08).

3.3 Style Types

According to a previous survey result, the clothing needs of patients living are not being met (Sau-Fun, Chi-Leung et al. 2011), the lack of appropriate clothing prevented individuals from fully engaging in person activities and relationships, everyday life events. Using patients garment products, many of the interactive problems encountered were difficult to find the convenience and comfort clothing in the hospital. Designers have to understand other unique physical characteristics, and put more emphasis than ever on satisfying their needs (Lee & Liao, 2003). As a patient garment suit (designed with top wear and bottom pants display) represents a typical patient wearing, it was chosen to study solve problems in this study.

Table 1. Design detailed description

Number	TypeA	TypeB
Artwork		
Style Photo		
Patients try on photo	 (a)  (b)	 (a)  (b)

Design detail		
24 hours ECG Monitor	Put in side bag	Put in front pocket
Key points of design	1. Suit of upper and lower garments 2. Loose and comfortable 3.Easy to put on and take off 4. Design of pocket for patients' personal items	1. two double pockets 2.Easy put ECG in the pockets 3.fabric 100% cotton comfortable

The patient garment was designed with two different designs, namely (Table 1) further details are described as follows:

1. Type A (Table1) is regular patients, rehabilitation garment. Kimono-style garment top features band collar, one side pocket (Table1), on-seam sleeves, and full-front crossover wrap styling with ties at underarm. Pull-on garment, pants with elasticized waistband; bound hem at leg openings. Dressed current patient style (Kimono-style) steps were (a) Slip patients arms into the sleeves of the patient garment and grasp it along its front hem, one side in each hand, at about waist level. Fold the right-hand side underneath the left-hand side and hold it in place with patient hand (Table1); (b) Fold the left hand over the right-hand side and hold it in place with patient hand while patients get their belt; (c) Secure everything in place with the belt by wrapping it around the patient's waist. Begin in the front and wrap it around patient back. (d) Cross the belt around your back and tie it in the front. To the patient, the belt is tied at the waist. (e) Patient garment has one pocket for carrying hospital ECG Holter Monitor and private goods (Table1).

2. Type B (Table1) is an improved Post-operative patient garment. Notch collar shirt features spread collar; button front closure; Two pockets on two side waists (Table1). Pull-on garment, pants with elasticized waistband; open crotch fly design. 100% cotton material used and machine washable. Dressed notch collar patient style steps were (a) Slip patients arms into the sleeves of the patient garment; (b) Button up patient's garment. (c) Put the hospital ECG Holter Monitor and private goods in the right or the left side pocket.

3.4 Task and procedure

According to the category of identity, 30 subjects were divided into two groups—G1(18 patients for G1), G2(12 nurses for G2). All subjects were required to finish questionnaire and interview 30 minutes. G1 group also divided into two groups in gender –Male and Female. Male and Female add task is dressing the current and improvement a new Post-Operative Garment in 8 hours. For each dress activity wear on and take off clothing time, heart beat and blood pressure were recorded. The questionnaire consists of nine questions (Fig2.) regarding the subjects' responses. Type B finishes the tasks for each dress activities, the subjects answered questionnaires and were interviewed on how they feel about this current and improvement patient garment.

4. Results

Responses from patients during in-deep interviews are summarized as follows:

1.From intensive care unit to a general ward, due to external pipes, it is inconvenient for patients wear the garment. When patients are transferred from intensive care unit to general Post-operative ward, their arms or upper limbs are attached with drainage bag or drainage bottle. It is difficult for them to change or tie the garment.

2.Post-operative Garment type B medical operation are not suitable for patients with special figures. Patients with special figures have difficulty in terms of sizes of Post-operative garment.

3.Some state that it is helpless to wear an unsatisfying garment during the time of illness. Female patients suggest that unfitted patients' garment expose their breasts and it is uncomfortable and no dignity.

4.Post-operative Garment are not classified by seasons. Some patients are afraid of the cold and they suggest that the clothes are not warm enough.

5.Medical personnel realize that some patients are allergic to current mixed material of cotton

6.Male patients suggest that it lacks the design of front rise of pants and it is inconvenient in the toilet.

7.The Pocket of the garment is too small for ECG Holter Monitor and private items will fall from the pocket.

8.The present Post-operative garment of the hospital are not totally new. Patients suggest that Post-operative garment they we're currently are the second-hand and they are anxious about hygiene and Post-operative.

This study has several limitations, all cardiac surgery patients were grouped together, regardless of type or whether the individual had an additional operation (e.g. Sensory or cognitive). Additionally, responses are likely to be biased towards more immediate or recent concerns, so questions regarding needs during different seasons, for example, might have varied if the survey was given during those seasons. The results indicate that 9 (style, size, color, material, pretty, convenience, dignity, protection, clean). Factors in the Post-operative garment design changes were significant between the two subject groups.

A paired-samples t-test was conducted to compare including style, size, color, material, pretty, convenience, dignity, protection and clean factors in G1(patients)and G2(nurses) group (Fig 3.).

1. Inconvenient to put on the clothes due to too many drainage tube – Post-operative garment increase the pockets and the front arm open sleeve design (Table 1/design detail). Thus, attached with intravenous drip patients who are easy let the nurse take care of them. The result show that G1 type A (M=3.06, SD=0.966) and type B (M=4.59, SD=0.507), $p < 0.05$(Fig 2.). Some nurse thinks the Post-operative garment was too complex to take off and not easy to give first aid treatment. G2 type A (M=3.25, SD=0.622) and type B (M=4.17, SD=0.718) conditions; $p > 0.05$(Fig 2.). The result show that G1 group type B Mean data higher than A. It points Style B more fit for patients (Fig 3.).

“For the past year, I have been in and out of the hospital several times with different surgical procedures related to Cardiac Procedures and Surgeries. Finding a convenient, comfortable clothing during my recovery was not an easy task. I had to wear the clothing in the hospital. Now I wear the new one clothing that had front open, were loose where they needed to be loose, were good looking, and, most importantly, were easy to use and comfortable. It was not easy to find garments that met these specifications.” (S3) Patient after surgeries it is not easy to wear or take off the clothing. One patient wear type A close to very hard level.

2. Current garment sizes are not suitable for some patients with special body type. The Post-operative garment pattern applies the YUKA computer software set up, let the garment pattern fittest to patient's body shape G1 type A (M= 3.24, SD=0.752) and type B (M=3.17, SD=0.577) conditions; $p < 0.05$(Fig 2.).

3. Due to circuit and attached ECG Holter Monitor device, patients have difficulty in movement and wearing stress type A operation. There was easier to wear type B(Fig 4.).

4. New Post-operative garment changes the material to 100% combed cotton instead of T/C cotton. Patients feel more comfortable (Fig 3.). 100% cotton is more comfortable and warm for patients. G1 type A (M=2.53, SD=0.717) and type B (M=4.47, SD=0.717) conditions; $p < 0.05$, 100% cotton is more comfortable and warm for patients (Fig 2.).

5. Insufficient functions of present garment in the hospital. In design of patient clothing beneficence underlies the attempts to make the care work more ergonomic and when taking into account the dignity and functional (Iltanen, 2009). There was a significant difference in the scores for G1dignity. Type A (M= 2.41, SD=1.064) and type B (M=4.59, SD=0.507) conditions; $p< 0.05$ and G2 type A (M=2.92, SD=0.669) and type B (M=4.25, SD=0.622) conditions; $p< 0.05$(Fig 2.).

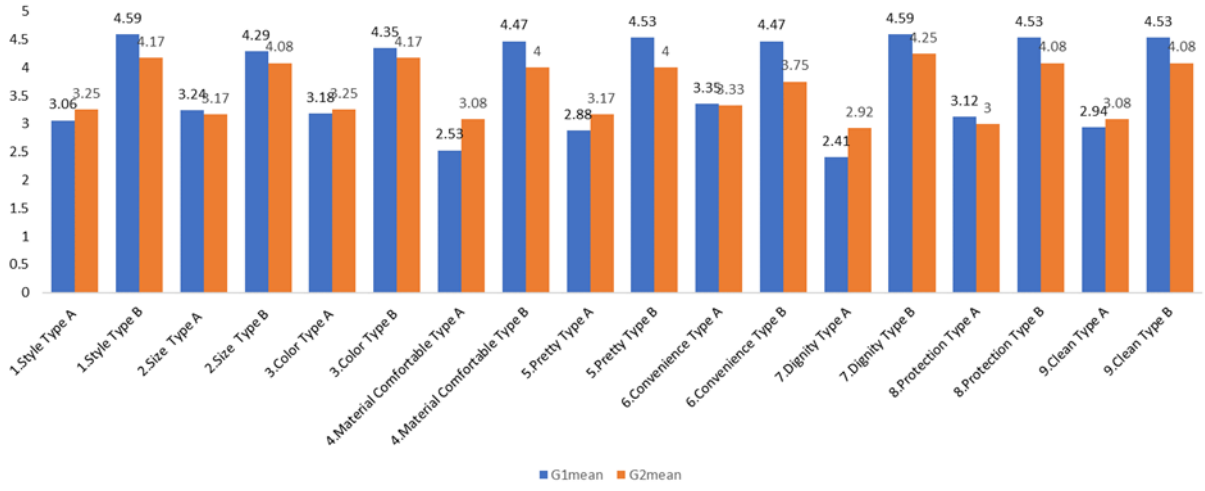


Fig2.G1 patients/G2 nurses compare Type A/B

The themes that emerged from the patient interviews were similar to those that emerged from the interviews with nurses. The characteristics that patients attributed to dignity and its maintenance included respect, privacy, control, choice, humor and matter-of-factness. Respect was shown to patients when they had their personhood acknowledged, as well as their need for privacy and time. Privacy involved

protecting the patient from the unnecessary gaze of others and maintaining patient confidentiality (for example, preventing others knowing that the patient had been incontinent). Patients felt that their dignity had been maintained when they were given choices and had control of aspects of their care (Walsh and Kowanko 2002).

6. Present rehabilitation clothes of the hospital are not totally new. The same clothes, whether they are underwear, pajamas, dressing gowns, dresses or sweat suits are shared by tens or even hundreds of patients (Iltanen, 2009). There was a significant difference in the scores for clean factor G1 group type A (M= 2.94, SD=1.029) and type B (M=4.53, SD=0.514) conditions; $p < 0.05$.Patients' more prefer to wear the new design garment. It makes them feel more better. The findings suggest that having patients' input while selecting clothes for them can boost their psychological selves and thereby to improve the quality of daily life in the hospital. We suggest can use this strategy to better meet the socio-emotional needs.

5. CONCLUSIONS

Medical Garment design factors (Fig.3), including style, size, comfortable, fit, quality, dignity and hygiene, had significant effects on the findings of this study. Smart, wireless functional post-operative garment is the future development trend.

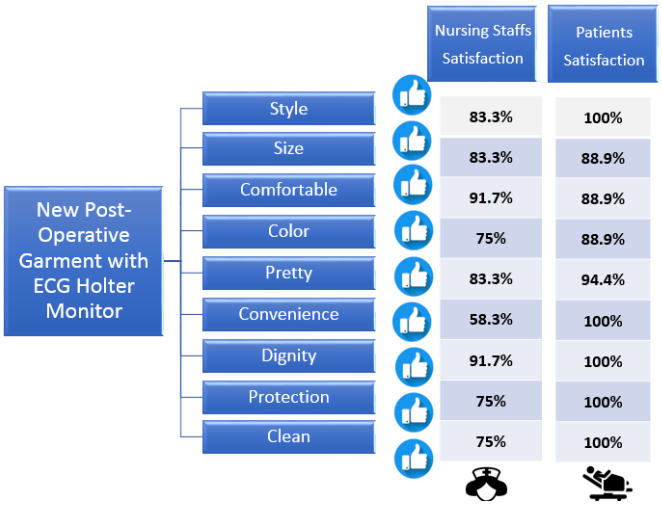


Fig3. Nursing Staffs and Patients Satisfaction for the new Post-Operative Garment designed with ECG Holter Monitor

More than 88% of the hospitalized patients showed satisfied and preference to the new designed post-operative garments with ECG Holter Monitor (50% agree, 50% strongly agree) due to its convenience, improved psychological perspective through dignity (38.9% agree ,61.1% strongly agree), care and comfort.

As a result, this study concludes the new design changes in the garments' fabric (33.3% agree, 55.6% strongly agree), functionality and ECG Holter Device access for 24 hours should be considered as the first improving area to the challenges faced by the patients and health care providers. The impact is not only important for the patients, but also helpful to the nursing staff.

Survey responses indicated that the design of the original hospital garments was not convenient (46.6% agree) for daily life and had existing dignity(16.7% agree) challenges experienced by patients during the recovery process.

Overall, responses to the survey support the argument that clothing and its appropriate design is an important aspect of attaining patients' quality of health care, and social engagement while residing in the hospital during recovery. These design issues have a larger social significance and choosing the appropriate apparel should be emphasized and acknowledged by hospital providers. This study illuminates the patient's clothing and experience of dignity from the perspective of the patient and the nurse.

6. FUTURE STUDY

The future work will aim to collect physiological ECG data with cloud computing application (Fig4). Besides, we will develop lighter smart clothing to fit other patients in different cultures to determine if the findings are unique to Taiwanese patient or applicable universally.

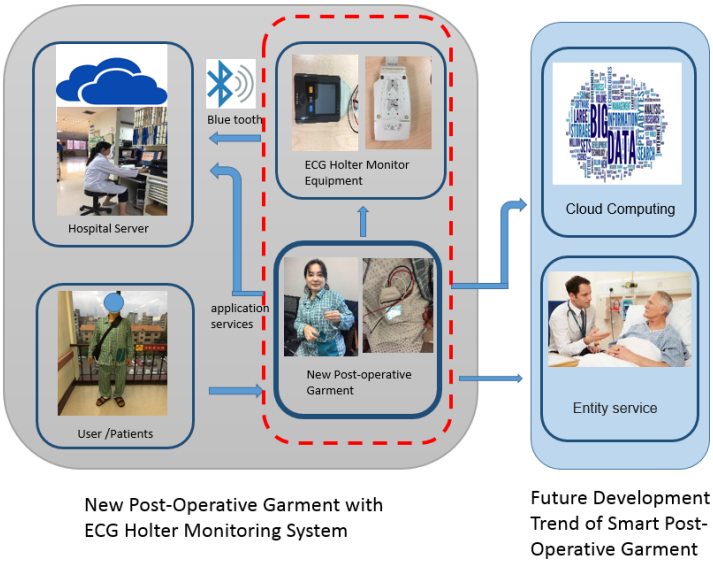


Fig 4 . Hospital Wearable device system architecture

Moreover, we also plan to develop different styles, such as smart t-shirt and vest. In doing so, it has posed a few further questions, such as that if patients have a same perception of care about what compromises patient dignity. We believe that we still can do more in patient's clothing.

Acknowledgment

The researchers are grateful to all the patients who took the time and thank Dr. Wei's Heart Center staffs of the Cheng Hsin General Hospital. Dr. Wen Chien Liao of Taiwan Adventist Hospital. Shu-fen Tsai and Yu-Huei system development staffs help the garment's paper pattern making. Dr. Fu-Ling Cheng in Taiwan Textile Research Institute for the garment fabric consultation. Penny Pau. Huang, Yan-Ping in Sunny LAB.

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Appendix

Outline of interview:

A. Nurse:

What is your working state? How many years have you worked in nursing? Please talk about

Your experience to assist with the patients' clothing clinically. What is the main category of your nursing? How do you work? What is the effect of physical monitor on your job? When changing their clothes, do you feel inconvenient? Do you have to turn over patients' clothes to check the physical figures on the monitor? Is the conducting wire, thus easily detached? What are the most difficult and time-consuming clothes to change? Why?

Have you ever encountered the after-operation patients who resisted the clothes? Why? What was your solution? What is your suggestion to improve the design of your patients' clothes?

B. Patients:

Outline of interview:

What is your state of illness? How long have you been received the operation? What is your experience with the clothes of the patient? When you put on the clothes, which one is more difficult, upper or lower garment? How do you put on the clothes, can you describe it?

What is the effect of physical monitor on your putting on of clothes? When you change the clothes, do you feel inconvenient? Do you have to turn over the clothes to check the physical figures of the monitor? Is the conducting line easily detached? Do you think that you catch a cold easily since the clothing is not sufficient? What is your suggestion for rehabilitation clothes after the medical operation?

Selection of samples

As to the selection of samples, upon the participants' consent, this study retrieves their case history. First, it eliminates the samples that are allergic to cotton or synthetic fiber, have a history of mental disorder or cannot communicate with others and obtains 30 subjects.

Interview time is set at 30 minutes. The actual interview time depends on the subject's intention of expression and content of description. After interviewing, the sound recording is transcribed. Research subjects are A. Nursing personnel, health care personnel and family members of patients.

Description of the principles of confidentiality and privacy in this study: regarding the participants and their information, the researcher has the duty to protect their privacy which cannot be identified and obtained by others. Names or other identities in the sound recording are shown anonymously or by codes. It eliminates and simplifies the identifiable information. In the process of data collection, without the participants' agreement, the researcher does not conduct sound and video recording. As to information, except for consents, the researcher only shows the participants anonymously. All videos, images, transcription and consents are preserved with locks without other uses to protect the participants' privacy.

術後復原衣設計於佩掛動態心電圖監控病患之機能性探討

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摘要

本研究的目的為改善病人術後攜帶移動式心電圖設備，穿著之復原病人服裝。12 位護理人員與 18 位病人台灣北部醫院參與本次研究。試穿者在問卷調查、訪談中提供意見與回饋；研究顯示病人對於新型術後復原衣滿意度達 88%以上，研究證實新的改良術後復原衣有助於病人便利攜帶 24 小時移動式心電圖設備。同時我們建議醫療院所應為患者提供體積更小之生理監視器，讓病人方便長時間穿戴配戴以達到醫療照護的目標。

關鍵詞：術後復原衣，病患自尊，動態心電圖