ABSTRACT

JHA, SWETAMBALI. Exploring Design Requirements for a Functional Patient Garment: Hospital Caregivers' Perspective. (Under the direction of Dr. Traci A.M.Lamar).

An investigation was carried out to understand the requirements of a patient gown from the perspective of hospital caregivers. Hospital gowns are unique functional garments as they have multiple end users from various departments. The same gown during its lifecycle is worn by many patients who do not have authority in the purchasing decision of the gown. Patients wear it wanting warmth, comfort, aesthetics and modesty. Caregivers, on the other hand want ease of access to patient's body, ease of donning and doffing, and functionality which would aid them in administering medical care. Therefore, any gown design should take the needs of all the end users into consideration. However, most attempts at redesigning the traditional patient gown have focused on the need of the patient alone. The requirements of its second most important user, the doctors, nurses and other hospital staff (caregivers) have not been investigated in depth. This research aimed to establish the size and scope of the problems associated with the traditional patient gown from the caregiver's point of view. This exploratory research, funded by the Robert Wood Johnson Foundation, was part of a larger project whose objective is to assess the requirements of patients, hospital administrators and caregivers and combine their requirements to develop a revolutionary patient gown that would satisfy the needs of all the stakeholders.

The research employed a two pronged approach to distill requirements from the caregivers. Part I of the research focused on exploring the problems that caregivers face

with the traditional patient gown and understanding how severe these issues were. This was accomplished by surveying 1200 hospital caregivers with a questionnaire. The sample included physicians (72), clinical nursing support (149), clinical professionals (234), clinical support staff (122), clinical technical staff (93) and registered nurse responsible for direct patient care (530). Part I, therefore defined the problem set and prioritized issues which needed in-depth investigation.

Part II of the research aimed to establish a deep understanding of the issues by conducting five focus groups with caregivers from three large regional hospitals. The qualitative data obtained provided insights, detailed explanations and experiences which would have been difficult to obtain through surveys.

The findings of the research indicate that all the hospitals in the study used the traditional gown. The survey and focus group response indicated that the traditional patient gown did not meet the accessibility and functionality needs of the caregivers. The majority of the caregivers felt that the current patient attire hindered their ability to efficiently perform medical procedures. In addition, they also felt that there was a strong relationship between the patient attire and their physical and emotional well being. The results suggest there is a need to replace the present attire with an improved and more functional garment.

Exploring Design Requirements for a Functional Patient Garment: Hospital Caregiver's Perspective

by
Swetambali Jha

A thesis submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the degree of
Master of Science

Textile Apparel Technology and Management

Raleigh, North Carolina

May 2009

APPROVED BY:

_____	_____
Prof. Nancy Powell	Dr. Moon Suh

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Dr. Traci May-Lamar
Chair of Advisory Committee

BIOGRAPHY

The author was born in Bihar, India on March 3, 1981. She is the daughter of Anil Kumar Jha and Reeta Jha. Swetambali grew up in Darjeeling, India, along with her younger sister, Shivangi and brother, Saket, the youngest of the siblings. She completed her schooling at Dow Hill School, Kurseong and high school at Pratt Memorial, Kolkata. She received her Bachelor of Arts degree from Calcutta University.

Following her undergraduate degree, she entered graduate school at North Carolina State University. Swetambali was awarded a graduate assistantship funded by the Robert Wood Johnson Foundation. She interned at Victoria's Secret, New York, during the summer of 2008 with the production and sourcing department.

Swetambali plans to complete her requirements to earn her Master of Science degree in Textile Management and Technology in December 2008. Upon graduation she looks forward to her career in the industry.

ACKNOWLEDGMENTS

I would like to sincerely thank Dr. Traci Lamar for her constant support, motivation, and guidance throughout my years at NC State. Dr. Lamar has believed in me and allowed me to accomplish goals I never thought possible. Her unwavering dedication to her career, the University, and most especially to her students is simply inspiring.

Special thanks goes to my committee members, Prof. Nancy Powell and Dr. Moon Suh, who took interest in my research and guided me through this journey by providing valuable comments and recommendations.

I would also like to acknowledge the Robert Wood Johnson Foundation for funding this research. Special thanks to the staff of College of Textiles, for all the help and suggestions during the course of my curriculum.

Finally, I would like to thank my family especially my husband, Abhishek, for being a pillar of strength for me. My research and my graduate studies would not have been successful without his support, understanding and help.

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Chapter 1

Introduction

The healthcare industry today is very different from what it was 50 years ago. Advancement in diagnostic technologies, therapeutics and hospital care have led to a greater awareness of medical options and as a result, hospital visits are becoming shorter. The American Hospital Association says that while the average visit to a community hospital has become shorter, due to an aging population, more and more people are being admitted into hospitals (www.aha.org, 2008). The cost of providing a modern healthcare system is also increasing every year. According to Plunkett Research, the national healthcare expenditure will surpass $2.7 trillion with a per capita expenditure of $7,498 on healthcare products and services (www.plunkettresearch.com, 2008). AHA further says that more and more Americans are paying a significant portion of their medical expenses from their own pocket. As a result, it is becoming increasingly common for a patient to shop for medical services and select which hospital they want to go to for their surgeries (www.hhs.gov). This has forced hospitals to try to differentiate themselves, not on healthcare services alone but also on the quality of the hospital experience they offer to their patients.

An integral, yet often overlooked part of a patient's hospital experience is the patient gown. The patient's experience with the patient gown starts with entry into the hospital and lasts until the patient leaves the hospital; hence, a patient gown is the only constant in a patient's treatment process. However, this is also a garment which is not bought by the user

but someone else is responsible for purchasing it. Gowns currently in use were designed in the early 1900s and have not undergone any major redesign since then. Popular literature is full of examples of patients wearing traditional gowns which do not cover their bodies well. This implies little investment or thought has been given on improving this important part of the patient's experience. Besides, the traditional gown is known to be inconvenient and may obstruct routine medical procedures, such as taking temperature and blood pressure, and delivering intravenous injection.

Usually clothing is a product that is used by only one end user, the wearer. However, patient gowns are unique because they have two types of end users – the patients and the caregivers. In addition, the same gown during its lifecycle is worn by many patients and handled by many caregivers specializing in different types of care. For example, the same gown may be used one week by a cardiac patient and the next week by an incontinent patient. These patients and their caregivers have very different gowning requirements. The hospital gown should accommodate the needs of all its end users.

Caregivers are typically pressed for time when they conduct medical procedures including examinations. These procedures require a gown capable of being opened for easy and quick access to the appropriate part of the patient's body (Truitt & Southwell, 1992). This is a key requirement in an emergency or urgent response situation.

1.1 Purpose of Research

The purpose of the research was to identify any problems associated with the traditional patient gown from the perspective of hospital caregivers. This research aimed to establish the size and scope of such problems from the caregiver's point of view. This exploratory research, funded by the Robert Wood Johnson Foundation, was part of a larger project whose objective is to assess the requirements of patients, hospital administrators and caregivers and combine their requirements to develop a comprehensive listing of requirements of a patient gown that would satisfy the needs of all the stakeholders.

While many attempts have been made to redesign the traditional patient gowns, most of them have focused on the needs of the patient and have failed to undertake a systematic study of its second most important user, the doctors, nurses and other hospital staff, termed as "*hospital caregivers"* in this study .

Hospital caregivers have their own set of requirements. While the main focus area is the ease of access to the patient's body, donning/doffing, infection prevention, supply, storage and handling of the gown by the linen and laundry staff are also important research consideration. This research identifies the caregiver's perceptions of the functionality provided by the traditional gown and examines the issues in detail. Alternatives or new features as deemed important by the caregivers are identified and the caregiver's perception of the impact of gown on patient emotional and physical well being is discussed.

1.2 Relevance of Proposed Research

Before any attempt to redesign an existing product is made, a thorough analysis of environment, context and requirements needs to be conducted (Cooper R, 2001). This study explores the context of the traditional patient gown and provides requirements of a patient gown from a hospital caregiver's perspective. The strengths and weaknesses of the current patient gown are identified. Results provide a better understanding of the problems that have been faced by the caregivers and how those problems can be resolved. The information found from this study will be consolidated with the information from the other studies being conducted from the patients' and the hospital administrator's standpoints to build a comprehensive understanding.

1.3 Research Objective

The objectives of this research are:

1. Analyze caregivers need with respect to
    - ease of access to the patient's body for medical examination and
    - donning/doffing, storage, sizing, handling of the gown by the linen and laundry staff
2. Understand caregiver's perception of impact of the traditional patient gown on a patient's emotional and physical well being

3. Identify caregiver's perspectives on the design requirements and features of an ideal patient gown

1.4 The Traditional Patient Gown

Figure 1 and Figure 2 below describe the features of the traditional gown. For the purpose of this study the current gown is addressed as the "traditional patient gown" by the researcher. It is named so because the gown was designed in the early 1900's and has not changed much since that time.



Figure 1: Front View of a traditional patient gown **Source: www.canadiandawn.ca/health_care**

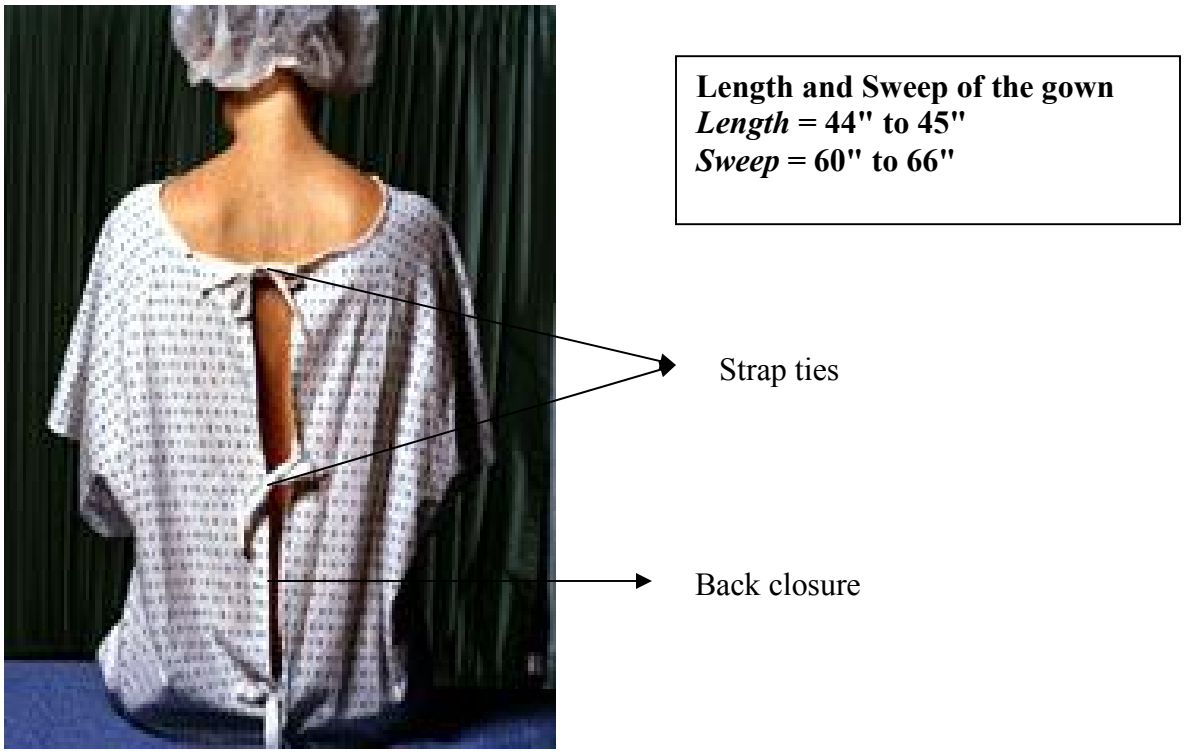


Figure 2: Back View of the traditional patient gown **Source: Adapted from news.bbc.co.uk**

Chapter 2

Literature Review

Review of existing literature shows that few attempts have been made to improve the traditional patient gown to provide hospital caregivers with greater ease in accessing the patient's body. Truit and Southwell (1992) also patented a hospital gown with the means for fully closing an 'openable' seam while affording selective access to portions of a patient's body through the seam. The closing or fastening elements are either continuous along the seam or were relatively closely spaced so that no significant gaps remain when all of the closing elements are secured together. The patent further states that several normally closed and 'openable' seams may be provided to afford access to different portions of the patient's body. Burbidge's patent (2000) shows a shoulder opening which would allow access to the patient's back by opening the closure extended from the shoulder to the sleeve.

Also, patents by Jakub, (1991) and Janzen (1990) exhibited a triangular-shaped, free floating area on the front, side open slits, and openings extending from the neck to the armpit as a design solution for easy access to the patient's body. Maria's (1999) patent features two panels, which can be attached or detached with the help of snaps along the shoulders and the side seams.

In spite of multiple patents filed for new patient gowns, survey of popular literature available online did not provide any clear evidence of large scale adoption of new gown by the hospitals in the United States.

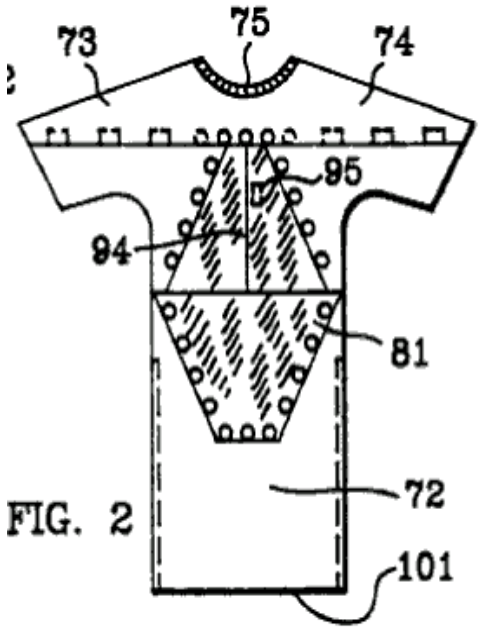


Figure 3: Gown patented by Truitt & Southwell (1992)



Figure 4: Gown Patented by Burbidge (2000)

2.1 Apparel Quality and Comfort

Apparel quality and comfort are important determinants of the effectiveness of functional garments such as a patient gown. The primary components of apparel quality are physical features and performance attributes. Physical features should address the question – what is the garment? And performance features should address, what does the garment do? (Brown & Rice, 1998)

Physical features describe the garment's design, materials used and finish. In general, the quality of all textile and apparel products can be measured along the above dimensions. A garment's performance features describe how the user benefits from using the garment. Aesthetic benefits imply how the garment fulfills appearance expectations and the wearer's emotional needs. Functional benefits are concerned with practicality and durability of the garment (Brown & Rice, 1998).

Apparel quality is further qualified by the feeling of comfort enjoyed by the wearer of the garment. Comfort is "a condition of ease or well-being that is affected by many factors" (Collier & Epps, 1999). Characteristics of comfort can be categorized by psychological, physiological, and physical aspects (Cheng & Cheung, 1994; Sarkar, 1994). Psychological comfort can be attributed to the color, style, fashion, and suitability for an occasion (Cheng & Cheung, 1994). Physiological factors such as warmth and fit arise with the interaction of the body and the garment. Fabric properties such as air permeability, tensile property, thermal insulation, water-vapor permeability, pore sizing, determine physical comfort. The perception of physical comfort is affected by the environment and health of the wearer and

the way in which various fabrics interact with that environment (Tarafdar, 1995). Slater (as cited in Tarafdar, 1995) goes on further to say that the purpose of clothing is "to maintain bodily and mental efficiency and a feeling of comfort in a particular climatic condition". Ultimately, clothing is a buffer against environmental changes and social contexts (Cho, 2006). The literature survey shows little evidence of a large scale adoption of any of the inventions described above.

Four factors consistently found in garment comfort analysis are physical, functional, physiological, and psychological and one may be dominant over the others in a given context. In spite of the dominance of one or two factors over the other, it is important not to neglect the other factors, because holistic comfort can only be achieved when all the factors are taken into consideration. In essence, new functional garment designers should not focus on functional factors alone. This has clearly not been the case with majority of the attempts to develop new patient gowns. Most of the redesign attempts have focused on one or two of the factors discussed above.

Thus, this research is better positioned to be successful as the team has taken a more holistic viewpoint and is considering physical, functional, physiological and psychological factors in addition to considering the needs of all the stakeholders - the patients, the caregivers and the purchasing staff.

2.2 To Gown or not to Gown

One concern related to patient gowns is the understanding of the level of necessity to wear a gown during the hospital stay. According to research conducted by Institute of Social and Preventive Medicine, Lausanne, wearing plain clothes instead of hospital gown did not *significantly* affect the length of hospital stay or the level of spontaneous physical activity. However, there is a trend towards increased spontaneous physical activity and shortening of hospital stay in patients wearing plain clothes. It was also concluded that the wearing of plain clothes is not associated with complications and could be included in post operative program aimed at early function recovery (Oliver Despond, 1999).

However, so far no study has been conducted from the caregiver's perspective to understand in detail whether a patient is required to wear a hospital issued gown or not, and if so, what are some of the important reasons.

2.3 Clothing and Well-Being

"One of the greatest needs of people is the admiration of their fellow men and women, and here clothing plays a major role" (Lawrence Langner, 1991). Clothing has always been a status symbol and an expression of individuality. In commenting on clothing as an expression of personality, George Dearborn, an early twentieth century psychologist said, “We might consider clothes as a vicarious second skin, almost an extension of the individual boundary,

involving important relationships between the person and his environment, spiritual as well as material."

The psychological impact of clothing has been the topic of many books and research projects. The positive effect of clothing on self-esteem, productivity and performance has been strongly and clearly established. For example, Quinn & Chase (1990) found that disabled children are more clothes conscious than able-bodied children. Particularly in a rehabilitation setting, there is a significant rise in the self-esteem of special needs patients, after fashionable, functional clothing has been developed for them (Quinn & Chase, 1990).

This is as true for older people as it is for special needs children. Older people need ego support, social relationships, and a role in society. Clothing for the aged, therefore, must serve not only the needs related to physical conditions but also the needs of a social and psychological nature (Hoffman, 1970). Hoffman further mentions that the elements of attractiveness in clothing are color, design, decoration, distinctiveness and individuality and for those whose environment is limited by age, conditions of health, or physical handicaps, attractive clothing can provide aesthetic stimulation and can also lift the spirit and enhance the sense of personal worth.

2.4 Paper Vs Cloth

Many hospitals use paper gowns for patients who are on temporary hospital visits. These gowns are flimsy, prone to tear, create noise and appear cold and sterile projecting a

negative environment during a hospital visit. A survey conducted by Harris Interactive on behalf of the Nixon uniform service and medical wear found that 75 percent of adults feel much more comfortable in a cloth medical gown than in a paper gown (PR.com, 2007).

While the efficacy of paper gowns is debatable, what is certain is that both the paper and the traditional cloth gowns make perfect economic sense. Paper gowns don't need maintenance and extra storage and can be easily disposed. Cloth gowns, while needing laundering usually need not be sorted to patient's size or illness making the overall carrying cost very low. The 'one size fits all' concept makes sound economic sense.

While it may make sound economic sense, our literature survey clearly indicates patients prefer a cloth gown over a paper gown. Furthermore, we did not find any evidence of large scale use of paper gown in hospital settings where the stay of patient typically is longer than a visit to the clinic.

2.5 Needs Assessment

A recent study by Kyeong Sook Cho (2006) assesses the needs of the patients and shows that traditional gowns fail to meet those needs. In this study, Cho designed two prototypes to compare their comfort to a typical design of a conventional gown. The features of Prototype A were an A-line style gown with a front opening; enclosed raglan sleeves; a triangular-shaped, free-float area in the front; and a back-slit overlap (see Figure 5).



Figure 5: Prototype A on a subject sitting in a wheelchair and the flat sketch (Source: Cho, 2006)

Prototype B was composed of four panels; three panels in front and one panel in back. It had cap sleeves; a front-slit overlap, openings on the upper chest area, and an opening from the armpit to the hem on the right side (see Figure 6).





Figure 6: Prototype B on a subject lying in bed and the flat sketch

(Source: Cho, 2006)

The conventional gown used for the trial evaluation was composed of one front panel, two identical back panels, and raglan sleeves with snap openings along the sleeve seam line, and a back opening secured with two ties (see Figure 7).

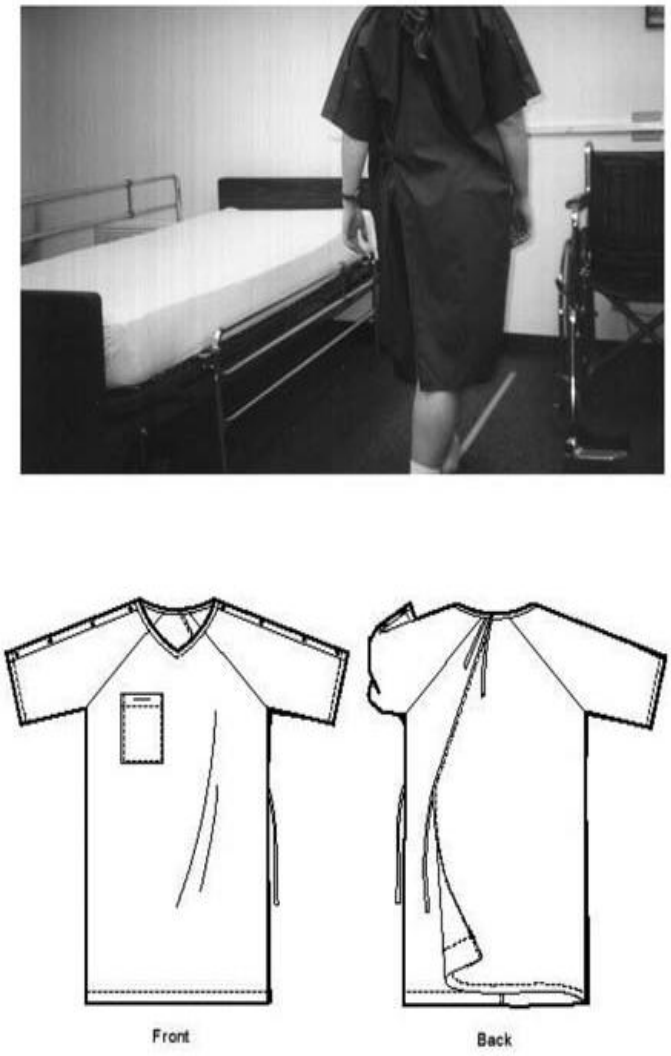


Figure 7: Conventional gown on a walking subject and the flat sketch
(Source: Cho, 2006)

Participants in the study were asked to evaluate the gowns according the following criteria.

Table 1: Evaluation category and questions for wearer trial evaluation

(Source: Cho, 2006)

Category	Item
Functional comfort • *Accommodation of activities* • *Easy reach of fasteners* • *Ease of donning/doffing*	a) The gown was easy to put on b) The gown didn't restrict walking c) The gown was not a problem when I used the toilet d) The gown did not get tangled/twisted around my body when I was lying in bed e) The gown didn't restrict my ability to maneuver a wheelchair f) The fasteners on the gown are placed within easy reach g) The gown was easy to take off
Physiological comfort • *Sensorial comfort* • *Thermal comfort* • *Fit and fabric weight*	a) The gown did not seem bulky when I was standing b) The gown covered my body well to keep me warm while using the bathroom c) The seams of the gown did not irritate my skin while lying in bed d) The length of gown was appropriate when I sat in the wheelchair e) The gown was a size that fit me well f) The gown kept me warm enough g) I was comfortable because the gown seems to be light
Psychological comfort • *Aesthetic/expressive* • *Satisfaction* • *Suitability for daily life in hospital* • *Privacy and dignity*	a) The gown maintains my privacy while walking b) The gown maintained my dignity while using the bathroom c) I was not concerned that my body might be exposed while lying in bed d) The gown covered my body well to maintain my privacy while sitting in the wheelchair e) The gown makes it easy to tell the difference between who is a patient and a visitor (or medical staff) f) I liked the style of the gown g) I would feel comfortable wearing this gown if I had visitors when I was in the hospital
Total comfort	**Functional + Physiological + Psychological**

Based on the results, Cho concluded that a patient gown should:

a) Accommodate daily activities during hospitalization

b) Protect wearer's privacy

c) Be easy to don and doff

d) Adapt to the various postures of lying down, sitting up, and standing

e) Not cause pressure against the skin that might lead to sores

Cho's interviews with nurses revealed the following requirements for a patient gown:

a) Wide roll up sleeves to accommodate blood pressure measurement

b) Functional gown to accommodate easy administration of IV and other tubes

c) Reduce accidental snagging of the IV loop or the catheter hub when a patient's gown is changed

Though this study provides valuable insights into the needs and requirements of a patient gown, the researcher has included only the patients' viewpoints and not considered the caregiver's perspective in depth in this research.

2.6 Donning and Doffing

Gown donning and doffing (dressing and undressing) is either done by patients themselves or by the caregivers for patients who lack physical mobility. Thus, the design of a gown should make it easy for the patients to don and doff the gown themselves. For caregivers, the gown design should reduce problems associated with donning and doffing gowns on patients who are bedridden. Maria's (1999) patent addresses this with the help of a two identical panel design, one front and one back, which can be attached or detached with

the help of snaps along the shoulders and the side seams. A caregiver can place a patient on the back panel and then snap the front panel on the patient.

Burbidge (2000) patented a reversible gown composed of two identical panels attached permanently together along one side seam leaving the other side seam open. The design was meant to make the donning easier as the caregiver could ease in the gown on one side of the patient and tie the other side. Similarly, for doffing process, the ties can be untied and the gown can be taken out from the other end. The literature review does not show any evidence of adoption of the design features of this patent.

2.7 Sterility characteristics of a gown

The traditional patient gown is not effective in preventing infections. Infections like MRSA, Clostridium difficile and fungal spores can enter a hospital on the fabric of visitors' clothing leading to life threatening illness in patients with weakened immune system (Obendorf and Dart, 2001)

The report released by the Association for Professionals in Infection Control and Epidemiology (APIC) found that 13 out of every 1,000 patients or approximately 7,178 inpatients on any one given day were infected or colonized with C. difficile (94.4 percent were infected). The rate is 6.5 to 20 times higher than previous incidence estimates that were based on more limited data. The report estimated that on any given day these infections cost between $17.6 million to $51.5 million and cause the death of 165 to 438 patients. The other

most common fungal infection is caused by *Aspergillus.* Aspergillus comes from external environment and is a big problem for immune-suppressed people such as those who just had chemotherapy and those with AIDS or other immune deficiency diseases because their bodies are less able to fight this infection.

Obendorf and Dart (2000) compared differences based on three factors affecting the release of spores: moisture content, fiber morphology and fiber construction. They found that fabrics with higher moisture content will release more Aspergillus's spores when hit with an air current. However, fiber surface morphology and the physical structure of the fabric were also important determinants in the retention and release of spores. Evidently, garments and its fabric play a key role in carrying and dispersing Aspergillus spores. The researchers further discovered that certain fabrics are more suitable for medical procedures than others. "The less fiber surface per fabric surface area, the rounder and more regular the fabric, and fewer the fiber ends, the fewer the places that can serve as sites for the spores."

Another big concern is MRSA or 'Methicillin-resistant Staphylococcus aureus' also referred to as "Superbug". MRSA is a resistant variation of the common bacterium 'Staphylococcus Aureus' and has evolved an ability to survive treatment with antibiotics. MRSA is of special concern to hospitals as patients with open wounds, invasive devices, and weakened immune systems are at a much greater risk than the general public. Visitors and hospital staff who do not follow sanitary procedures are capable of spreading the bacteria in the hospital. (www.mayoclinic.com/health/mrsa, 2008)

Presently the regularly used gowns in the majority of hospitals do not have any anti-bacterial coating. Hence, there is a need to investigate the importance of building anti-bacterial properties into a gown to minimize MRSA and other deadly infections.

2.8 Aesthetic Consideration

Patient gowns are functional garments and as a result, their aesthetics are often overlooked. The general perception is that the gown has to serve its primary purpose as a hospital accessory, and it need not look aesthetically pleasing as patients confined to hospitals have other more important things to worry about than how they look in their patient gown. However, human nature forms relationships in all environments and hospitals are no exceptions. These relationships need expressive considerations and gowns should provide that to the extent possible. Goodwin (1994) observed that, in nursing or residential home environments, it is very important for older patients to wear clothing that suits their needs and reflects their values, previous lifestyle, and personality.

Patient gowns are usually grey or blue in color, often faded and wrinkled from frequent washing and sterilization. They are not aesthetically pleasing which contributes to patient's becoming more self-conscious and psychologically uncomfortable (Hinkin, 2000). In fact, hospitalized school-age children have showed signs of depression caused by separation from family, medical treatments and procedures, length of stay in the hospital, and fears associated with higher levels of anxiety (Hart & Bossert, 1994).

2.9 Special Needs

Patients with special needs require more from a patient gown. For people with limited mobility and grip strength, easy fastening and light weight are critical factors. Sperling and Karlsson (1989) found that elderly patients were much more effective in donning when the fasteners were put in front of the chest than when they were placed in a diagonal or lateral position. This was because the fasteners were within the optimum grip area, could be easily identified and secured with one hand. Hoffman (1979) suggested that large zippers and large buttons, or Velcro® closures would further help making donning/doffing easier for patients with special needs. Udell (1991) invented a colored-tie system thus making it easy to locate the correct tie among multiple ties to secure.

It has also been noted that different types of illness have their own gowning requirements. Patients with covering braces, prostheses or crutches have different set of requirements from patients who use wheelchairs. Hoffman (1979) noted that a patient who spends much time in a sitting position might prefer a garment that is longer in the back than the front. For incontinent patients, ease of diapering dictates a slightly different set of requirements. Accessories such as pockets or pouches might be of extreme importance for patients who have to carry multiple diagnostics devices with them all the time.

Hoffman (1979) suggested that for patients who are not bedridden, wearing day wear rather than night wear creates a feeling of recovery and hope to return to normal health. For patients who are bedridden, some sort of night wear would be preferred. Pajamas are alternative for patient gown (Goldsworthy, 1981).

Most of the patient gown patents feature the raglan sleeve, which has oblique seam line from the neckline to the armpit. These sleeves which have deep armholes are especially useful for those with limited range of arm motion making it easier to don and doff (Brown & Rice, 1998).

The above information provides an opportunity to investigate the necessity of developing more than one type of gown. It also brings up the question of whether one gown design is sufficient to accommodate the varied requirements born out of differences in age group, gender and medical conditions.

2.10 Analysis of alternative patient garments

Efforts have been made to design patient friendly gowns over the last twenty years. Hundreds of patents and designs available in the market are testimony to that effort. However, none of the designs have managed to influence the people who purchase these gowns to provide them broadly to patients. One influential factor is clearly in the price charged which is often 4-5 times more than the cost of a regular gown. Additionally, these gowns have failed to accommodate the varied needs of age, gender, disability, size, illness etc.

Most of these efforts are a result of a personal experience rather than a broad based scientific attempt. Some famous designers have also entered the market. For example, Nicole Miller worked with the Hackensack University Medical Center in New Jersey to design a line of gown called "chic collection" which won acclaim from a large number of patients

(Nursezone.com, 2008). Royal Preston Hospital in Britain came up with a new "Burkha" style gown for Islamic women to respect their religious belief (freepublic.com, 2005). This also increased the number of Muslim patients that visited the hospital. Arizant Health Care Inc. came up with a patient adjustable warming gown called "The Bair Paws System". This made the patients feel less anxious before an operation and made them relax (surgicenteronline.com, 2008). In the year 2005 "Spirited Sisters" created clothing that is equipped to handle the wear and tear of radiation and chemotherapy treatment. Their clients are the Massachusetts General Hospital and the Bringham & Women's Hospital (healingthreads.com, 2007). Designer Noemi Marquis and Denyse Roy have designed a gown which is practical, economical and light weight (www.univalor.ca, 2006). Recently, DCS Design has designed a patient gown which can fight MRSA (medicalnewstoday.com, 2007). The gown's unique design aims to reduce the spread of infection by minimizing patient handling. It facilitates access to the patient's body for examination and makes it easier to change than regular gowns.

Clearly, these initiatives are positive steps but without the support of all the stakeholders and disciplined scientific effort, they have not been able to convert good isolated use into large scale adoption.

Chapter 3

Research Methodology

A thorough review of the literature suggested that no broad based research has been conducted on patient gown design from the perspective of hospital caregivers. Therefore, the nature of this research is exploratory. Exploratory studies are used when the existing literature or knowledge base is insufficient to conclude a certain and basic set of facts (Yin, 1994). A mixed method approach was chosen for this research. The mixed method approach of data collection involves gathering both qualitative and quantitative data and analyzing it to establish a set of facts which can be used as a basis for further research. This approach is useful when researchers desire to generalize the findings to a population set, and to develop an understanding of the meaning of a phenomenon or concept for individuals (Creswell, 2003).

The research was done in two parts. Part I involved gathering quantitative data through a survey. Part II involved gathering qualitative data through focus group interviews.

3.1 Survey

The objective of the survey was twofold. The first objective was to identify the strengths and weaknesses of the traditional gown and the second objective was to identify the features and functionality that the respondents would like to see in new patient attire.

3.1.1 Instrument development

Data was gathered using a three-page questionnaire (Appendix A) developed by the researchers. The questionnaire was prepared in English and was sent to 1200 healthcare caregivers. The survey was sent by mail and was also made available online.

The questionnaire consisted of 25 questions of four different types:

- Dichotomous questions in which the respondent chose one of only two answers
- Multiple response questions
- Opinion scale questions (Likert type) in which respondents were asked to specify their level of agreement with a statement
- Open ended questions

Some of the questions from the questionnaire and their corresponding objectives are discussed below:

- Does the patient gown interfere with administering IV's, catheters, feeding tubes or other medical devices?
- Does the current patient gown meet your requirements to access a patient's body during examinations?

These questions were designed to understand the degree of problem if any, faced with accessibility and functionality with the traditional patient gown.

- Do you think that the patients you treat need to wear a hospital issued gown?
- Do you think the style of the gown affects a patient’s emotional well being?
- Do you think that the style of the patient gown affects a patient’s physical wellbeing?

The above questions helped the researchers in establishing a connection between appearance (in a patient gown) and the emotional and physical wellbeing of the patient. The other goal was to find out from the caregiver's experience if appearance had any role to play in the healing process. In addition, the response provided a clear evidence of the importance of wearing a hospital issued gown versus personal clothing in the hospital.

- In a day how many times does the average patient get a gown change?
- How long does the average gowning process takes?

The above questions helped in understanding the challenges faced by the caregivers with the donning/doffing process.

- Which styles are the patient gowns?
- What is the condition of the patient gown when patients receive it?
- What type of closures does patient's gown have?

These questions provided information regarding the gowns currently in use.

- Are there any changes in patient gown that you would like to see?

This question helped in achieving the third objective of the research, that is, to find out the features and design of an ideal patient gown.

The online questionnaire respondents had to answer every question in the survey for the survey to be accepted by the system. The online survey was designed using the website, www.surveymonkey.com.

3.1.2 Sample

The sample of 1200 caregivers was generated randomly from a list of 2400 caregivers provided by Hospital A.

The sample included:

- 72 Physicians
- 149 Clinical nursing support staff
- 234 Clinical professionals
- 122 Clinical support staff
- 93 Clinical technical staff
- 530 Registered nurses

These caregivers had direct day-to-day dealing with the patients. The breakdown of the number of patients that the respondents typically saw each day is shown in figure 8 below. Both males and females were included in the sample. The cumulative response rate for the survey was 17%.

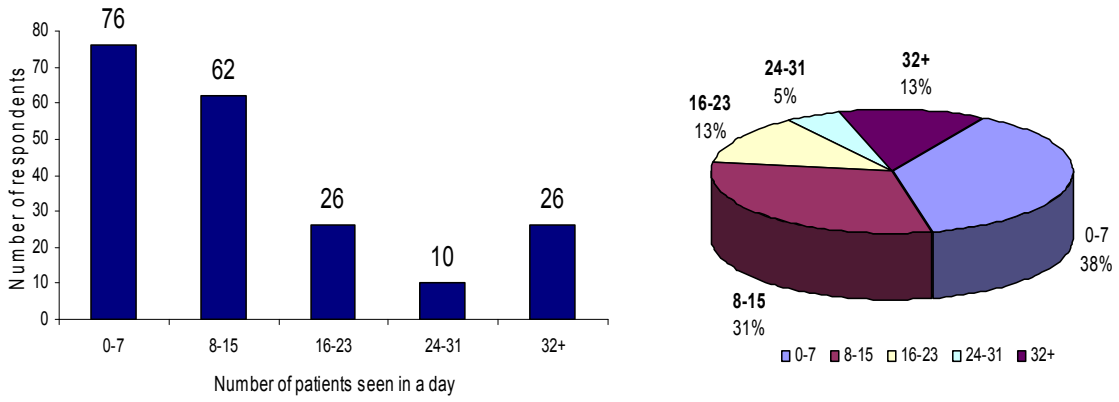


Figure 8: Number of patients seen by caregivers in a day

3.1.3 Data collection method

The data was collected over a three week time period in 2008. Surveys were mailed out to 1200 hospital caregivers. The mailed survey also provided the recipients with a URL address for the online survey. One week later, a reminder was sent out to all recipients. A copy of the reminder is in Appendix B. Twelve percent of the respondents responded online and 88% responded via mail.

3.2 Focus Groups

3.2.1 Instrument development

Qualitative data for Part II was collected using a focus group methodology. A focus group is an interview conducted by a moderator in an unstructured and natural manner with a

small group of respondents (Malhotra, 1993). The main strength of a focus group methodology is that it allows researchers to understand the perceptions related to various themes by listening to a group of people from the appropriate target population discussing specific topics. The data is qualitative, rather than quantitative, and provides insights on the topic by providing detailed explanations and reasoning which are difficult to obtain in quantitative data.

It is pertinent to understand what a focus group can and cannot accomplish before using it as a research tool. Focus groups are not designed to provide complete and actionable information on the research topic, nor are they meant to be decision making forums. Instead focus groups elicit the full range of ideas, experiences, attitudes and opinions of participants on a selected topic. Through facilitation and focused interactions, participants provide a wealth of qualitative data not available from surveys. Group members stimulate each other with an exchange of ideas not possible in individual interviews (Gramann, 2003).

Malhotra (1993) suggests the following steps for successfully planning and conducting a focus group:

1. Determine the objectives of the research
2. Specify the objectives of qualitative research
3. Develop the questions to be answered by the focus groups
4. Develop a moderator's outline
5. Conduct the focus group
6. Analyze the data
7. Summarize the findings and plan follow-up research or action

3.2.2 Question development

One common instrument was developed for conducting the five planned focus groups. The instrument served as the moderator's guide and included six questions that were used to direct the discussions. The questions and the corresponding objectives are as follows:

Question A

What are the different types of patient gowns that are used in your department?

This question was asked to provide researchers with an understanding of the gowns currently being used and to ascertain if any of the hospitals had adopted any non-traditional patient attire.

Question B

What are the strengths and weaknesses of the current patient gown?

This question was designed to clarify which features of the traditional patient gown were sources of concern for the caregivers and, in their perception, patients. The researchers also wanted to know which features were useful for the caregivers and important to the gown's function as patient attire.

Question C

How does the current patient gown interfere with your work?

The purpose of this question was to elicit real life examples of any problems associated with the traditional gown. These examples help in clarifying weaknesses of existing gowns.

Question D

What is some of the feedback that you get from your patients regarding the patient gown?

As caregivers are the closest to patients, they often get first hand reactions and comments from them, and this question was aimed at cataloging those reactions.

Question E

Do you think that the patient gown has any effect on a patient's emotional and physical well being?

This question was used to understand caregiver's perceptions of the intensity of the problem faced by patients using the traditional patient gown and also beliefs related to healing environment.

Question F

What, in your opinion would be an ideal patient gown?

The main reason for asking this question was to understand what features and functionality caregivers would like to see in a patient gown. This offered further insights into shortcomings of the current gown and requirements for an optimal garment.

3.2.3 Site and sample selection

Three major hospitals in North Carolina agreed to cooperate in conducting the focus groups. Two focus groups were conducted at Hospital A, two at Hospital B and one at Hospital C. The hospitals were selected because of their pre-eminence in the region and also because of their strong research programs.

Potential focus group participants were selected by the researchers in collaboration with the head of the nursing department at the respective hospitals. The goal of the selection process was to gather a diverse and experienced group of direct patient contact nurses representing a variety of clinics and situations.

Once the potential participants were identified, an Excel spreadsheet was created to take note of their departments. Then, an email invitation was sent to the coordinator regarding the topics of discussion and objectives of the focus group.

3.2.4 Process of conducting

The research group held five focus groups between February and May, 2008. Two focus groups were conducted at the Hospital A, in Cary, North Carolina on February 12, 2008. Two more were conducted at the Hospital B in Raleigh, North Carolina on May 2, 2008 while one focus group was conducted at Hospital C in Chapel Hill, North Carolina on April 2, 2008. The three hospitals used the traditional patient gown or a similar product across most clinics and departments. A total of 50 registered nurses participated in the five focus groups including both male and females. The breakdown is shown in Table 2 below.

Table 2: Focus group participant breakdown by gender

	Hospital A – Focus Group 1	Hospital A – Focus Group 2	Hospital B – Focus Group 1	Hospital B – Focus Group 2	Hospital C – Focus Group 1
Male Participants	2	1	2	1	1
Female participants	8	9	8	9	9
Total	10	10	10	10	10

The male/female ratio was not by design. The representation is a reflection of the common nursing environment where there is higher number of female workers than male workers. The National Sample Survey of Registered Nurses conducted in 2004 showed that the female population represented 94.2% of the total registered nurse whereas male representation was only 5.8% (bhpr.hrsa.gov, 2004)

The participants of the focus groups were volunteers from the following areas: Operation Theatre, Intensive Care Unit, Hematology/Oncology, Surgery, Telemetry, Orthopedics, Emergency Department, Heart Center, Pre-care Surgical Service, Maternity and New Born Care, Burn Center and Neurosurgical ICU. This diverse pool provided broad set of opinions and experiences. The number of participants in each focus group was restricted to ten. This was done to assure that every participants view point was accommodated in the one hour duration. The breakdown of departments represented in each of the hospitals is shown in table 3 below.

Table 3: Focus group participant breakdown by department

	Hospital A – Focus Group 1	Hospital A – Focus Group 2	Hospital B – Focus Group 1	Hospital B – Focus Group 2	Hospital C – Focus Group 1	Total
Operation Theatre	1		2	1		4
Intensive Care Unit	2	2	1	1		6
Hematology/ Oncology	2	1	2		1	6
Same day surgery (SDS)			2	2		4
Telemetry	1		1			2
Orthopedics		1	1			2
Emergency		2	1	1		4
Heart Center	2				1	3
Pre-care surgical		1			1	2
Maternity/New Born Care	2	3			1	6
Burn Center					1	1
Neurosurgery					1	1
Medicine unit					4	4
Pain Clinic				1		1
Others				4		4

3.2.5 Data collection method

The duration of the focus group was one hour. This restriction was imposed by the hospital as they did not want the nurses to take time off from their regular scheduled hours to participate. Therefore, the focus group was conducted during the lunch hour break. The participants were provided with lunch and a gift card.

A moderator's guide was used to manage the focus groups. The primary moderator was a researcher at North Carolina State University. Malhotra (1993) describes the role of the primary moderator as a facilitator whose primary responsibility is to provoke an intense discussion in the relevant areas. A moderator's guide was developed with this design principle in mind and included the rules of group interaction, objectives of the session, questions to ask, summarization methods and time schedule. The moderator was assisted by

two researchers from the same research group. They were responsible for taking notes and writing down important points on a flip chart and in a note book. Along with flip chart and notebook, two audio recorders were used. This was done so that the researchers could later transcribe the proceedings of the focus groups.

Focus group participants were provided with a detailed guide before the meeting. The moderator started the focus group with a warm up exercise by asking the members to write down five words that come to their minds when they hear the words "patient gown". The goal of this exercise was to get people thinking and to get them ready for the intense discussion later.

During the sessions, the moderator led the participants through the discussion guide, addressing each question in turn. Comments made by the participants were recorded on a flip chart and a notebook. Audio recordings were later transcribed. The results of the focus group proceedings are presented in the next section.

Chapter 4

Research Results

4.1 Results of Survey

The results of the survey are grouped under logical headings and are summarized using histograms and pie charts. Any comments made by the respondents were captured and cataloged. The survey respondents represented a wide variety of departments as shown in Figure 9. The category "others" includes radiology, MRI, pathology, pediatrics and other departments.

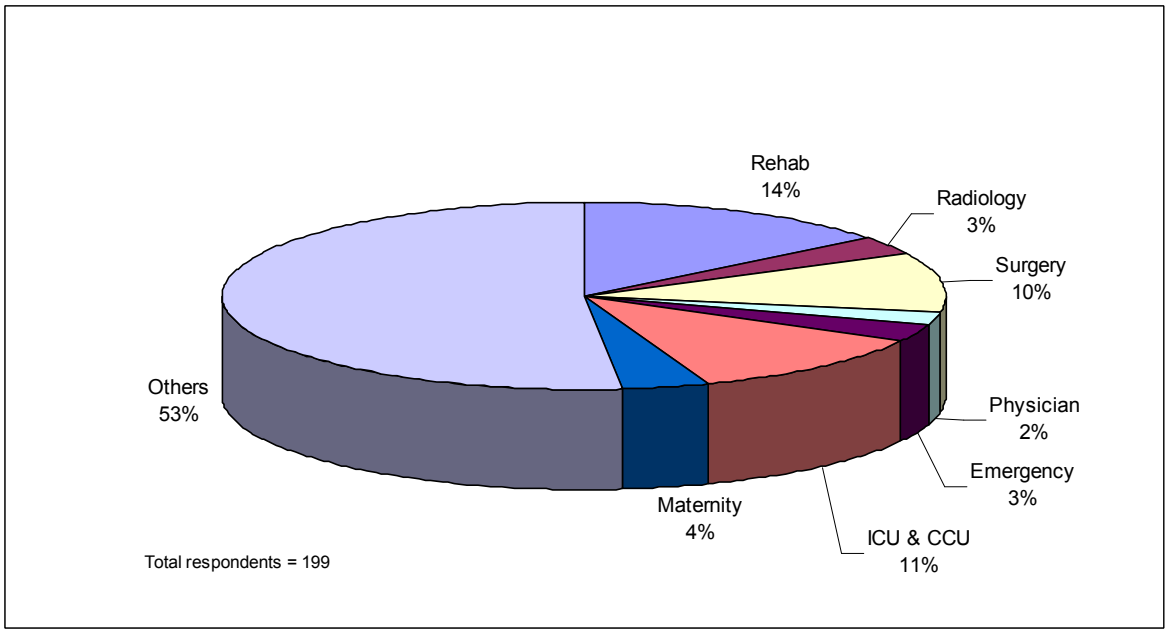


Figure 9: The percentage of respondents according to their departments

4.1.1 Interference with medical procedures

Result of the research showed that 87% of the respondents felt that at least *sometimes* the traditional patient gown interfered with administering IVs, catheters, feeding tubes or other medical devices. Only 13% felt that the gown never interfered with the work of the hospital caregivers.

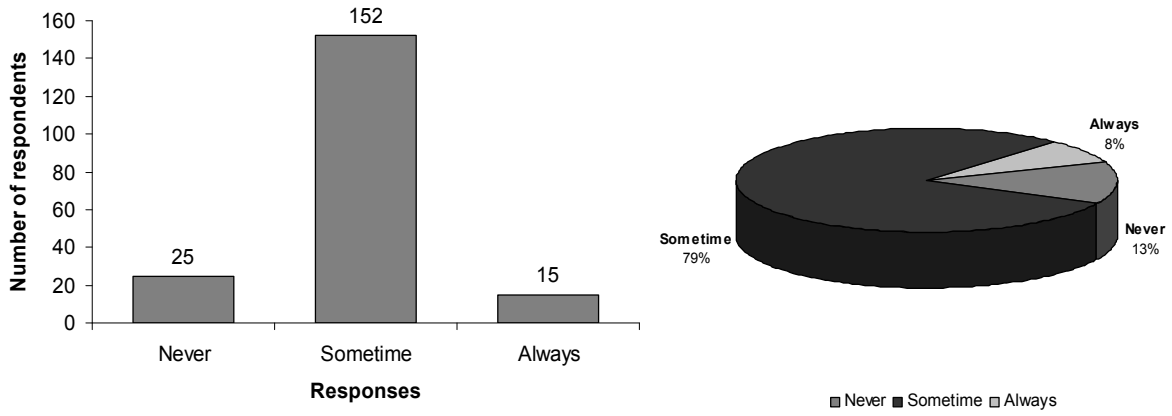


Figure 10: Interference of gown with medical procedures

4.1.2 Access to a patient's body areas during examinations

For accessibility, 70% of the respondents felt that the current patient gown failed to consistently meet their requirement to access patients' body areas during examination. Only 30% reported that the current gown *always* met their requirement.

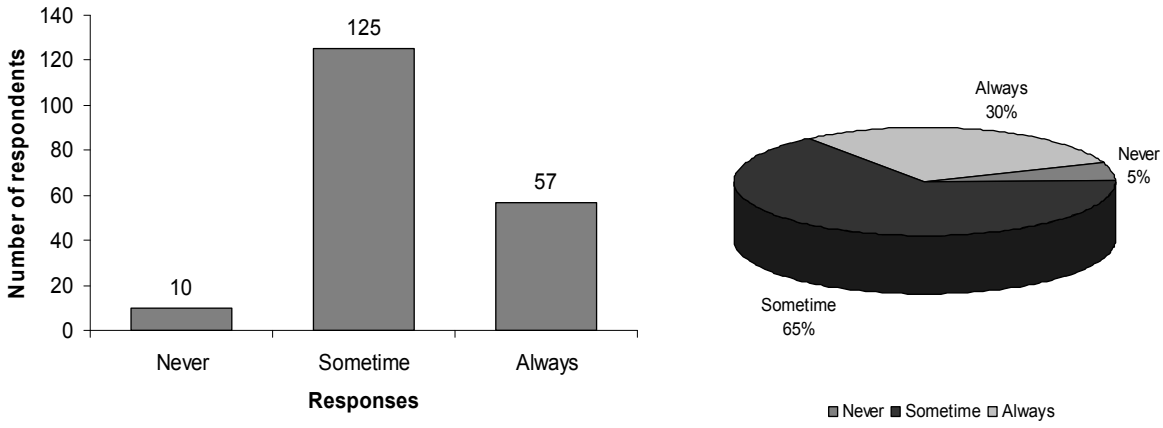


Figure 11: The degree to which the traditional gown provides accessibility to a patient's body

4.1.3 Need to wear a hospital issued gown

Out of total respondents, 98% of them felt that patients *sometimes* or *always* needed to wear a hospital issued gown, more than half of those indicating always. Only 2% indicated that the patients should *never* be required to wear a hospital issued gown.

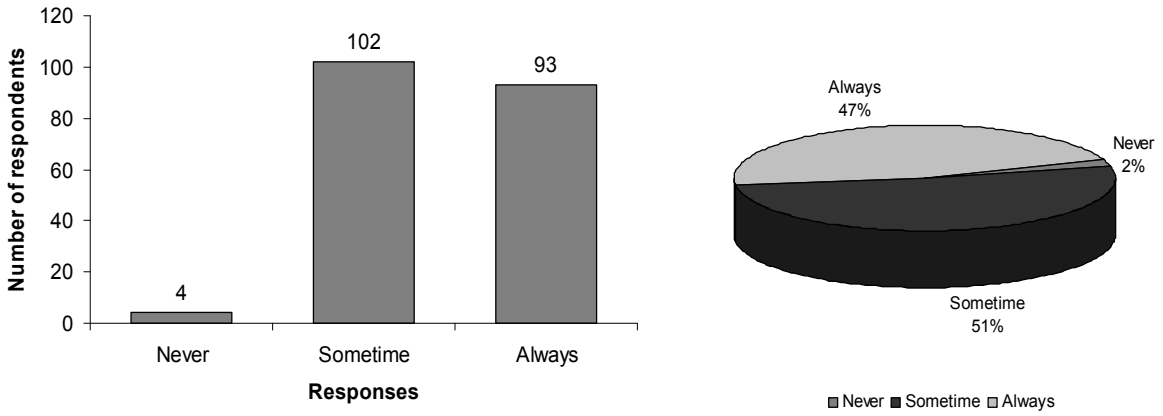


Figure 12: The degree of importance of wearing a hospital issued gown

Summary of Comments

The respondents explained that the need to wear a hospital gown depended on many factors such as the location of injury, the reason for the hospital visit, the treatment the patient is going to receive, etc. The respondents also specified that wearing a hospital gown is important for the patients who have tubes and lines to their bodies, who are incontinent, who need therapeutic ultrasound or soft tissue massage and those who have undergone surgery. Furthermore, cleanliness and the need for maintaining a sterile environment were important drivers of the decision. The gown can also serve as a means of identifying patients. The traditional gown does not have metal snaps, zippers or buttons that could interfere in an X-Ray or during an emergency.

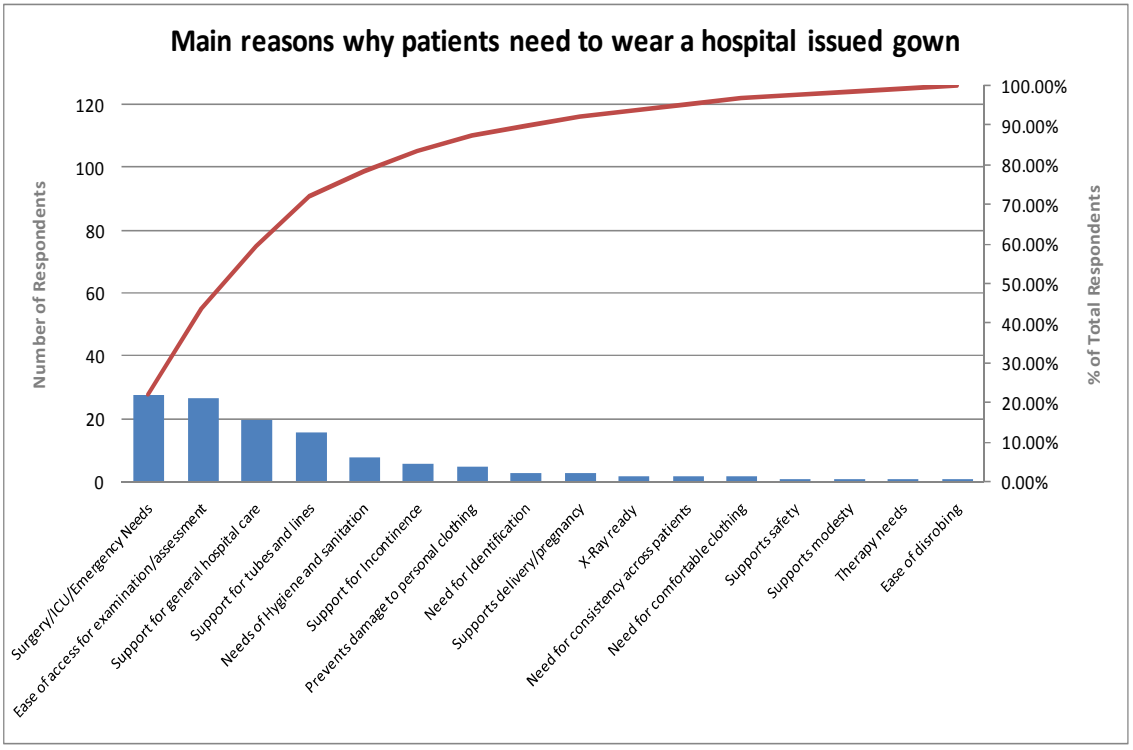


Figure 13: Chart showing the reasons required to wear a patient gown

According to the above chart, the top five reasons to wear a hospital issued gown provided by the caregivers were

(i) Surgery, ICU and emergency needs

(ii) Ease of access for examination/assessment

(iii) Support for general hospital care

(iv) Support for tubes and lines, and

(v) Need for hygiene and sanitation

These reasons were provided by more than 80% of total responses and are therefore the key parameters for further investigation.

4.1.4 The choice to wear personal clothing

Of the total respondents, 35% indicated that the patients are *never* given a choice to wear their personal clothing. Of the remaining 65%, the majority said that the choice is only given sometimes.

Summary of Comments

The caregivers said that the patients were encouraged to wear a hospital issued gown so that their personal clothing did not get soiled. Also, with tubes and IV, patient wearing a hospital gown provided the caregivers with greater accessibility. For outpatient, in some cases the patients are allowed to wear their own personal clothing. However, the decision to let the patient wear their own clothing versus the hospital issued gown depends on the medical condition for which the patients are being admitted.

4.1.5 Effect of the gown on a patient's emotional and physical well being

Out of the total respondents, 88% of them felt that the current gown *sometimes* or *always* affect the emotional well being of patients. While only 12% indicated a belief that the gown *never* affected a patient's emotional well being.

As for physical well being, 66% of the respondents felt that the current gown does *sometimes* or *always* affect the physical well being of patients. Only about one third of the respondents indicated that the gown never affected a patient's physical well being

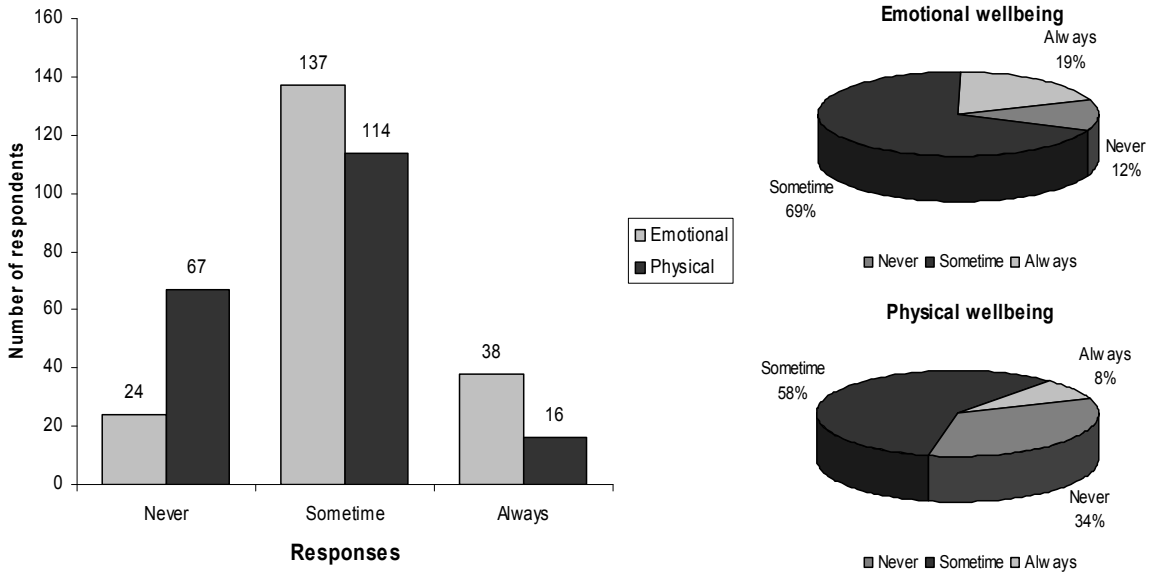


Figure 14: The degree to which the traditional gown has an effect on patient's emotional and physical well being

Summary of Comments:

The most common explanation given by the respondents was that the traditional patient gown exposes the back of the patients which makes the patients feel "embarrassed", "afraid", "insecure", "worried", and “nervous". The open back is a constant "joke". Sometimes the patients feel that they are no longer independent enough to dress themselves the way they want.

The men felt a "loss of identity" wearing the gown. They felt like they were wearing a dress. Some of the other issues of concern were coarse fabrics, lack of warmth and complicated ties. Ties break or get into a knot easily which needs to be cut off creating lots of waste. The patient usually cannot fasten the ties without help. In some cases, malfunctioning closures have hindered emergency treatment. Size is also a big factor. Some small sized patients are "swallowed" in the gown making them feel awkward, and sometimes the gown is too big and falls off the patient’s shoulders.

The color of the gown influences the problem of emotional well being. A respondent noted that if a patient is wearing a dull gown, it does make the person feel "gloomy". Most of the patients feel very uncomfortable when they are asked to go outside of the room or get out of the bed because it is difficult for them to maintain modesty with the open exposed back. They are more likely to walk the halls if the gown keeps them warm and covered. The neck line is deemed “uncomfortable” as it does not allow the nurses to easily put telemetry lead back on the patient. One of the respondents noted that she believed in the mind-body-spirit connection and said that the physical well being depends on the emotional well being.

4.1.6 Need for patient's to wear a short or pant in addition to traditional gown

Out of the total respondents 55% of them said that it was very important or important for a patient to wear a short or pant with a hospital gown. Whereas, 45% of them said that it was either very unimportant or unimportant for the patients to wear a short or pant with the hospital gown.

4.1.7 Nurses involvement in the gowning process

Out of the total respondents 74% of them were involved with the gowning process. Whereas, the 26% of the respondents said that they did not help the patients to gown.

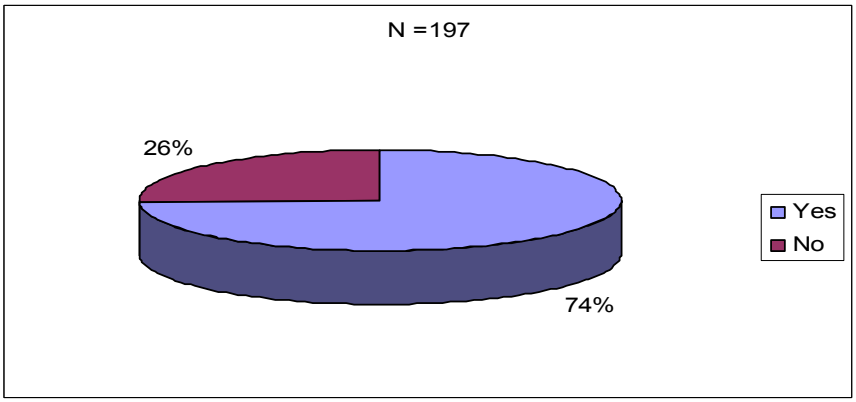


Figure 15: Showing the percentage of nurses involved in the gowning process

4.1.8 Need to redesign the traditional gown

Out of the total respondents 63% of the respondents felt that it was *important* to change the design of the current patient gown. More than one third of the respondents indicated that it was not important to change the design.

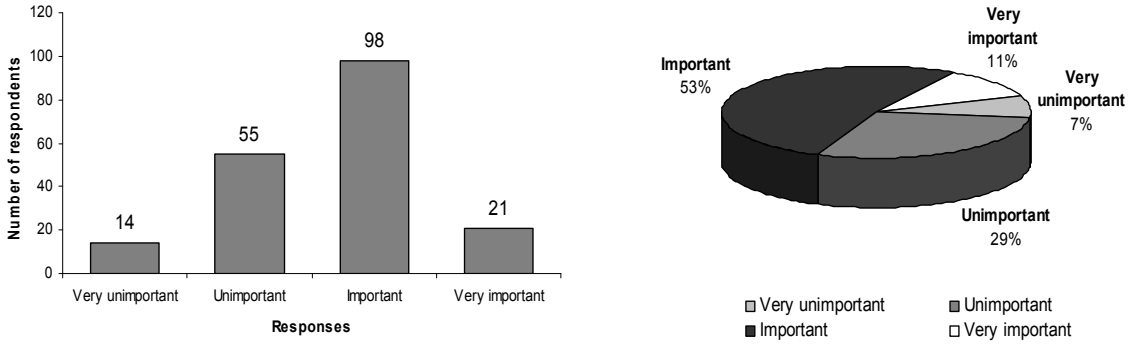


Figure 16: Perceived importance of patient gown redesign

4.1.9 Average number of gown changes in a day

Of the total respondents, 83% said that the average patient got their gowns changed at least once, 33% said twice and 17% said thrice. For most patients a single gown is worn all day.

4.1.10 Changes that the respondents preferred

The respondents said that they would like the gown to be more functional and accessible especially for the cardiac monitor and IV's. Some respondents cited the following as reasons for a re-design:

- *"need places in front where feeding tubes could come out"*

- "*It is difficult to place telemetry leads to all 5 points on the chest".*

The fabric of the present gown is coarse and dull colored. The respondents suggested that the fabric should be soft and bright in color. Another concern with the fabric used in traditional gowns was their durability. Gowns quickly acquire a worn out and see through look.

Different closure options were recommended. At present, the gowns have ties which cause knots and create an uncomfortable bump for the patients. The fastening of the strap is not intuitive enough and patients often need extra help to tie them. The respondents suggested Velcro® as an alternative.

Respondents were very concerned about the one size only gown. Availability of sizing options - small, medium, large and extra large should be an important consideration for a redesign. Presently, the large gowns do not have snaps on sleeve which creates difficulties for the nurses as well as the patients. A respondent cited an example of an IV line threading through the sleeve of the patient's gown causing great discomfort to the patient. Longer sleeves and lower necklines were the preferred designs. The caregivers' also suggested that male and females should have different gowns. More pockets should be considered as patients need to carry heavy telemetry boxes and heart monitors. Finally, the gown should be suitable for all adult age groups.

4.2 Results of Focus Groups

In order to fully analyze the data, extensive discussion, documentation and interpretation was needed. Comments were noted in a spreadsheet and the transcribed audio recording was analyzed in detail. The researcher based her analysis of the focus group proceedings on:

- Specific comments
- Consistent responses
- New ideas
- Concerns
- Confirmation

The discussion of the focus group findings is presented in two broad categories:

A. Overview of the caregiver's perception of the traditional patient gown

B. Focus group participants' perception of an ideal patient gown

The participants were queried on their own view as well as their perceptions of patient's perspectives on the current gown. Within the two categories, comments are further subdivided by gown features and characteristics. These are:

- Types of gowns currently in use
- Sizes

- Closures and Snaps
- Color
- Fabric
- Donning/Doffing
- Impact of gender on perception of traditional gown
- Cost
- Supply and storage of gowns
- Impact of gown on patients' emotional and physical well being
- Patient's attitudes toward traditional gown
- Importance of wearing a hospital issued gown

This sub-categorization was adopted to clearly bring forth the dimensions of the problem and identify critical design elements. It is very important to note that because of the fluidity of the discussion, not all the focus groups discussed all of the above.

Sub-topics are introduced with bold-faced titles, and the following paragraphs outline the larger context as well as specific comments. Specific comments are italicized and placed in paragraphs. This allows for a broad synthesis of discussion, while also preserving insights of focus-group participants that illustrate the synthesis.

4.2.1 Hospital A - Focus Group 1

A. Overview of the caregiver's perceptions of the traditional patient gown

Types of gowns currently in use

For most of its patients, Hospital A issues a traditional patient gown which is open in the back with two ties to close the back panels. In addition, special breast feeding gowns are used for nursing mothers. The breast feeding gowns are more brightly colored than the regular gowns and are open from the front. For larger patients, specially designed large gowns are used which are closed at the back and do not have any snaps.

Patients who are on a monitored floor wear a different type of gown. These gowns have an open back with pockets in the front and snaps down the sleeves. The snaps are extremely useful for running intra venous (IV) devices through them and provide ease of access to the caregivers. The sleeves in these types of gowns are short, about three quarter length. There is also a little pocket in the front and a hole in the near the chest area of the gown. The hole is used to connect the electrodes that are hooked to the patient with the monitor which fits into the outside of the pocket. This design feature makes it easier for the nurses to disconnect and reconnect the electrodes with the monitor.

The open back gowns have two ties to close them. These gowns are a source of concern for the nurses and the patients. Many times, gowns come back from the laundry with ties ripped off or cut off or in knots. The "frustration" to undo the knots often leads to the nurses deciding to cut off the ties. Nurses then have to use safety pins or some other way to

keep the gown closed. This also creates waste as gowns are rendered useless without the ties and are eventually discarded.

Normally, patients do not have a choice to wear their own personal clothing. But the nurses felt that the patients should get a choice to wear what they want especially in the maternity ward because if they are not breast-feeding they do not need to be exposed.

Nurses strongly feel that the traditional gown is up for a redesign. According to them, the rationale is that historically patients were bedridden and the open back of the traditional gown would not bother them because they did not get up from bed that often. But now there is a stronger push to get patients up from bed and have them move around for quicker recovery.

Sizes

For large or obese patients, there is a regular shortage of large sized gowns. Because of the shortage, the nurses have to wait to get large gowns and in the interim, the obese patients have to wear the regular gowns. These "tight-fitting" gowns are extremely "awkward" to the patients. Furthermore, the large gowns do not have snaps down the sleeve or a pocket. To accommodate the missing pocket, nurses often have to use a Velcro® device that has a pocket and have to strap it around the patients' neck. This problem is magnified for extra large patients, who cannot use either the large or the standard gown. The hospital keeps very few numbers of extra large gowns in each unit.

For tall patients, the standard gown barely covers their personal areas. For shorter patients, it gets uncomfortably oversized. Thus for patients who are not "regular" size, the

traditional gown is often uncomfortable. For men, who are not used to wearing gowns, the gowns get "twisted" and "tangled up" when they are in bed.

Closures and snaps

The ties are the most commonly used closure for traditional gowns at Hospital A. Tying these presents multiple challenges for the nurses. For bedridden patients, nurses have to come up with new techniques to fasten the ties. For example, nurses first tie the gown closed in front and then pull it over the head to the back. Often, the ties end up in a knot and the patients feel very uncomfortable when lying down on the knots.

Nurses at Hospital A were of uniform opinion that snaps in the traditional gowns are a big advantage. Snaps make it easy to insert IVs and other medical devices and provide easy access to the patient's upper body. This is especially beneficial in the cardiac departments as nurses can undo the snaps and work around the gown with ease as compared to pulling the gown all the way up. Since the gown is not open in the front, nurses find it difficult to work with the leads.

But not having snaps in the front has its own disadvantages. For example, in the cardiac department, when the nurses are trying to replace the electrodes on the lower body, they have to either pull the gown up or reach down from the top to get to the electrodes. This process is uncomfortable for both the patient and the nurse.

Color

The traditional gowns usually come in blue, pink and gray colors. The maternity gowns are relatively bright in color while the large gowns are "funny gray". The most common word used to describe the color of the gown was "ugly".

Most of the gowns fade with time giving them a "dull" and "depressing" appearance. This dull appearance makes the gown look very used. Although the gowns start out looking very fresh, they quickly change with a few washes and take on the worn out look. One of the nurse said that when she finds a patient looking very depressed, instead of grabbing the "shabby looking" gown, she tries to give the patient a "fresh looking" gown. She further added that the "shabby looking" gown is for someone who does not notice what he or she is wearing and is often surprised how this gesture lifts the patient's spirit.

Fabric

When the gown is new, the fabric is coarse and uncomfortable on skin. However, after a few washes, the fabric becomes softer and thinner. This makes the patient feel cold in the operating room which has lower temperatures than the other rooms. To help alleviate this, some nurses keep the gown in a warmer.

Donning/Doffing

The design of the traditional patient gown is not intuitive to the first time user. When the patients are asked to wear the gown they often look puzzled and have a hard time figuring

their way around the snaps. As a result, even if they are not seriously ill and can do the donning/ doffing themselves, they still ask the nurses for help.

Impact of gender on perception of traditional gown

The nurses felt that male patients often feel more uncomfortable with the gown than the female patients. This was attributed to the fact that men usually wear pants and feel that wearing a gown is akin to wearing a "dress". This causes "embarrassment" and “discomfort” to them. In addition, since the male patients are not used to wearing gowns, the gown gets entangled when they are in bed.

Cost

One of the direct cost implications of using the traditional patient gown is that patients tend to use a second gown as a robe to cover themselves from the back. This effectively doubles the cost and time of collecting, laundering and stocking the gowns.

The basic style of the traditional gown is also a cost burden. This is because a nurse usually has to escort an otherwise able bodied patient with the instruments and attachments as the traditional gowns do not have enough pockets to carry them. Clearly, the nurse's time would be better utilized in doing something more valuable.

Another cost related issue is when patients leave the hospital wearing their issued patient gown. This may happen if patient comes in either with a trauma or his clothes are not in a condition to be put back on. Thus a need exists for an inexpensive or disposable hospital gown that could be used for this purpose.

Supply and storage of gowns

Another big problem is the growing population of obese patients. The following charts outline generalizations about the obesity demographics of the population in the U.S.

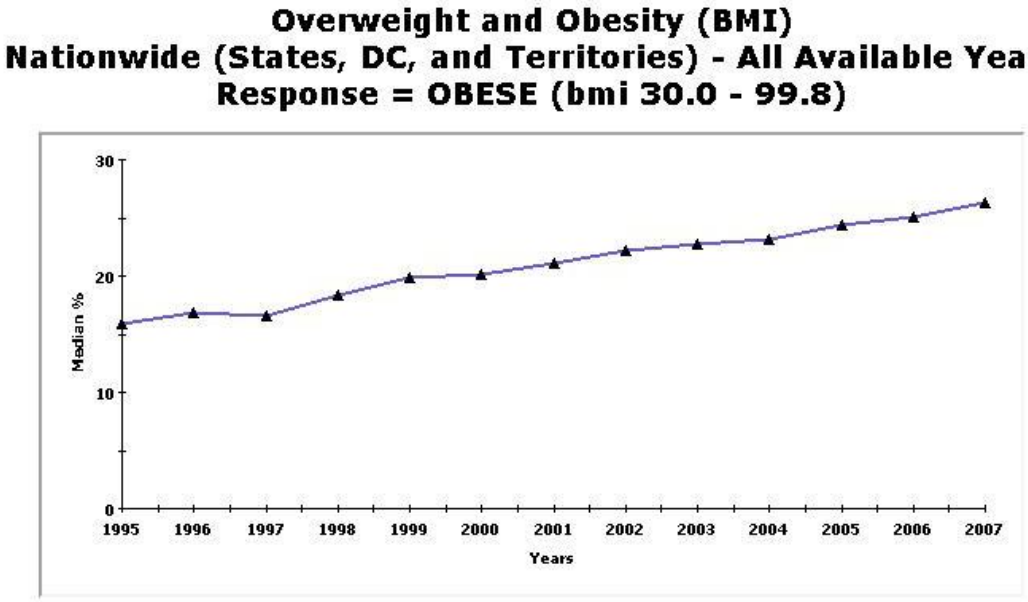


Figure 17: Obesity in the US

Source: National Center for Chronic Disease Prevention & Health Promotion

In the past, there weren't that many obese patients and as a result, two or three large/extra large gowns were kept on each floor. However, the number of obese patients has dramatically increased as shown in the above table while the number of large gowns available on each floor has remained the same. As a result, large gowns are typically short in supply. Because of this, large patients often have to wear regular gowns in the interim period making them feel awkward and uncomfortable in the "tight-fitting" gown.

Also, the hospital rarely has pants for men. Some men are very modest and when the gowns are so short, they feel awkward which further extenuates their ill feeling. Even when pants are provided to the patients, they are usually so small that they only fit men who are thin.

Impact of traditional gown on patients' emotional and physical well being

Nurses believe that the gown has a larger impact on the patients' well being when their stay in the hospital is long than when it is short. The patients feel “vulnerable” when they are not feeling well and being "regimented" throughout the day by the caregivers “exacerbates” their helplessness. The patients feel that they have to give away their power and follow instructions. The "hideous looking" gown adds to this feeling and an opportunity to inspire the patients is lost. A nurse said that "*although it may seem like a small little thing but the patients don’t have much independence to begin with and if they could have a nice gown that would be great*".

Some of the nurses who had been in this profession for more than 20 years said that clothing can be a real key in the healing process. According to them, there are many things other than medicine that can make a person get better. *"Medicines are only tip of the ice berg"*. One nurse said that by just walking into a patient’s room she can Figure out if they are depressed by the lack of eye contact or the response to touch. She further says that the importance of clothing cannot be overlooked, after all clothes are like a "second skin” and have to have "some kind of therapeutic sense in the long haul". "*A happier patient feels that they can get better faster. Emotions play a lot in the recovery process"*.

An example of emotional impact given by the nurses was when a mother who just lost a child had to wear an "ugly worn out gown" which was very depressing for everyone around her. While the nurses did not give a scientific reasoning for the relationship between happiness and the state of the gown, they felt that a fresh brightly colored gown does make the patient feel better.

The hospital also has pregnant female prisoners who always have to leave their babies to go back to jail. This situation is a big change for them, and they are usually very depressed and stressed which may inhibit mother's ability to nurse. The nurses feel that it is important to make them happy while they are in the hospital and leave them with a positive outlook. But at the moment the hospital does not have any "cheerful" gown which could make them feel better.

Another example cited was of a diabetic patient who has to adapt to the new restricted lifestyle with their diet, insulin shots etc. This adoption is facilitated through regular teachings on the timings, amounts, methods etc of the new regimen which is critical to their betterment. However, the patients are already depressed about their condition which adds to the lack of receptivity to the teachings. While a nicer gown will not solve the entire problem but it can contribute to alleviating the depression and avoid making the patient feel as if they "*are just another patient in Room #22*".

Back exposure is another issue which seems to trouble patients especially women who are older and modest. For men, it is also a "matter of pride".

Patients' attitude towards the traditional patient gown

Some of the feedback that nurses get from the patients on the traditional gown is captured below:

"*This gown is too short*"

"*I'm showing my behind*"

"*How do I put this thing on*?"

"*Why do I have to wear this*?"

The nurses reported that the patients have lot of trouble with the closure. They find it complicated to tie the straps at the back.

The importance of wearing a hospital issued gown

According to the nurses it is important for a patient to be in hospital issued gown versus their personal clothing. They prefer to "*start from scratch'* in their assessment process and hence require the patients to be clean from top to bottom. It becomes more important in some of the department than others. For example, for patients with loss of bowel control have Foley catheters attached to them. In this case a patient needs to wear a gown. Also, patients in the hospital come from wide array of lifestyles. The clothes that they wear to the hospital might be contaminated. In some drug related issues, patients have found to bring contraband with them and wearing personal clothing would make it convenient for them to hide drugs in small little pockets that are not accessible to the caregivers.

Some patients who are allowed to ambulate are given pajamas or their own sweat pants to wear after couple of days of stay at the hospital

B. Focus group participant's perception of an ideal patient gown

Sizes

Availability of different sizing option (small, medium, large, extra large) is crucial. Special consideration needs to be given to gowns for larger patients. Along with the size the length of the gown needs to be appropriate. The length should to enough to cover the patient but not tangle them up.

Closures

The nurses suggested using Velcro® for all closures. Velcro® is a brand name of fabric hook-and-loop fasteners. It consists of two layers: a "hook" side and a "loop" side. The hook is a piece of fabric covered with tiny hooks and the loop side is covered with smaller and "hairier" loops. When the two sides are pressed together, the hooks catch in the loops and hold the pieces together. When the layers are separated, the strips make a characteristic "ripping" sound

The Velcro® has to stand the longevity test because the gowns go through many washes. The Velcro® used should be soft so that it is not uncomfortable for the patients. The reason why the nurses preferred Velcro® is because if the gown had Velcro® strip all the way down it would be easy to rip it off during the time of emergency or in a hurry. It would also be user friendly from the patient's point of view.

Fabric

The gowns usually need lot of scouring because of blood and other fluids on them. As they go through heavy duty industrial cleaning they tend to fade and over time take on a dull appearance. The ideal gown would use a fabric which is more resistant to fade, flame retardant, soft and breathable.

Color and Prints

The color of the ideal gown would be brighter than the colors of the traditional gown. Also, the nurses suggested if there could be more than one color option because wearing the same color can be very depressing. A new color would make a patient feel that they are wearing something new. Prints were also suggested. For example, a sports gown suggestion could have a football or a baseball print.

Desired features

The first design feature the nurses would like to see is an opening in the front, which will make it easy to access the upper body. Both back and font closure should be an option and the two parts could be made reversible. This feature is especially important for cardiac patients who need the electrodes changed periodically.

Nurses suggested that the gown should have color coded straps which would help the patients match the straps and wear the gown themselves. This would free up nurses who could do other important work.

A 'V' neck is considered better than a round neck as it provides accessibility. The nurses strongly recommended a "detachable'" bib for tracheotomy patients or for those who are slobbering. Because of the secretion, nurses have to change the gown when only the front of the neck is soiled. A detachable 'bib' which may be just a flap with Velcro®, would solve the problem. The bib could be disposable.

It was also suggested that the area around the neck and the start of the sleeve could be made a darker color than the rest of the fabric in order to provide the patients with a lead to start stringing the gown. It would make it intuitive and easier for the patients to tie the gown.

Appropriately sized pockets are also recommended which will hold the various diagnostic devices needed in modern healthcare.

It would also be beneficial if the gowns were color coded according to the department such that special needs of patients in a particular department are met and appropriate gowns are stocked.

To accommodate patients who do not fit well in the regular sized gown, the nurses proposed an innovative solution. They suggested that gowns should have panel similar to 'pleats' which could be attached/detached using Velcro® in order to increase or decrease the size of the gown.

Storage of gowns

According to the respondents it would be helpful to have assortment of all the different types of gowns on each of the floors because patients of all sizes some can be found

on a floor. If this is not done, scouting and obtaining a particular sized gown becomes a difficult activity.

4.2.2 Hospital A - Focus Group 2

A. Overview of the caregiver's perceptions of the current patient gown

Sizes

The other problem of the traditional gown is the absence of many sizing options. This is a major issue for the larger patients. The large gowns are also fewer in numbers and as a result, large patients often have to wear the regular sized gown. This makes the larger patient uncomfortable and leaves them greatly exposed from the back. Patients therefore ask for more than one gown which further increasing the laundry and logistics cost. For smaller patients the gown is either too loose or too long and because of this the small men tie knots in the gown to make the gown fit them well.

Closures and snaps

The nurses were of uniform opinion that the ties at the back used in the traditional gown are "very uncomfortable". Patients find it difficult to tie themselves and even if they manage to do so, they either form a knot or tie it too tight. Because of this the nurses are left with no option but to cut the ties off. Also when the patients have various lines running then it makes more sense to cut off the gown than remove the lines and try to untie the knot. Thus, many gowns get wasted in the process.

Snap are important in a gown but this design feature is both a weakness and strength of the traditional gown. Snaps at the back and on the sleeves are a strength because they provide ease of access to a patient's body. They are a weakness because the gowns do not have enough snaps especially in the front. Large gowns are especially problematic because they do not have any snap at all. In an emergency, nurses end up cutting the gown to get access to some of the body areas which cannot be reached through the available snaps.

When the nurses were asked if they would want the gown to be front opening versus back opening they felt that having only front opening would further complicate the problem. This was because it would not let the nurses and doctors get underneath the patients. With the back open the nurses find it convenient to dress the patients because most of the time the patients are awake so all they have to do is roll them and get the gown underneath them and then roll them back and do the same from the other side.

Color

All the participants felt that the color used in the present gown is dull and needs to be changed to a more cheerful color. The most common comment on the color of the gown currently in use was "*ugly*".

Design

As mentioned above, snaps in the traditional gown are a crucial feature. Snaps provide ease of access to a patient's body and are convenient for getting IV's and other medical devices to the appropriate area.

The other useful feature is the heart monitor pocket. This pocket helps in keeping the heart monitor away from all the other linings that are hanging out. Some of the patients also use that pocket to keep their wallet or money. Though the heart monitor pocket is helpful, it also has a hole which makes the patients feel exposed.

Sometime, the round neckline of the gown chokes the patient when they try to sit or when the ties are strongly tied.

Impact of gown on a patient's emotional and physical well being

The nurses felt that there is a direct connection between the clothing of a person and their emotional and physical state. A nurse commented, "*The patients are already vulnerable due to what they are going through in the hospital setting and all of a sudden they have to rely on someone else for their day-to-day activities. They have their dentures taken away, their earpiece taken away, maybe even the hair piece is taken away and the least they want is to be covered. It is a natural human instinct".*

The nurses suggest that one of the most important steps in healing is to be active and walk around. But the hospital gown does not encourage the patients to do that. For smaller sized patients, "*the gown is hanging all around them and everything is exposed*". As a result, they resist moving from the bed. It makes them feel like an "*invalid"*. A nurse compared the patient's state with sunny versus cloudy day. The patients want to be normal as soon as possible and will do anything to make it happen, but in spite of their willingness they cannot get up and walk because of the exposed back.

Patient's attitudes toward traditional gown

The patients often complain that they are cold but the gown is not the only reason for that. According to the interviews it is also the room temperature. The other feedback from the patient is that they feel exposed. Some of the patients also complained that the design in the gown looks like bugs to them and that they would prefer a solid print gown.

Nurses feel that most of the patients "*just accept what they get*". Some patients admitted for a short stay don't care because they are in hospital for short duration. Many of the patients prefer wearing their own personal gown.

Another observation was that the patients did not mind wearing the hospital gown for the initial four days before the surgery but as soon as the surgery was over they would want to get out of the hospital gown.

Under normal circumstances, the nurses allow the patients to wear their pajamas if it is not a hindrance in the caregivers work. Also if the patients are not on IV's or tubes the nurses let them wear whatever the patients are comfortable in because that will motivate them to walk in the hallways. Wearing their own clothing is convenient for the patients. Especially, the ladies do not want to walk in the hallways if they are in hospital gown.

Some of the patients are uncomfortable for reasons such as the small bed, gown being uncomfortable around the neck, rough fabric, dull color, and the lack of warmth from the gown. Some want to cover their bottom and hence pull their gown to cover themselves which cuts the blood circulation. As for the men goes they complain of wearing a dress. Many times, more than the patients, it is their family that complains about the traditional gown.

Importance of wearing a hospital issued gown

The decision on whether a patient should wear a hospital issued gown or their own personal clothing depends on many factors. Chief among them is how critical their condition is and what is the patient's daily routine. The nurses felt that if a patient is allowed to wear their own clothing, it would be time consuming and difficult to treat them. Patients with their own clothing would also make the nurse's work difficult because the clothes may get soiled, or have solutions or even blood clots on them. But under normal circumstances the nurses allow the patients to wear their pajamas if it is not a hindrance in their work. Also when the patients are not on IV's or tubes the nurses let them wear whatever they are comfortable in because that will motivate them to walk in the hallway.

B. Focus group participant's perception of an ideal patient gown

Desired features

An ideal patient gown would be one with the option of both open front and back. This would give the nurses more accessibility in cases such as abdominal dressing, chest tubes etc. A tiny loop to hang drain tubes would be very convenient too.

Additional pockets would solve many of its issues with the traditional gown. Nurses suggested that a little piece of material that comes around and snaps would be simple and convenient and can serve the purpose of the pocket. Another design feature which would enhance the functionality is to have snaps in the larger gown as well.

Closure

Velcro® was the most common closure option preferred by the participants. The nurses suggested that an ideal gown should have soft Velcro® closures. At the same time, they were apprehensive about Velcro® not holding up well after a few heavy duty washes. The reason stated was that hairs tend to get inside the Velcro® strip which does not allow the Velcro® to hold up together.

Fabric

The ideal patient gown should have a fabric that is durable, thick and is as soft as "*t-shirt material*". At the moment the fabric used is very thin. The traditional gown is very rough when it is new, but after few wash it becomes soft and comfortable to wear.

Color and Prints

Often the patients feel that the print on the gown appears to be a bug and they do not want to wear it. So the nurses suggested that a gown with solid color would be an ideal. Also, if the ideal gown has design special attention should be given to the pattern. The nurses thought that prints like stripe or dot would be good but would not prefer anything "*too busy*".

The color of the ideal patient gown should be something more cheerful and not a "*depressing"* color like blue.

Design

One of the issues with the present patient gown is that the ties form a knot at the back which makes the patient feel very uncomfortable while lying down on the bed. The nurses proposed that the ideal gown should wrap round with the strap coming from inside a hole, would solve the problem of both coverage and the knots. This would mean that the patients do not use more than one gown reducing the cost of laundering and logistics.

The gowns should be color coded according to the sizes-small, medium, large and extra large. Also the gown needs to be longer for tall people to give them a proper coverage.

According to caregivers at the hospital, another feature of the ideal patient gown would be to have a V neckline rather than the round one. This would help in preventing the choking sensation. The nurses also suggested that some time back, the hospital used to provide robes in addition to the gowns. The use of robe was also convenient because even if the patients did not tie the gown, they still had robe to cover themselves. This was stopped and because of that a lot of the problems arose. It was speculated that providing the robe might not have been cost effective from the administration stand point.

At times when a robe does not interfere with patient care, the nurses ask the patients to bring their own robe if they wanted because patients feel much better wearing their own clothes.

Nurses would also like to see long sleeves in an ideal patient gown. At the moment the sleeves are very short which makes the patient feel very cold so having a longer sleeve would take care of that problem.

The other feature recommended is to have a few slits and pockets in the gown. The slit will let the tubes slide through it at the same time it should not gape out and leave the patient feel exposed. The size of the pocket recommended is something close to a "grenade" because it will be used to store JP and Foleys

In some of the surgical floors the patients have drains, catheters and tubes when they are ambulating after a surgery. It is very difficult for them to carry all this equipment with them. They can't let it hang either because the equipments may pull out. To work around this, nurses use safety pins to attach the tubes etc. to the gown. The nurses proposed to have a "fanny pack" in the inside which would hold this equipment and allow the patients to ambulate.

Nurses also recommended that for patients who can walk, a two piece gown would be better alternative to a traditional gown. Pajamas and shorts were suggested for men as they don't like wearing a dress.

Nurses suggested that a piece of fabric that would loop through and snap and that would work with JP's would be a good idea. Loop, logo, pockets, and color coded for large, medium, and small. But this was not encouraged by all the nurses because some of them felt that this would make it very confusing and also slow down the process.

Storage of gowns

Another issue that surfaced is that at the moment there is no proper storage area for the gown. A central storage area, not necessarily one on every floor but easily accessible, where the presence of a gown of a particular size is always guaranteed will be a welcome

supply solution. The assurance of finding the right sized gown is important because nurses need to change a patient's gown at least twice in a day and trying to locate gowns is a hassle for them.

Disposable gowns

Nurses in this focus group felt that using a disposable paper gown inhibits the healing process. They believe that if the patient has to wear a paper gown while visiting GYN/OB and has to sit on the chair, they feel very uncomfortable, unhygienic and exposed. It is worse if the patient has to walk down the hallway in a paper gown.

4.2.3 Hospital B – Focus Group 1

A. Overview of the caregiver's perceptions of the traditional patient gown

Types of gowns currently in use

The gowns used in the hospital are "*ugly*". The neckline of the gown is in circular shape resembling T-shirt neck line. Due to this the patients are choked while sitting down. The design of the gown is not hugely functional leading to various issues with the hospital caregivers.

Sizes

The gowns used in the hospital are "*one size fits all*". These gowns are either too long or too short on the patients. The gown does not provide any "*privacy*" to the patients as most of their intimate body area is exposed.

Closures

The closure used for the gown is ties. The ties often gets knotted up and when the nurse gets one of the gown with knotted up ties they often have to throw them away because they do not have time to open up the ties.

Snaps

Most gowns have snaps on the shoulder. The participants said that the large gown do not have any snaps.

Color

The gowns are mainly blue in color.

Fabric

The fabric is made of basic cotton and after a few washes the fabric becomes "*thin"* and "*flaky*" which results in patients feeling cold and gives a feeling that the gown is "*cheap*". But the nurses pointed out that the gown is durable.

Impact of gender on perceptions of traditional gown

The gowns are unisex. Most of the time men wear their gown with a pant underneath. The men do not feel "*masculine"* wearing the patient gown. "*It is like wearing a dress for a guy"*

Impact of gown on patient's emotional and physical well being

The participants said that the patients were normally happy to wear a gown that was brought by their family member rather than wearing the hospital issued gown. Majority of the nurses agreed to the impact of gown on a patient's emotional and physical well being but they also said that the intensity varies from person to person. The nurses' believed that even if the gown does not affect the direct physical recovery of a patient but it definitely affects them indirectly. The gown might have an impact on the motivational level. The patients might not be enough motivated to walk because they fear that they will be exposed.

Patient's attitude toward the traditional gown

Nurses said that most of the time the patients wear two gowns to cover themselves. Often patients feel exposed because of the back opening. The patients often ask the nurses if they can wear their own clothes rather than be in a gown.

B. Focus group participant's perception of an ideal patient gown

Design

The respondents suggested having more and larger pockets in the new gown. The patients are attached to various medical devices like drains, JPs, cardiac monitor and at times have to walk along with the devices. Having more pockets would make the walking process more comfortable for the patients. The other design feature that the nurses suggested was to have an option of both back and front openings. In addition to this they suggested to design a gown that is "*pretty*" and "*attractive*"

Closures

This group of participants did not clearly state what type of closure they think would be best for the new gown but they did mention that zippers were not an option because they are cold and are made of metal which would cause hindrance in x-rays and scans.

Color and Prints

Very little print on the gown, for example, plaids or stripes, was suggested by the group.

Fabric

The participants suggested using a fabric which was soft and not itchy, cold or rough on the skin.

4.2.4 Hospital B – Focus Group 2

A. Overview of the caregiver's perceptions of the traditional patient gown

Types of gown currently in use

The gown used in hospital B has a circular neck line. These neck lines are not low enough which results in choking sensation for the patients. This especially happens when they are lying on the bed. The gowns are open from the back. Having the backside open becomes very difficult for the cardio department to have accessibility in the front. But at the same time it becomes very easy for the patients when they have to go the bathroom. Also the gown design inhibits the nurses from doing their work efficiently. For example, to do EKG the nurses' have to remove the entire gown to get access to the chest. Though the gowns in the cardiac units have tiny slits in them but the hole is so small that the nurses have to rip the have off to get access to the desired area.

Sizes

The hospital does not carry a wide variety of sizes. The gowns used in the hospital are "*one size fits all*".

Closures and snaps

The closure used is ties which become very uncomfortable after it forms a knot. This finally leads to cutting the ties which leads to waste. Also, because of these knots the patients

back hurt. The nurses in the OR said that the first thing that they have to do before an operation is open up all the knots.

The snaps in the traditional gowns are on the sleeves and on the back of the gown. The snaps in a gown are a critical feature because the caregivers' cannot use a gown that does not have a snap because that will create complication with the tubing and IV's.

Color

The gowns used in hospital B were basic blue in color. The extra large ones were brownish.

Fabric

The fabric of the gown was thin and rough. Also the fabric absorbs the body fluid and other liquid making the gown very "*clingy*".

Impact of gender on perceptions of the current gown

The men often asked for pajama bottoms to wear along with the patient gown. A participant commented that women felt awkward in the gown because they are more concerned about their looks.

Impact of traditional gown on patients' emotional and physical well being

The nurses felt that wearing a hospital gown does affect how a patient "*feels*" not necessarily how they "*heal*". The most important reason for a patient not wanting to wear the

gown was exposure due to the open back. Most of the patients wear two gowns on them to cover themselves.

Patient's attitude toward the traditional gown

The patients often complained about the size of the gown, saying that either it was too long or too short. The patients complained of getting tangled up in their gown. The female patients find the opening of the monitor uncomfortable because it leads to exposure. The other common complaint from the patients was that the neckline created a chocking sensation.

The importance of wearing a hospital issued gown

Wearing a hospital issued gown provided the caregivers' with greater accessibility to the patients' body. Also, with excess drainage of different types of bodily and treatment fluids the use of hospital gown is preferred.

B. Focus group participant's perception of an ideal patient gown

Desired features

The nurses said that it was important for the new gown to have a different and thick border around the neckline to make it intuitive for the patients to separate the front from the back. They also suggested having a V neckline with slit down the middle.

They also suggested considering the design of the new gown department wise. They suggested having unit specific gowns as strength of a gown might be a weakness for the other department. They also said that instead of having an open back it would be better to have the

opening on the side this way the patients were protected from becoming exposed. In addition, providing a pajama bottom for both men and women especially when they are able to walk would encourage them to be mobile.

Another important design element is the pocket. The nurses suggested having pockets lower in the gown so that they do not have to attach the drainage pipes to the gown with a safety pin when a patient are walking down the hall.

A participant also suggested having a short top for those patients who come for hand surgery so that these patients can wear their own clothing and can change into the top for the hand surgery rather than opening up the entire gown.

Sizes

Having various sizing options like small, medium, large and extra and double extra large would help the patients to wear something that would fit them.

Closure

Some of the nurses said that they would like to see snaps rather than ties to prevent knots which hurts patients and is time consuming for the nurses. Few others suggested using Velcro® all around.

Fabric

The fabric suggested for the new gown should be soft, providing a feeling of a t-shirt material.

Color and Prints

The nurses said that the gown should be color coded according to the sizes. Also, the patients would respond better to wearing the colorful gowns.

4.2.5 Hospital C - Focus Group 1

A. Overview of the caregiver's perceptions of the current patient gown

Types of gowns currently in use

The gowns used at the hospital have snaps at the back and on the arm. The closure used in these types of gown is strap which is knotted and hence needs to be cut off causing unnecessary waste of gowns. These gowns also have pockets which is very important for the nurses because they can slide the medical devices through them. Then there is the radiology gown, these gown have three holes, one for the head and two for the arms. Radiology gowns do not have snaps. Next is the nursing gown. The strength of the nursing gown is that the patients do not have to take the whole gown down because it has a snap in front. Also, the hospital uses oncology gowns. The weakness of this gown is that they carry in only two sizes and very often chemo patients become extremely ambulated so they are swimming in the gown. Next are the obese gowns. Obese gowns do not have snaps in them.

The hospital gives out blue pants and shorts for who might need them. They also give out pants with the gowns. The pants are blue in color and are for anyone who wants them. They also give out shorts which are dark blue in color. This option is especially provided for patients who are able to walk around.

Sizes

Limited sizing option for the traditional gown has been a continuous source of issue with the caregivers and the patients. The example given by the nurse was the Chemotherapy gown. The chemotherapy gown is available in two sizes only. So when a chemo patient is ambulated they are "*swimming in the gown*".

The sizing that the hospital has is either a *"hit or miss*". Either the patient gets a *"correct one or a giant one"*. The hospital gets lot of small size patients who have difficulty finding a correct size gown for them, otherwise the gown that they are wearing just hang to the floor.

Snaps

The nurses said that due to the lack of snaps in the gown it is difficult to get proper access to the patient's body. For example, if the nurses have to get to the patients peripheral or if they have to disconnect the medical devices to switch gowns, each of these becomes an issue with the traditional gown.

The doffing/donning process with the traditional gown takes lot of time. The participants said that every time a patient is changed into a new gown they have to unhook the tubes and pipes because the gown does not have snaps which become time consuming and cumbersome for the nurses.

Fabric

The participants said that the fabric used in the gown is extremely rough when new. After several washes the gown becomes soft but at the same time it also becomes thin. Because of this some of the "little old ladies" get extremely cold.

The other concern of the participants with the fabric was that the fabric used in the traditional gown is not coated with anti- bacterial properties which might increase the chances of infection among the nurses and the patients.

Impact of gender on perception of traditional gown

The nurses felt that the women mind the gowns less than the men. Men are not used to wearing a dress and they feel very "*awkward"* and "*naked"* in the gown. They ask the nurses if they can wear a pant underneath. While the smaller sized women feel cozy in the relatively large gowns, the older women are cold because the fabric is light weight and thin. Patients that are on the heavier size usually struggle with the gowns because of the lack of fit. Men with the big arms look very uncomfortable in the gowns.

Impact of gown on patients' emotional and physical well being

The nurses felt that that the gown affects a patient emotional and physical well being. According to one of the participants, two factors that most affect the most in a patient is the loss of dignity that patients feel. They are stripped of everything that they don't have any "choice or rights". The nurses tell them when to eat and when to take a pill.

The other factor observed by the nurse and also heard sometimes is that if the patients are in their own sweat clothes versus the hospital gown they feel better. It is almost a mental thing, "*if I have this gown I am really sick. It's not that I'm in the hospital. It's almost the hospital gown that makes them feels worst then if they put on their own clothes"*

A nurse gave an example from the surgery perspective for breast cancer patients. The breast cancer patients go over to another building and have a needle localization procedure to identify the tumor, prior to going to the OR. Once they are done with that they have to come back to the surgical building and wait. The nurses have everyone come two hours in advance in case the appointment in front of them gets cancelled, the next patient in line will be moved up. This is not a good situation for them. These patients have *"increased anxiety, anger and are cold.* The gown makes them feel "*vulnerable".*

Another participant who worked in the pre-operation area said that the patients who are getting ready for the operation are already upset, concerned and nervous. And then they have to take everything from them including their underwear, which the patients hate. And then they have to wear a gown which does not fit them because the patients are of different sizes. The situation is difficult for the patients. It puts them in *"not an operable mind set, because they feel vulnerable".*

With diversity, ethnic groups, culture and beliefs the nurses felt that the gown has a greater impact. An example used by a participant was that of Chinese and Muslim patients. They are very awkward in the traditional gown and especially when it comes to the breast feeding gown. The breast feeding gowns have a flap in the front that can easily expose the

breast for feeding purpose and can be flapped back over. Some patients have had on three gowns for various reasons.

These patients want to lot more things, move around but because of the gown "they don't want to get up and go to the bathroom. They don't want to get up and brush their teeth. Or they get up and get right back into bed. They just want their own pajamas. They want their own control with what they are familiar with".

Patient's attitude toward traditional patient gown

Some of the patients appreciate the nursing gown. Some patients who are not nursing also wear the nursing gown. But for the open back gowns patients are very uncomfortable and ask for second gown which would act as a bath robe to cover the patients behind. The nurses also said that more than the patient themselves it is their families who are more concerned about their family member wearing the hospital gown. Some participants said that the patients don't care if they have shorts on or not. They know it is what it is and they accept it.

The other complain by the patients is that the ties are too complicated. They look very confused and ask the nurses to tie it for them. Many patients feel that the size is a big issue. They ask the nurses if they can get their own clothing. Nurses said that some of the patients have said to them that they feel much better when they are in their own clothing versus the hospital gown. The nurses felt that this is true since they have observed this transformation in the attitude of the patients. Also the fabric of the gown, it is too light weight and thin and some of the "little old ladies" feel uncomfortable and are cold in it. Also, the neckline of the

gown is far up on the neck or shoulder of the patients. And when the patients stretch and slide down in bed the gown chokes them.

The importance of wearing a hospital issued gown

The patients have a choice but the nurses encourage them to wear a gown. A nurse said that "*When the patients know that they are going to be in the hospital for thirty or forty-five days, they bring a suitcase with eight pairs of pajamas. So it is not like they look like they are going out for dinner, but they wear pajamas that are comfortable for them. And a lot of them now understand that with lines and stuff, that they should get button down pajamas. They will come in ready, which is nice. Some like wearing athletic pants and athletic shorts. I see a lot of the patients pre-operable and they will ask for something else underneath".*

B. Focus group participant's perception of an ideal patient gown

Desired features

The nurses said that the open back was necessary for ease of access with EKG leads and other medical devices. With an open back the nurses have to pull up the sides to insert any medical device which causes minimal exposure in the process.

An ideal gown would be open in the back with another opening in the front. Instead of having the ties, the gown could have overlapping parts with buttons down one side to keep the two parts together. The nurses opined that overlaps make one feel covered up.

Another important design feature required in a gown is pocket. The traditional patient gown have only small dark blue color pocket. For patients who are mobile and who do walk

the halls and in their room they hold the different leads in their hand or attach it in their pocket. The Physical therapist and occupational therapist that work with them a lot of times discuss and teach the patients how to walk with medical devices and carry all their stuff. Some patients have their own creative ideas. For example, they put their Foley on their IV pole or their walker. A nurse gave an example of one of her patient. She said "*we had a patient who just got back from Iraq. He had this big pole and three pumps; he tied the power cord around his waist. He pulled it as he walked through the hall. We are all very motherly up there. And we are like; if you hurt your line we are going to very mad. He's like I just don't want to push it or pull it, I just want to go and have it come with me. Since he's got Chemo running, he cannot leave the floor. He's able to like pick up speed and go. His hands are free. He likes power walks. We just watch him go by".*

A lot of the patients come out walking with the standup pole with IV tubing that's usually looping; hanging, dragging, and they get tangled up in it. And then they roll over it with the pole. The nurses suggested if the ideal gown would have a loop or strap with some Velcro® to attach the tubes and pipes.

Closures

The nurses said that they did not prefer the strap closure. When asked about buttons, they said that they would prefer to have something that would snap off easily and quickly.

Fabric

From a fabric point of view, warm and fuzzy material is almost always preferred. The traditional gowns are softer when they are older than when they are new, and nurses usually give the choice to the patients on whether they want the old or the new ones.

Fabric is also an important consideration when infections and control are a big concern with the patient. Currently there aren't any gowns which offer infection control. For patients who have extensive open wounds and heavy fluid discharge, a fabric that will not insolate and hold moisture will be very useful.

Chapter 5

Discussion and Summary

5.1 Discussion

The research results indicate that there is a clear need to undertake a functional and aesthetical redesign of the traditional patient gown. The result also brings up the question if "one universal gown" design concept is valid or not given the disparate requirements arising out of difference in gender, age and medical condition of the patients. For example, from the gender standpoint, one of the common themes among all the focus group was that men do not like wearing the gown because they felt they were wearing a dress. Phrases like "loss of identity" and "embarrassment and discomfort" were used to describe the emotional state of men wearing the gown.

The modern healthcare system in turn puts additional performance pressures on the traditional gown. The treatments taken for granted today did not exist before. However, the patient gown has failed to keep pace with these advancements and has been over simplified to "one size fits all". Interviews with the caregivers clearly suggest that the traditional gown met the need of only some caregivers while the majority felt that the current gown was inadequate. For example, caregivers working with cardiac patients felt that the traditional gown inhibited accessibility as it does not have any opening in the front.

Even though modesty is a concern for everyone, the research results highlighted how the older population is especially concerned with the open-back design. The elderly population in United States has been growing rapidly as shown in Figure 18. As a significant recipient of healthcare, the needs of this sector should be actively considered in the designing process of the gown. The following chart shows the growth trend of the elderly population.

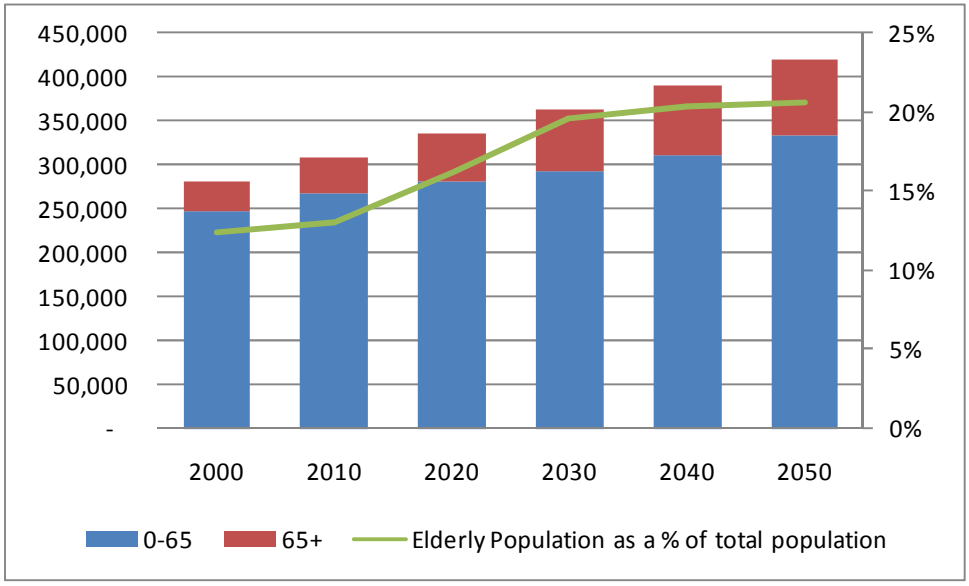


Figure 18: Growth of the elderly population in the US

Source: U.S. Census Bureau

Another common theme found in this research was the relation between exposure due to the open back gown and the resultant feeling of negativity. Caregivers in all the five focus groups provided various examples on how an immodest gown can affect a patient's recovery process. For example, due to the back exposure the patients do not want to get up from the bed and walk around which is a key element in the healing process. In addition, the family

members of the patient are also affected due to the poor condition of the gown. The condition of the gown also conveys the level of care to the patients.

The issue faced with accessibility was another concern among all the focus groups. The need to design a gown which provides a great level of accessibility is crucial for smooth and efficient functioning of the caregivers.

5.2 Summary

The first objective of this research was to analyze the traditional patient gown from the perspective of hospital caregivers with respect to (i) ease of access to the patient's body for medical examination, (ii) donning/doffing and (iii) supply, storage and handling of gown. The second objective was to understand the caregiver's perception of the impact of the gown on the emotional and physical well being of their patients. The third and final objective was to catalog the caregiver's perception of the features and functionality in an ideal patient gown.

A mixed method approach consisting of both quantitative and qualitative research was employed to achieve these objectives. Quantitative information was collected by sending out the questionnaire to a sample of 1200 hospital caregivers. The results of the survey and comments were recorded for tabulation. Qualitative data was gathered through five focus groups conducted with registered nurse at three leading hospitals in North Carolina. The proceeding of the focus groups were transcribed and carefully interpreted

The following discussion of results is based on both the quantitative information (Table 6) obtained from surveys and qualitative information (Tables 7, 8, 9, 10 and 11) distilled from the proceedings of the five focus groups.

Furthermore, the qualitative results are cataloged in a tabular format for ease of understanding. The table is divided into five columns. The first column shows the high level functionality category of the gown being discussed and the second column describes the issues pertaining to that particular functionality. The three columns on the right are used to show the researcher's assessment of the criticality of the issue (*low, medium and high)*.

The ratings were provided to the issue according to the number of repetitions of the issues across all the focus groups. The issue with highest number of repetitions was ranked high while the issue with least number of repetitions was ranked low.

5.2.1 Research Objective 1

The research indicates that there is a need to develop a new patient gown as the traditional gown is clearly not able to satisfy the demands of modern healthcare. The quantitative results indicated that majority of caregivers felt that the current gown does not accommodate the needs of the caregivers, the patients and the hospital administrators.

In summary, the traditional gown interferes with routine medical procedures and fails to provide adequate access to the patient's body. Caregivers prefer that patients wear hospital issued gowns and therefore, a gown that accommodates the needs of caregivers is required.

The primary elements governing access to a patient's body through a patient gown are snaps, closures and pockets. The issues and associated criticality are mentioned in the Table 4.

Table 4: The features of the gown that affects accessibility

Gown Features and Characteristics	Current Issues	How critical is the issue?		
		Low	Medium	High
SNAPS	Accessibility is reduced by lack of snaps		medium	
	Lack of snaps leads to restricted chest accessibility especially for cardiac patients			high
	Donning/ Doffing a huge problem due to lack of snaps			high
	Large gown do not have any snaps			high
	Leads to cutting the gown in emergency due to lack of snaps	low		
CLOSURES	Knots very uncomfortable for the patients			high
	Creates Wastage			high
	Time consuming for the caregivers		medium	
	Not intuitive to tie			high
POCKETS	Size very small.			high
	Extra pockets are required to hold medical devices			
	Exposure for women		medium	

The recurrent theme across all the focus groups was that the traditional gown lacks enough snaps needed to adequately access a patient's body. This is especially true for cardiac

patients who require multiple tubes and monitor lines running from their body to other medical devices.

In addition, the majority of the participants complained about the large gowns not having snaps. As more and more patients are requiring large gowns, this is increasingly becoming a common problem that the caregivers have to deal with.

Donning and doffing are complicated by the access elements used in the traditional gowns. The primary issues with donning and doffing are:

Table 5: Issues with doffing/donning

Gown Features and Characteristics	Current Issues	How critical is the issue?		
		Low	Medium	High
DOFFING/ DONNING	Causes frustration and is uncomfortable for the patients	low		
	Time consuming for the nurses		medium	
	Change of gown frequent due to bodily fluid discharge		medium	

Supply, storage and handling of gowns are not done in an efficient manner. There is continuous shortage of "*obesity*" gowns and extra large size gowns. The caregivers suggested having a central storage facility where gown of a particular size can always be found. The primary issues with the supply, storage and handling of gown are shown in the table below.

Table 6: The issues faced with supply, storage & handling of gown

Gown Features and Characteristics	Current Issues	How critical is the issue?		
		Low	Medium	High
SUPPLY/ STORAGE & HANDLING	Lack of proper storage facility according to size			high
	Not enough supply of extra large gowns			high
	Not enough supply of pants		medium	

5.2.3 Research Objective 2

This study shows that a clear relationship exists between the gown and a patient's emotional and physical well being. Gown features which contribute to this are shown in Table 7 below.

Table 7: The issues faced with size, color & print & fabric of gown

Gown Features and Characteristics	Current Issues	How critical is the issue?		
		Low	Medium	High
SIZE	Regular shortage of obese gown			high
	Incorrect sizes cause exposure for the patients			high
	Patients use more than one gown to cover themselves due to the exposure		medium	
COLOR & PRINT	Dull and used appearance		medium	
	Prints reminds patient of bugs or blood clots		medium	
FABRIC	Coarse, cheap looking and uncomfortable on skin			high
	Patients feel cold			high
	No anti-bacterial properties		medium	

The degree of this relationship is captured by the various words used by the participants to describe the effect of the gown on the patient's emotional and physical well being. The words are summarized in the table below:

Table 8: The emotional &physical impact of gown on patient

Impact of gown	Common associations
Emotional wellbeing	Back exposure - "embarrassment", "afraid", sense of "insecurity", "worried", "nervous", "vulnerable"
	Men - "Loss of identity"
	Size - Awkward
	Color - Gloomy
	Neck line - Chocking sensation, frustration
Physical wellbeing	Mind, body, spirit connection
	Back exposure - discourages being active and walking around which is key to quick healing process

5.2.3 Research Objective 3

An exhaustive set of features and functionalities for an ideal patient gown was distilled from the focus group interviews and survey results. These are categorized in below.

Table 9: The characteristics of an ideal patient gown

Features and characteristics	Description
Size and length	Different sizing options (small, medium, large, extra large)
	Color coded according to the sizes-small, medium, large and extra large
	Proper length to cover a patient's body
Fabric	Resistant to fade, flame retardant, soft, durable, thick and breathable
	Anti-microbial properties
	Recommended a "detachable"' bib
	Area around the neck and the start of the sleeve could be made a darker color in order to provide the patients with a lead to start stringing the gown.

Table 9 continued.

Color and prints	Brighter color
	More than one color option
	Solid color preferred but if the gown has design attention should be given to pattern, nothing too busy.
Snaps and Sleeve	To have snaps in the larger gown
	Side snaps important for accessibility to the patient's body
	Longer sleeve preferred so that the patient don't feel cold
Closure	Snaps rather than ties to prevent knots
	Velcro® was the most common closure option preferred
	If the new gown has strings as closure it should have color coded strings which would help the patients line the leads and wear the gown themselves
	The gown could have overlapping parts with buttons down one side to keep the two parts together
Pockets	The size of the pocket should be appropriate to hold various modern medical devices
	Along with pockets few slits are required
	To have a "fanny pack" in the inside
	Tiny loops in the gown to hang drain tubes
	Little piece of material that comes around and snaps would be simple and convenient and can serve the purpose of the pocket
Neckline	A 'V' neck is considered better than a round neck
Other design consideration	Option of both open front and back and the two sides could be made reversible
	The gowns should have panel similar to 'pleats' which could be attached/detached using Velcro® in order to increase or decrease the size of the gown.
	The nurses also suggested that providing robes in addition to the gowns will help in solving lot of issues.
	For patients who can walk, a two piece gown would be better alternative to a traditional gown. Pajamas and shorts were suggested for men.
	Having a logo of the hospital on the gown was another suggestion

5.2.4 Conclusion

In conclusion, the caregivers strongly agreed that there is a need to redesign the traditional patient gown to incorporate the caregiver's need of accessibility and functionality. The traditional patient gown does not provide sufficient accessibility to the patient's body. The gown does not have opening in the front or on the sides and the large gowns does not have snaps at all. Having snaps in front is especially a critical issue with the cardiac patients. In addition, the lack of snap leads to complication in the doffing and donning process making it time consuming and inefficient. It also leads to cutting off the gown during emergency hence creating wastage.

The closure of the traditional gown adds further complications. The current closure often forms a knot leading to frustration as patients and the caregivers spend time trying to untie the knots. Since the knotted ties are at the back, it hurts the patients when they are lying down. The caregivers often have to cut the ties off because they are unable to untie it, thus leading to further waste. Another important feature that reduces functionality is the pockets. The size of the pocket in the traditional patient gown is very small and cannot hold the modern medical devices.

According to the caregivers, there is a strong connection between the gown and a patient's emotional and physical well being. The caregivers suggested that having proper sizing option, better fabric quality and "cheerful" patterns and color would help improve the patient's hospital experience. They also emphasized the importance of having anti-bacterial coding on the gown in order to prevent infection.

The caregivers recommended multiple design alternatives. They suggested that the gown have slits in addition to the pockets. These slits could be used for inserting tubes. Also, an option of both open front and open back, i.e. a reversible gown, would enhance the flexibility of the gown. Another design consideration was to have a "detachable bib" which would reduce the need for constant donning and doffing.

The focus group result indicated that though the current gown is not functional in many ways it does have few strengths, one of them being the snap on the sleeve. Lack of *enough* snap cause problem but having a snap on the sleeve provides certain level of accessibility for the caregivers. The caregivers also commented that the gown after several wash becomes soft which is preferred by the patients as it does not feel coarse on their skin.

The development of a prototype will bring few challenges. This study provides a complete set of requirements for a hospital garment from the perspective of the caregivers. However, importance should be given to needs expressed and needs required. All the needs addressed in the research may not be the needs required. Also, incorporating a new feature in a gown may increase the cost of the final product so a cost effective design strategy is required. The other challenge which may be encountered is that some of the caregiver's needs may contradict the requirements of a patient or those of hospital administrators. For example, the caregiver's preference of having different sizing options with different colors may increase the complexity of inventory management and lead to an increase in costs. Also, having additional snaps in a gown would increase the accessibility for the caregivers but this may cause exposure for the patients. The prototype development phase should therefore

focus on implementing an optimal set of requirements which incorporate the needs of the caregivers without compromising the needs of the patients and the hospital administrators.

Chapter 6

Limitations and Future Research

6.1 Limitations

Quantitative information is based on surveys sent to hospital caregivers from one hospital only, so may not be generalized to all the hospitals. Hospitals that participated in the focus groups were all based in North Carolina, so the results of this study may not be applicable to other states and countries. Hospitals that participated in this study were predominantly using the traditional patient gown, so results could vary if hospitals that used non-traditional patient garments were also included in the research.

6.2 Future Research

According to this research there is a necessity for the traditional gown to be replaced with a gown that incorporates the needs of the hospital caregivers in addition to the needs of the patients and hospital administrators. The caregivers are also the end users of the hospital gown. Listed below are suggestions for future research that may be required to achieve the goal of developing an "*Ideal Patient Gown"*.

1. Future research should conduct a broader in-depth study by interviewing caregivers at hospitals across the country.

2. Future research could examine the functionalities and features of a new patient gown by building a prototype and testing it in the market.
3. This research should be combined with the research conducted from the patients' and hospital administrator's perspective to accommodate the needs of all stakeholders.
4. Design features mentioned in this study can only be implemented if the benefits are shown to be greater than the cost. Therefore, a need exists to study cost effective system and manufacturing processes.
5. Future research could involve assessing the feasibility of using electro textiles in a patient gown. This will minimize the discomfort caused due to medical devices attached to a patients' body. In addition, research is required to incorporate fabric which is resistant to fade, flame retardant, soft, durable, thick and breathable and can withstand the harsh laundering environment.
6. Lastly, research needs to be conducted on developing a closure which is durable, functional and comfortable as well as cost effective so as to incorporate the needs of patients, caregivers and the hospital administrators.

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APPENDICES

APPENDIX A

Questionnaire for focus group

- What are the different types of patient gowns that are used in your department?
- What are the strengths and weaknesses of current patient gown?
- How does the current patient gown interfere with your work?
- What are some of the feedback that you get from your patients regarding the patient gown?
- Do you think that the patient gown has any effect on a patient's emotional and physical well being?
- What features and characteristics should an ideal patient gown have?

APPENDIX B

Questionnaire for hospital caregivers



North Carolina State University
College of Textiles
with
The Robert Wood Johnson Foundation

Patient Gown Survey

As a health care provider, your opinion is very important regarding patient gown performance and comfort. Our goal is to help improve the quality of medical care. Please complete the following survey, we appreciate your time and how valuable it is. All responses are confidential, no person will be identified by name, neither in the report nor in its summary findings.

The survey should take less than three minutes to complete

Please respond to the following questions by circling the appropriate number.

Which type of medical facility is this?

□ Hospital □ Ambulatory Care □ Nursing/Long term care

□ Hospice □ Outpatient Clinic □ Doctor's Office

□ Other (please specify)_____

What is your department and job title?

□ Department: _____

□ Job title: _____

Are you a male or female?

□ Female □ Male

Are you involved in the purchasing process for patient gowns?

□ Yes □ No

How many patients do you see in a day?

□ 0 - 7 □ 8 - 15 □ 16 - 23 □ 23 - 30 □ 31+

What area of the patient's body do you most frequently access?

(please specify) _____

Does the patient gown interfere with examinations?

□ Yes □ No □ Unsure □ Not considered it

Do patients have a choice to wear their own clothing at any time?

□ Yes, entire stay □ Yes, part of stay □ No

□ Other (please specify)_____

Do patients have a choice of facility issued patient gowns?

□ Yes □ No

If yes, how many choices are given? □ 1 □ 2 □ 3 □ 4 □ 5+

In a day, how often does the average patient get a fresh patient gown to wear?

□ Once □ Twice □ 3 or more times □ Not applicable

□ Other (please specify)_____

To what degree does the current patient gown meet your requirements to access a patient's body areas during examinations?

Not at all 1 2 3 4 5 6 Extremely well

To what degree do you think that the patients you treat need to wear a facility issued gown?

Not at all 1 2 3 4 5 6 Extremely well

To what degree do you think the style of a patient's gown affects a patient's emotional well being?

Not at all 1 2 3 4 5 6 Extremely well

To what degree do you think the style of a patient's gown affects their physical well being?

Not at all 1 2 3 4 5 6 Extremely well

How important is it for patients to wear pants or shorts with a patient gown?

Not at all 1 2 3 4 5 6 Very Important

How important is it that the design of patient gowns is changed?

Not at all 1 2 3 4 5 6 Very Important

Are you involved in gowning the patients?

□ Yes □ No

If you gown patients, how long does the average gowning process take?
(check all that apply)

□ Bedridden, _____ minutes □ Mobile, _____ minutes

□ Post surgery, _____ minutes □ Out patient, _____ minutes

□ Other (please specify)_____

□ Not applicable

Which style(s) are the patient gowns? (check all that apply)

□ Center back tie □ Center back tie w/ overlap

□ Front cross-over w/ side tie □ Top only □ Top w/ bottom

□ Other (please specify)_____

What condition is a patient gown in when patients receive it?
(check all that apply)

□ Very good □ Good □ Poor □ Very poor

□ Brand new □ Moderately worn □ Worn □ Well worn
□ Individually sealed in plastic □ Neatly folded □ Loosely folded
□ Ironed □ Not ironed
□ Other (please specify)_____

Which type of closures do the patient gowns have? (check all that apply)
□ Ties □ Velcro □ Buttons □ Snaps □ Zippers
□ Other (please specify)_____

Is the patient gown made of fabric or paper?
□ Fabric □ Paper □ Both □ Neither
□ Other (please specify)_____

Do your patients walk around the facility while wearing a patient gown?
□ Yes □ No □ Not applicable
If yes, while walking around what do the patients wear?
□ 1 gown □ 1 gown w/ robe □ 2 gowns □ 2 gowns w/ robe □ 3 gowns
□ Other (please specify)_____

Do your patients do physical therapy while wearing a patient gown?
□ Yes □ No □ Not applicable
If yes, while in physical therapy what do the patients wear?
□ 1 gown □ 1 gown w/ robe □ 2 gowns □ 2 gowns w/ robe □ 3 gowns
□ Other (please specify)_____

Are there any changes in patient gowns that you would want to see?
□ Color □ Fabric □ Functionality □ Accessibility □ None
□ Other (please specify)_____

_____

Additional comments:_____

_____

Thank you for your time and contribution to improve patient care.