

# Developing an Innovative Strategy of Emotional Design for Hospital Gowns

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## Abstract

Under the background of rapidly developing age, people pay more attention to their own feelings and care more about the experience of medical treatment. During the treatment process, the hospital gown needs to be in contact with the patient for a long time, which can effectively buffer the impact of environmental changes on the patient's feelings. In order to explore the idea of designing hospital gowns to meet patients' emotional needs, this paper will analyze the characteristics of current hospital gown design and the innovative features of previous studies, combine the three-level theory of emotional design, and explain the emotional expression of hospital gown design. Moreover, to propose strategies to enable the future development of hospital gowns to improve patients' emotional satisfaction.

**Keywords:** Patient gowns; Emotional design; Three-level theory; Strategy analysis

## Introduction

### Hospital gowns

The hospital gown is worn by patients for medical procedures and treatments and to identify them as being under medical care [1]. It is designed to protect, facilitate access to the patient's body and assist with management and cleaning [2]. Due to the influence of various social cultures, there are differences between the hospital gowns used by patients in domestic and foreign medical institutions. The hospital gown in China typically comprises shirts with trousers, whereas the hospital gown in other countries is commonly a long gown. Although there exist various styles of gowns, each of them shares similar issues related to their aesthetics, comfort, and functionality, which fail to meet the requirements of contemporary patients. A study of the impact of the hospital gown on patient wellbeing found that patients were dissatisfied with the fit, comfort, style and overall function of hospital gowns [2]. Another systematic review of hospital gowns revealed that their design and function do not adequately uphold patient privacy, resulting in a pervasive sense of discomfort and compromised dignity [3].

In order to enhance the hospital gown design to meet patient needs, domestic and foreign scholars conducted research primarily from three aspects, namely innovative designs for style and size, research into structural and functional design, and the development of practical fabric performance. For instance, previous study has been conducted to patients' emotional requirements for hospital gowns, with the goal of improving gown appearance by applying fresh colors and fitted prototypes, which have been more popular with patients [4]. Several researchers have addressed the issue of enhancing hospital gown security and privacy by modifying the gown's layout and structure [5,6]. Meanwhile, other experts have focused on creating reusable hospital gowns through the use of high-performance fabrics, which exhibit characteristics such as sweat-wicking, antibacterial, durable and even smart sensory and computing properties [7,8]. These innovations have been positively received by patients. For patients with special needs for hospital gowns, the focus of most researches has been on the use requirements and medical procedures of patients with specific diseases. For example, Hwang et al. used a user-centered design approach to develop a two-piece knit maternity hospital gown with an adjustable waist and a washable nursing breast pad insert

system, which successfully improved the physical and psychological comfort of patients at different stages of parturition [9]. In addition, Cho has developed a patient gown design with open back and magic tape closure elements in a research study for patients with restricted mobility, making it convenient to put on and take off even while seated [10].

The main content of these researches include identifying the patient population and their unique needs and challenges, conducting literature reviews, questionnaire investigation and participatory interviews to gather information and ideas, and testing modified hospital gowns with patients and healthcare professionals to assess usability and effectiveness. Overall, researchers prioritize patients' practical requirements and attach great significance to the emotional experience of patients when developing improved hospital gowns. The emotion of the patient is an important concern, as studies have demonstrated that patients often experience embarrassment, anxiety and shame arising from ill-fitting gowns that lead to exposure and feelings of vulnerability [2,11]. Moreover, survey results reveal that hospital gowns affect patients' self-identity, with some participants reporting negative impacts on their emotional health and self-worth [3,12]. Therefore, the emotional design of hospital gowns has the potential to improve the emotional and physical well-being of patients through the provision of comfortable and personalized gown options. As such, patient gown designers must identify innovative methods and strategies to create designs that enhance the emotional satisfaction of patients. Achieving this goal is critical to creating a positive patient experience and facilitating a conducive healing environment in hospitals.

### Emotional design methodology

Emotion represents an individual's subjective experience of an objective need [13,14]. The concept of emotional design is derived from emotional cognition to the field of design and involves the design concept of a product's emotional design [15]. It means that while ensuring the basic functions of a product, it delivers information to meet the needs of users, thus stimulating their positive emotions [16]. As people's materialistic aspirations have continued to evolve, there has been a growing interest in exploring the role of emotions in the domain of product design and consumption, and a variety of theoretical systems have been formed in the process, among which the most popular are three theories: Product emotion model, Kansei engineering theory, and the three-level theory of emotional design.

Product Emotion Model refers to the way in which products are designed, marketed and functioned to appeal to customers' emotions and create positive emotional experiences [17]. The Kansei engineering theory is a combination of interdisciplinary disciplines, including ergonomics, design, psychology, and computer science [18]. The three-level theory of emotional design is to explore the design of product function and shape in a rational and logical way, and to analyze the connotation of humanization in product design,

specifically including instinct level, behavior level, and reflection level [19,20]. The instinctive level refers to an individual's initial, automatic, instinctive emotional and physiological response to the sensory characteristics of a product (such as its appearance, tactile quality, or sound), including changes in heart rate, breathing, and sweating [19-21]. The behavioral level refers to observable behavioral responses triggered by emotional stimuli, such as facial expressions, body language, and other external signs of emotions that can be observed [19-21].

The reflective level refers to the user's cognitive evaluation and interpretation of the function, value and meaning of the product after the experience [19-21]. Among them, the applied research of Product Emotion Model and Kansei engineering theory involves users' emotional evaluation data of the product and the analysis of the design attributes of the product, which needs to be combined with emotional measurement tools and the establishment of emotional models to develop. Their research is limited in scope, focusing only on users' emotional responses to products, without considering the broader emotional design context of user experience, and relying heavily on subjective evaluation of emotional impact, lacking theoretical rigor. In contrast, the three-level theory of emotional design is based on established psychological principles and empirical research and takes into account both practical and aesthetic aspects. For example, this study of consumers' emotional responses to fashion products which is under the guidance of the three-level theory of emotion found that the visual attraction, wearability and symbolic significance of apparel products affect instinct, behavior and reflection level to different degrees [22]. It has been shown that the dynamic and cyclical nature of emotional experience is emphasized among the three levels of emotion. Instinctive levels provide automatic and immediate responses to stimuli that can drive observable and behavioral expressions of emotions (e.g., facial expressions and body postures) [20-22]. This then acts on the reflective level, providing a conscious assessment of emotions in which the user interprets and responds to their own and others' feelings in an appropriate way [21-22].

In summary, the three-level theory of emotional design can combine the information analyzed with the theoretical content (instinctive, behavioral, and reflective levels) to present a clear and comprehensive framework for understanding how emotions are related to human-product interactions, which is more meaningful for the long-term development of product design. Therefore, this study will use the three-level theory of emotional design as a guide to clarify the emotional expression of hospital gown design by analyzing the characteristics of current hospital gown design and the innovative features of previous studies and summarize and propose strategies and suggestions for developing innovative development of hospital gown design that improves patients' emotional satisfaction.

### Emotional Characteristics of Hospital Gowns

The color and fabric of hospital gowns may have a guiding effect

on the emotional state of patients. During their use, patient gowns primarily impart information to patients through visual and tactile cues. Color and fabric constitute the key attributes of the visual and tactile aspects of the design of hospital gowns, and serve as vital carriers of emotions, guiding patients' emotional states [23]. From a color psychology perspective, color evokes psychological and emotional responses in people. For example, white is usually considered pure and innocent, and is frequently associated with cleanliness and simplicity. It can also evoke a sense of composure and calmness [24]. The fabric of the hospital gowns both affects the tactile sensation experienced by patients who wear the gown as well as the visual texture of wearing. Soft and comfortable fabrics used in hospital gowns can effectively promote relaxation and comfort during patients' hospital stay, contributing positively to their emotional well-being. The study on the patient experience of gowns also indicated that the warm, soothing colors and soft and comfortable fabrics of hospital gowns could improve the emotional experience of patients to a certain extent.

The structure and function of hospital gowns may interact with the emotional state of patients. The structural and functional design of hospital gowns involves convenience, protection and identification, which are important factors affecting patients' emotional experience. The ease of use of the hospital gowns are quickly obtained by its open structure, functional accessories and physical protective properties. Patients will focus their attention on the part they care about, attend to it in the process of use, and give behavioral responses, accordingly, thus deepening the patient's reflection and determining the pleasure of their cognitive experience. The effective design and structural build of hospital gowns can enhance patient engagement and promote positive emotional experiences through interactive engagement. Previous research about the wearing of chemotherapy patients concluded that hospital gowns made from high-quality fabrics with adjustable openings and comprehensive coverage can have a positive impact on the emotional well-being of long-term bedridden patients by providing them with warm, safe and comfortable treatment [25].

The style and shape of hospital gowns may have an impact on the emotional experience of patients. The patient gowns will present the style and shape to the patient through visual information in an intuitive and expeditious manner. Subsequently, patients will evaluate the aesthetic design of the hospital gown and its shape effect based on their own cognitive experience after wearing it. A design that is comfortable, flattering, and familiar can significantly contribute to the reduction of patients' stress and anxiety levels by promoting a relaxed atmosphere. Previous study has revealed that plain and monotonous hospital gowns can increase patients' feelings of vulnerability and underscore their identity as "patients," which reduces satisfaction [2,3]. Consequently, several hospitals have improved experience and satisfaction by providing gowns that are more personalized and closer to what patients normally wear [26].

## The Strategy of Emotional Design for Hospital Gowns

From hospital gowns design perspective, the three-level theory of emotion can help designers in comprehending patients' emotional responses towards hospital gowns, thus enabling the creation of hospital gowns designs that can elicit desired emotions. In order to clarify the approach of emotional design of patient gowns, this study will combine the current design and research features of patient gowns and the three-level theory of emotional design to put forward the emotional design strategy.

### Design for instinct level

The instinct level of emotion is utilized to guide the innovation of the hospital gowns design attributes. The appearance of hospital gowns can significantly increase the level of attention received. Color, pattern, fabric texture, and overall shape are crucial aspects of gowns design that attract patients' attention. Among them, color as patients in the visual perception process, the most sensitive and responsive visual symbol of visual symbol, can stimulate the emotional feelings of patients. However, patients will rely on their personal preferences to evaluate the pattern and fabric texture of hospital gowns. They will also consider the convenience and experience of the actual use process when evaluating the overall shape of hospital gowns, leading to a more comprehensive assessment. Considering that patients may experience physical pain, mental anxiety and fear, as well as a lack of privacy and control during the medical treatment process. Therefore, designers can alleviate patients' discomfort by using instructive and attractive design elements, such as adaptive structures, soft textures, and pure, fresh colors. For example, using colors such as yellow that easily evoke feelings of sunshine and happiness, green that represents nature and harmony, and blue that brings a sense of calm and relaxation can emotionally stimulate patients with positive feelings.

### Design for behavior level

The behavior level of emotion is employed to guide the innovation of the interaction between the functional structure of hospital gown and patients. The functional and ergonomic attributes of hospital gowns include pocket positioning, the way of front flap opening, sleeve structure, etc. [4,5]. Hospital gowns interact with patients through their functions and ergonomics during the usage process, which trigger emotional responses in patients' behavior. For example, opening the hospital gown in a way that is not easy for the patient to put on and off will make the patient impatient and dissatisfaction [9]. Therefore, to provide comfort to patients while they are staying in the hospital, on the one hand, the fabric of the hospital gown should be soft and breathable, on the other hand, the design should be adjusted to factor in ease of movement and wearing, making it easier for patients to carry out their daily activities as they recover. Additionally, hospital gowns should be designed to protect the dignity and privacy of patients, in order to provide a modicum of confidence and assurance for the patient.

For example, providing additional coverage, adjustable designs, and subtle patterns can help reinforce privacy and boost patient confidence during a vulnerable time [4-6]. Also, to ensure that the design of hospital gowns demonstrates empathy for patients, patients should participate in the design process. Designers can create hospital gowns through a combination of patient experience and response to better meet their needs.

### Design for reflection level

The reflection level of emotions is used as a guide to innovate the approach of hospital gowns design. Patients will consider both ease of use and aesthetic appeal when wearing hospital gowns. Ease of use is evaluated continuously during use, while aesthetic appeal includes two factors. First, whether the design elements of hospital gowns itself meet the patients' aesthetic requirements. Second, the aesthetic appeal of patients' figure after putting on the gown. The evaluation of the aesthetic appeal of a patient's appearance when wearing hospital gown primarily relies on existing experience. When the physical sensation of wearing the hospital gown is similar to the patient's aesthetic preferences and self-identity, it can enhance the patient's favorable impression of the hospital gown. Additionally, designers need to deeply understand patients' demands for design details in hospital gowns which can aid in achieving the goals of empathic design and creating emotionally durable designs.

### Conclusion

The application of emotion design theory in hospital gowns design has improved the emotional experience of patients. By analyzing the emotional design needs of hospital gowns, we have initially defined the design direction. Based on the emotional impact of hospital gowns design on patients and emotional design theory, we have proposed three levels of design principles: Instinctive level: fresh and soothing colors, soft fabric texture, high strong adaptability of structure, which can guide patients to feel warmth, comfort, and ease to use. Behavioral level: simple and user-friendly functional structure, detailed design that can protect privacy and dignity, taking into account patients' responses and experience. Reflective level: wearing a hospital gown triggers existing experiences and increases emotional resonance. By using emotional design to enhance the experience of patients wearing hospital gowns and reduce dissatisfaction. In future research, there will be further refinement of the emotional design theory to provide specific guidance for the design attributes of hospital gowns.

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