

Validity and reliability of a Thai version of the Body Image Scale among patients with post-coronary artery bypass graft

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Abstract

Background: Body image is a significant concern for patients who have undergone a coronary artery bypass graft (CABG) surgery, as the presence of scars on the chest, arms, and legs can impact their self-perception. Difficulty accepting these scars may lead to negative body image, non-compliance with prescribed treatments, and potentially poorer health outcomes. However, the Body Image Scale, commonly used to assess body image, has not been validated for Thai patients.

Objective: This study aimed to evaluate the validity and reliability of the Body Image Scale in Thai post-CABG patients.

Methods: This instrument validation study was conducted between April and July 2022. A total of 320 post-CABG patients were randomly selected to participate in the study. The scale was translated from English to Thai and adapted to address the concerns of CABG patients specifically. Validity and reliability were assessed using Principal Component Analysis and Cronbach's alpha.

Results: The Thai version of the Body Image Scale demonstrated satisfactory internal consistency, as indicated by a Cronbach's alpha coefficient of 0.88. The factor analysis revealed a single-factor structure, and each component had communalities ranging from 0.63 to 0.76, explaining 70.07% of the variance in body image.

Conclusion: The Thai version of the Body Image Scale exhibited good validity and reliability for assessing body image in Thai patients undergoing CABG surgery. Nurses and other healthcare professionals can effectively utilize this measurement tool to evaluate the body image concerns of Thai patients following a CABG procedure.

Keywords

coronary artery bypass graft; factor analysis; body image; body dissatisfaction; Thailand

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Background

A coronary artery bypass graft (CABG) is a surgical procedure performed on the chest that involves relocating a blood vessel from the arm or leg and connecting it to the coronary artery. This surgery aims to improve blood flow to the cardiac muscle (The Society of Thoracic Surgeons, 2022; University of California San Francisco, 2021). Many patients perceive CABG as a potentially life-threatening procedure. Additionally, the surgery has an impact on body image due to the resulting scars on the chest, arms, or legs. These scars can lead to a decrease in self-confidence, self-esteem, or self-awareness. Body image is a significant concern among individuals who undergo CABG. Previous research indicates that 84% of CABG patients experience issues related to body image (Lyigun et al., 2017). Similarly, a study conducted in Thailand revealed that over one-third of CABG patients had poor perceptions of their body image (Yodphet & Ua-Kit, 2018). The alteration in body image experienced by CABG patients can have a detrimental impact on their mental and psychological well-being (Kantoch et al., 2006), which, in turn, can affect their interpersonal interactions. Consequently, body image holds

considerable importance for CABG patients and can negatively affect their overall health outcomes (Barnes et al., 2020; Hartmann et al., 2017; Yuksel et al., 2016).

Hopwood et al. (2001) defined the concept of body image as a distorted perception of one's emotional and cognitive state. This distortion leads to dissatisfaction with one's body, including surgical scars, and alters one's behaviors. To assess body image, Hopwood et al. (2001) developed an assessment form based on qualitative research and in-depth interviews. This form has been utilized in studies examining the impact of disease or therapy on patients' body image, such as cancer patients. Patients may experience a decline in positive body image due to surgeries, radiotherapy, chemotherapy, or other treatments. For instance, women who have undergone a mastectomy as part of breast cancer treatment may encounter a sense of sadness related to body image. The loss of a breast and resulting disfigurement profoundly affects their body image perception and self-conception. Unfortunately, negative body image is linked to adverse physical and mental health outcomes.

Changes in a patient's body image can significantly impact their level of satisfaction or dissatisfaction (Lyigun et al., 2017).

Notably, dissatisfaction with body image diminishes self-esteem and self-worth while negatively affecting work performance and interpersonal relationships (Kantoch et al., 2006). It further deteriorates the overall quality of life (Hartmann et al., 2017; Yuksel et al., 2016) and exacerbates feelings of anxiety, stress (Dao et al., 2012), and depression (Barnes et al., 2020). Considering the potentially harmful consequences, patients who are satisfied and able to accept changes in their body image experience improvements in their self-esteem, anxiety, and depression (Begovic-Juhant et al., 2012). These individuals are more likely to adapt their lifestyles and daily activities successfully (Lightfoot, 2010), which can help reduce or delay the progression of the disease, minimize costs, and enhance their overall quality of life (Ballan & Lee, 2007; Begovic-Juhant et al., 2012; Masoumi et al., 2017).

Previous research on body image in Thailand has primarily focused on specific groups of patients, such as those with breast cancer who have undergone mastectomies, neck and head cancer, and individuals with gynecological cancer (Cheewapoonpol, 2004; Phaikhamnam, 2014; Phummarin et al., 2019). These patients experience sudden changes or threats to their bodies, and their mental and physical well-being may depend on their ability to accept these changes. Research on body image has also been conducted in other countries, examining diverse patient populations, including those receiving hemodialysis, undergoing renal transplantation (Rezai et al., 2009), dealing with heart failure (Goudarzian et al., 2016), and undergoing heart surgery (Lyigun et al., 2017). Among patients who have undergone coronary artery bypass grafting (CABG), previous studies have shown that surgical scars on the chest can result in a loss of positive body image if the patients are unable to accept these physical changes (Sun et al., 2022). Lyigun et al. (2017) reported that 84% of post-CABG patients experienced a negative perception of body image or a decrease in positive body image due to the presence of surgical scars. However, patients who can accept these physical changes are more likely to adhere to post-surgery treatment (Ballan & Lee, 2007; Lightfoot, 2010; Masoumi et al., 2017).

The Body Image Scale (BIS) has been utilized in various studies to evaluate body image in different groups of patients, including breast cancer patients (Moreira et al., 2010). The BIS has proven to be a simple and reliable tool for assessing body image dissatisfaction in individuals with inflammatory bowel disease (McDermott et al., 2014) as well as body image in patients with head and neck cancer (Rhoten et al., 2013). Moreover, the BIS has been translated into Thai and used to examine the connections between personal factors, fear of reactions from significant individuals, coping mechanisms, social support, and body image assessment among post-mastectomy patients (Cheewapoonpol, 2004).

In order to assess body image changes in patients undergoing coronary artery bypass grafting (CABG), it is essential to have assessment tools that are consistent, easy to understand, and comprehensive. In this study, the researchers focused on evaluating a specific tool that Hopwood et al. (2001) developed for assessing body image. This tool consists of ten items and has been previously used in studies involving cancer patients, including those who have undergone mastectomy (Hopwood et al., 2001) and individuals with surgically treated head and neck cancer

experiencing body image disturbances (Graboyes et al., 2019). These assessment tools play a crucial role for nurses in evaluating changes in patient body image. Based on their assessment, nurses can provide guidance and support to help patients accept and adjust to these changes in their body image. To effectively measure body image levels in post-CABG patients, it is essential to have a brief, reliable, and highly valid instrument. However, such scales have not yet been developed or evaluated for Thai post-CABG patients. Therefore, this study aimed to assess the validity and reliability of the Thai version of the Body Image Scale (BIS) for Thai CABG patients and determine its suitability for use with this specific patient population.

Methods

Study Design and Study Participants

The study assessed the validity and reliability of the BIS among post-coronary artery bypass grafting (CABG) patients. A random sample of 320 patients who had undergone CABG and were receiving follow-up care at the Cardiovascular Thoracic Outpatient Departments of three hospitals in Bangkok, Thailand, was included in the study. A sample size of 200 cases is considered necessary to achieve adequate statistical power for factor analysis (Hair et al., 2010).

To be eligible for participation, individuals needed to meet the following criteria: (1) Thai patients who had undergone CABG and were attending the outpatient department for follow-up care two weeks after the surgery, (2) aged 20 years or older, regardless of gender, (3) capable of understanding and communicating in the Thai language, (4) willing to participate in the research, (5) experiencing stable physical symptoms, normal vital signs, and no wound pain, and (6) free from complications such as chest pain or shortness of breath. Individuals displaying acute signs and symptoms such as chest discomfort, dyspnea, severe wound pain, or any other unstable conditions were excluded from the study.

Instrument Translation and Validation Process

In this study, body image refers to post-coronary artery bypass grafting (CABG) patients' perception of their external body in terms of affective, cognitive, and behavioral aspects when a surgical wound is present on their chest, arms, and legs. The BIS, developed by Hopwood et al. (2001), was used to assess body image and consists of three components: affective, cognitive, and behavioral. Cheewapoonpol (2004) translated the BIS from English to Thai for use in cancer patients, and subsequently, Yodphet and Ua-Kit (2018) modified it to assess body image before receiving CABG. The researchers obtained permission from the original tool's owner and the owner of the modified Thai version to use it in their study.

The scale comprises nine items, with one item related to the loss of femininity omitted as it pertained specifically to mastectomy. The nine negative items were selected through consensus to ensure the face validity of the scale. CABG patients responded to these items on a self-rating questionnaire using a Likert scale ranging from 1 (nothing) to 4 (very much), as reported by Yodphet and Ua-Kit (2018).

Participants were required to indicate their responses for each question, resulting in an overall score ranging from 9 to 36. A higher score indicates a lower level of body image, and

the scale demonstrated a high internal consistency with an alpha-Cronbach coefficient of 0.92 (Yodphet & Ua-Kit, 2018).

Translation process

The translation process employed in this study followed the back-translation approach (Dhamani & Richter, 2011). Initially, Cheewapoonpol (2004) translated the tool from English to Thai. Subsequently, Yodphet and Ua-Kit (2018) made modifications to the original Thai version to tailor it specifically for CABG patients. This involved ensuring that the previously described questions aligned with the operational definitions and assessing the content validity of the tool's items. The researchers compared the old Thai version with the revised version, sought confirmation from advisors, and discussed any discrepancies. The results of this process indicated that both the original and updated Thai versions of the scale conveyed similar meanings.

Content validity

The final Thai version of the scale underwent content validity assessment by a panel of five experts. The panel consisted of a cardiovascular thoracic surgeon, two nursing lecturers with doctoral degrees (PhD) in nursing and expertise in cardiovascular thoracic surgery, and two registered nurses specializing in cardiovascular thoracic surgery with five years of relevant experience. This expert panel was carefully selected to ensure the acceptability of the translated instrument and the accurate translation of each item's meaning. The experts evaluated the level of correspondence between the items and the presented operational definitions of the concepts. Each question was rated on a four-point Likert scale, ranging from 1 (certainly false) to 4 (certainly true). The content validity index (CVI) was calculated based on these ratings to assess the content validity of the Body Image Scale (BIS) in the Thai version. The resulting CVI was 0.97, indicating that the Thai version demonstrated good content validity.

Construct validity and reliability

A pilot test was conducted on 30 Thai post-CABG patients at the King Chulalongkorn Memorial Hospital Outpatient Cardiothoracic Surgery Center prior to the main study, as Hair et al. (2010) recommended. These patients were asked to complete the modified Thai Body Image Scale (BIS) version. It's important to note that these 30 samples were excluded from the main study. The internal consistency of the Thai BIS was evaluated using Cronbach's alpha, which yielded a value of 0.88, indicating good internal consistency, according to DeVellis (2016). The item-total correlation coefficients were also assessed and found to be favorable, ranging from 0.56 to 0.76. Hair et al. (2010) suggest that item-total correlation coefficients between 0.3 and 0.7 are desirable.

Following the pilot test, exploratory factor analysis (EFA) was conducted to confirm the extracted factors. Specifically, principal component analysis (PCA) extraction with varimax rotation was employed. Factors with eigenvalues greater than one were selected based on the recommendation by Hair et al. (2010). The cumulative percentage of variance accounted for by the factors was examined. Factor loadings exceeding 0.4 were considered sufficient to identify a factor, as per Hair et al. (2010).

Data Collection

Data collection for this study took place between April and July of 2022 by the researchers after obtaining permission from the Institutional Review Board (IRB) to collect the data. The researchers requested access to collect data on each patient's follow-up day after undergoing CABG. The participants were then given the questionnaire to complete, which typically required approximately 20-25 minutes.

Data Analysis

The statistical analysis in this study was performed using IBM version 26 software, which was licensed by Chulalongkorn University. A significance level of 0.05 was chosen to determine the statistical significance of the findings. Descriptive statistics were employed to summarize the data, while exploratory factor analysis (EFA), specifically Principal Component Analysis (PCA), was conducted to assess the concept validity of the BIS. The collected data satisfied the basic assumptions required for factor analysis.

Ethical Considerations

This study received ethical approval from multiple institutions: The Ethics Committee of the Institutional Review Board, Faculty of Medicine, Chulalongkorn University (Approval code: COA NO. 0240/2022), the Institutional Review Board, Royal Thai Army Medical Department (Approval code: Q003q/65_Exp), and the Institutional Review Board, Faculty of Medicine, Siriraj Hospital (Approval code: COA: 192/2022).

Prior to the study, the researchers provided detailed information to the patients about the study's purpose, potential benefits, and duration and assured them of the confidentiality of their data. Informed consent was obtained from all patients through a signed consent form. On the day of data collection, the research objectives were explained to the patients, emphasizing the importance of their confidentiality and their right to choose whether or not to participate in the research. Participants were given a comprehensive study explanation and asked to sign a participation document if they willingly agreed to participate. Participants were explicitly informed that they could decline participation or withdraw from the study before the data collection phase was concluded without facing any negative consequences. These ethical procedures aimed to protect the rights and well-being of the participants, ensuring that they were well-informed, had the opportunity to make an autonomous decision, and were reassured about the confidentiality of their data throughout the study.

Results

Characteristics of the Participants

Table 1 displays the characteristics of the 320 eligible Thai post-CABG patients included in this study. The findings indicate that a majority of the patients, 63.80%, were 61 years of age or older. Male patients constituted a larger proportion at 60.90% compared to female patients at 39.10%. Regarding body mass index (BMI), 55.60% of the patients had a 23.00 kg/m² BMI. The majority of the patients were married, accounting for 61.90% of the sample, and nearly half (46.90%) held a bachelor's degree. A significant portion of the patients had two or more comorbidities (85.60%), and approximately one-third were not employed (27.20%).

Factor Analysis Results

Several assumptions were assessed before conducting the Exploratory factor analysis (EFA). The linearity and factorization properties of the variables were examined, resulting in correlation coefficients of 0.76. The Kaiser-Meyer-Olkin measure of sample adequacy was calculated to be 0.94, indicating excellent adequacy. Bartlett's test of sphericity on the nine items yielded a significant result ($\chi^2 = 2352.38$, $DF = 36$, $p < 0.001$), indicating that the population correlation matrix was not an identity matrix.

The principal component analysis extraction method was used to extract the factors, and varimax rotation was applied to rotate the factors in the BIS orthogonally. One factor was identified, explaining 70.07% of the total variation. Each factor exhibited communalities ranging from 0.63 to 0.76, as shown in [Table 2](#).

Scoring

The body image score ranges from 9 to 36. In the previous study, a higher score indicates a lower level of body image satisfaction or an increase in negative changes. However, in our research, to categorize the body image scores, the researchers divided the scores into four levels: a score of 9 to 13.49 indicates a very good body image, a score of 13.50 to 22.49 indicates a good body image, a score of 22.50 to 31.49 indicates a moderate body image and a score of 31.50 to 36 indicates a poor body image.

Factor Loading

The Thai version of the BIS consisted of a single factor comprising nine components. The factor analysis revealed the extraction of only one component. The factor loading values for each component are presented in [Table 3](#).

Table 1 Patients' characteristics (N = 320)

Characteristics	n	%	Mean ± SD (Min-Max)
Gender			
Male	195	60.90	
Female	124	39.10	
Age (Years)			65.23 ± 11.34 (30-93)
BMI (Body Mass Index) (kg/m²)			23.86 ± 3.59 (15.62-36.89)
Marital Status			
Single	33	10.30	
Married	198	61.90	
Widowed	89	27.80	
Educational Background			
None	14	4.40	
Primary school	116	36.30	
Secondary school	10	3.10	
Diploma	26	8.20	
Bachelor's degree	150	46.90	
Postgraduate	4	1.30	
Occupation			
None	87	27.20	
Career	48	15.00	
Farmer	2	0.60	
Housewife/Butler	10	3.10	
Government officer	37	11.60	
White-collar worker	61	19.10	
Self-employed	16	5.00	
Retired	59	18.40	
Comorbidity			
None	21	6.60	
1 comorbid	25	7.80	
≥2 comorbid	274	85.60	

Table 2 Total variance explained and communalities (N = 320)

Item	Initial Eigenvalues			Extraction Sums Squared Loading			Communalities
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
Body image 1	6.306	70.068	70.068	6.306	70.068	70.068	0.634
Body image 2	0.587	6.517	76.585				0.688
Body image 3	0.527	5.854	82.439				0.762
Body image 4	0.342	3.799	86.238				0.727
Body image 5	0.314	3.492	89.730				0.709
Body image 6	0.285	3.167	92.897				0.651
Body image 7	0.232	2.583	95.480				0.695
Body image 8	0.210	2.333	97.813				0.688
Body image 9	0.197	2.187	100.000				0.753

Table 3 Factor loading

Extraction Component Matrix	Factor Loading
Item	
1. Have you felt that having surgical scars on your chest, arms, and legs will change your appearance?	0.796
2. Did you been worried and anxious about having surgery on your chest, arms, or legs?	0.830
3. Did you feel that surgical scars on your chest, arms, and legs are unsightly and unattractive?	0.873
4. Have you felt that having surgical scars on your chest, arms, and legs will reduce your self-confidence?	0.852
5. Did you feel that having surgical scars on your chest, arms, and legs will make you lack charm and receives less attention	0.842
6. Did you feel dissatisfied if there is a surgical wound on the chest, arms, and legs	0.807
7. You think those around you might find your surgical scars ugly	0.833
8. Did you feel that having surgical scars on your chest, arms, and legs will require you to cover up in order to hide the scars from others?	0.830
9. Have you felt that having surgical scars on your chest, arms, and legs will reduce your socializing with friends?	0.868

Discussion

This study provides evidence for the reliability and validity of the Thai version of the Body Image Scale (BIS) in assessing body image in Thai patients who have undergone CABG. The item-total correlation coefficients were within an appropriate range, indicating satisfactory relationships between individual items and the overall scale. The questionnaire demonstrated good internal consistency, as indicated by a Cronbach's alpha coefficient of 0.88. All items were deemed important for maintaining the scale's reliability, as their deletion would diminish Cronbach's alpha.

In the exploratory factor analysis of the Thai version of the BIS, only one component emerged, representing the patients' evaluation of changes in their body image following CABG. It was observed that the Thai version differed from the original version of the scale. This discrepancy could be attributed to variations in cultural values, differences in the attention and care given to body image loss, and essential linguistic and cultural disparities between Thailand and Western countries, including the United States. These differences may influence how patients perceive their body image and react to changes (Sharps et al., 2001). Considering these factors when discussing the affective, cognitive, and behavioral aspects of body image is essential, as they are interconnected and cannot be separated.

Furthermore, it is noteworthy that a significant proportion of the participants (63.80%) were over the age of 60. Older patients tended to have a more positive body image than their younger counterparts. The presence of surgical scars on the chest, arms, and legs did not necessarily lead to negative body image perceptions in this group. Older individuals often possess greater judgment, analytical skills, problem-solving abilities, and life experience, possibly contributing to their more favorable body image perceptions (McGuinness & Taylor, 2016).

Additionally, it is worth noting that the majority of patients in this study were married (61.90%), indicating that they had a support system in place to assist them with their care. In Thai culture, familial bonds are strong, and it is common for patients to live with their families. This family support can play a significant role in promoting acceptance of body image changes (Laus et al., 2018).

The subscales assessing affective, cognitive, and behavioral perceptions in the Thai version of the BIS differed from those in the original version. However, it is essential to emphasize that all of these elements are relevant to the assessment of body image in CABG patients. Despite the differences, the Thai version of the BIS proves to be a valid and accurate measure of body image in Thai patients who have undergone CABG.

The concept of body image holds significant relevance in nursing care, as nurses are the primary caregivers who closely interact with patients and are well aware of their concerns. With their ability to assess patients physically, psychologically, socially, and spiritually, nurses are equipped to provide holistic care. In the context of patients who have undergone CABG, nurses play a vital role in assisting them in accepting and adapting to changes in their body image. This support and encouragement provided by nurses can enhance patients'

confidence and contribute to improved health outcomes (Ballan & Lee, 2007; Lightfoot, 2010; Masoumi et al., 2017).

This study has implications for advancing nursing science and post-CABG patient care. By emphasizing the importance of assessing body image, it highlights the potential benefits of integrating body image assessment into the treatment of CABG patients. Negative body image can have adverse effects, such as an increased risk of cardiac events like coronary artery narrowing and angina symptoms. Screening post-CABG patients for body image concerns can help identify those at risk and facilitate interventions aimed at promoting positive body image. This, in turn, may contribute to reducing readmissions and cardiac events. Future studies, whether correlational or experimental, should investigate the impact of body image assessment on factors such as quality and duration of life, healthcare costs, and readmission rates.

Nurses should actively encourage patients to engage in discussions and assessments related to body image as part of their post-CABG care. By incorporating body image assessment into their practice within the multidisciplinary healthcare team, nurses can contribute valuable insights and collaborate with other healthcare professionals to devise appropriate treatment strategies for patients in this context. Policymakers would greatly benefit from the development of a screening tool for body image that can assist nurses in understanding their patients' perceptions and guide care decisions, ultimately aiding patients in maintaining or cultivating a positive body image.

In addition, nurses can utilize the questionnaire both before and after CABG to gather essential information that informs their care, encouragement, and support for patients who have experienced a loss of body image. By assessing body image levels and engaging in discussions with the multidisciplinary care team, nurses can contribute to developing tailored treatment strategies for each patient. Policymakers should prioritize the implementation of a body screening tool to assist patients in coping with their emotional distress and to guide healthcare recommendations that improve overall health, severity of illness, quality of life, and readmission rates.

Limitations

This investigation had certain limitations that need to be acknowledged. The study focused specifically on Thai patients who underwent CABG, which may limit the generalizability of the findings to individuals with different heart disorders or diseases. Future research should assess the applicability of the scale in Thai patients with coronary heart disease who have undergone surgery or have been diagnosed with other conditions in Thailand. Additionally, it is recommended to consider a larger sample size for factor analysis to ensure sufficient statistical power (Williams et al., 2010).

Conclusion

The Thai version of the body image test demonstrated satisfactory validity and reliability for assessing body image in Thai post-CABG patients. However, it is recommended to validate and confirm the instrument's reliability and validity in a larger sample size or at different healthcare institutions in Thailand. Despite the differences in factor analysis results between the Thai and original versions, the adapted Thai

questionnaire specifically addresses body image issues in post-CABG patients. This article provides valuable knowledge and information that nurses and other healthcare professionals can utilize in assessing body image among Thai post-CABG patients.

Declaration of Conflicting Interest

The authors declared no potential conflict of interest in this study.

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Authors' Contributions

All authors contributed to the study conception, design, data collection, data analysis and interpretation, drafting of the article, critical revision of the article, and final approval of the version to be published.

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Data Availability

Datasets generated and/or analyzed during the current study and the Thai version of the Body Image Scale are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing

Nothing to declare.

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