



## Research article

# Predictors of body image perceptions among healthcare providers in Terengganu, Malaysia

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## ARTICLE INFO

## Keywords:

Body image perception  
Healthcare provider  
Overweight  
Obesity  
Predictors

## ABSTRACT

**Objectives:** The study's aim was to find predictors of body image perception scores among health care providers (HCPs) in Terengganu, Malaysia.

**Methods:** A cross-sectional study among 201 health care providers (HCPs) was conducted from January to March 2023. This study participants were drawn from a pool of HCPs with a BMI of 25 kg/m<sup>2</sup> or higher. Body image perceptions were scored using the Malay version of the Body Self-Image Questionnaire-Short Form. Multiple linear regression was used to determine the predictors of body image perception scores.

**Results:** Age and longer work hours correlate with higher body satisfaction among HCPs, while higher BMI lowers satisfaction. Nurses typically experience more height dissatisfaction. Higher income is associated with better self-ratings in looks, health, and fitness, but higher education correlates with poorer self-ratings. Married HCPs report lower attractiveness, health, fitness, and self-esteem but are more satisfied with their height.

**Conclusion:** This situational analysis identifies predictors, such as sociodemographic factors and occupational aspects, that can aid in customising interventions to address specific body image concerns among HCPs, with the goal of reducing obesity prevalence among them.

## 1. Introduction

The Malaysian National Health Morbidity Survey 2019 reveals a high prevalence of NCD risk factors among the working population. The survey findings revealed that 34 % of Malaysian adults were obese, with over half of them being employed [1]. Obesity presents a significant concern for healthcare providers (HCPs) as it impacts their health outcomes and mortality rates. Research conducted in 2012, 2015, and 2021 indicates that more than 20 % of HCPs in Malaysia were classified as obese [2,3]. HCPs, which include doctors, nurses, and other medical staff, are dedicated to their patients' health. The demanding nature of their professions, long hours, and exposure to stressful situations, on the other hand, may contribute to self-neglect and self-criticism [4]. Large body HCPs were more likely to have high levels of presenteeism or absenteeism at work. Many workers may have difficulty using appropriate tools or seating arrangements, and they may have difficulty managing the physical demands of their employment [5]. Healthcare workers,

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<https://doi.org/10.1016/j.heliyon.2024.e37674>

Received 14 May 2024; Received in revised form 29 August 2024; Accepted 8 September 2024

Available online 10 September 2024

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particularly those who are obese, may develop negative body image perceptions and encounter a range of psychological and emotional challenges due to this situation [6].

The perception of body image is a complex and multidimensional concept that influences how individuals view and emotionally relate to their bodies [7]. Positive and negative characteristics, as well as aspects of perception, attitude, and behaviour, are all included in the broad concept of body image [8,9]. One's body image significantly influences their self-esteem, overall mental well-being, and quality of life. Issues related to body image are common among different groups, especially adolescents and older adults, and HCPs are not excluded. Healthcare professionals, such as doctors and nurses, encounter distinct challenges and pressures that can greatly influence how they perceive their bodies [7]. Understanding body image is crucial for elucidating the social and psychological impacts of obesity, as well as the medical consequences of psychological challenges and the psychological factors influencing obesity development. This understanding is also vital for providing comprehensive care [10].

There are many factors influencing body image perceptions, which include age, sex, body mass index, marital status, education, income, working night shifts, and occupation [11–17]. Most studies primarily concentrate on body dissatisfaction among female adolescents and adults, revealing that females tend to be more aware of their body image and, consequently, more dissatisfied. These studies have also explored differences in body dissatisfaction levels between younger and older women, with young women consistently exhibiting significantly higher levels of dissatisfaction compared to their counterparts [12,15,18].

The factors influencing body image perception within the overweight working population have been relatively understudied in existing literature. Nonetheless, research from Brazil suggests that women working night shifts with insufficient sleep are at a higher risk of experiencing dissatisfaction with their body image compared to those on day shifts [14]. Limited research is available on occupations in the healthcare sector that are associated with higher dissatisfaction levels, with the majority of studies concentrating on nursing and medical students. Nursing students in the United States and Brazil frequently encounter low levels of body satisfaction, with 88 % and 89.2 % respectively reporting dissatisfaction [19,20]. Conversely, in India, around 24 % of medical students reported being dissatisfied with their body image [21].

Currently, there is a lack of comprehensive research specifically addressing body image perception and the identification of predictors among healthcare providers in Malaysia. This study seeks to determine the mean scores and predictors of body image perception among large body healthcare providers in Terengganu, Malaysia.

## 2. Materials and methods

### 2.1. Study design and participants

A cross-sectional study was conducted spanning from January to March 2023, encompassing district healthcare providers (HCPs) from all health offices in Terengganu, Malaysia. Eligible participants were HCPs with a body mass index (BMI) of 25 kg/m<sup>2</sup> or higher who voluntarily agreed to participate. Exclusions were made for pregnant HCPs, those with physical constraints limiting vigorous physical activity, individuals who had undergone surgical procedures within the preceding six months, and those actively engaged in other weight loss programs.

Upon receiving approval from the State Health Director, lists of healthcare providers (HCPs) with a body mass index (BMI) of 25 kg/m<sup>2</sup> or higher were extracted from the health screening records of HCPs in both district and state health offices in Terengganu. A multistage random sampling methodology was employed to select participants, utilizing a stratified sampling technique across eight districts.

### 2.2. Sample size calculation

The sample size for the study was determined using the rule of thumb suggested by Harrel (2001), which recommends ten participants per independent variable in a regression analysis. With 11 independent variables included in the study, the initial sample size was calculated to be 110. To account for a potential 20 % non-response rate, the adjusted target sample size was set at 132 participants. However, the study successfully enrolled between 22 and 38 participants from each district, resulting in a total of 201 participants who consented and met the eligibility criteria. Since 201 participants were available, all of them were included in the study.

During an informed consent session, each selected participant provided written consent. Subsequently, participants completed a proforma to gather sociodemographic and occupational details and were administered the Malay version of the Body Self-Image Questionnaire-Short Form (BSIQ-SF), which took approximately 20–30 min to complete.

### 2.3. Research tool

The Malay version of the BSIQ-SF, consisting of 21 items across various domains, uses a 5-point Likert scale ranging from 'Not at all True of Myself' to 'Completely True of Myself,' with scores for 'Negative Affect' and 'Height Dissatisfaction' ranging from 1 to 40, 'Attractiveness Evaluation' from 1 to 30, and 'Physical Functionality Awareness' from 1 to 20. Higher scores indicate increased body dissatisfaction or satisfaction and heightened awareness of physical functionality, depending on the domain. The Body Self-Image Questionnaire-Short Form (BSIQ-SF) demonstrated reliability and validity through thorough testing. The nine-factor structure showed a good fit ( $\chi^2$  [df = 576] = 2210.19, CFI = 0.93, NNFI = 0.92, RMSEA = 0.04), with significant factor loadings and a mean standardized loading of approximately 0.77. The scale's internal consistency was confirmed with Cronbach's alpha values ranging from 0.797 to 0.850, indicating a strong reliability [9].

## 2.4. Statistical analyses

In this study, SPSS version 28 software was used for data analysis. Initially, simple linear regression was applied to identify predictors for body image perception, considering factors with p-values exceeding 0.25 and clinical relevance. Subsequently, multiple linear regression was performed using forward, backwards, and stepwise methods, with the reporting of adjusted b-coefficients. Factors with p-values  $\leq 0.05$  were deemed significant and included in the final model. Additionally, two-way interactions were explored, with the incorporation of terms having p-values  $< 0.05$ . Assumptions were verified, including the assessment of normality through residual histograms and the evaluation of linearity and homoscedasticity through scatter plots of residuals vs. predicted values.

## 3. Results

Table 1 shows the sociodemographic and job characteristics of large body HCPs in Terengganu. The mean (SD) age of HCPs was 39.9 (77.3). The majority of them were female (74.6 %), married (86.1 %), and Malay (99.0 %). Most of the participants were nurses (36.8 %). Nearly 56.2 % of the participants were practising on-call, with an average of working 53 h per week.

Four aspects of body image perception were evaluated: negative affect, attractive evaluation, physical functional awareness, and height dissatisfaction, with the mean scores (SD) as follows: negative affect, 27.2 (7.78); attractive evaluation, 18.5 (5.19); physical functional awareness, 15.7 (3.47); and height dissatisfaction, 8.6 (3.82).

We also explored the predictors for the negative affect score, attractive evaluation score, physical functional awareness score, and height dissatisfaction score. For the predictors of negative affect in body image perception, after adjusting for other possible confounders, age, BMI and working hours per week showed significant associations with negative affect scores at the multivariable level. As age increased by one year, there was a decrease of 0.24 units in the negative affect score, assuming all other variables remained constant (adjusted  $b = -0.24$ , 95 % CI:  $-0.38, -0.10$ ;  $p = 0.001$ ). For every one-unit increase in BMI, there was an associated increase of 0.40 units in the negative affect score, assuming all other variables remain constant (adjusted  $b = 0.40$ , 95 % CI:  $0.17, 0.64$ ;  $p = 0.001$ ). As the number of working hours increases, there was a decrease of 0.07 units in the negative affect score, assuming all other variables remain constant (adjusted  $b = -0.07$ , 95 % CI:  $-0.12, -0.01$ ;  $p = 0.034$ ). The multiple linear regression model (adjusted  $R^2$ ) showed that all the important variables explained 10.6 % of the variation in the negative effect score among large body HCPs. The detailed results of the predictors are shown in Table 2.

For the predictors of attractive evaluation in body image perception, marital status, education levels, and income show a significant

**Table 1**  
Sociodemographic and job characteristics of large body HCPs in Terengganu, Malaysia ( $n = 201$ ).

Characteristics	Mean (SD)	n (%)
Age (years)	39.9 (77.3)	
Race		
Chinese		2 (1.0)
Malay		199 (99)
Sex		
Male		51 (25.4)
Female		150 (74.6)
Marital status		
Single		16 (8.0)
Widow/divorced		12 (6.0)
Married		173 (86.1)
Education Level		
Secondary		85 (42.3)
Tertiary		116 (57.7)
Total income per month (RM)	3563.31 (1414.62)	
Income		
< Rm 2500	41 (20.4)	
$\geq$ RM 2500	160 (79.6)	
Height	158.83 (7.14)	
BMI ( $\text{kg}/\text{m}^2$ )	30.93 (4.30)	
Duration of employment	15.12 (6.94)	
Working hours per week	52.92 (17.22)	
On call		
No		88 (43.8)
Yes		113 (56.2)
Job position		
Nurses		74 (36.8)
Other healthcare professionals, <sup>a</sup>		92 (45.8)
Administrative Staff		35 (17.4)

SD = standard deviation.

<sup>a</sup> Doctor, assistant environmental health officer, assistant medical officer, driver, pharmacist staff, doctor, public health assistant, dental staff, laboratory technologist, healthcare assistant.

association with attractive evaluation scores after controlling for the other possible confounders. It was found that married HCPs would decrease their attractive evaluation score by approximately 3.29 units compared to those who were not married (adjusted  $b = -3.29$ , 95 % CI:  $-5.31, -1.27$ ;  $p = 0.002$ ). Having tertiary education would decrease the attractive evaluation score by approximately 2.84 units compared to someone without tertiary education (adjusted  $b = -2.84$ , 95 % CI:  $-4.32, -1.36$ ;  $p = 0.00$ ). HCPs with a high monthly income ( $\geq$ RM2500) would have an increase in their attractive evaluation score by approximately 2.73 units compared to someone with a low monthly income ( $<$ RM2500) (adjusted  $b = 2.73$ , 95 % CI:  $0.94, 4.52$ ;  $p = 0.003$ ). The multiple linear regression model (adjusted  $R^2$ ) showed that all the important variables explained 9.5 % of the variation in the attractive evaluation score among large body HCPs. The detailed results of the predictors are shown in Table 3.

For the predictors of physical functional awareness in body image perception, the female sex displayed a significant association with physical functional awareness scores after controlling for the other possible confounders. For physical functional awareness, being female was associated with an increase of 1.57 units in the score compared to their counterparts (adjusted  $b = 1.57$ , 95 % CI:  $0.47, 2.66$ ;  $p = 0.005$ ). The multiple linear regression model (adjusted  $R^2$ ) showed that all the important variables explained 3.4 % of the variation in the physical functional awareness score among large body HCPs. The detailed results of the predictors are shown in Table 4.

For the predictors of height dissatisfaction in body image perception, being married and job position revealed a significant association with height dissatisfaction scores after controlling for the other possible confounders. Being married is associated with a decrease in the height dissatisfaction score by approximately 2.34 units compared to those who are not. Meanwhile, being a nurse is associated with an increase in the height dissatisfaction score by approximately 1.23 units compared to their counterparts. The multiple linear regression model (adjusted  $R^2$ ) showed that all the important variables explained 5.7 % of the variation in the height dissatisfaction score among large body HCPs. The detailed results of the predictors are shown in Table 5.

#### 4. Discussion

Following the assessment framework established by Joo et al. (2018), HCPs in Terengganu exhibited body image dissatisfaction, linked to negative emotions and height-related concerns [9]. The majority of the study population were female (74.6 %), a factor that may have influenced these results. It is noteworthy that Asian females typically have a shorter average height compared to females from other regions, and it is commonly observed that shorter women tend to express higher levels of dissatisfaction with their height [22,23]. Healthcare providers (HCPs) in Terengganu generally reported satisfaction with their physical appearance and health, emphasizing the importance of maintaining optimal physical functionality. These outcomes were likely influenced by the participants' high educational attainment, with 57.7 % having tertiary education, and nurses making up 36.8 % of the group. Their backgrounds in biology and physiology may have contributed to this perspective, consistent with previous research showing high obesity awareness among nurses [24].

With increasing age, there was a notable decrease in body dissatisfaction among the study participants, indicating that older individuals tended to have a more positive body image compared to their younger counterparts. This finding aligns with a study conducted to explore the differences in the level of body dissatisfaction between younger and mature women [25]. Their research revealed that young women exhibited significantly higher levels of body dissatisfaction compared to their counterparts. Furthermore, a study in the United States among obese women found that individuals who experienced obesity at a young age are more likely to face body dissatisfaction in adulthood [26]. This study did not directly examine the relationship between age and body image; instead, it focused on the onset age of obesity and its link to body dissatisfaction. As people age, they often prioritize family, work, and health over societal beauty standards, which can reduce their concerns about appearance and lessen body dissatisfaction.

The result indicates a significant positive relationship between BMI and negative affect scores, suggesting that as BMI increases, negative emotions related to body image or weight also tend to increase. Findings from both a study conducted among Chinese adolescents and another study involving medical students in Oman reaffirmed this result. These studies, which included adolescents with diverse body weights, consistently demonstrated that individuals with a higher BMI were more prone to experience elevated levels of body dissatisfaction [17,27]. Individuals with a higher BMI may experience self-concerns and body dissatisfaction, influenced by their own health worries and negative perceptions from others about obesity-related risks.

Increasing work hours are linked to a decrease in body dissatisfaction, contrary to findings from a cross-sectional study involving shift-working women in Brazil. This study indicated that women on night shifts with insufficient sleep are at a notably elevated risk of encountering body image dissatisfaction compared to those on day shifts with adequate sleep [14]. Longer working hours might lead

**Table 2**

The predictors of negative affect in body image perception among large body HCPs in Terengganu, Malaysia ( $n = 201$ ).

Predictors	Simple Linear Regression		Multiple Linear Regression		
	Crude $b^a$ (95 % CI)	$p$ -value	Adjusted $b^b$ (95 % CI)	$t$ -test	$p$ -value
Age	-0.25 (-0.39,0.10)	0.001	-0.24 (18.05,37.46)	-3.381	0.001
BMI	0.39 (0.14,0.64)	0.002	0.40 (0.17,0.64)	3.333	0.001
Working hours per week (hours)	-0.60 (-0.12,0.01)	0.062	-0.07 (-0.12, -0.01)	-2.132	0.034

<sup>a</sup> Crude regression coefficient.

<sup>b</sup> Adjusted regression coefficient. CI = confident interval. Forward and stepwise method. The model fitness was acceptable. Model assumptions were met. No interaction and multicollinearity. Adjusted regression coefficient( $b$ ),  $R^2 = 0.106$ .

**Table 3**The predictors of attractive evaluation in body image perception among large body HCPs in Terengganu, Malaysia ( $n = 201$ ).

Predictors	Simple Linear Regression		Multiple Linear Regression		
	Crude $b^a$ (95 % CI)	$p$ -value	Adjusted $b^b$ (95 % CI)	$t$ -test	$p$ -value
Marital status					
Single/widow/divorced	0		0		
Married	-2.46 (-4.52, -0.40)	0.002	-3.29 (-5.31, -1.27)	-3.209	0.002
Education Level					
Secondary	0		0		
Tertiary	-1.80 (-3.24, -0.35)	0.015	-2.84 (-4.32, -1.36)	-3.781	<0.001
Income					
< Rm 2500	0		0		
≥ RM 2500	1.59 (-0.20, 3.37)	0.081	2.73 (0.94, 4.52)	3.008	0.003

<sup>a</sup> Crude regression coefficient.<sup>b</sup> Adjusted regression coefficient. CI = confident interval. Forward and stepwise method. The model fitness was acceptable. Model assumptions were met. No interaction and multicollinearity. Adjusted regression coefficient(b),  $R^2 = 0.095$ .**Table 4**The predictors of physical functional awareness in body image perception among large body HCPs in Terengganu, Malaysia ( $n = 201$ ).

Predictors	Simple Linear Regression		Multiple Linear Regression		
	Crude $b^a$ (95%CI)	$p$ -value	Adjusted $b^b$ (95 % CI)	$t$ -test	$p$ -value
Sex					
Male	0		0		
Female	1.752 (-0.73, 4.23)	0.165	1.57 (0.47,2.66)	2.830	0.005

<sup>a</sup> Crude regression coefficient.<sup>b</sup> Adjusted regression coefficient. CI = confident interval. Forward and stepwise method. The model fitness was acceptable. Model assumptions were met. No interaction and multicollinearity. Adjusted regression coefficient (b),  $R^2 = 0.034$ .**Table 5**The predictors of height dissatisfaction in body image perception among large body HCPs in Terengganu, Malaysia ( $n = 201$ ).

Predictors	Simple Linear Regression		Multiple Linear Regression		
	Crude $b^a$ (95%CI)	$p$ -value	Adjusted $b^b$ (95 % CI)	$t$ -test	$p$ -value
Marital status					
Single/widow/divorced	0		0		
Married	-2.2 (-3.772, -0.765)	0.003	-2.34 (-3.83, 0.85)	-3.093	0.002
Job position					
Other health profession	0		0		
Nurses	1.16 (0.08, 2.26)	0.036	1.23 (0.16, 2.30)	2.271	0.024

<sup>a</sup> Crude regression coefficient.<sup>b</sup> Adjusted regression coefficient. CI = confident interval. Forward and stepwise method. The model fitness was acceptable. Model assumptions were met. No interaction and multicollinearity. Adjusted regression coefficient(b),  $R^2 = 0.057$ .

individuals to prioritize work over body-related worries, potentially reducing negative body affect and enhancing body satisfaction.

The findings of the present study suggest that being married is linked to a decreased score in attractiveness evaluation, consequently leading to higher levels of body dissatisfaction. A study in Brazil found that married women have 50 % higher odds of body image dissatisfaction due to feeling of overweight [16]. This finding aligns with a study conducted among adults in Southern Brazil which also found an association between marital status and body image dissatisfaction due to excess weight [18]. However, few other studies present contradictory findings. Tom et al. (2005) emphasized that body image dissatisfaction is less significant in married couples compared to their counterpart [28]. Meanwhile, Friedman et al. (2002) found that marital status was not associated with body dissatisfaction [29]. This suggests that factors like marital experiences can influence how marital status affects body image perceptions. Marital strain may cause body dissatisfaction and emotional distress, as individuals focus on perceived flaws during tough times. In contrast, a stable and supportive relationship can lead individuals to prioritize their partner's acceptance, potentially reducing concern about physical appearance.

We found that having tertiary education was associated with a decrease in the attractive evaluation score, indicating that those with higher levels of education tended to rate themselves as less attractive or had a lower self-perceived attractiveness score. Nevertheless, our results oppose the conclusions drawn in the research conducted by Rosenqvist et al. (2023), where it was observed that men with lower educational achievements tended to sustain a less favourable body image over their lifetimes [12]. The study found that women with lower educational levels experienced increased body dissatisfaction over time. This may be because those with higher education are more conscious of their appearance due to greater awareness of body image concerns.

Higher income was associated with higher body satisfaction. This result contradicts most of the literature. For example, in a cross-sectional survey study among a cohort of women recruited from socially vulnerable areas in Brazil discovered a significant association between higher income and increased levels of body dissatisfaction [13]. This result was in line with another research in Brazil, which also noted a higher prevalence of dissatisfaction with perceived excess weight among people with higher incomes [30]. Furthermore, similar patterns have been identified in many other developed countries [31].

The varied composition of the study cohort implies that obese HCPs with higher incomes probably have better access to health education resources. This enhanced access may empower them to engage in educational endeavours like buying books, enrolling in courses, and participating in wellness-oriented seminars. Such access to educational resources could cultivate a heightened sense of initiative among higher-income HCPs in addressing their health needs, potentially resulting in a more favourable body image perception [32].

In the present study, it is observed that females exhibit a greater consciousness of their physical functioning compared to males. The increased awareness of physical functioning in this context signifies a heightened focus on maintaining optimal physical performance. However, these results diverge from previous research. A study among adolescent girls and boys proposed that girls frequently encounter more adverse emotions regarding their bodies, encompassing specific physical functions [33]. Additionally, a qualitative investigation indicated that individuals with a heightened awareness of their bodily functions may also display considerable attentiveness to both their internal physical sensations and external appearances [15].

In a study conducted in Malaysia, it was discovered that females exhibited notably higher levels of body dissatisfaction compared to males, suggesting a preference for a leaner body shape. Intriguingly, the sex difference did not have a significant effect on the inverse relationship between dissatisfaction with height and overall body dissatisfaction in this study [34]. This discrepancy may stem from differences in sample sizes across the two studies, underscoring the intricate nature of these variables in influencing body image perceptions.

This study suggests that being married is associated with increased satisfaction with height compared to individuals who are not married. Previous studies have shown that dissatisfaction with height is more common among adolescent girls and middle-aged men [35–37]. Recent research shows a link between height dissatisfaction and increased loneliness among Chinese high school students. Adolescents dissatisfied with their height often report feeling lonelier. Conversely, married healthcare providers (HCPs) may be more satisfied with their height due to the emotional support marriage provides. Negative remarks from a spouse can contribute to body dissatisfaction, while positive communication within marriage can enhance body satisfaction [38].

Occupying the role of a nurse is linked to a rise in the score for height dissatisfaction in comparison to other professions. A heightened score in height dissatisfaction signified a more pronounced level of body dissatisfaction. Numerous studies have highlighted that nursing students often encounter diminished levels of body satisfaction [19,20]. In a descriptive study investigating health behaviours among nursing students in the United States, it was discovered that 88 % of the students expressed dissatisfaction with their body image [20]. Similarly, a study conducted among nursing students in Brazil revealed a high rate of distorted self-perception. In this study, 89.2 % of students expressed dissatisfaction with their body image, as indicated by the Body Shape Questionnaire (BSQ), which showed a 55.9 % dissatisfaction rate [19]. In contrast, concerning medical students in India, it was noted that 24 % of them expressed dissatisfaction with their body image [21].

When comparing nursing students with medical students, it is clear that nursing students face more significant challenges with body image and satisfaction. The physical appearance of nurses is crucial for their professional image and is emphasized in society. Nurses, like the general population, may be influenced by cultural beauty standards, contributing to body dissatisfaction. Nursing involves physical tasks like patient lifting and prolonged standing, which may lead nurses to feel their bodies don't meet professional demands, causing dissatisfaction. This study found that nurses were particularly dissatisfied with their height, possibly due to the predominance of female subjects (74.6 %) and the generally shorter stature of Asian females compared to other regions [39]. Research indicates that shorter women commonly express higher levels of dissatisfaction with their height [22].

The strengths of this study include its specific focus on healthcare providers, which allows for the exploration of factors particularly relevant to this group, including unique work-related stressors, expectations, and cultural influences. Additionally, the study's coverage of multiple districts in Terengganu provides geographic representation, capturing regional variations in predictor variables that could impact body image perception. This geographic diversity enhances the depth and relevance of the findings.

The study is limited by the absence of various work-related and psychosocial factors, including job stress, working conditions, bullying experiences, family background, peer influences, media effects, and sociocultural norms. This exclusion restricts our comprehensive understanding of how these factors could influence the outcomes under investigation. Additionally, the use of self-reported data introduces potential recall bias, although we mitigated this by using standardized questionnaires and ensuring anonymity. The multistage random sampling and stratified sampling within district health offices were designed for representativeness, but the reliance on voluntary participation may have introduced self-selection bias. We addressed this by clearly communicating the study's importance and ensuring voluntary participation without coercion. Future research should integrate a comprehensive psychosocial evaluation encompassing these variables and utilize qualitative approaches such as interviews or focus groups to delve deeper into their impact on weight management outcomes among healthcare providers.

## 5. Conclusion

In this study, we investigated factors influencing body image perception in large body healthcare providers (HCPs) in Terengganu, Malaysia. Significant associations were found with marital status, education, income, sex, and job category. These results carry implications for interventions aimed at enhancing body image and overall well-being within this group. Further research is warranted to



deepen our understanding of these associations and develop customized support initiatives to address low body image perception among HCPs in Terengganu, ultimately improving their holistic well-being.

### Ethical statement

Approval for the study was granted from the Human Research Ethics Committee of Universiti Sains Malaysia (JEPem Code: USM/JEPem/22080558) and the National Medical Research Register (NMRR) Malaysia (NMRR ID-22-02093-DWX). Data confidentiality was ensured by anonymizing participant identities and securely storing all data with restricted access exclusively for authorized personnel. The remaining data was further safeguarded through coding to maintain participant confidentiality.

### Funding

The research was funded by the Universiti Sains Malaysia through *Tabung Insentif Pembangunan Pengajian Siswazah (TIPPS)*.

### Data availability statement

Data generated in this study are all in the manuscript and supplementary data.

### CRedit authorship contribution statement

**Siti Fatimah Samsury:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Mohd Nazri Shafei:** Writing – review & editing, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Mohd Ismail Ibrahim:** Writing – review & editing, Supervision, Methodology, Investigation. **Wan Nor Arifin:** Writing – review & editing, Supervision, Methodology, Investigation, Formal analysis. **Noriah Mahmud:** Writing – review & editing, Supervision, Methodology, Investigation.

### Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT 3.5 in order to correct English. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Acknowledgement

We are grateful to the Terengganu State Health Department and all health districts, particularly the Occupational and Environmental Health Unit, for their invaluable support and contributions to this research project. We also extend our sincere thanks to the staff whose assistance was crucial to the success of our research.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e37674>.

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