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Exploring the Link between Body Image Perception and Body Composition among Female Members of the Curves, Setia Alam

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Abstract: Body image perception plays an important role in a person's life, especially for women. Misconceptions about body image perception can lead to unhealthy lifestyle and affect the psyche. Therefore, this study was conducted to investigate the relationship between body composition and body image perception. 99 active female members of the Curves, Setia Alam took part in this study. Questionnaires were distributed and body composition was measured. The hypotheses were statistically analysed using Pearson's chi-square test at $p < 0.05$ level of significance. The results showed that there was a significant relationship between body image perception and body composition (BMI, body fat mass, percentage body fat, waist-to-hip ratio, visceral fat percentage, and skeletal muscle mass). All body composition variables showed that body perception was controlled by these factors. It also proved that the details of the body composition variable could influence respondents' answers to the body image question when they described how they thought they look. The perception of body image and the relationship with women's lifestyle, such as the quality of sleep, the amount of physical activity and daily food intake, can be investigated in more detail in the future.

Keywords: Body perception, body type, physiology variables, women's perception

Introduction

Body image perception is about the acceptance of adaptation to change and the existence of perception itself, which begins in late childhood and adolescence (Alharballeh & Dodeen, 2021). During puberty, girls are more concerned about their weight, body image and self-image than boys. It had been scientifically proven that body image causes negative experiences for most girls and women (Pop, 2016). To differentiate actual body image from people's typical "ideal body", women and men are increasingly investing in cosmetic products and procedures, piercings and tattoos, plastic surgery, sports equipment, and sports gadgets. Body image concerns can lead to many negative things, such as misperception, dissatisfaction with one's body and dissatisfaction with body shape. A misperceived self-image can make people feel like a burden and cause depression, eating disorders, unhealthy lifestyle, increased sedentary behaviour, and poor nutritional status (Zaccagni et al., 2020).

The negative perception of body image and physical appearance could be linked to body composition. The reason for this is that people base their perception of their appearance on what shape and weight they are. Body composition is the key component for the growth and health of both individuals and populations (Wells & Fewtrell, 2006). Body composition is about determining the percentage of body fat and lean mass. There are a few techniques that can be used to measure body composition, such as skinfold thickness, body mass index and waist circumference. These techniques,

all having the same aim, which is to measure and analyse the fat percentage of people and to classify them into a classification published by the World Health Organisation (WHO). Based on this classification, dissatisfaction with body image can be linked to the actual appearance of the body.

In addition, a false or incorrect perception of body image can lead to many risk factors such as eating disorders, low self-esteem, increased physical inactivity, and others (Wade & Tiggemann, 2013). Having an ideal body type could be a great dream in life, but the wrong perception of body image could turn life into a dark side and reinforce unhealthy habits in life. Therefore, the perception of body image must be examined and the knowledge of how people interpret the perception of body image must be corrected, and a new target body type that they can achieve without burdening themselves must be determined. Therefore, it is very important to examine how women see themselves and what their body perception is in relation to their appearance.

Literature Review

The meaning of body image is the combination of a person's actual, perceived, and desired size (Prabhu & Cunha, 2018). Furthermore, the concept of body image is a multidimensional construct that includes the behavioural component, such as body-related behaviours like checking one's body, thoughts, and perceptions about how one's body looks on oneself, and the cognitive-affective component, which includes cognitions, attitudes, and feelings about one's perception of body image.

Many thoughts about body image and misperceptions that lead to negative risks for people, such as depression, eating disorders, low self-esteem, and unhealthy eating, are a high prevalence of body image misperceptions. All these effects are due to obsession with body image perception and can lead to dissatisfaction with one's body image. Dissatisfaction with body image is particularly pronounced among female adolescents and women, as shown by the study conducted by Quittkat et al. (2019).

Ghannadiasl and Hoseini (2020) found that body fat percentage is positively related to visceral fat percentage, which may be a factor that determines a person’s perception of body image. It was also found that visceral fat percentage can provide a positive or negative result for self-perception of one's body image at certain point in time. The percentage of visceral fat is significantly related and can be used as a factor for predicting body image using the Nine Stunkard Figure Rating Scale (1983). This statement was made by Seidell and Bouchard (1997).

Most studies by more recent researchers used the cross-sectional method. The reason for this is that the data on body image perception, body composition, and body shape dissatisfaction need to be collected in two ways, namely through body image perception and body composition questionnaires, which are usually collected face-to-face, and through some procedures that are studied in a meeting with the participants or the sample. One of the studies conducted using a cross-sectional method is the study on “Body image perception and body composition: Assessment of perception inconsistency by a new index”. This study was conducted using a cross-sectional study to achieve the goal of assessing self-image perception and body composition (Zaccagni et al., 2020). In addition, to investigate body image perception, the body perception index can be used to determine the degree of its assessment. According to Parzer et al. (2021), the body perception index is used to determine whether the person underestimates, correctly estimates, or overestimates their body image.

Next, the general population of the previous study was used as the participant sample among adult women and men. In most studies, data were collected from adults aged 18 years and older. There are some differences between the previous studies in terms of their objectives. Some of the studies focused on women and female teenagers and meanwhile, some of the studies others focused on comparing men and women, which makes made the study population broader than the researchers who focused only on women and women. In general, however, the data was collected from healthy adult men and women. In a previous study, body fat mass and body fat percentage were found to lead to an overestimation of body perception (Ghannadiasl & Hoseini, 2020).

Body image perception is one of the thoughts that everyone goes through, especially teenagers. Accepting changes in body image can be a difficult matter and it can be risky for someone to accept the changes, which can lead to a distorted perception of one's body image (Moehlecke et al., 2020). The concept of body image perception encompasses several dimensions, such as the way a person

thinks, feels, and behaves about their body. A misperception of body image can lead to a negative lifestyle, such as lack of exercise, unhealthy eating, sad moods, low self-esteem, and others (Chae, 2022). These factors of distorted body image can have a negative impact on someone and in most cases, stress and misconceptions about one's body image with all the negative thoughts lead to suicide attempts.

Methodology

Respondents and Research Design

99 active female members of the Curves, Setia Alam ("the Curves") participated in this study. The sample size was calculated from the population of female members of the Curves, using the table of (Krejcie & Morgan, 1970). This study was drawn using the probability sampling method. Participants must be an active member of the Curves, aged 18 years or older. They do not have to be fit, just in good health with no chronic diseases. All body types such as normal, overweight, underweight, and obese could be included in this study. The UiTM Research Ethics Committee had approved this study, and all participants were provided with a written informed consent. (600-UiTMPs (PJIM&A/UPK-REC 552/2023).

For the body image study, the Figure Rating Scale questionnaire by Stunkard et al. (1983) was used. This scale had been used by many previous researchers in their studies. In addition, body composition was measured with the InBody 270 device to determine some variables. These independent and dependent variables were used as indicators to determine whether body image and body composition are significantly related in women.

Instrumentation

In this study, the participants had to answer a questionnaire consisting of demographic information and body image perception. Nine body image rating scales developed by Silhouette were used in this study to measure body image (Figure 1). Respondents were given a rating scale with nine pictures of women with very thin to very obese bodies. The respondents had to choose two pictures. The first picture would show how they perceive their body image and the second picture would show the body shape they would like to achieve. The result of this rating scale ~~shows~~ showed how the members of the Curves, perceived their body image, whether they were satisfied or dissatisfied with their body. Finally, their body composition was measured to determine all dependent variables. In this study, body mass index was calculated and weight was measured in cm using the InBody 270 body composition analyser scale with an accuracy of 0.1 kg. Height was measured using a standardised procedure with the InBody 270 stadiometer with an accuracy of 0.1 cm. The body mass index was calculated using the formula weight(kg)/height(m)^2 to determine the subject's weight status. They were classified according to the World Health Organisation's body mass index, which could be divided into "underweight"," "normal"," "overweight", and "obese".

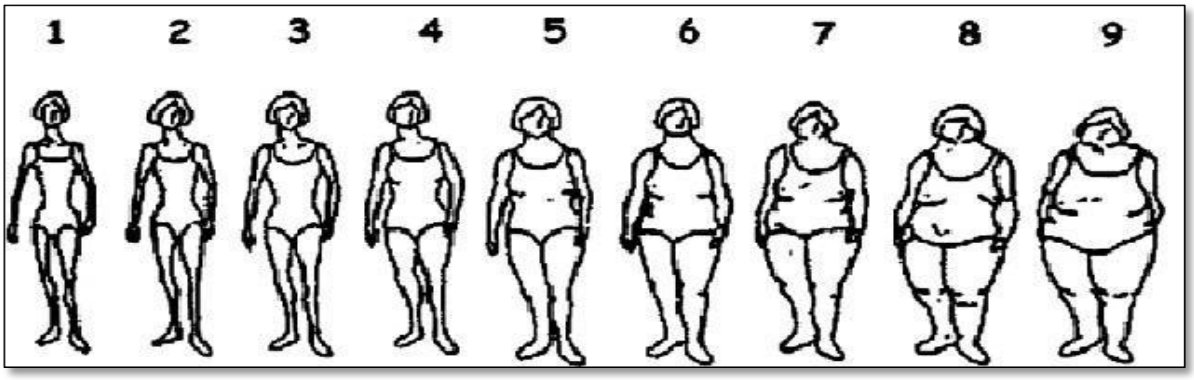

Fig. 1 Nine Figure Silhouette Body Image Rating Scale by Stunkard et al. (1983)

Data Analysis

The data were analysed using SPSS v.27 (IBM Corp., Chicago, IL, USA). The frequency and percentage (%) were used to represent the descriptive statistics of the subjects' characteristics. The prevalence of the relationship between body image and body composition among the members of the Curves, was determined using Pearson Chi-square test as the data were not normally distributed. The significance level was <0.05.

Findings and Discussion

Based on Table 1, the data from 99 female respondents of the Curves were used for the analysis of this study. They range from young adults (33.3%) to the oldest adults (4.0%). In terms of education level, most respondents have a bachelor's degree (71.7%), while the fewest are STPM holders (2.0%). The majority of respondents are employed full-time (73.1%) and only 1% are employed part-time. The respondents with the highest monthly income come from M40 group (B3) (25%) and those with the lowest come from M40 group (M4) (3.0%). The highest proportion of respondents without and with two to four independent family members is 41%, while the lowest with one independent family is 8%.

Table 1. Descriptive Statistic

		Frequency	%
Age	Young Adult	33	33.3%
	Adult	43	43.4%
	Middle-Aged Adult	19	19.2%
	Oldest Adult	4	4.0%
Level of Education	SPM	5	5.1%
	STPM	2	2.0%
	Diploma	1	1.0%
	Bachelor	71	71.7%
	Master	16	16.2%
	PhD	4	4.0%
Employment Status	Full Time	73	73.1%
	Part Time	1	1.0%
	Housewife	17	17.2%
	Student	6	6.1%
	Business Owner	2	2.0%
Monthly Income	No Income	8	8.1%
	B40	15	15.2%
	M40(B2)	23	23.2%
	M40(B3)	25	25.3%
	M40(M1)	8	8.1%
	M40(M2)	8	8.1%
	M40(M3)	4	4.0%
	M40(M4)	3	3.0%
	T20	5	5.1%
Family Independent	None	41	41.4%
	One	8	8.1%
	Two to four	41	41.4%
	More than four	9	9.1%

Table 2 shows the frequency of different categories of perception of body index and body image among the members of the Curves. The result presented below shows that all 99 respondents overestimated their body.

Based on this current result, it can be shown that the suggestion from previous study can be implied to ~~on~~ decrease the level of overestimation of body image perception towards their self. They suggested improving the body image perception among women to not have an overestimation such as practising healthy lifestyle in daily life such as improving ~~on~~ eating behaviours and consistent physical activities and exercise (Alharballeh & Dodeen, 2021).

Table 2. Frequency Between Body Index Perception and Body Image Perception

Variable	Categories	Body Image Perception				Total
		Under Weight	Normal Weight	Overweight	Obese	
		N				
Body Index Perception	Accurate estimation	0	0	0	0	0
	Overestimation	3	21	70	5	99
	Under estimation	0	0	0	0	0

Table 3 shows the relationships between the variables of body composition and body image perception among the members of the Curves. A chi-square test showed that body mass index, $X(9) = 34.902$, $p = 0.001$, percentage body fat, $X(6) = 23.964$, $p = 0.001$, skeletal muscle mass, $X(6) = 12.858$, $p = 0.045$, body fat mass, $X(12) = 77.794$, $p = 0.001$, waist-to-hip ratio, $X(6) = 30.840$, $p = 0.001$, and visceral fat level, $X(3) = 28.771$, $p = 0.001$, were significantly associated with body image.

This study aimed to analyse the correlation between the actual body fat percentage and the perceived body image. The result showed that there was a significant correlation between these two variables. The result showed how accurately respondents predicted and self-assessed their body image based on body fat percentage. In a previous study, it was found that psychological well-being was followed by body fat percentage (Campos-Uscanga et al., 2022). The significant correlation between body perception and body composition (percentage body fat) shows that respondents answered and predicted their body perception based on their appearance and their awareness of their body fat percentage. The results of the current study showed that the respondents' accuracy in predicting their body fat percentage was quite high. This result is consistent with the finding of a previous study which stated that respondents have a consistent perception of their body with a general tendency to estimate body fat (Zaccagni et al., 2020).

Furthermore, there is a significant relationship between body image perception and skeletal muscle mass which is the lowest significant among other variables of body composition. In the previous study, it is rare to find the discussion or study about correlation between body image perception and body composition. In this study, the skeletal muscle mass correlation would be discussed. Based on previous study, it was stated that the muscle volume and body mass, fat mass, and body mass index have a significant correlation (Baumgartner et al., 1999). The above statement can indirectly relate with the significance of relationship between body image perception and body composition (skeletal muscle mass). People would not directly know the level of their skeletal muscle mass but they can predict from their strength and it would be related with their predictions.

A significant result between body perception and body fat mass was also shown in this study. This result showed that the respondents' answers to the Stunkard Figure Rating Scale (1983) had an influence on their body fat mass. Following Brodie and Slade (1988), body fat mass was found to be a direct predictor of weight. It can be said that people can predict their body fat mass categories based on their weight and make an assumption or prediction about how they feel about themselves in order to get an accurate estimation, underestimation or overestimation. Brodie and Slade (1988) took a different view of the relationship between body image perception and body fat mass. According to their study, body fat mass may not be a variable that leads to the accuracy of body image perception, but it may lead to a correct prediction of body image dissatisfaction and people's desire to lose and

change their body goals. This statement needs to be re-discussed with a new input from the research article, because from this current study, body image perception from the collected responses is significantly associated with the body composition variable body fat mass. From this result, it can be concluded that the previous statement needs to be revised to determine the new accuracy between body image perception and body composition variable body fat mass.

The next variable for body composition is the waist-hip ratio (WHR). In this study, body image perception and body composition (WHR) were found to be significantly related. In a previous study, it was found that the WHR is one of the main variables for assessing self-perceived body image (Justino et al., 2020). From this statement, it can be deduced that there is a positive correlation between the aforementioned significant relationship and the result shown. The previous study also found that less than half of female adolescents either underestimated or overestimated their body image by measuring their abdominal obesity, i.e. waist-to-hip ratio (Justino et al., 2020).

Since many of the studies reviewed used body mass index, body fat mass, and body fat percentage as variables to examine the prediction or association with body image, few results were found on the association between waist-to-hip ratio (WHR) as the main factor contributing to their response to self-perception of body image. In the journal by Singh (1983), it was found that women judge themselves based on their WHR (WHR) and continue to desire to lose weight and have a gynoid body shape. This statement is a clear and positive explanation as to why the relationship between body image perception and body composition, specifically WHR, has a significant relationship and is related to the answers that respondents chose based on the outcome of their WHR.

The last variable that belongs to body composition is the visceral fat. Body fat percentage is an indicator of weight and correlates significantly with visceral fat percentage (Ghannadiasl & Hoseini, 2020). The current study shows that body perception and visceral fat level have a significant relationship. This result can be positively supported by previous research which concludes that visceral fat level and visceral fat area can lead to negative and positive assumptions about appearance orientation in women (Ghannadiasl & Hoseini, 2020). It can be said that the significant association from this current finding proves that respondents have made a self-perception out of their concern about visceral fat percentage and the prediction of fat area evident from their appearance. In addition, previous studies have shown that total body fat is related to the percentage of visceral fat (Seidell & Bouchard, 1997). Therefore, measuring BMI and body fat percentage is essential to gain insight into health, fitness, and physical activity (Zarizi Ab Rahman et al., 2023). As mentioned earlier, body fat mass is the indicator of body mass index (Prabhu & Cunha, 2018) and visceral fat percentage is the indicator that can be derived from body fat mass. A direct influence on respondents' answers to the question of how they perceive themselves was determined using the Stunkard Nine Figure Rating Scale (1983), and a significant correlation with visceral fat percentage was found (Seidell & Bouchard, 1997).

Table 3. Relationship Between Body Composition Variables and Body Image Perception

Variables	Categories	Body Image Perception				Value	df	*P*
		Under Weight	Normal Weight	Overweight	Obese			
		Percentage %						
Body Mass Index (BMI)	Under Weight	0	3.0	0	0	34.902	9	0.001
	Normal Weight	1.0	13.1	7.1	0			
	Overweight	0	17.2	26.3	27.3			
	Obesity	0	0	0	5.1			
Percentage Body Fat	Fitness	0	1.0	0	0	23.964	6	0.001
	Average	2.0	6.1	3.0	0			
	Obese	1.0	14.1	67.7	5.1			
Skeletal Muscle Mass	Low	3.0	21.2	54.5	2.0	12.858	6	0.045
	Normal	0	0	14.1	3.0			
	High	0	0	2.0	0			

Body Fat Mass	Essential Fat	3.0	2.0	1.0	0	77.794	12	0.001
	Athletes	0	8.1	9.1	0			
	Fitness	0	7.1	8.1	0			
	Average	0	3.0	21.2	0			
	Obese	0	1.0	31.3	5.1			
Waist Hip Ratio	Low	1.0	1.0	0	0	30.840	6	0.001
	Moderate	2.0	9.1	11.1	0			
	High	0	11.1	59.6	5.1			
Visceral Fat Level	Low Risk	3.0	17.2	18.2	0	28.771	3	0.001
	High Risk	0	4.0	52.5	5.1			

Conclusion

The main objective is to investigate the relationship between the perception of body image and body composition in terms of the variables body mass index, percentage body fat, skeletal muscle mass, body fat mass, waist-to-hip ratio, and visceral fat among the female members of the Curves, Setia Alam. The result showed that there is a significant correlation between body image and all body composition variables. It is also clear to see that all respondents overestimate their body image. Most of them opt for an overestimation of their physique, neither underweight, normal weight, overweight, nor obese. This result is in line with previous studies that showed that women tend to change something about their body shape and size. The results of this study have shown that the members of the Curves, Setia Alam really do base their self-perception on their body composition results.

Suggestion for Future Research

One suggestion for future researchers is an extension of the result for body image perception being caused and the effects on the relationship between the dependent variable and the independent variable. Next, future researchers can develop themes that extend body image perception with body image dissatisfaction and its prediction by the Stunkard Nine Figure Rating Scale of body image perception. In addition, the themes may lead to an investigation of cause and factor of body image perception and body image dissatisfaction. Further, future researchers can elaborate the themes on the status of adolescents' body image perception and its related factors. A body composition intervention can be conducted to identify the effects on perceived body image and body image dissatisfaction. Future research can also explore the causes of the increase in obesity in relation to body mass index and overestimation of self-perception. Finally, a comparison between employed and unemployed women in terms of their perception of their body self-image can be conducted and how this affects their body image can further be investigated.

Co-Author Contribution

The authors have confirmed that there is no conflict of interest in this article. Author 1 conducted the fieldwork, collected the data and entered all the data into the Statistical Package for Social Sciences. Author 2 and author 4 analysed the statistical analysis. Author 3 prepared the introduction and literature review. Author 5 provided the concept of the study and wrote the results, discussion, and conclusion.

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