
**"PERCEPTION OF BODY IMAGE AND SELF ESTEEM
AMONG FEMALE COLLEGE STUDENTS IN AN URBAN
AREA- A CROSS SECTIONAL STUDY"**

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(REG. NO. BD0122008)**

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(Reg. No. BD0122008)

Dr. GIRIJA J MAHANTSHETTI MD
Professor and Head,
Department of Community Medicine,
J. N. Medical College,
KAHER, Belagavi,
Karnataka, India – 590010.



Date : 24.02.25

Place : Belagavi

Dr. (Mrs.) N. S. MAHANTASHETTI MD
Principal,
J. N. Medical College,
KAHER, Belagavi
Karnataka, India – 590010.

PRINCIPAL
JAWAHARLAL NEHRU MEDICAL COLLEGE
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Nehru Nagar, Belagavi- 590 010, Karnataka, INDIA

☎ 0831 - 2471350

☎ 0831 - 2470759

🌐 www.jnmc.edu

✉ principal@jnmc.edu

Ref No: MDC/PG/

Date: 24-02-2025

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Reg. No. BD0122008
Postgraduate Student,
2022-23 Batch,
Department of Community Medicine
J. N. Medical College, Belagavi.

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JNMC INSTITUTIONAL ETHICS COMMITTEE
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)

Website: <http://www.jnmc.edu>
E-Mail : domc@jnmc.edu

Phone: (+ 91-0)831 Office : 2472550
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref No.MDC/JNMCIEC/ 50

Date: 01/04/2023

To,
BD0122008
PG Student in Community Medicine
J. N. Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

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(Dr. Smita Sonoli)
Member Secretary
JNMC Institutional Ethics Committee
J.N.Medical College, Belagavi.

(Dr. Harsha Hegde)
Chairman,
JNMC Institutional Ethics Committee
J.N.Medical College, Belagavi

LIST OF ABBREVIATIONS USED

S. No	ABBREVIATION	EXPANSION OF THE ABBREVIATION
1	AOR	Adjusted Odds Ratio
2	BMI	Body Mass Index
3	BSQ	Body Shape Questionnaire
4	CI	Confidence Interval
5	CPI	Consumer Price Index
6	GPA	Grade Point Average
7	IQR	Inter Quartile Range
8	KAHER	KLE Academy of Higher Education and Research
9	MDBSRQ	Multi Dimensional Body Self Relations Questionnaire
10	NFHS	National Family Health Survey
11	OR	Odds Ratio
12	PUC	Pre University College
13	SD	Standard Deviation
14	SES	Socio Economic Status
15	SPSS	Statistical Package for Social Sciences
16	WHO	World Health Organization

ABSTRACT

“Perception of Body Image and Self Esteem among female college students in an urban area – a cross sectional study”

Introduction:

Body image is the way one thinks and feels about his/her physical appearance. Body image concern, which was considered to be a problem of the developed and western countries is also noted in developing countries due to westernization, media influences and many other factors. Young women due to the hormonal changes associated with puberty, also experience changes in the body shape and are likely to face peer, family or media pressure which may lead to a negative perception of their own body. Such dissatisfaction with one's own body may affect their self esteem. It is vital that one has to feel happy about oneself in order to give the best academic and overall performance in any front.

There is a limited literature in India regarding body image problems prevalent among the young women and this study aims to fill the gaps related to the understanding of body image perception and its association with low self esteem, by using standardized tools and also looks into the Body Mass Index and the other factors associated with body image.

Objectives:

- 1.To study the association between Perception of Body image and self esteem among female college students in an urban area.
- 2.To assess the body image and its association with Body Mass Index among them

Methodology:

A cross-sectional study was conducted among 500 female students studying in degree colleges in Belagavi city over a period of one year. Four colleges were randomly selected from the north, south, east, and west zones of the city and 125 students from each college were included using simple random sampling method. After obtaining institutional ethical clearance, permission was taken from the Principal of the Colleges and informed consent was taken from participants. Data was collected on Sociodemographic details and other factors. Body Image concern was assessed using Body Shape Questionnaire BSQ 8C, Body Image perception was assessed using Stunkard Figure Rating Scale, Self esteem was measured using Rosenberg Self Esteem Scale. The height and weight of the participants was measured and BMI was calculated. Data was entered in Excel and analysed using SPSS software.

Results:

The mean $\pm$ SD age of the participants was 19.86 ± 1.40 years. Majority of the students 426 (85.20%) were Hindus and 320 (64%) lived in nuclear families. According to the modified BG Prasad classification, 343 (68.60%) students belonged to socioeconomic classes I, II and III

Among the 500 participants, 198 (39.6%) had a normal BMI, 146 (29.2%) were underweight, 71 (14.2%) overweight and 85 (17%) of them were obese. Majority 402 (**80.4%**) expressed body image dissatisfaction with 314 (62.8%) of participants desiring a thinner body and 88 (17.6%) of them desiring a heavier body. The prevalence of body image concern was **64.8%** and that of moderate and severe concern was 29.4% among the study participants. Notably, 97 (**19.4%**) of the participants had low self esteem, majority 392 (78.4%) of them had normal self esteem and 11(2.2%) of the girls exhibited high self esteem

Nearly half of the students have felt body image comparison by family 247 (49.4%), body shaming by friends 234 (46.8%) and pressure from advertisement or media to look beautiful by 246 (49.2%) of them. More than half of our study participants had attempted to lose weight 273 (54.6%) and 1/3rd of them 163 (32.6%) had skipped meal to reduce weight. Majority 415 (83%) students had engaged themselves in physical activity and 217 (43.4%) had participated in competitive sports. Regarding academic performance, 69 (13.8%) had excellent performance, 311 (69.2%) had good performance and 100 (20%) reported regular or poor performance.

In Kendall's tau test, there was a negative association between body image concern and self-esteem level ($\tau_c = -0.266$, $p < 0.001$), perceived body image and self esteem ($\tau_b = -0.308$, $p < 0.001$) as well as BMI and self esteem ($\tau_c = -0.183$, $p < 0.001$). Low self esteem was reported in students with body image dissatisfaction ($\chi^2 = 31.61$, $p < 0.001$).

There was a positive association between BMI and body image concern ($\tau_b = 0.473$, $p < 0.001$) revealed in Kendall's tau test. Overweight/ Obese students had incorrect body image perception ($\chi^2 = 40.18$, $p < 0.001$) and more body image dissatisfaction ($\chi^2 = 210.73$, $p < 0.001$).

Spearman's correlation analysis also indicated that higher the Body Image Concern, Perceived Body Image dissatisfaction or BMI, Self-Esteem tends to decrease ($p < 0.001$). Also, as BMI or perceived body size increases, concerns about body image tend to rise ($p < 0.001$).

Multiple linear regression analysis identified significant predictors of Body Image Concern like higher BMI, body image dissatisfaction, pressure from family, body shaming by peers and attempts to change weight. Higher body image concern negatively impacted self esteem while the absence of body shaming by peers, lack of pressure from advertisements or social media, Engaging in regular physical activity and achieving higher academic performance were associated with higher self-esteem.

Conclusion:

The study highlights significant body image concerns (64.8%) and dissatisfaction (80.4%) among female college students, with higher BMI, peer or family pressure influencing it adversely. Low self-esteem (19.4%) was linked to body image concerns and external pressures. Addressing these factors through targeted interventions is crucial to promote positive body image and self-esteem among young women.

Keywords:

Body Image concern, Body Image perception, Body Image dissatisfaction, self esteem, female students, Body Mass Index.

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INTRODUCTION

The World Health Organisation reported that the prevalence of weight-related health problems has grown alarmingly worldwide. As of 2022, a notable 16% of adults over the age of 18 were obese, while 43% were overweight. This marks a dramatic escalation in the prevalence of obesity, with rates more than doubling since 1990. The situation is even more concerning among adolescents, where obesity rates have quadrupled over the same period.¹

In India, the situation is particularly complex due to the coexistence of underweight and rising overweight and obesity rates, resulting in a "double burden of malnutrition." Historically, India has struggled with high levels of undernutrition, but recent trends reveal a sharp increase in overweight and obesity, highlighting a shift in the nutritional challenges faced by the country. This concerning trend is also reaffirmed by the National Family Health Survey 5, which showed that 24% of the females between the ages of 15 and 49 are in the overweight or obese category. The disparity is more pronounced in urban areas, where 33.2% of women fall into these categories compared to 19.7% overnutrition among women from rural households.²

In Karnataka the problem of overnutrition is even higher, with 30.1% of women affected overall and it is 37.1% among urban women, higher than 25.6% prevalence among rural women.³ Overweight and underweight conditions, while often recognized for their physical health implications, also present significant psychological risks that can profoundly affect an individual's overall well-being. Beyond the well-documented health issues such as cardiovascular disease or nutritional deficiencies, these weight-related conditions are closely linked to psychological problems like body image issues.⁴

Body image is the perception of people about their physical appearance. This is a deeply personal and multifaceted aspect of self-perception that profoundly influences the mental stability and emotional health of a person. It encompasses how an individual sees themselves, how they believe others perceive them, and the feelings they have about their own physical appearance. A positive perception of one's own self is distinguished by the appreciation for one's unique features and embracing the body in its current state, irrespective of media representations or social norms. This self-acceptance fosters a sense of confidence and self-worth, allowing one to focus on the strengths and capabilities rather than on perceived flaws. A negative body image involves a skewed view of one's own body, where individuals fixate on perceived imperfections and shortcomings. Such a negative perception erodes self-confidence and self-worth, leading individuals to dwell on their perceived flaws rather than recognizing their inherent strengths and abilities. This preoccupation with perceived imperfections can undermine emotional well-being, fostering feelings of inadequacy, anxiety and a diminished drive to participate fully in various aspects of life. Body image concerns, which was considered to be a problem of the developed and western countries is also noted in developing countries due to westernization, media influences and many other factors.⁵

Young women undergo changes in body shape as a result of the hormonal changes brought on by puberty and are likely to face peer, family or media pressure and comparison. In the Indian context, contemporary beauty standards often exert considerable pressure on young women. Historically, attributes such as fair skin, slim physique and specific facial features have been upheld as ideals of beauty. These norms are perpetuated by popular media, including movies, advertisements and social media platforms, where idealized and often unattainable representations of beauty are

prevalent. Bodily dissatisfaction may result from the pressure to meet these expectations, as many young women find themselves at odds with these ideals. Additionally, societal expectations, including those from family and peers, can further exacerbate concerns about body image. The importance placed on appearance and the value associated with adhering to these beauty norms can result in negative self-perception among female college students. Such concerns are most of the times not discussed openly with their parents or teachers hence there are chances that they resort to unhealthy eating practices to tide over their concerns and may end up with more physical and mental problems. For some students, the internalization of negative body image can result in negative actions such as extreme dieting, excessive exercise or stress eating, all of which can further harm their physical and mental health.^{6,7}

The sense of worth or value that one has for oneself is known as self-esteem. Academic achievement of a student is significantly influenced by self-esteem, and also it determines their ability to succeed and thrive in an educational setting. Self-esteem and confidence, affects how students approach their studies, manage challenges and engage with their educational environment. Students who have a good self esteem have a positive attitude towards learning and view academic challenges as opportunities for growth rather than obstacles. This confidence encourages proactive behaviours such as seeking help when needed, participating actively in class, and maintaining persistence through difficult tasks. It is vital that one has to feel happy about oneself in order to give his/her best performance in any front. High self-esteem also fosters resilience, enabling students to handle setbacks and failures constructively, which in turn supports continuous improvement and higher academic achievement. Also, people with high self esteem can face challenges in life in an efficient manner.⁸

Body image perception that one has and the level of self-esteem are crucial and highly interconnected components for psychological well-being, especially in young women who are transitioning to college life and face new opportunities and challenges such as increased independence, exposure to diverse peer groups and academic pressure, as these factors may influence the mental health and well being of the person. Negative comments about the physique can significantly affect the self-confidence and performance of female college students, creating a detrimental cycle that affects their overall well-being. Bullying and derogatory remarks about appearance can undermine a student's esteem, leading to reduced motivation, which in turn affects academic performance and engagement in campus activities. Peer influence to follow the beauty standards like size zero can prompt unhealthy behaviours, further exacerbating stress and distraction from academic responsibilities. These negative influences erode self-esteem, making it difficult for students to focus on their studies and fully participate in college life. Addressing these challenges requires fostering a supportive environment that promotes body positivity and self-acceptance, helping students build resilience and achieve their full potential.⁹

There is a limited literature in India regarding body image problems prevalent among the young women and the associated factors. Our present study aims to fill the gaps related to the understanding of body image perception and its association with self esteem using standardized assessment tools and also looks into the Body Mass Index and the other factors associated with body image perception.

OBJECTIVES OF THE STUDY

1. To study the association between perception of Body Image and Self esteem among female college students in an urban area.
2. To assess the Body Image and its association with Body Mass Index among them.

REVIEW OF LITERATUTRE

In 2023, a cross-sectional survey of 493 female medical students in Puducherry, India, was carried out. The study revealed that 34.3% female participants had normal BMI, 10% of them were underweight, 16.1% were overweight and 39.6% of them were obese, whereas among male participants, 27.8% had BMI in the normal range and 9.5%, 13.7%, and 49% of them belonged to underweight, overweight and obese category respectively. The Body Shape Questionnaire BSQ-16 scores showed that 54.1% of participants had concerns regarding their body shape. Males had statistically significant ($p < 0.01$) lower (Mean $\pm$ SD) BSQ scores (35.36 ± 13.2) compared to females (43.83 ± 14.6). The percentage of individuals in the moderate and severe body image concern categories was higher among females. Additionally, 20.1% of males expressed a desire to be heavier than their current body image, whereas 66.9% of females wanted to be thinner, indicating a greater preference for leanness among females. BSQ scores and BMI showed a significant positive correlation that was moderate to strong ($r = 0.766$, $p < 0.01$), indicating that higher BMI is associated with more body image concerns. The study emphasized the need for health education programs to promote optimal weight and active lifestyle among students.¹⁰

An observational study was conducted in Chandigarh, involving 168 adolescent girls aged 13-19 years over a span of six months, from January 2023 to June 2023. Among the participants, 54.2% reported feeling self-conscious about their bodies, while 25% expressed dissatisfaction with their appearance. Also, 39.9% of the girls were involved in efforts to improve their physical appearance. Notably, 29.8% of them stated that they had experienced body shaming. Majority, 61.3% participants

had reported comparison with other children, around 29.8% of the girls had faced peer pressure and 53% of them had academic pressure. It also revealed a statistically significant relation between the class of study and body shaming experience ($\chi^2=6.47$, $p = 0.03$). Additionally, 76.8% of the study subjects reported that physical appearance significantly impacted their mental well-being.¹¹

In Mysore, a cross-sectional survey was performed among 210 female students in 2022. The study reported that according to BMI measurements, 47.1% of participants were categorized to have a normal BMI, 39% as overweight or obese category and 13.8% as underweight. Using the visual analogue scale, 52.4% were classified as normal weight, 34.3% as overweight or obese, and 13.3% as underweight. Regarding body image perception, 37.1% of participants held a neutral view, 33.8% were happy and 24.2% were not contented about their physique. Unhealthy weight management practices were reported, including skipping meals by 24% of the participants and increasing meal quantity and frequency followed by around 17% of them. Several factors like wishing to increase or decrease weight ($\chi^2=31.5$, $p<0.01$) relatives' opinion ($\chi^2= 105.2$, $p<0.01$) friends' opinion ($\chi^2= 94.8$, $p<0.01$) feeling anxious about body type ($\chi^2= 39.7$, $p <0.01$) were reported to be linked with the way they perceived about their body, which may pose a threat to their mental health in future.¹²

In 2022, 164 female undergraduate students from Uttarakhand participated in a cross-sectional study, which adopted Body Image Questionnaire to check Body Image. Rosenberg Self esteem questionnaire was used for self esteem and Hamilton's scale for screening for anxiety and also depression among them. The results reported that 35% of students showed low self esteem, 27.4% experienced anxiety and 19.5%

suffered from depression. Students with low self-esteem demonstrated a poorer body image, as indicated by a higher Body Image score of 61.34 ± 4.22 (Mean $\pm$ SD) compared to those with normal self-esteem 57.25 ± 6.52 (Mean $\pm$ SD). Similarly, students with severe anxiety and depression had higher Body Image scores and poorer body image compared to those with mild or moderate issues ($p < 0.05$). A substantial relationship of body image with depression and self-esteem was further supported by multiple regression analysis ($p < 0.05$). According to the study's findings, pupils who have a negative body image were more likely to experience anxiety and depression and have poorer self-esteem.¹³

An observational study was undertaken between June and November 2022 involving 397 female students from two government schools in Kolkata West Bengal. The results revealed that the study subjects' mean age was 15 ± 3.32 years. According to BMI, 44.33 % of study participants were normal, 31.73% of them were underweight and 23.93% students belonged to the overweight category. Adopting the Stunkard figure rating scale, 60.75% girls were not contented with their present body. Among those with body image discontent, 52.10% students had low self esteem compared to 37.42% of students reporting low self esteem among those without any body image dissatisfaction ($\chi^2=8.151$, $p=0.004$). Body image dissatisfaction was notably higher ($\chi^2 = 8.826$, $p=0.0029$) among the girls belonging to urban areas than those from the rural areas. According to the study's findings, body image dissatisfaction was quite prevalent and substantially linked with low self-esteem.¹⁴

A study conducted during the year 2022 among 130 participants, including 76 males and 54 females, across India to assess the effect of body image perception on the self esteem reported a Mean ($\pm$ SD) Body Image satisfaction score of $67.95 (\pm$

10.4) using Body Image questionnaire and a Mean ($\pm$ SD) Self-Esteem score of 28.72 ($\pm$ 4.72) using Rosenberg self esteem scale. Male participants had a slightly higher Body Image score of 69.27 ± 11.4 (Mean $\pm$ SD) compared to females 66.09 ± 8.78 (Mean $\pm$ SD) but not very substantial ($t = 1.7986$, $p > 0.05$). The study revealed a statistically significant positive correlation ($r = 0.599$, $p < 0.01$) between Body Image satisfaction score and Self-Esteem score.¹⁵

In the year 2022, around 358 undergraduate students in Shillong, Meghalaya participated in a cross-sectional correlational study which evaluated body image and its relationship to anxiety, depression and self-esteem. Standard tools like Multidimensional Body Self relations Questionnaire- Appearance scale, Beck scale for depression, Hamilton scale for anxiety and Rosenberg scale for esteem were used. It was found that a majority 83.8% of the participants had a normal BMI, while 10.9% were overweight, 4.5% underweight and 0.8% were obese. Regarding self-perception of Body Image, 34.9% viewed their weight as normal, 55.9 % as overweight and 9.2% perceived themselves to be thin. Fear of weight gain varied, with 38% not worried and 19.6% either very tense or extremely worried. Preoccupation with being overweight was significantly positively correlated with both feelings of depression ($r=0.278$, $p=0.01$) and anxiety ($r=0.280$, $p=0.01$). There was a negative relationship between body area satisfaction and mental health issues like depression ($r=-0.148$, $p=0.01$) and anxiety ($r=-0.138$, $p=0.01$). There was a positive correlation between self-classified weight and anxiety ($r=0.204$, $P<0.01$) and depression ($r=0.143$, $P<0.01$). Body image variance was significantly influenced by anxiety (Beta=0.211, $P=0.005$) and self-esteem (Beta=0.296, $P=0.001$).¹⁶

In order to understand young people's perception of their physical appearance and its impact on their self-esteem, a cross-sectional research was carried out in the community with 220 participants, of age 20 to 35 years, from different parts of India. The study was published in 2021. Using modified BSQ Questionnaire and Rosenberg scale, the average score for body image dissatisfaction was 40.81, with a standard deviation of 16.024, while the self-esteem scoring had a mean value of 19.66, with a standard deviation of 7.291. Females had a significantly higher body image dissatisfaction score ($M = 22.69$ and $SD = 3.64$) than male participants ($M = 23.28$ and $SD = 3.6$) ($p < 0.001$). A negative relationship was seen between body image score and self-esteem ($r = -0.342$, $p < 0.01$) with 11% variance. The study concluded that body image dissatisfaction was a significant predictor of self esteem.¹⁷

A cross sectional study was conducted to estimate the prevalence, pattern and determinants of body image dissatisfaction among female undergraduate students in University of Delhi from 2018 to 2020. A total of 180 students were included in the study. The results showed that the participants had an average BMI of 21.46 ± 3.37 kg/m². Around 52.2% girls belonged to normal BMI, 27.8% of the study participants' BMI was more than the normal range and 20% of them were underweight according to BMI. Among the students, 30.6% had reported to have body shape concerns assessed by BSQ 34 scale and 76.7% girls were unhappy with their present physical appearance as assessed by the Stunkard scale. There was a positive relation between level of body dissatisfaction and the Body concern ($r = 0.454$, $p < 0.001$) gauged by both the scales. Higher odds of Body dissatisfaction was noted among those students who were underweight/ overweight/ obese AOR = 2.524 (1.160-5.493), those with mothers' education status as illiterate or up to high school AOR = 4.099 (1.020 –

16.475) and those who compared their own body with that of an actress AOR = 3.541 (1.525 – 8.224).¹⁸

A study done in Oman between September and December 2019 investigated about the perception of one's body and discontent with their appearance among 351 pupils from pre-medical, pre-clinical, and clinical groups. The average age of the participants was 21.6 ± 2.2 (Mean $\pm$ SD) years and majority 88% of them belonged to the female sex. According to WHO classification of BMI, 63% belonged to normal category, 12% underweight and 25% of overweight/obese category. However, half of the students (50%) viewed their body image as normal, while 18.8% considered themselves undersized and 29.3% perceived themselves as oversized. A significant relationship was noted between perceived and actual Body Mass Index ($\chi^2 = 293.9$, $p < 0.001$), with those at BMI extremes showing greater accuracy in understanding their body image. Around 19.4% of study subjects were contented with their present body and there was no discrepancy in their perceived body image compared to what they thought was the ideal body. A majority 80.6% were unhappy with their body image and 59.5% wished to get thinner. Participants with obesity had four times higher odds of being discontent with their physical appearance compared to those with underweight (OR = 4.122, $p < 0.05$). Also, a positive relationship was found between actual BMI and perceived BMI ($r = 0.699$, $p < 0.0001$), while ideal BMI weakly correlated with perceived BMI ($r = 0.168$). The students who were satisfied with their body image had rightly perceived their body shape ($p = 0.038$). The study concluded that there was a high prevalence of body image dissatisfaction and misperception in body image among the students.¹⁹

According to a cross-sectional study of 1,200 college students of 18 to 19 years age group which was done in Coimbatore, Tamilnadu and published in the year

2018, around 53.6% of the participants were of normal weight, more than one fourth (26.7%) students were underweight, 15.7% of them were overweight and 3.9% had obesity according to their BMI. Using the Stunkard tool, it was found that 77.6% pupils were unhappy with their present body. Students who had a higher BMI, AOR = 1.28 (1.06 – 1.54), higher socioeconomic status AOR = 1.28 (1.06 – 1.54), increased sociocultural pressure AOR = 1.05 (1.02 – 1.07) and depression AOR = 1.04 (1.01 – 1.05) were found to have high level of dissatisfaction with their present appearance. Eating small meals was the most common weight-control strategy followed by 53.2% of the girls and skipping meals was done by 42.7% of them. Compared to 57.5% of study subjects contented with their physical appearance, 67% of those who were unhappy with it adopted one or more weight-control strategies. It was also noted that those students without any body image dissatisfaction had scored better in the self esteem scale with an average value of 18.65 ± 3.20 compared to those with body image dissatisfaction who had mean self esteem score of 17.92 ± 3.30 ($p < 0.01$).²⁰

A cross-sectional research was undertaken in a rural area in Dindugul, Tamilnadu in the year 2018 among 360 adolescent students between 13 and 20 years of age from eight selected institutions. Among the entire sample, 52% of participants were categorized as having a ‘mildly negative body image,’ 4% as having a ‘moderately negative body image’ and 44% as having a ‘positive body image’ based on the Body Image Satisfaction Scale for Adolescent people. There was slightly lower level of body discontent among the younger group who were attending school (Mean = 66.32, SD = 10.47) compared to the older pupils who were attending college (Mean = 67.96, SD = 10.15) ($p > 0.05$). Body esteem and discontent were negatively related ($r = -0.19$, $p < 0.01$). Further analysis had found that 8 % variance in body esteem and

14% of dissatisfaction could be attributed to criticism from parents or peers or media.²¹

Body image perception among adolescent students was studied in a cross sectional survey from Thrissur Kerala during 2018. Around 179 participants were enrolled and the results revealed that 65.4% of the participants had a normal BMI, while 26.2% were overweight and 8.4% were underweight. A striking 84.91% of the students displayed varying degrees of negative perceptions about their body image using a self designed, structured 10 item questionnaire. Additionally, 36.8% of the participants had an inaccurate perception of their body size, a finding that was statistically significant. More female subjects (40.4%) expressed dissatisfaction with their body appearance than the male students (23.4%). Students dissatisfied with their body size ($t=3.894$, $p=0.0001$) and those who had attempted weight loss in the past ($t=7.716$, $p=0.0001$) showed a significantly higher mean BMI. Furthermore, an inverse relation was discovered between the perceived body image size and the academic scores obtained by them ($r = -0.167$, $p=0.031$), which had suggested that students having a poor body image tended to perform poor academically.²²

A cross-sectional survey of 125 students in Punjab—76 females and 49 males—was carried out in 2018 to investigate the links between BMI, opinion on their body image and self worth using standardized questionnaires. Of the respondents, 17.6% had a BMI $< 18.5 \text{ kg/m}^2$, around 62.4% of the participants had normal BMI, while 20.0% had a BMI $> 25 \text{ kg/m}^2$. The results showed that 16.8% learners were discontented with their physical look. Among the participants, 21.6% had low self-esteem. The level of body discontent and self worth varied across the pupils belonging to different categories of BMI ($p<0.001$). There was a moderately positive

relationship ($r=0.384$, $p<0.001$) found between body image satisfaction and level of self-esteem.⁹

An observational study was undertaken in Guwahati, Assam among 400 students aged between 18 and 21 years, over a period of nine months from August 2018 to April 2019. The study found that 66.3% of participants reported satisfaction with their body image, while 33.8% expressed dissatisfaction. The mean body image satisfaction score was higher among boys (3.37 ± 0.65) compared to girls (3.20 ± 0.68). Body image satisfaction was found to be significantly inversely related with family, peer and media factors ($p < 0.01$). Moreover, students felt greater pressure from media (Mean = 2.48, SD = 1.23) compared to family (Mean = 2.39, SD = 1.24) and peers (Mean = 2.39, SD = 1.13). The study highlighted the impact of societal factors in influencing how the students perceive their body appearance.²³

A cross-sectional survey was performed during 2017 involving 370 medical students aged 17 to 30 years in New Delhi. The study found incorrect perception regarding their body shape in 35.4% of participants. Around 39.4% of students aged 20 and older had negatively perceived their body, comparing with the 28.4% of students aged less than 20. Media influence was notable, with 36.5% and 40.5% acknowledging being influenced by models and athletic figures respectively. Around 27.6% of the students reported feeling pressure to conform to societal beauty standards. The body image that was perceived by the pupils was associated significantly with age ($p=0.033$) as well as the impact from media ($p=0.003$). The study concluded that media should act responsibly and not to represent unrealistic body image standards and also highlighted the need for efforts to be taken at the educational institutions to address body image related concerns.²⁴

A descriptive study was carried out in 2017 with 510 college students from Puducherry, ranging from 18 to 21 years of age, to assess their perception of body shape and its relation with BMI. The study revealed that 48.8% had a normal BMI, while 39%, 12.1% had low and high BMI values respectively. Using Figure Rating Scale, 60.2% of participants had rightly perceived their current body shape, while 18.6% underestimated and 21.2% overestimated their body image. Among those with a normal BMI, 11.2% thought they were underweight while 9.6% overestimated their body image. Family members and peer group significantly affected the self discernment of their body image, with 32.3% and 29.6% agreeing to their impact. Media also played a major role, as reported by 48% of the participants.⁴

In a study conducted among 1811 students from 13 – 16 years in Pune India during 2015 – 2016, the association of BMI and insight on body image was evaluated using Multidimensional Body Self Relations Questionnaire and Stunkard Figure Rating scale. It was found that there were considerable differences in how people felt about their bodies across different BMI categories ($p < 0.005$) and that girls felt significantly higher body image dissatisfaction than boys. While girls viewed a smaller figure than their existing body shape as desirable, boys preferred a larger figure. A greater proportion of girls misjudged their body weight. Additionally, it was noted that students' erroneous body image perceptions varied across different Body Mass Index categories.²⁵

An exploratory study was undertaken in 2015 in a sample of 63 girls studying Commerce in a private college in Vijayapur city. Among the participants, 39.7% were underweight, 44.4% were of normal weight and 15.9% were overweight or obese. A significant proportion 72 % of underweight and 89% of overweight girls perceived their weight as normal. When questioned about satisfaction on their body image,

50.8% were either satisfied or very satisfied, 30.2% were neutral about it and 19% were unsatisfied or very unsatisfied about their looks. Body image content was related to body image perception ($\chi^2 = 16.247$, $p = 0.003$), maternal education ($\chi^2 = 12.943$, $p = 0.044$), opinions from relatives ($\chi^2 = 8.417$, $p = 0.015$) and peers ($\chi^2 = 10.630$, $p = 0.005$) about body weight. Unhealthy weight management behaviors were reported, including skipping meals among 50% of the overweight/obese category girls and 10.7% of those in normal weight which was statistically significant ($\chi^2 = 16.29$, $p = 0.001$). Increasing meal quantity and frequency was reported among 32% of the underweight girls and in 10.7% of those with normal weight ($\chi^2 = 6.667$, $p = 0.036$).⁶

A cross-sectional study was conducted in 2014 was carried out among 550 students of 15 to 19 years of age in Udupi Taluk, Karnataka to assess body image and association with body shape, self esteem and BMI. Among the participants, 84.9% had a normal BMI, 5.27% were underweight and 9.82% were in overweight or obese category. However only 37.64% of participants felt their body image as normal, 29.82% as thin and 32.54% perceived themselves as fat. The study found that 57.82% of the students exhibited mild or moderate body shape concerns, while 42.18% had no concerns. Regarding self-esteem, 20.54% had low self-esteem, 71.46% had normal self-esteem while 8% had high self-esteem. In multivariable analysis, it was reported that people with low esteem (AOR=6.19, 95% CI: 2.76–13.9) and belonging to the Overweight/Obese category (AOR= 4.65, 95% CI: 2.13–10.12) had higher odds of being associated with a Fat Body image perception.²⁶

MATERIALS AND METHODS

Source of Data:

Belagavi is a district located in the northwest region of the state of Karnataka. All degree colleges in the district are divided into six different blocks, namely Belagavi city block, Belagavi rural block, Bailhongal block, Khanapur block, Ramdurg block and Soundatti block. In Belagavi city, there are a total of 14 degree colleges of which 10 are private aided first grade degree colleges and four are government first grade degree colleges.²⁷ These colleges typically offer undergraduate degrees in various streams such as Arts, Science, Commerce and Management. The various colleges are spread across different areas within Belagavi city, catering to the educational needs of students from Belagavi city and surrounding neighbourhood. The study population were degree college female students from the selected four colleges in Belagavi city.

Study Design:

A cross sectional study

Study Period:

1st June 2023 to 30th May 2024.

Sample size

$p = 27$ ²⁸ (p is the prevalence of Body image concern)

$q = 100 - p = 100 - 27 = 73$

$d = \text{Relative error} = 15\% \text{ of } p, \text{ i.e. } 15\% \text{ of } 27 = 4$

95% Confidence Interval

Estimated sample size = $4pq / d^2$

$$= 4 \times 27 \times 73 / 4 \times 4$$

$$= 492.75 \sim 493, \text{ Rounded off to 500 female students}$$

Sampling technique:

As per the list obtained from Department of Collegiate Education, Government of Karnataka there are a total of fourteen degree colleges in Belagavi city, out of which four colleges - One college from north, one from south, one from west and one from east zone of Belagavi city were selected randomly. Letter seeking permission with detail explanation regarding the need of the study was addressed to the principals of the selected colleges and their approval was obtained.

S.No	Name of the College	Number of female students in the college	Number of female students for study sample
1.	Maratha Mandal Degree College (North)	325	125
2.	Jain College of Commerce (South)	450	125
3.	Lingaraj College (East)	656	125
4.	Government First Grade College for Women (West)	650	125
	Total sample size		500

Sampling frame was made and 125 female students from each college were selected by simple random sampling method, using computer generated random number.

Inclusion Criteria:

Female students in degree colleges of Belagavi city, who gave informed consent, were included.

Exclusion Criteria:

Students with pre diagnosed psychiatric illness like Anxiety, Depression, Eating disorders were excluded.

Ethical Clearance:

Ethical clearance was obtained from Institutional Ethical Committee, J.N. Medical College, KAHER, Belagavi. (Letter no.- MDC/JNMCIEC/50 dated 01/04/2023)

Data collection procedure:

Data was collected after obtaining informed written consent from the selected participants. Data was collected by personal interview using a pre-designed and pre-tested questionnaire. The questionnaire included the following details:

I. Sociodemographic details:

Details like name, age, religion, type of family, education and occupation of mother and father, per capita income and socioeconomic status was collected.

II. Body Image perception questions:

i)Body Shape Questionnaire 8 C (BSQ 8C): ^{29, 30}

The Body Shape Questionnaire 8C had 8 questions to assess how one feels about the physical appearance over past four weeks. Each question was answered in a likert scale with score 1 to 6, for the responses varying from 'Never' to 'Always'. The total score was calculated by summing up the individual responses of the six questions. Total score value of <19 was interpreted as No Body Image Concern , 19-25 as Mild Body Image concern, 26-33 as Moderate Body Image concern and score >33 as Severe Body Image concern.

ii)Stunkard Figure Rating Scale:^{31, 32}

This scale comprised of 9 images varying from thin to obese in increasing size, numbered from 1 to 9. The participants were asked to mark the image that they perceived as their present body image. The students who selected images 1 or 2 were interpreted as to have Perceived Underweight body image, images 3 and 4 as Perceived normal body image, those selected images 5, 6 or 7 as perceived overweight body image images 8 or 9 was interpreted to have perceived obese body image.

The participants were also asked to mark the image that they thought as ideal body image. Difference between the perceived present body image and the ideal body image was interpreted as Body Image dissatisfaction Score (Present image number minus Ideal image number). If the present and ideal image were the same, then the score was zero and interpreted as No Body Image Dissatisfaction. If the present and ideal body image were different, a positive or a negative score was obtained and was

interpreted as Body Image Dissatisfaction. Positive score indicated desire for a thinner body image and negative score indicated desire for a heavier body image.

III. Factors related to Body image perception:

Data regarding felt pressure for ideal body image from advertisement, family and peer comparison, physical activity, sports participation, academic performance, attempts to change weight and skipping meal was collected.

IV. Self-Esteem perception questions:

Rosenberg's self esteem scale^{33, 34}

Rosenberg self esteem scale was used to collect data regarding self esteem from the students. This scale comprised of 10 questions regarding general feelings about oneself, to be answered in a 4-point Likert scale scored 4 to 0 for responses from 'strongly agree' to 'strongly disagree'. Five of the ten items were reverse scored. The total score of all the ten questions was summed up accordingly and was interpreted as Low self-esteem for score<15, Normal self esteem for score 15-25 and High self esteem for score>25.

V. Body Mass Index:

Weight: A standard portable adult weighing machine was used to measure body weight, with no shoes and with the least amount of clothing, to the nearest 0.1 kg. This machine was standardized on a regular basis during the study. Every session began with the scale reset to zero, and the weight was recorded in kilogram.

Height: The participant was instructed to stand upright, without shoes, with their arms falling down by their sides, their back, buttocks, and heels all contacting the wall.

From the head to the heel, the height was measured. The corresponding reading was determined to the closest cm using a measuring tape.

Body Mass Index (Weight in kg/ square of height in metre) was calculated. Asian Classification of BMI was adopted to categorize the participants as Underweight for BMI < 18.5 kg/m², Normal weight for BMI between 18.5 kg/m² and 22.9 kg/m², Overweight for BMI between 23 and 24.9 kg/m² and Obesity for BMI > 25 kg/m².³⁵

Definition of Study variables:

1. Age: Age was recorded to the nearest completed years.

2. Type of family:

I. Nuclear: The family consisting of married couple along with their dependent children.

II. Joint: The family consisting of more than one married couples and their dependent children.

3. Literacy status:

I. Illiterate: A person who cannot read or write with understanding in any language

II. Primary: A person who has studied up to 7th standard

III. Secondary: A person who has studied up to 10th standard

IV. Pre-University College (PUC): A person who has completed education up to PUC 2nd year

V. Diploma: A person who has completed any diploma course

VI. Degree: A person who has completed any graduate degree course

VII. Post graduate: A person who has completed any post-graduation course

4. Occupation:

I. Farmer: A person who owns land or on a contract basis or who works at any place including agricultural fields on a daily wage basis.

II. Labourer: A person who works in any place on a daily wage basis.

III. Self-employed: A person engaged in commercial or industrial business either an owner or executive.

IV. Government employee: A person who is a permanent or contract worker in any government agency.

V. Private employee: A person who is a permanent or contract worker in any private company or factory or Non - governmental organizations (NGOs).

VI. Unemployed: A person who is currently not working.

VII. Home maker: A person who looks after the home and children.

Socioeconomic class: For the year 2023, data on per capita income (in Rupees per month) was collected and the Modified B. G. Prasad's categorization was used to classify socioeconomic category.

The B.G. Prasad's scale was first introduced in the year 1961. It was calculated by considering the base Consumer Price Index (CPI) as 100 for the year 1960. It was later modified by introducing the Linking Factors 4.63, 4.93, 2.88 for the year 1982, 2001 and 2016 respectively as given by the Labor Bureau.

Consumer Price Index (Industrial Workers) for January 2023 was 132.8³⁶

Multiplication factor = Current CPI (132.8)/ Base index value in 2016 (100) = 1.328

The new income value is calculated using the following equation:

New income value = Multiplication factor × Old income value × 4.63 × 4.93 × 2.88.

Upon substituting the values in the equation, the updated ranges for January 2023

Revised BG Prasad Socio-economic Status Classification for 2023

Socio-Economic classes	Original B. G. Prasad's classification (1961)	Revised B. G. Prasad's classification for January 2023
I	100 and above	₹8,711 and above
II	50-99	₹4,356–₹8,710
III	30-49	₹2,613–₹4,355
IV	15-29	₹1,307–₹2,612
V	Below 15	Below ₹1,307

Data processing and statistical analysis:

The surveys sheets collected were bundled and numbered serially. Collected data was entered into Excel sheet and analyzed using Statistical Package for Social Sciences SPSS software (version 26).

The quantitative data was summarized as mean, standard deviation or median, interquartile range. The qualitative data was summarized as percentage and proportion.

The Chi-square test was used to determine whether there was a significant association between the categorical representations of Body Image and Self-Esteem.

The Kendall Tau-b correlation coefficient was used to assess the strength and direction of the association between Body Image and Self-Esteem, as it is a non-parametric measure suitable for ordinal data and can handle tied ranks effectively.

The Kendall Tau-c coefficient was used to evaluate the association between ordinal data with different numbers of categories, particularly because it is adjusted for tables of unequal size.

Spearman's rank correlation test was used to measure the strength and direction of the monotonic relationship among Body image, BMI and self esteem scores and provide a complementary measure of association.

Multiple linear regression analysis was performed to assess the effect of sociodemographic and other variables on body image and self esteem.

P value less than 0.05 was considered statistically significant.

RESULTS

The present cross-sectional study was conducted in degree colleges of Belagavi city during the period of 1st June 2023 to 31st May 2024.

A total of 500 female students participated in the study. The data obtained was tabulated and analysed under the following headings.

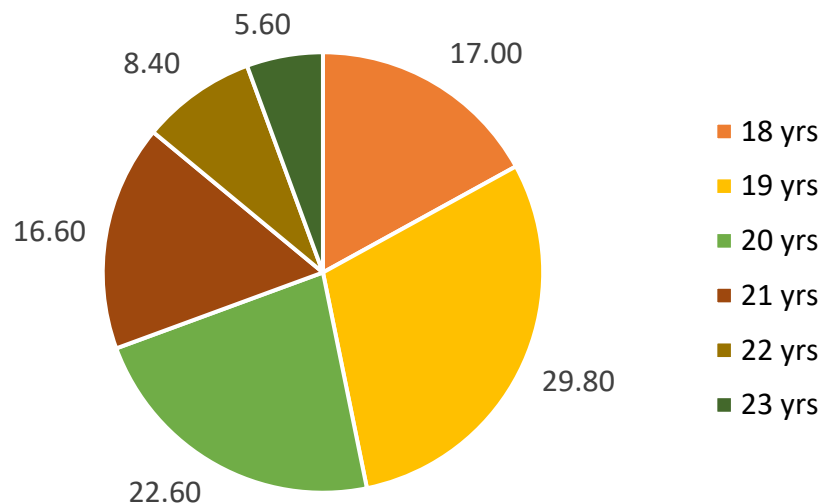
- I. Socio-demographic profile of the study participants
- II. Body Mass Index of the study participants
- III. Body image among the study participants
- IV. Self esteem among the study participants
- V. Association between body image and self esteem among the study participants
- VI. Association between BMI and body image among the study participants
- VII. Correlation among body image, self esteem and BMI of the study participants
- VIII. Assessment of effect of sociodemographic and other variables on body image and self esteem among study participants

I. Socio-demographic profile of the study participants

Table 1: Age distribution of study participants

Age (in years)	Number	Percentage
18	85	17.0
19	149	29.8
20	113	22.6
21	83	16.6
22	42	8.4
23	28	5.6
Total	500	100.0

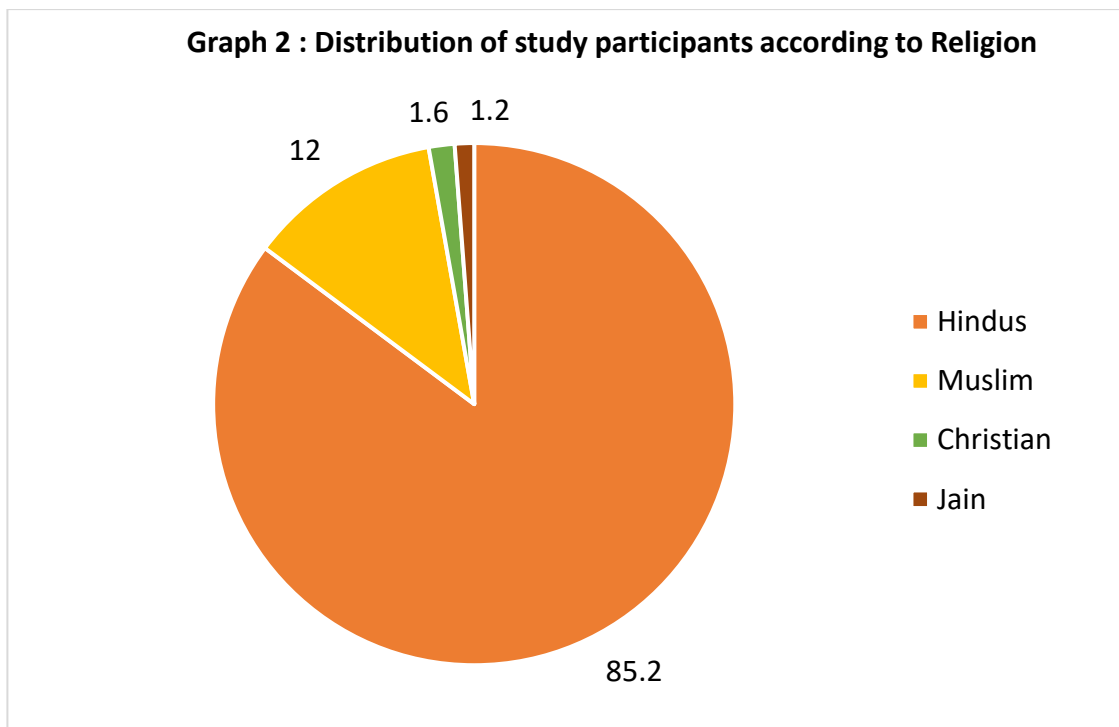
Graph 1: Age distribution of study participants



Among the 500 study participants, 85 (17.00%) were aged 18 years, 149 (29.80%) were aged 19 years, 113 (22.60%) were aged 20 years, 83 (16.60%) were aged 21 years, 42 (8.40%) were aged 22 years, 28 (5.60%) were aged 23 years. The age of the study participants ranged from 18 to 23 years. The mean age of the study participants was 19.86 years, with a standard deviation of 1.40 years.

Table 2: Distribution of study participants according to religion

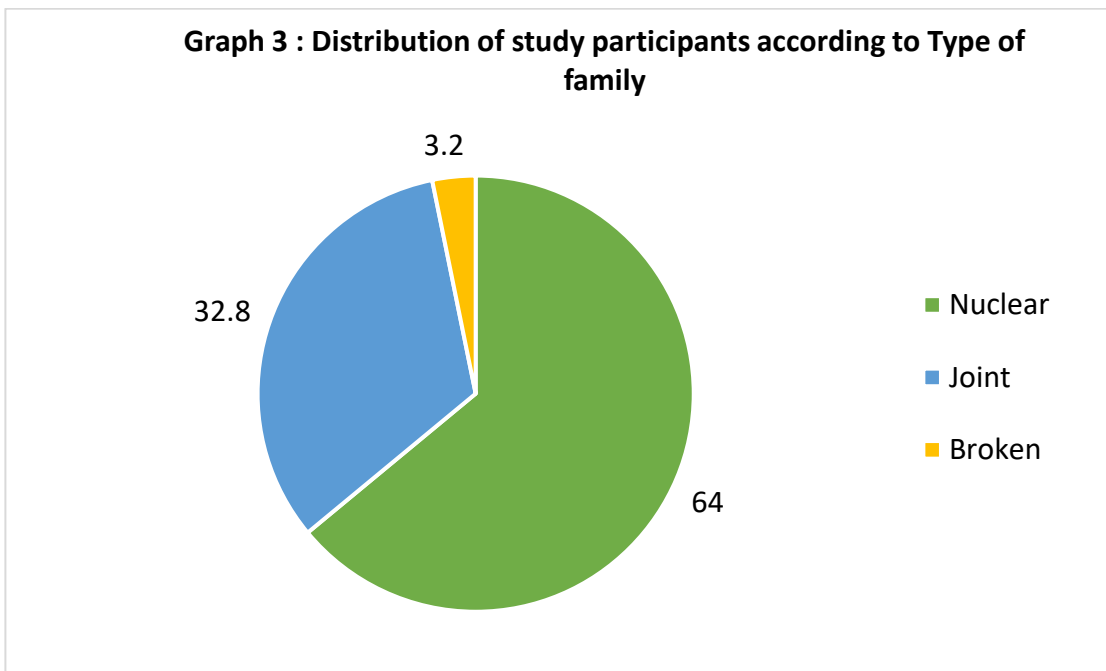
Religion	Number	Percentage
Hindus	426	85.2
Muslim	60	12.0
Christian	8	1.6
Jain	6	1.2
Total	500	100.0



Out of 500 study participants, 426 (85.20%) were Hindus by religion, 60 (12.00%) were Muslim by religion, 8 (1.60%) were Christian by religion and 6 (1.20%) were Jain by religion.

Table 3: Distribution of study participants according to type of family:

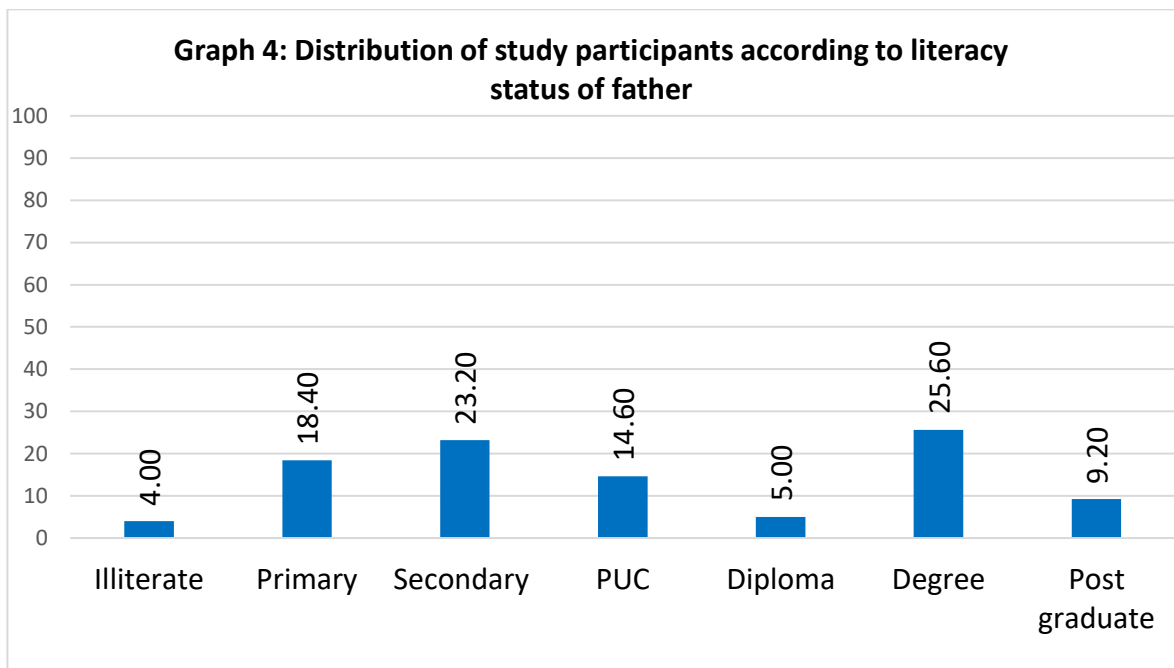
Type of Family	Number	Percentage
Nuclear	320	64.0
Joint	164	32.8
Broken	16	3.2
Total	500	100



In our study, out of 500 students 320 (64.00%) of the study participants were staying in nuclear family, 164 (32.80%) were staying in joint family and 16 (3.20%) had a broken family.

Table 4: Distribution of study participants according to literacy status of father

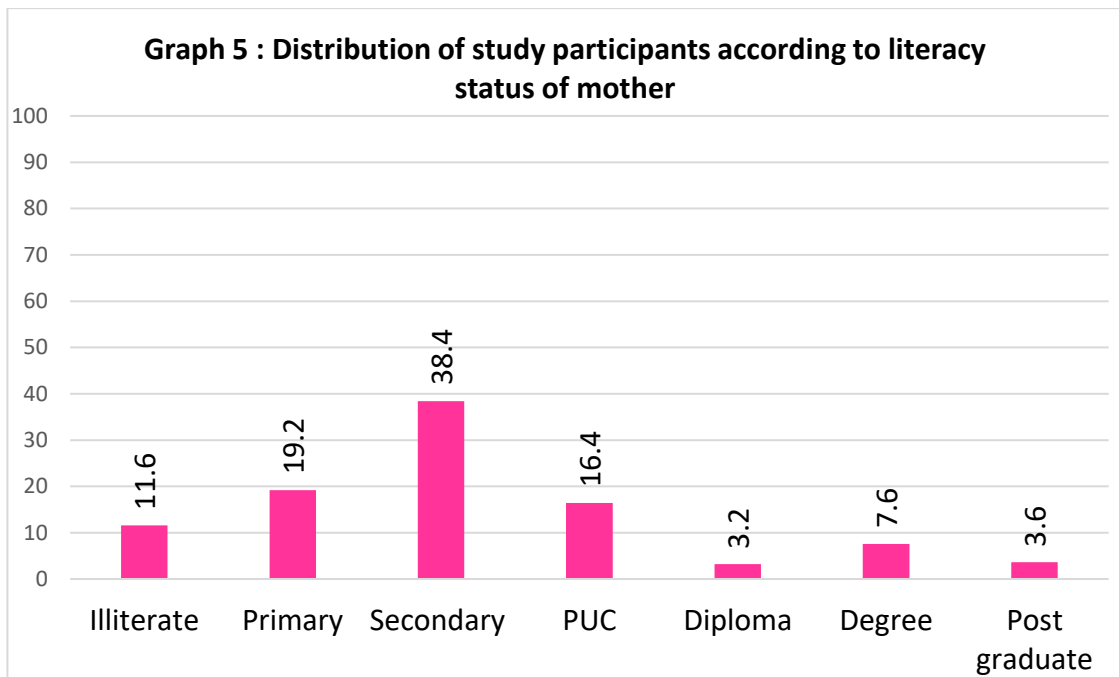
Literacy status	Number	Percentage
Illiterate	20	4.0
Primary	92	18.4
Secondary	116	23.2
PUC	73	14.6
Diploma	25	5.0
Degree	128	25.6
Post graduate	46	9.2
Total	500	100



In our study regarding literacy status of fathers of study participants, majority of them 480 (96.00%) were literates. Among them 46 (9.20%) were postgraduates 128 (25.60%) were degree holder, 25 (5.00%) were diploma holder, 73 (14.60%) had completed PUC, 116 (23.20%) had completed schooling up to 10th standard and 92 (18.40%) had completed schooling up to 7th standard.

Table 5: Distribution of study participants according to literacy status of mother

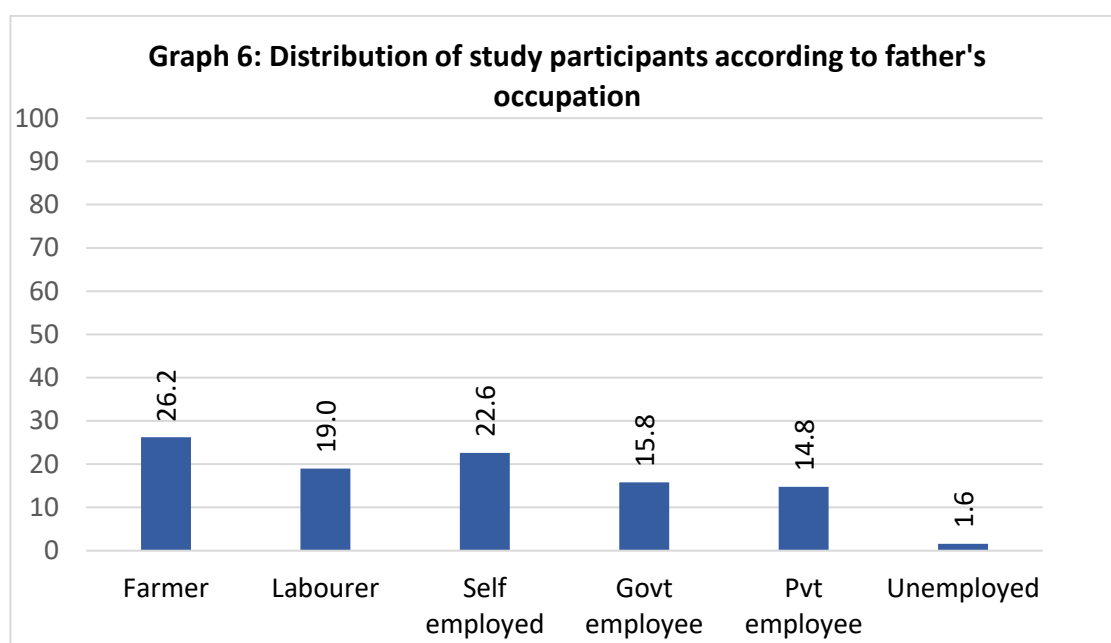
Literacy status	Number	Percentage
Illiterate	58	11.6
Primary	96	19.2
Secondary	192	38.4
PUC	82	16.4
Diploma	16	3.2
Degree	38	7.6
Post graduate	18	3.6
Total	500	100



Regarding literacy status of mothers of study subject, most of them 442 (88.4%) were literates. Among them 18 (3.6%) were post graduates, 38 (7.6%) were degree holder, 16 (3.2%) were diploma holder, 82 (16.4%) had completed PUC, 38 (7.6%) had completed schooling up to 10th standard, 18 (3.6%) had completed schooling up to 7th standard.

Table 6: Distribution of study participant according to father's occupation

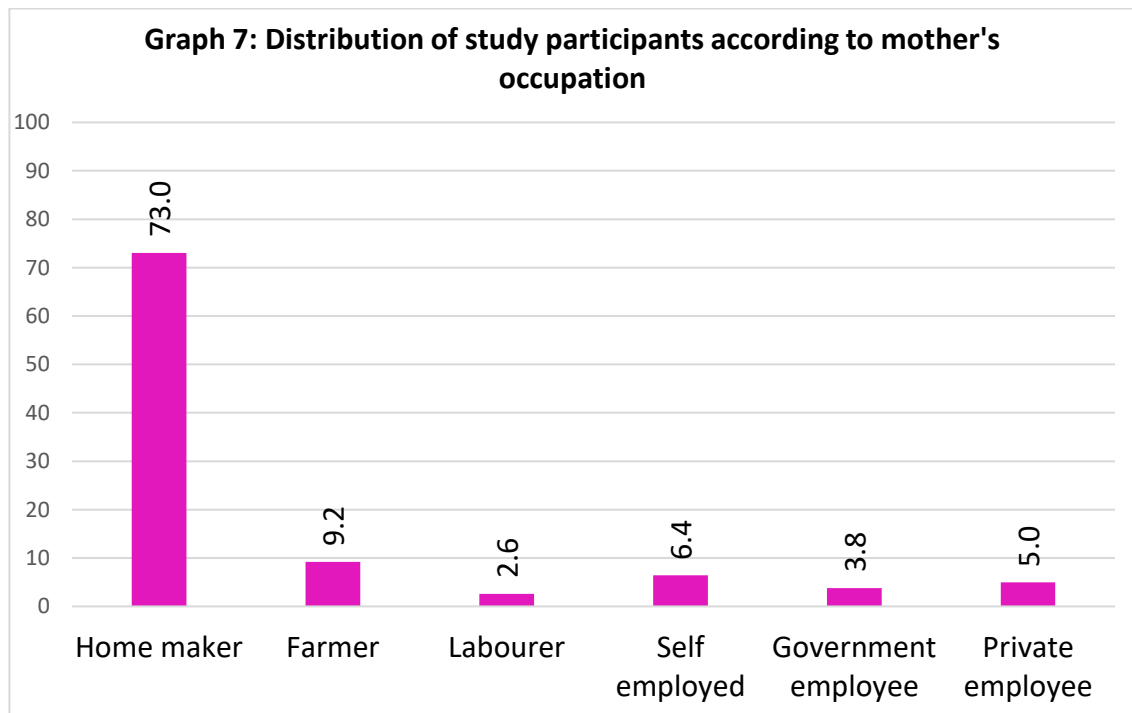
Occupation of father	Number	Percentage
Farmer	131	26.2
Labourer	95	19.0
Self employed	113	22.6
Government employee	79	15.8
Private employee	74	14.8
Unemployed	8	1.6
Total	500	100



In the present study regarding occupation of fathers of study participant, 131 (26.2%) were farmer by occupation, 95 (19.0%) were labourer, 113 (22.6%) were self-employed, 79 (15.8%) were government employee, 74 (14.8%) were employed in private sector and 8 (1.6%) were unemployed.

Table 7: Distribution of study participant according to mother's occupation

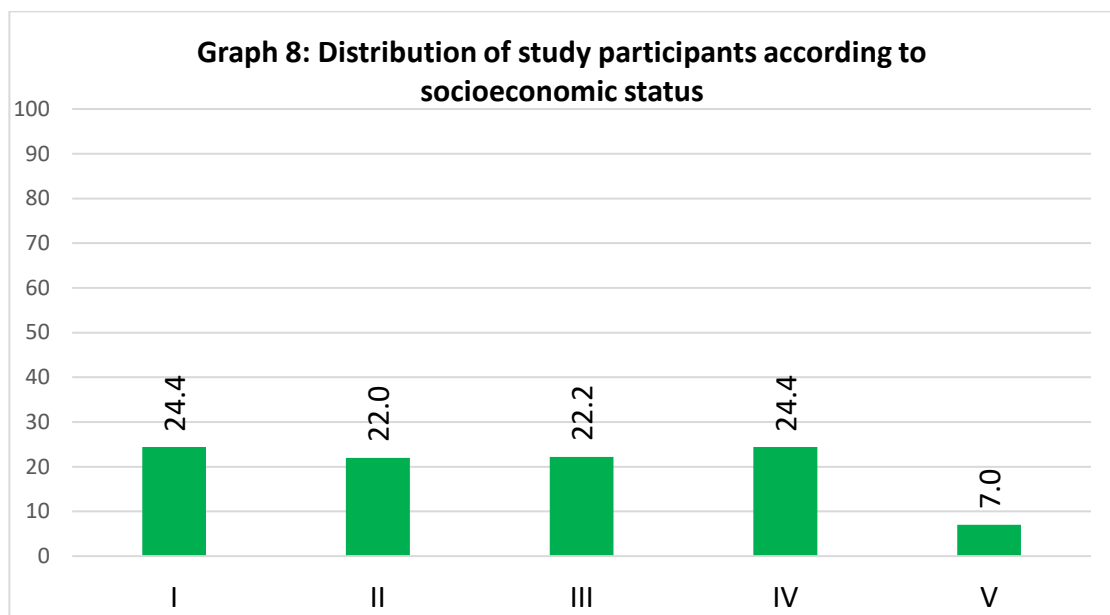
Occupation of mother	Number	Percentage
Home maker	365	73.0
Farmer	46	9.2
Labourer	13	2.6
Self employed	32	6.4
Government employee	19	3.8
Private employee	25	5.0
Total	500	100



In relation to occupation of mothers of study participant, 365 (73.0%) were homemaker and 135 (27.0%) were working mothers. Out of them 46 (9.2%) were farmer, 13 (2.6%) were labourer, 32 (6.4%) were self-employed, 19 (3.8%) were government employee, and 25 (5.0%) were employed in private sector.

Table 8: Distribution of study participant according to socioeconomic status

Socioeconomic status class	Number	Percentage
I	122	24.4
II	110	22.0
III	111	22.2
IV	122	24.4
V	35	7.0
Total	500	100



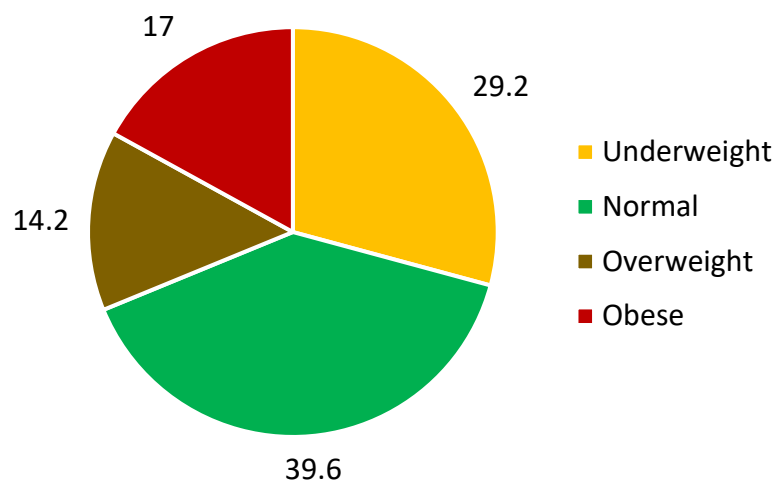
The present study reveals that out of 500 students, 122 (24.4%) of the study participant belonged to socio-economic class I according to Modified B. G. Prasad's classification, 110 (22.0%) belonged to class II, 111 (22.2%) belonged to class III, 122 (24.4%) belonged to class IV and 35 (7.0%) belonged to socio economic class V.

II. Body Mass Index of the study participants

Table 9: Distribution of study participant according to Body Mass Index

BMI Category	Number	Percentage
Underweight	146	29.2
Normal	198	39.6
Overweight	71	14.2
Obese	85	17.0
Total	500	100

Graph 9: Distribution of study participants according to the Body Mass Index



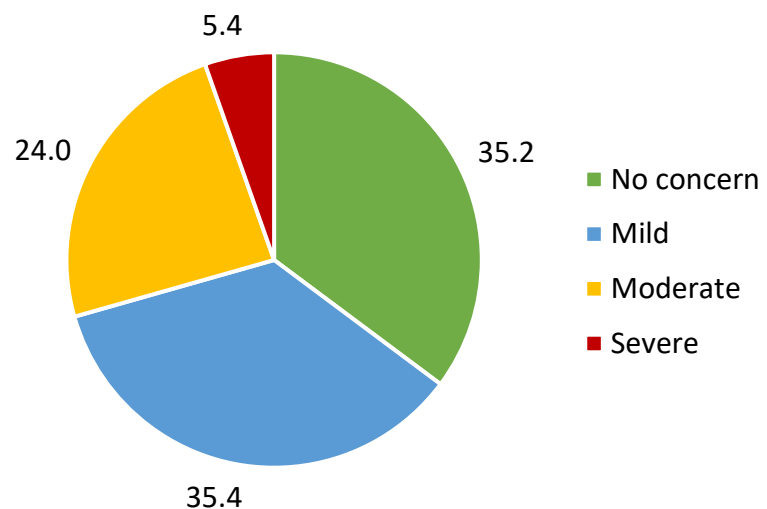
In our study, the median (IQR) BMI score was 20.43 (18.07 – 23.81). Among the study participants, 198 (39.6%) of the girls belonged to normal Body Mass Index category as per Asian classification of BMI, around 146 (29.2%) of them were underweight, 71 (14.2%) were overweight and 85 (17%) of the participants belonged to the obese category.

III. Body Image among the study participants

Table 10: Distribution of study participants according to body image concern

Body Image Concern	Number	Percentage
No concern	176	35.2
Mild	177	35.4
Moderate	120	24.0
Severe	27	5.4
Total	500	100

Graph 10: Distribution of study participants according to body image concern

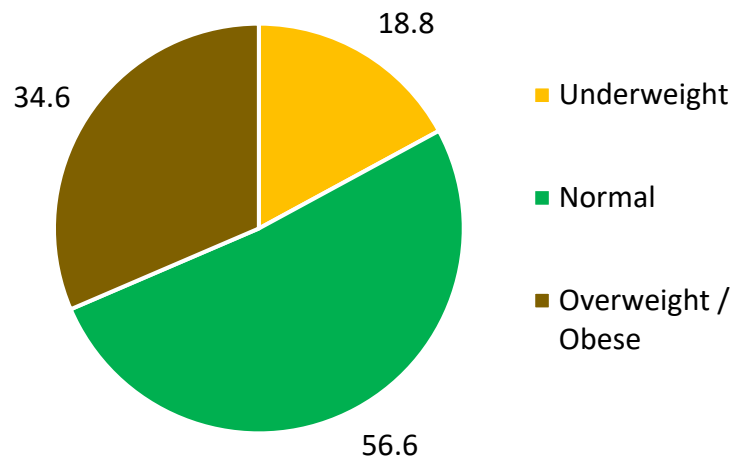


In the present study, the Median (IQR) of Body Image Score of the students was 21.00 (15.25 - 27.00) according to the BSQ 8C questionnaire. Among the 500 study subjects, around 176 (35.2%) of the participants had no body image concern, while 177(35.4%) of the students had mild, 120 (24.0%) had moderate and 27 (5.4%) of them had severe body image concern. The prevalence of body image concern was 64.8% and that of moderate and severe concern was 29.4% among the study participants.

Table 11: Distribution of study participants according to the perceived body image

Perceived Body Image	Number	Percentage
Underweight	94	18.8
Normal	283	56.6
Overweight / Obese	123	34.6
Total	500	100

Graph 11: Distribution of study participants according to the perceived body image

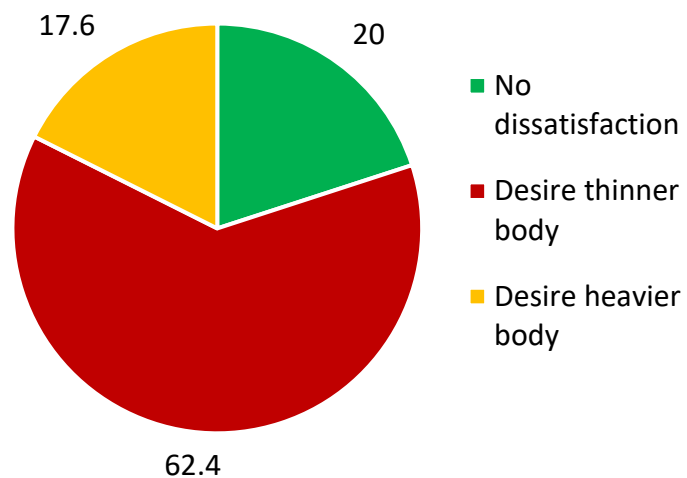


In our study, among the 500 students, according to the Stunkard figure rating scale, based on the selection of the silhouette that best represented their present body image, around 283 (56.6%) of students perceived their body image as normal, 94 (18.8%) of the participants felt they were underweight and 123 (34.6%) of them perceived that they were of the overweight or obese body image.

Table 12: Distribution of study participants according to body image dissatisfaction

Body Image Dissatisfaction	Number	Percentage
No dissatisfaction	100	20
Desire for a thinner body	312	62.4
Desire for a heavier body	88	17.6
Total	500	100

Graph 12: Distribution of study participants according to body image dissatisfaction



In our study, among the 500 study participants, 98 (19.6%) of them had no body image dissatisfaction, according to the Stunkard Figure Rating Scale and they felt their present body image is the ideal one. Majority 402 (80.4%) expressed body image dissatisfaction with 314 (62.8%) of participants desiring a thinner body and 88 (17.6%) of the students desiring to have a heavier body.

Table 13: Distribution of study participants according to the factors related to body image

Factor related to body image	Number	Percentage
Body image comparison with others by a family member		
Yes	247	49.4
No	253	50.6
Body shaming by batchmate / friend		
Yes	234	46.8
No	266	53.2
Pressure from advertisement / social media to look beautiful		
Yes	246	49.2
No	254	50.8
Total	500	100

In the current study, among the 500 study subjects, 247 (49.4%) of the girls had felt comparison of body image with others by a family member. Around 234 (46.8%) of the students had experienced body shaming by a batchmate or a friend. The felt pressure from advertisement or social media to look beautiful was reported by 246 (49.2%) of the study participants.

Table 14: Distribution of study participants according to the factors related to body image

Factor related to body image	Number	Percentage
Attempted to change (increase / decrease) weight		
Yes	273	54.6
No	227	45.4
Skipped meal as a method of dieting		
Yes	163	32.6
No	337	67.4
Total	500	100

In our study, among the 500 participants, 273 (54.6%) of the students had attempted to modify their weight. Around 163 (32.6%) of the girls had adopted skipping meal as a method of dieting to reduce the weight.

Table 15: Distribution of study participants according to the factors related to body image

Factor related to body image	Number	Percentage
Physical activity (30 min of walking/ running/ cycling / jogging / sports)		
Regular (4 – 5 days a week)	79	15.8
Sometimes (1-3 days a week)	336	67.2
None	85	17.0
Participant in competitive sports		
Yes	217	43.4
No	283	56.6
Total	500	100

In the present study, among the 500 students, 415 (83%) of the participants had engaged themselves in Physical activity like walking, running, jogging, cycling or sport activity while 85 (17%) of them did not do any routine physical activity. Around 79 (15.8%) students had regular physical activity of 4 to 5 days a week, while 336 (67.2%) of them were engaged in physical activity sometime 1 – 3 days a week. Among all the participants, 217 (43.4%) were engaged in competitive sports.

Table 16: Distribution of study participants according to academic performance

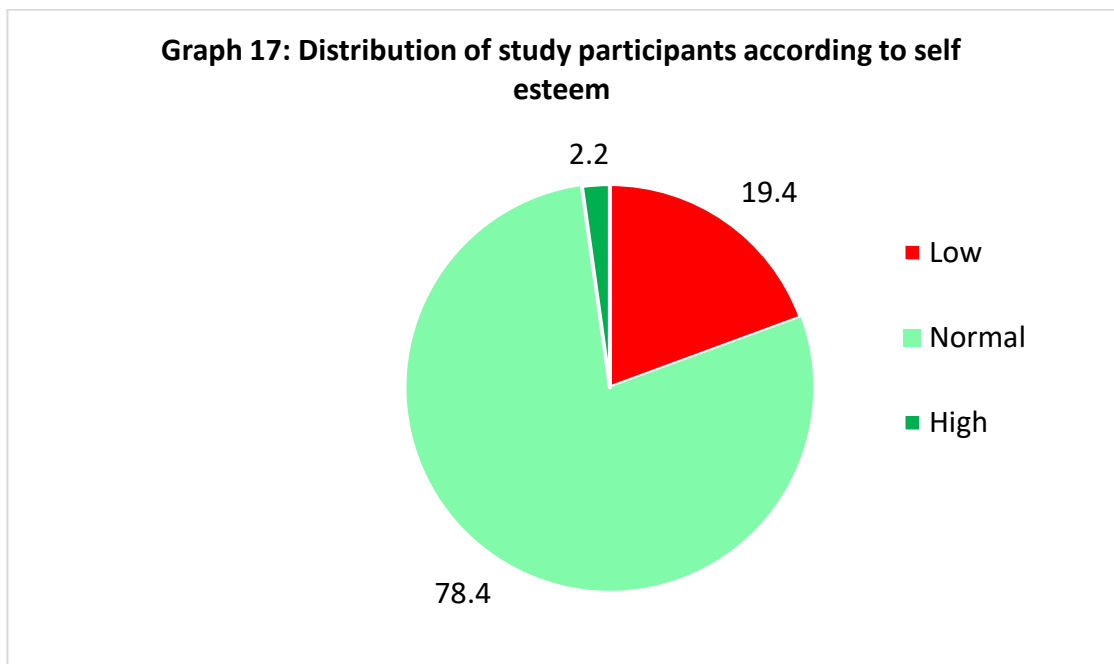
Academic performance in college	Number	Percentage
Excellent	69	13.8
Good	311	69.2
Regular	97	19.4
Bad	23	4.6
Total	500	100

In the present study, among the 500 study participants, 69 (13.8%) of them had reported excellent academic performance in college. Majority, 311 (69.2%) had reported their academic performance as good whereas 97 (19.4%) and 23 (4.6%) students had reported their academic performance as regular and bad respectively.

IV. Self esteem among the study participants

Table 17: Distribution of study participants according to self esteem

Self esteem	Number	Percentage
Low	97	19.4
Normal	392	78.4
High	11	2.2
Total	500	100

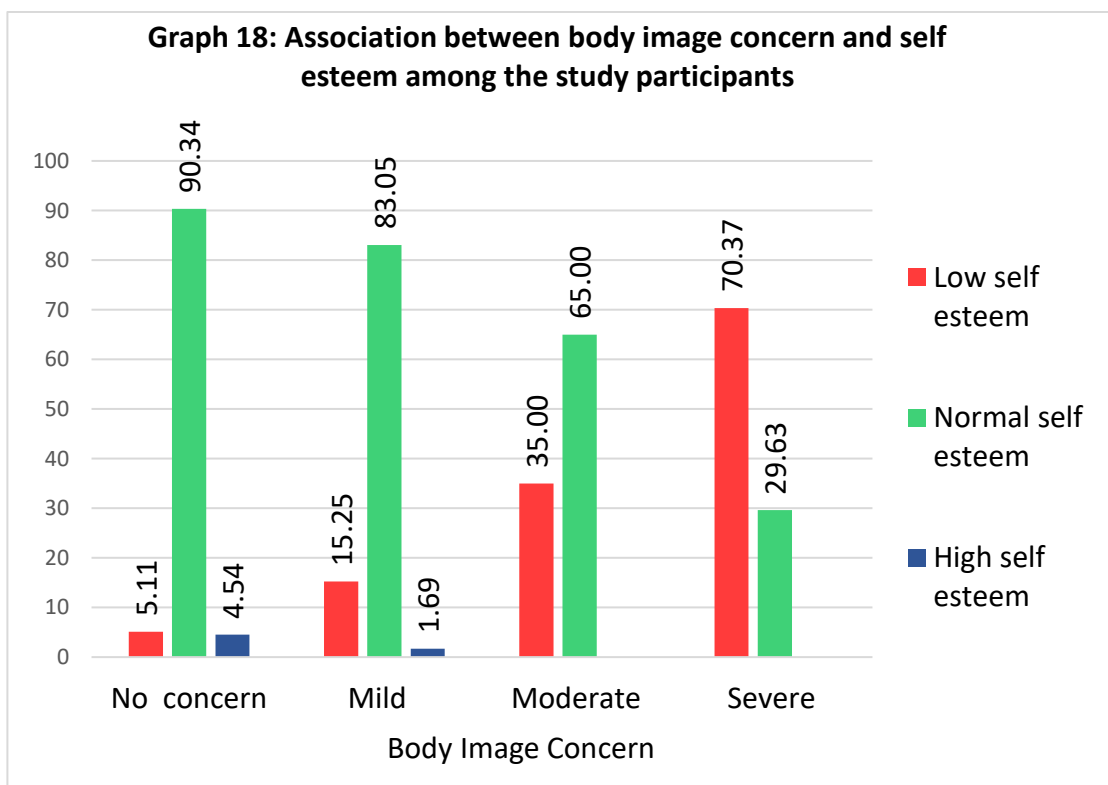


In our study, the Median (IQR) score of self esteem was 17 (15 – 20) among the girls according to the Rosenberg self esteem scale. Out of the 500 students, 97 (19.4%) of the participants had low self esteem, a majority 392 (78.4%) of them had normal self esteem and 11(2.2%) of the girls exhibited high self esteem. The prevalence of low self esteem was 19.40% among the study participants.

V. Association between body image and self esteem among the study participants

Table 18: Association between body image concern and self esteem among the study participants

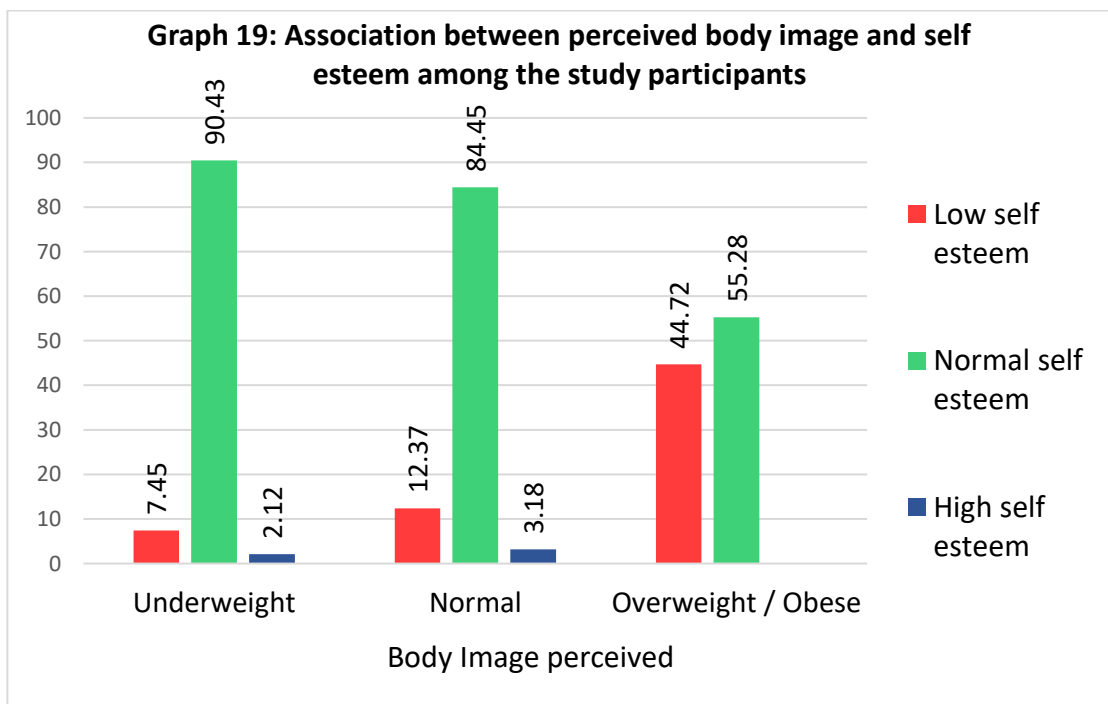
Body Image Concern	Low self esteem Number (%)	Normal Self esteem Number (%)	High self esteem Number (%)	Total Number (%)
No	9 (5.11)	159 (90.34)	8 (4.54)	176 (100)
Mild	27 (15.25)	147 (83.05)	3 (1.69)	177 (100)
Moderate	42 (35.00)	78 (65.00)	0 (0.00)	120 (100)
Severe	19 (70.37)	8 (29.63)	0 (0.00)	27 (100)
Total	97 (19.40)	392 (78.40)	11 (2.20)	500 (100)
Kendall's Tau c = -0.266 p<0.001				



In the current study, among the 176 students with no body image concern as per Body Shape Questionnaire BSQ 8C, 9 (5.11%) of them had low self esteem, a majority 159 (90.34%) of them had normal self esteem and 8 (4.54%) had high self esteem. Among the 177 students who had mild body image concern, 27 (15.25) girls had low self esteem, 147 (83.05%) had normal and 3(1.69) of them had low self esteem. In the 120 students with moderate body image concern category, 42 (35.00%) had low self esteem while 78 (65.00%) girls had normal self esteem and none of them had high self esteem. Among the 27 study participants with severe body image concern, 19 (70.37%) had low self esteem and 8 (29.63%) of them had normal self esteem and none exhibited high self esteem. It was noted that the proportion of students with low esteem were more among the Severe and Moderate body image concern students whereas normal and high self esteem was reported more among those participants with no and mild body image concern. In Kendall's tau c test, there was a weak to moderate negative association ($\tau_c = -0.266, p < 0.001$) between body image concern and self-esteem level, which suggests that as Body image concern increases, self-esteem tends to decrease.

Table 19: Association between perceived body image and self esteem among the study participants

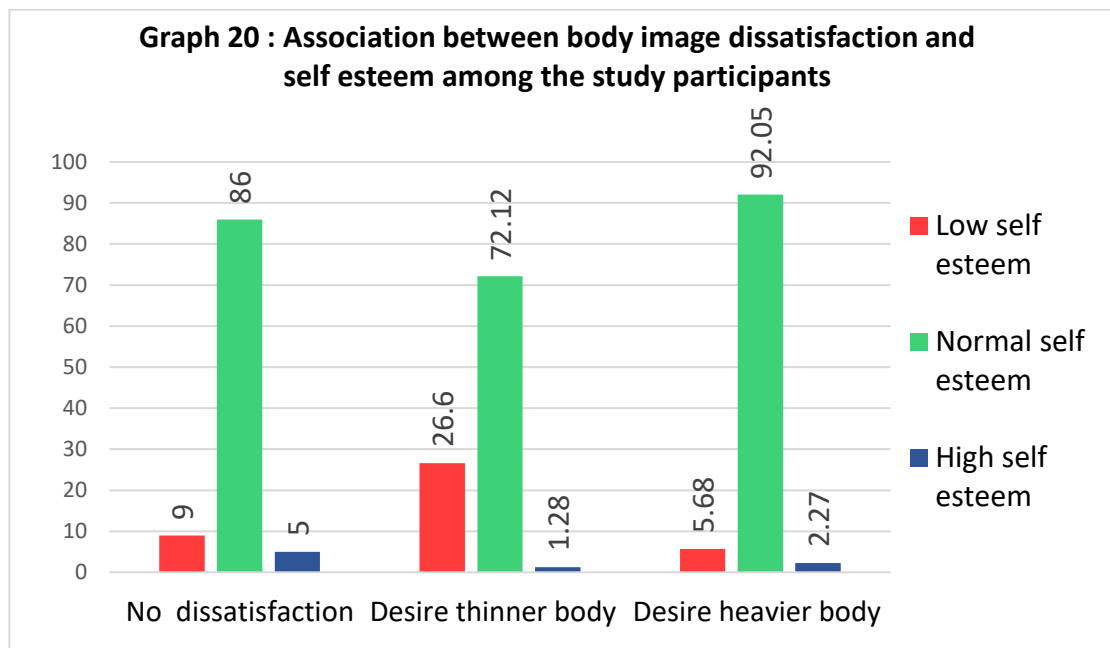
Body Image perceived	Low self esteem Number (%)	Normal Self esteem Number (%)	High self esteem Number (%)	Total Number (%)
Underweight	7 (7.45)	85 (90.43)	2 (2.12)	94 (100)
Normal	35 (12.37)	239 (84.45)	9 (3.18)	283 (100)
Overweight / Obese	55 (44.72)	68 (55.28)	0 (0.00)	123 (100)
Total	97 (19.40)	392 (78.40)	11 (2.20)	500 (100)
Kendall's Tau b= - 0.308 p<0.001				



In our study, among the 94 students who perceived their body image as underweight in the Stunkard Figure Rating Scale, 7(7.45%) of them had reported low self esteem, 85 (90.43%) girls had normal self esteem and 2 (2.12%) of them had high self esteem. In the 283 girls who perceived their body image as the normal silhouette, 35 (12.37%) had low self esteem, a majority 239 (84.45%) had normal self esteem and 9 (3.18%) had high self esteem. There were 123 students who perceived their body image as overweight or obese and of them, 55 (44.72%) students had low self esteem and the remaining 68 (55.28%) had normal self esteem. It was found that a higher percentage of students who perceived themselves as overweight or obese exhibited low self esteem, compared to those who perceived themselves to be of normal and underweight body image. Kendall's tau-b test showed a weak negative association ($\tau_b = -0.308$, $p < 0.001$) between perceived body image and self-esteem, indicating that as perceived body image size increases, self-esteem tends to decrease.

Table 20: Association between body image dissatisfaction and self esteem among the study participants

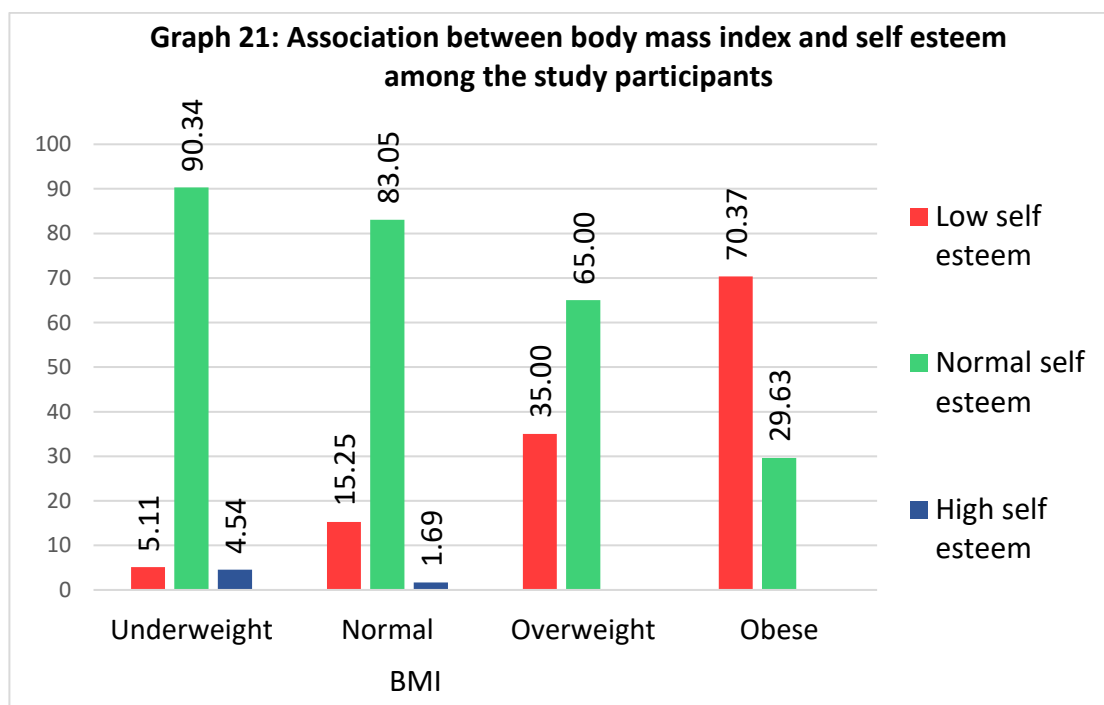
Body Image Dissatisfaction	Low self esteem Number (%)	Normal Self esteem Number (%)	High self esteem Number (%)	Total Number (%)
No dissatisfaction	9 (9.00)	86 (86.00)	5 (5.00)	100 (100)
Desire for a thinner body	83 (26.60)	225 (72.12)	4 (1.28)	312 (100)
Desire for a heavier body	5 (5.68)	81 (92.05)	2 (2.27)	88 (100)
Total	97 (19.40)	392 (78.40)	11 (2.20)	500 (100)
$\chi^2 = 31.61$ $df = 4$ $p < 0.001$ (Monte Carlo)				



In the present study, among the 100 study participants who were satisfied with their body image according to the Stunkard scale, 9 (9%) of them had low self esteem, 86 (86%) students had normal self esteem and 5 (5%) of them had high self esteem. Among those with body image dissatisfaction, desiring for a thinner body, 83 (26.60%) participants had low self esteem, 225 (72.12%) students had normal self esteem and 4 (1.28%) of them reported high self esteem. Among those dissatisfied with their body image and desirous of having a heavier body, 5 (5.68%) had low self esteem, 81 (92.05%) had normal self esteem and 2 (2.27%) of them had high self esteem. It was noted that people with body image dissatisfaction, particularly those desiring to have a thinner body image had lower self esteem comparatively and this difference in the level of self esteem among the Body Image dissatisfaction groups was statistically significant ($\chi^2 = 31.61$, $p < 0.001$).

Table 21: Association between Body Mass Index and self esteem among the study participants

Body Mass Index category	Low Self esteem Number (%)	Normal Self esteem Number (%)	High self esteem Number (%)	Total Number (%)
Underweight	9 (5.11)	159 (90.34)	8 (4.54)	176 (100)
Normal	27 (15.25)	147 (83.05)	3 (1.69)	177 (100)
Overweight	42 (35.00)	78 (65.00)	0 (0.00)	120 (100)
Obese	19 (70.37)	8 (29.63)	0 (0.00)	27 (100)
Total	97 (19.40)	392 (78.40)	11 (2.20)	500 (100)
Kendall's Tau c = - 0.183 p<0.001				

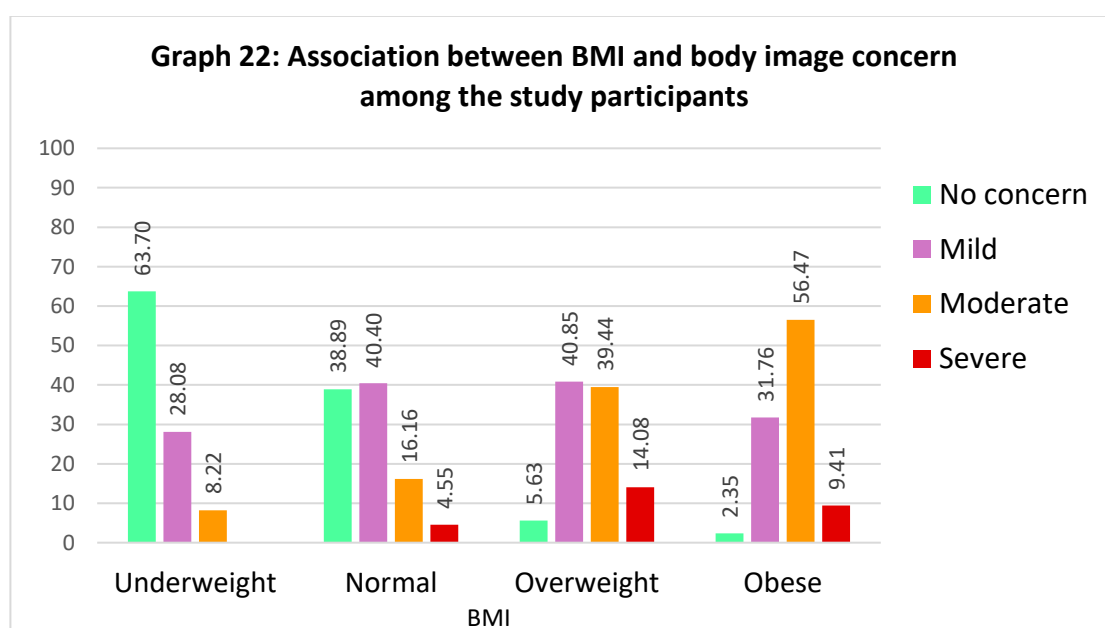


In our study, among the 176 students of the underweight category according to Asian Classification of BMI, a majority 159 (90.34%) of them had normal self esteem, 9 (5.11%) students had low self esteem while 8(4.54%) of them exhibited high self esteem. In the 177 students of the normal BMI category, 147 (83.05%) had normal self esteem, while 27 (15.25%) participants had low self esteem and 3 (1.69%) of them haad high self esteem. Among the students belonging to the Overweight category of BMI 42 (35%) of them had low self esteem and the remaining 78 (65.00%) girls reported high self esteem. Among the 27 students of Obese BMI category, 19 (70.37%) had low self esteem while the other 8 (29.63) participants had normal self esteem. The prevalence of low self esteem was higher among the Obese and Overweight participants. Kendall's tau c test showed a weak negative association ($\tau_c = -0.183$, $p < 0.001$) between BMI and self-esteem, indicating that as BMI increases, self-esteem tends to decrease.

VI. Association between BMI and body image among the study participants

Table 22: Association between BMI and body image concern among the study participants

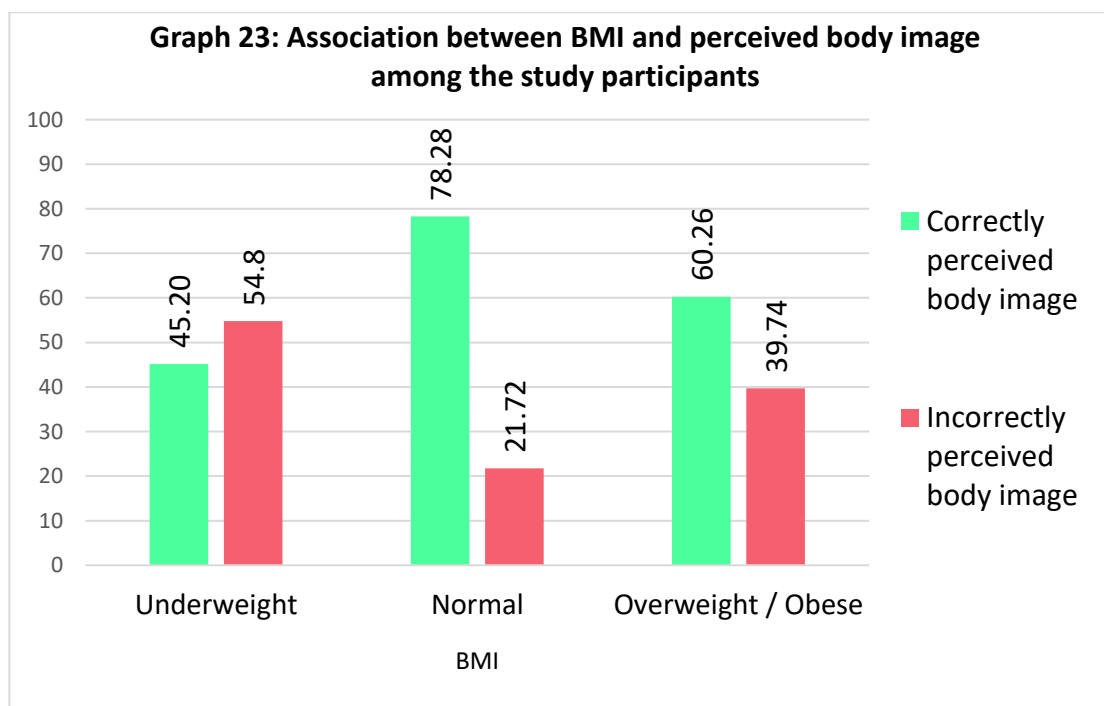
BMI Category	No body image concern Number (%)	Mild body image concern Number (%)	Moderate body image concern Number (%)	Severe Body Image concern Number (%)	Total Number (%)
Underweight	93 (63.70)	41 (28.08)	12 (8.22)	0 (0.00)	146 (100)
Normal	77 (38.89)	80 (40.40)	32 (16.16)	9 (4.55)	198 (100)
Overweight	4 (5.63)	29 (40.85)	28 (39.44)	10 (14.08)	71 (100)
Obese	2 (2.35)	27 (31.76)	48 (56.47)	8 (9.41)	85 (100)
Total	176 (35.20)	177 (35.40)	120 (24.00)	27 (5.40)	500 (100)
Kendall's Tau b = 0.473 p<0.001					



In the current study, among the 146 students of underweight BMI, 93 (63.70%) had no body image concern as per the BSQ 8C questionnaire, 41 (28.08%) had mild concern and the remaining 12 (8.22%) students had moderate body image concern. Among the 198 students belonging to the Normal BMI category, 77 (38.89%) girls had no body image concern, whereas 80 (40.40%), 32 (16.16%) and 9 (4.55%) girls had mild, moderate and severe body image concern respectively. Prevalence of body image concern was 94.31% and 97.65% among the overweight and obese students respectively. Precisely, among the 71 students of overweight category, 4 (5.63%) had no body image concern, while 29 (40.85%), 28 (39.44%) and 10 (14.08%) had mild, moderate and severe body image concerns respectively. Among the 85 obese participants, 2 (2.35%) students had no body image concern, 27 (31.76%) had mild concern, 48 (56.47%) had moderate body image concern and 8 (9.41%) of them had severe body image concern. The prevalence of body image concern, especially moderate and severe concern was considerably higher among the Overweight and Obese category of students. Kendall's tau-b test showed a moderate positive association ($\tau_b = 0.473$, $p < 0.001$) between BMI and Body Image Concern, indicating that as BMI increases, body image concern tends to increase.

Table 23: Association between BMI and perceived body image among the study participants

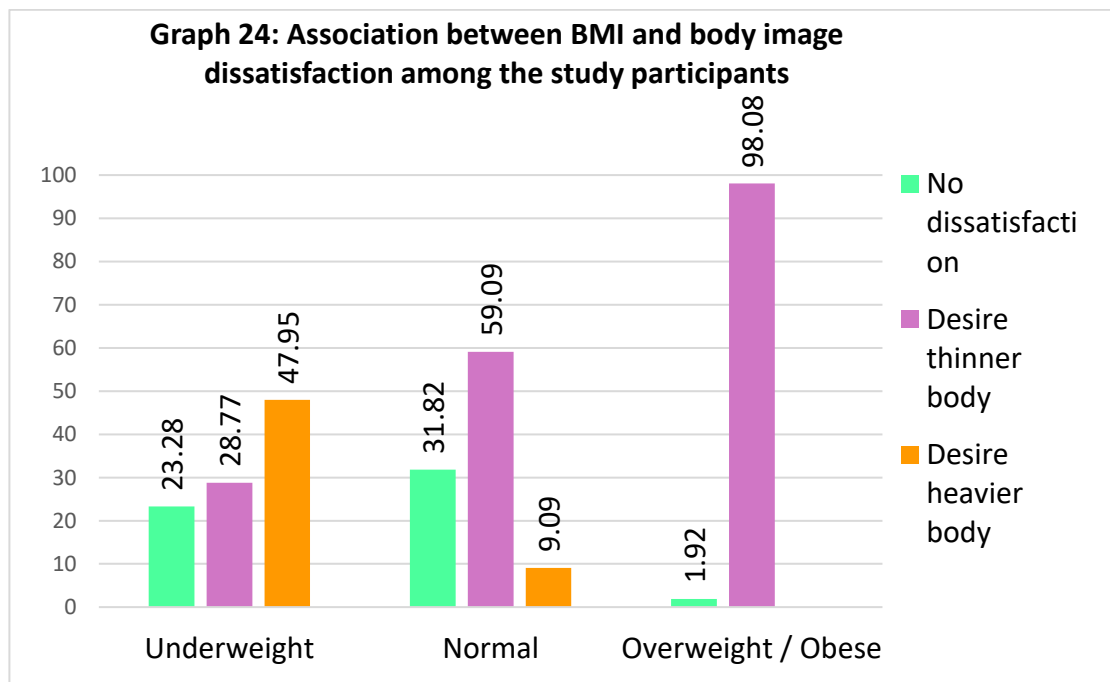
BMI category	Correctly perceived body image Number (%)	Incorrectly perceived body image Number (%)	Total Number (%)
Underweight	66 (45.20)	80 (54.80)	146 (100)
Normal	155 (78.28)	43 (21.72)	198 (100)
Overweight / Obese	94 (60.26)	62 (39.74)	156 (100)
Total	315 (63.00)	185 (37.00)	500 (100)
$\chi^2 = 40.18$ df = 2 p<0.001			



In our study, among the 146 students who were in the Underweight category as per the Asian classification of BMI, only 66 (45.20%) had correct perception of the body image, as reported in the Stunkard Figure Rating Scale whereas the remaining 80 (54.80%) students had erroneous body image perception. Among the 198 students belonging to the Normal BMI category, a majority 155 (78.28%) students correctly perceived their body image and the other 43 (21.72%) girls had incorrect body image perception. Among the 156 students of the Overweight / Obese BMI group, 94 (60.26%) participants had correctly perceived body image and 62 (39.74%) had incorrect body image perception. A higher proportion of students belonging to the Underweight group, followed by the Overweight / Obese groups had incorrect body image perception which did not correspond to their BMI, compared to the participants with normal BMI which was statistically significant ($\chi^2 = 40.18$, $p < 0.001$).

Table 24: Association between BMI and body image dissatisfaction among the study participants

BMI Category	No dissatisfaction Number (%)	Desire a thinner body Number (%)	Desire a heavier body Number (%)	Total Number (%)
Underweight	34 (23.28)	42 (28.77)	70 (47.95)	146 (100)
Normal	63 (31.82)	117 (59.09)	18 (9.09)	198 (100)
Overweight / Obese	3 (1.92)	153 (98.08)	0 (0.00)	156 (100)
Total	100	312	88	500 (100)
$\chi^2 = 210.73$ $df = 4$ $p < 0.001$ (Monte Carlo)				

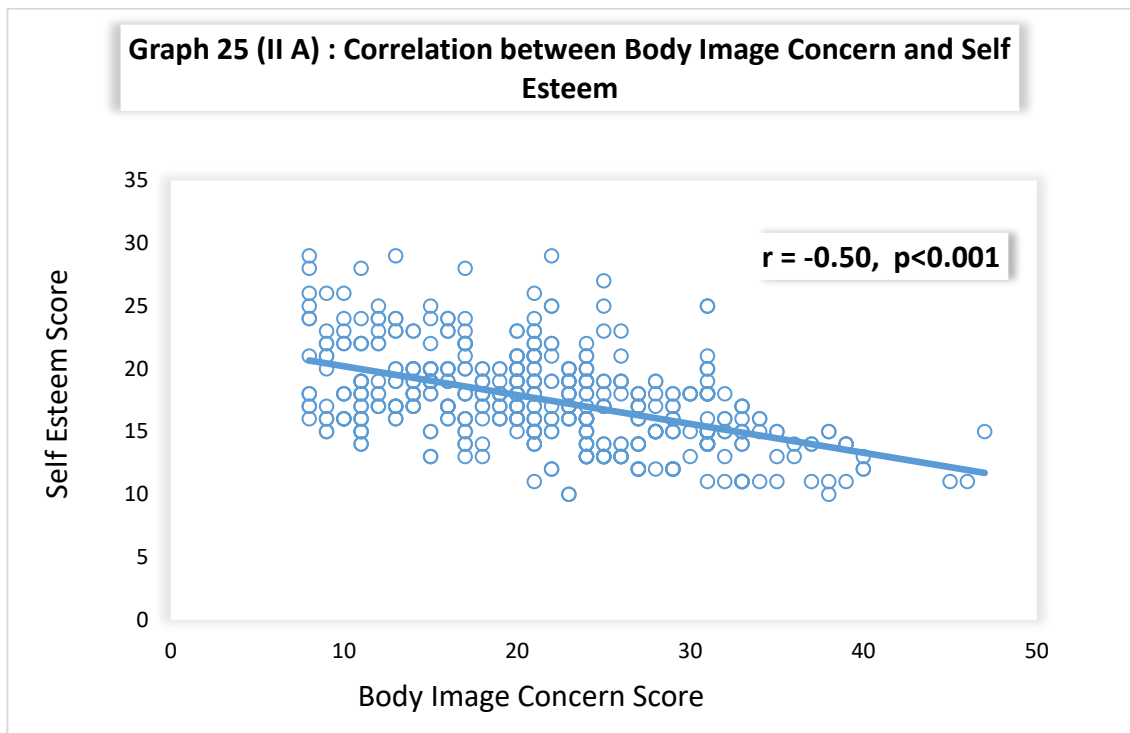


In the present study, among the 146 students of Underweight BMI group, 34 (23.28%) study subjects had no body image dissatisfaction as per the Stunkard figure rating scale's Body Image dissatisfaction score, 42 (28.77%) participants desired for a still thinner body and 70 (47.95%) of them desired to have a heavier body image. Among the 198 students of the normal BMI category, only 63 (31.82%) girls were satisfied with their body image. A majority 117 (59.09%) participants desired for a thinner body and 18 (9.09%) of them desired to have a heavier body, in the normal BMI group. Among the 156 students belonging to the Overweight / Obese BMI category, 153 (98.08%) girls desired to have a thinner body image and 3 (1.92%) of them were satisfied with their body image. The prevalence of body image dissatisfaction was comparatively more among the Overweight / Obese BMI group and the Underweight BMI group of students. The difference in prevalence of body image dissatisfaction among the participants of different BMI category was statistically significant ($\chi^2 = 210.73$, $p < 0.001$).

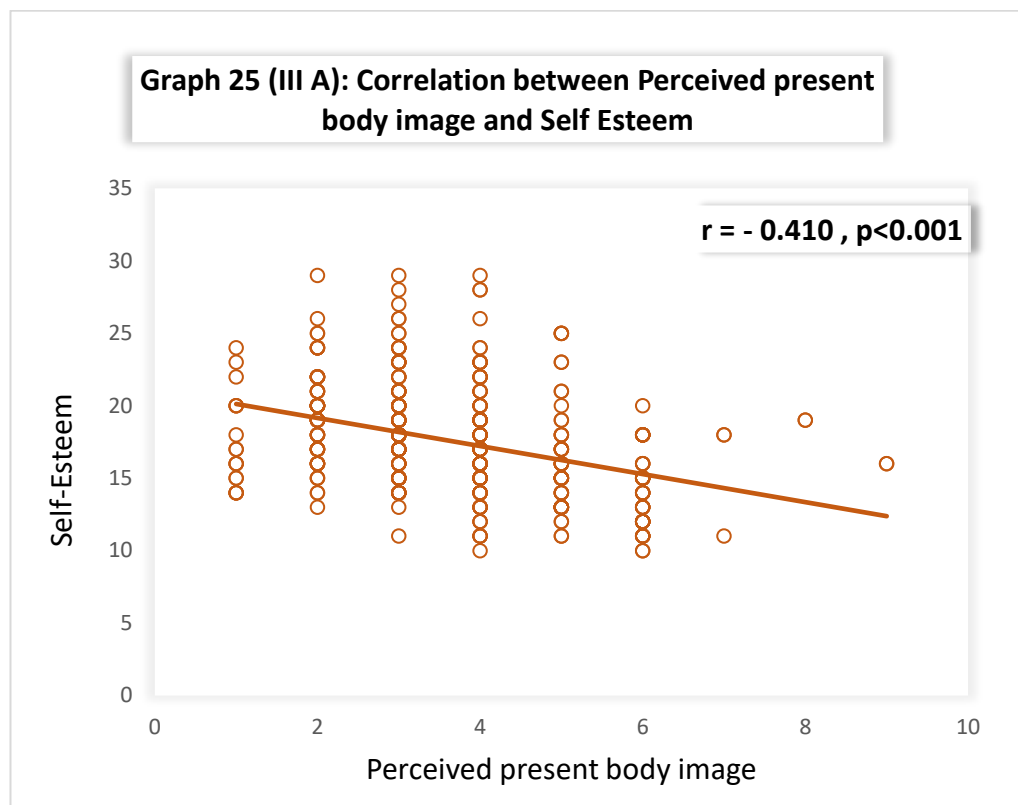
VII. Correlation among body image, self esteem and BMI of the study participants

Table 25: Correlation among body image, self esteem and BMI among the study participants

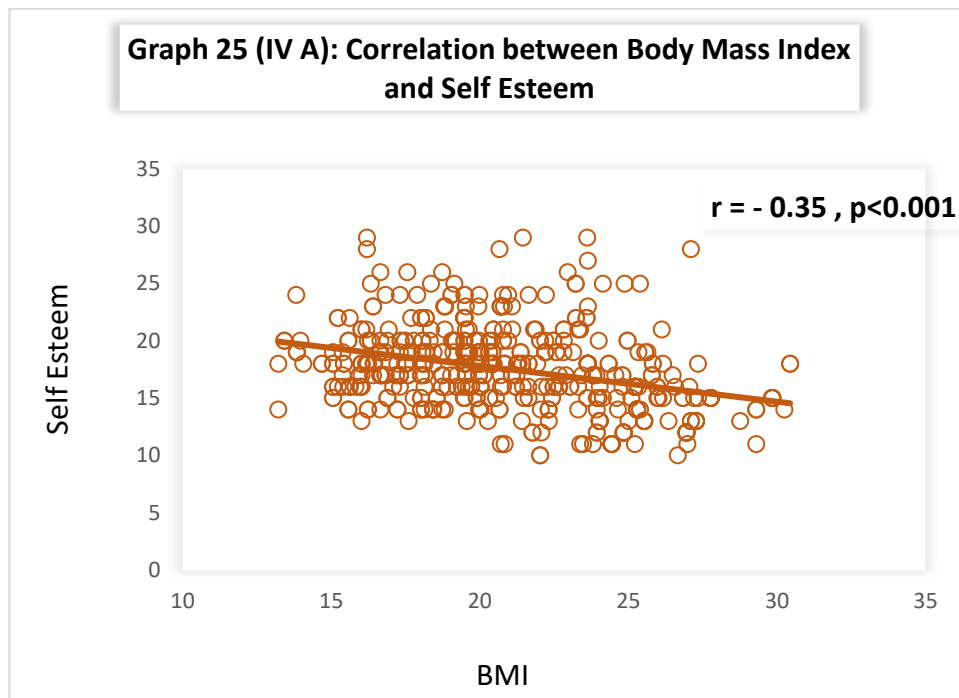
Spearman's rho						
			I	II	III	IV
			Self Esteem score	Body Image Concern Score	Perceived present Body Image	BMI
A	Self Esteem score	Correlation Coefficient Sig. (2- tailed)	1	-0.50 <0.001	-0.41 <0.001	-0.35 <0.001
B	Body Image Concern Score	Correlation Coefficient Sig. (2- tailed)		1	0.58 <0.001	0.59 <0.001
C	Perceived present Body Image	Correlation Coefficient Sig. (2- tailed)			1	0.64 <0.001
D	BMI	Correlation Coefficient Sig. (2- tailed)				1



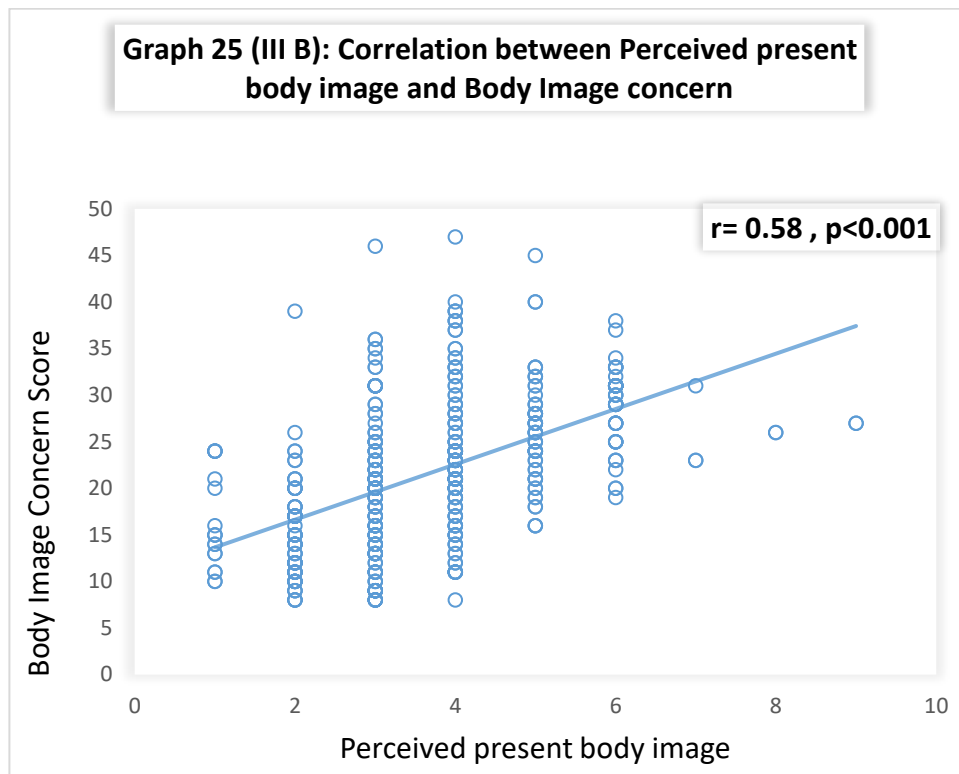
Spearman's correlation analysis showed a significant moderate negative correlation between Body Image Concern scores and Self-Esteem scores ($r = -0.50, p < 0.001$), indicating that as Body Image Concern scores increase, Self-Esteem scores tend to decrease.



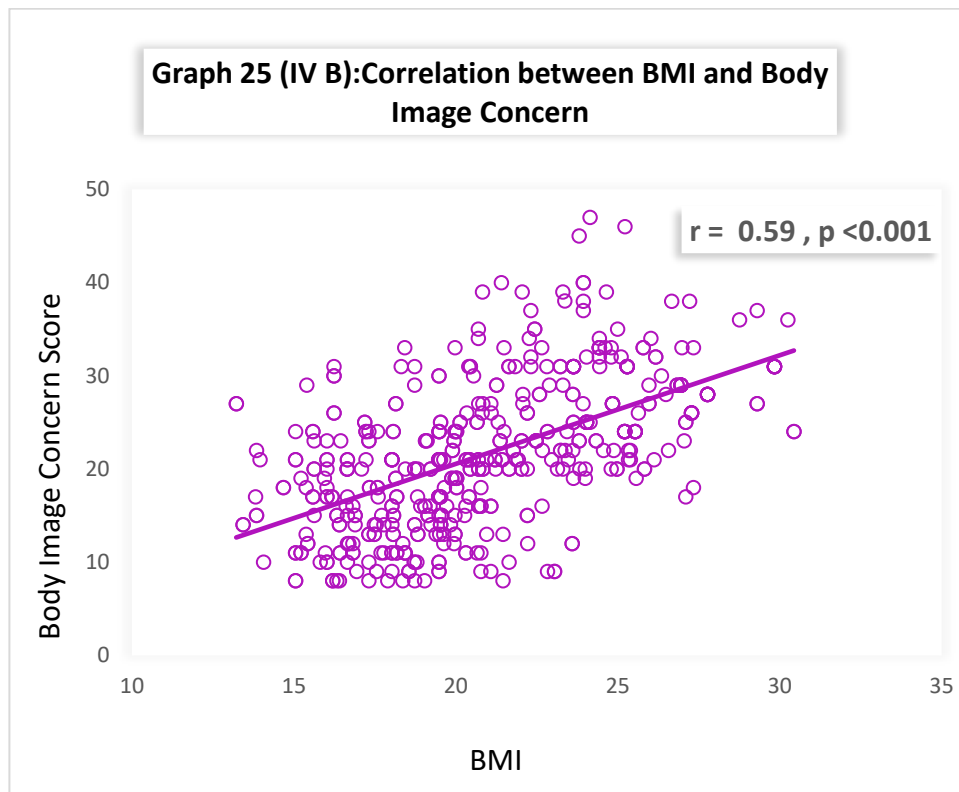
Spearman's correlation analysis revealed a significant moderate negative correlation between Perceived Body Image and Self-Esteem scores ($r = -0.410, p < 0.001$), suggesting that as the perceived body image size/ number increases, Self-Esteem scores tend to decrease.



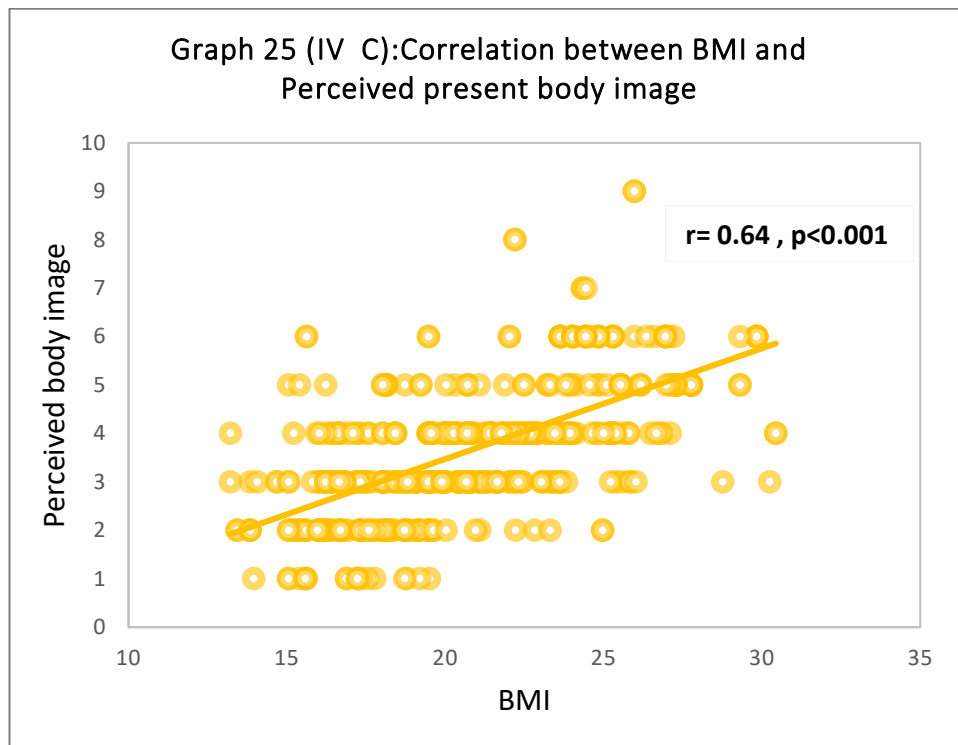
Spearman's correlation analysis showed a weak to moderate negative correlation between BMI and Self-Esteem scores, $r = - 0.35$, $p < 0.001$, indicating that individuals with higher BMI tend to have lower Self-Esteem.



Spearman's correlation analysis revealed a moderate positive correlation between Perceived present body image score and Body Image Concern score, $r = 0.58$, $p < 0.001$, suggesting that as the perceived body image number increases, Body Image Concern score tends to increase as well.



Spearman's correlation analysis showed a moderate positive correlation between BMI and Body Image score, $r = 0.59, p < 0.001$, indicating that as BMI increases Body Image Concern score tends to increase as well.



Spearman's correlation analysis showed a moderate to strong positive correlation between BMI and Perceived body image, $r = 0.64$, $p < 0.001$, suggesting that as BMI increase Perceived present body image value tends to increase as well.

VIII. Assessment of effect of sociodemographic and other variables on body image and self esteem among study participants

Table 26: Effect of sociodemographic variables on body image concern

Variable	Unstandardized Coefficients Beta (95% Confidence Interval)	Standardized Coefficients Beta	Significance P value
Age	-0.18 (-0.59, 0.23)	-0.033	0.389
No. of family members ≥ 5 ≤ 4 (Ref)	-0.496 (-1.617, 0.624)	-0.032	0.384
Religion Hindu Others (Ref)	-0.581 (-2.134, 0.973)	-0.027	0.463
Type of Family Joint Broken Nuclear (Ref)	0.168 (-0.978, 1.313) -1.223 (-4.129, 1.682)	0.01 -0.028	0.773 0.408
Education of father Illiterate Primary (1st to 7th) High School (8th to 10th) PUC or Diploma Degree Post graduate (Ref)	0.413 (-3.172, 3.999) -0.987 (-3.459, 1.485) 0.298 (-1.948, 2.545) -0.942 (-3.113, 1.229) -0.563 (-2.583, 1.456)	0.01 -0.049 0.016 -0.048 -0.032	0.821 0.433 0.794 0.394 0.584
Education of mother Illiterate Primary (1st to 7th) High School (8th to 10th) PUC or Diploma Degree or Post Graduate (Ref)	-0.939 (-3.626, 1.747) -1.382 (-3.631, 0.866) -0.114 (-2.151, 1.924) -0.429 (-2.391, 1.533)	-0.039 -0.07 -0.007 -0.022	0.492 0.228 0.913 0.667

Occupation of Father			
Labourer	2.733 (1.059, 4.408)	0.139	0.001
Self-Employed	-0.66 (-2.463, 1.143)	-0.036	0.472
Govt Employee	-0.686 (-2.745, 1.373)	-0.032	0.513
Private Employee	0.555 (-1.365, 2.475)	0.025	0.57
Unemployed	0.269 (-3.291, 4.458)	0.004	0.9
Farmer (Ref)			
Occupation of Mother			
Labourer	-3.302 (-6.967, 0.364)	-0.068	0.077
Self-Employed	-0.842 (-3.797, 2.113)	-0.027	0.576
Govt Employee	-5.495 (-8.846, -2.145)	-0.136	0.001
Pvt. Employee	-3.81 (-6.851, -0.769)	-0.107	0.014
Home maker	-3.102 (-5.069, -1.135)	-0.178	0.002
Farmer (Ref)			
Socio Economic Status			
SES1	-1.061 (-2.828, 0.706)	-0.059	0.239
SES2	0.03 (-1.606, 1.665)	0.002	0.972
SES3	-1.349 (-2.805, 0.108)	-0.072	0.07
SES 4 or 5 (Ref)			

Multiple Linear Regression was carried out to check the influence of various factors on Body Image Score. The analysis revealed that among the sociodemographic variables, occupation of father and occupation of mother were significant predictors of Body Image Concern Score. As compared to male farmers' children, children whose fathers were Laborer on an average had 2.733 units higher Body Image Concern score. As compared to female farmers' children, children whose mothers were government employee, private employee and home maker scored on an average 5.49, 3.81 and 3.102 units less on Body Image Concern respectively. No other sociodemographic variable was significant.

Table 27: Effect of other variables on body image concern

Variable	Unstandardized Coefficients Beta (95% Confidence Interval)	Standardized Coefficients Beta	Significance P value
BMI	0.761 (0.564, 0.958)	0.371	<0.001
Body Image Dissatisfaction			
No dissatisfaction	2.619 (0.825, 4.413)	0.134	0.004
Desire a thinner body	6.579 (4.822, 8.337)	0.411	<0.001
Desire a heavier body (Ref)			
Pressure of body image comparison with others by a family member			
Felt	1.208 (0.055, 2.36)	0.078	0.04
Not Felt (Ref)			
Body shaming by a batchmate or a friend			
Felt	2.452 (1.34, 3.565)	0.158	<0.001
Not Felt (Ref)			
Pressure from advertisement or social media to look beautiful			
Felt	0.928 (-0.142, 1.998)	0.06	0.089
Not Felt (Ref)			
Made attempt to change weight			
Yes	2.214 (0.673, 3.754)	0.116	0.005
No (Ref)			
Skipped meal as a method of dieting			
Yes	0.97 (-0.273, 2.212)	0.059	0.126
No (Ref)			

Participant in competitive sports			
Yes	0.337 (-0.702, 1.377)	0.022	0.524
No (Ref)			
Engage in Physical Activity			
Regular (4-5 days / week)	1.138 (-0.3, 2.577)	0.054	0.121
None	-0.222 (-1.611, 1.167)	-0.011	0.754
Sometime (1-3) days a week (Ref)			
Academic performance			
Excellent	-1.142 (-2.954, 0.671)	-0.051	0.216
Good	0.458 (-0.836, 1.753)	0.029	0.487
Regular or Bad (Ref)			

Multiple Linear Regression was carried out to check the influence of various factors on Body Image Score. The analysis revealed that BMI, body image dissatisfaction, pressure of body image comparison by batchmates/ friends and family and attempts to change weight were significant predictors of Body Image Concern Score.

For every one unit increase in BMI, the Body Image Concern Score on an average would increase by 0.761. Participants having desire for thinner body image and same body image had 6.579 and 2.619 units higher Body Image Concern score respectively as compared to participants who desired to have a heavier body. Students who felt the pressure of body image comparison with others by a family member scored on an average 1.208 units higher on Body Image Concern score as compared to students who did not feel the pressure. Students who have experienced body shaming by a batchmate or a friend showed on an average 2.452 units higher Body Image Concern as compared to students who did not face body shaming by friend/ batchmate. Students who have tried to change their weight had 2.214 higher Body Image Concern Score as compared to students who did not attempt to change their weight.

No other variables were significant.

The **Adjusted R^2** value for the regression model predicting **Body Image Concern** was 0.46, indicating that approximately **46%** of the variance was explained by the independent variables included in the model.

Table 28: Effect of sociodemographic variables on self esteem

Variable	Unstandardized Coefficients Beta (95% Confidence Interval)	Stand ardiz ed Coeffi cients Beta	Signifi cance P value
Age	0.334 (0.133, 0.536)	0.132	0.001
No. of family members ≥ 5 ≤ 4 (Ref)	0.599 (0.047, 1.151)	0.084	0.034
Religion Hindu Others (Ref)	0.468 (-0.303, 1.238)	0.047	0.234
Type of Family Joint Broken Nuclear (Ref)	-0.124 (-0.693, 0.446) 0.059 (-1.374, 1.493)	-0.016 0.003	0.67 0.936
Education of father Illiterate Primary (1st to 7th) High School (8th to 10th) PUC or Diploma Degree Post graduate (Ref)	-0.070 (-1.847, 1.706) 0.133 (-1.096, 1.363) 1.103 (-0.017, 2.224) 0.510 (-0.572, 1.591) 0.673 (-0.334, 1.679)	-0.004 0.014 0.131 0.057 0.082	0.938 0.832 0.054 0.355 0.19
Education of mother Illiterate Primary (1st to 7th) High School (8th to 10th) PUC or Diploma Degree or Post Graduate (Ref)	-0.558 (-1.878, 0.763) -1.191 (-2.31, -0.071) -0.826 (-1.837, 0.185) 0.416 (-0.555, 1.387)	-0.05 -0.132 -0.113 0.046	0.407 0.037 0.109 0.4

Results			
Occupation of Father			
Labourer	0.019 (-0.82, 0.859)	0.002	0.964
Self-Employed	1.396 (0.504, 2.289)	0.164	0.002
Govt Employee	0.251 (-0.768, 1.271)	0.026	0.628
Private Employee	0.054 (-0.904, 1.012)	0.005	0.912
Unemployed	-1.082 (-3.16, 0.995)	-0.038	0.306
Farmer (Ref)			
Occupation of Mother			
Labourer	0.210 (-1.602, 2.023)	0.009	0.82
Self-Employed	-0.214 (-1.664, 1.235)	-0.015	0.771
Govt Employee	1.764 (0.086, 3.443)	0.095	0.039
Pvt. Employee	-1.157 (-2.667, 0.352)	-0.071	0.133
Home maker	-0.131 (-1.11, 0.848)	-0.016	0.793
Farmer (Ref)			
Socio Economic Status			
SES1	0.759 (-0.111, 1.63)	0.092	0.087
SES2	0.521 (-0.291, 1.332)	0.061	0.208
SES3	-0.499 (-1.215, 0.218)	-0.058	0.172
SES 4 or 5 (Ref)			

Multiple Linear Regression analysis carried out to check the influence of various factors on Self-Esteem revealed that among the sociodemographic factors age, number of family members, literacy status of mother of the participants, occupation of father and mother of the study subjects were significant predictors of self esteem score.

For every unit increase in age, there was on an average increase of 0.334 units in Self-Esteem score. Students whose family consists of 5 or more members had on an average of 0.599 units higher self-esteem had compared to students whose family had four or less than four members. Students whose mothers had education up to the primary level scored, on average, 1.19 points lower on self esteem compared to those whose mothers were postgraduate. Students of self-employed fathers had on an average 1.396 higher

self-esteem scores compared to those whose fathers were farmers. Students of government employed mothers had on an average 1.764 higher self-esteem scores compared to those whose mothers were farmers. No other sociodemographic variable was significant.

Table 29: Effect of other variables on self esteem

Variable	Unstandardized Coefficients Beta (95% Confidence Interval)	Standardized Coefficients Beta	Significance P value
Body Image Concern score	-0.149 (-0.192, -0.106)	-0.325	<0.001
Body Image Dissatisfaction			
No dissatisfaction	0.716 (-0.138, 1.57)	0.08	0.1
Desire a thinner body	0.361 (-0.486, 1.209)	0.049	0.403
Desire a heavier body (Ref)			
Pressure of body image comparison with others by a family member			
Not felt	0.313 (-0.252, 0.879)	0.044	0.277
Felt (Ref)			
Body shaming by a batchmate or a friend			
Not felt	0.921 (0.367, 1.475)	0.129	0.001
Felt (Ref)			
Pressure from advertisement or social media to look beautiful			
Not felt	0.845 (0.302, 1.388)	0.119	0.002
Felt (Ref)			
Made attempt to change weight			
No	-0.805 (-1.875, 0.266)	-0.113	0.14
Yes (Ref)			
Skipped meal as a method of dieting			
No	0.366 (-0.245, 0.978)	0.048	0.24
Yes (Ref)			

Participant in competitive sports			
No	-0.269 (-0.785, 0.247)	-0.037	0.307
Yes (Ref)			
Engage in Physical Activity			
Regular (4-5 days / week)	1.247 (0.535, 1.959)	0.128	0.001
None	0.539 (-0.149, 1.228)	0.057	0.124
Sometime (1-3) days a week (Ref)			
Academic performance			
Excellent	1.868 (0.966, 2.771)	0.181	<0.001
Good	1.467 (0.825, 2.108)	0.2	<0.001
Regular or Bad (Ref)			

Multiple Linear Regression analysis carried out to check the influence of various factors on Self-Esteem revealed that body image concern score, pressure of body comparison by batchmates and friends, pressure from advertisement or social media, engaging in physical activity academic performance were significant predictors of self esteem score. For every one unit increase in body image concern score, the self-esteem score decreased by 0.149 units

Students who did not feel the pressure of body image comparison with others/ body shaming by a batchmate or a friend scored on an average 0.921 units higher on Self-Esteem as compared to students who felt the pressure. Students who did not feel the pressure from advertisement or social media to look beautiful scored 0.845 points higher on Self-Esteem as compared to students who felt the pressure. Students who engage in regular physical activity had on average scored 1.247 units more on Self-Esteem score as compared to students who sometimes engage in physical activity. Students who classified their academic performance as excellent and good had score 1.868 and 1.467 units respectively higher on self-esteem score as compared to students who classified themselves as regular or bad.

No other variables were significant.

The **Adjusted R²** value for the regression model predicting **Self-Esteem** was 0.44, indicating that approximately **44%** of the variance was explained by the independent variables included in the model.

DISCUSSION

The present cross-sectional survey was carried out among 500 female students from degree colleges of Belagavi city during the period of 1st June 2023 to 31st May 2024.

Table 1: Age distribution of the study participants

In our present study, the participants aged 18-20 years were 69.4% and those aged 21-23 years were 30.6%. The mean $\pm$ standard deviation of age of the students was 19.86 ± 1.40 years. In a study conducted in Punjab, 43.2% of participants were 20 years or younger, while 56.8% were above 20 years.⁹ A study in Pondicherry reported a Mean ($\pm$ SD) age of $20.57 (\pm 2.2)$ years.¹⁰ Similarly in Mysore study the Mean ($\pm$ SD) age of study participants was $20.8 (\pm 1.54)$ years.¹² In a Delhi study, participants were aged from 18-22 years and had a Mean ($\pm$ SD) age of $18.96 (\pm 0.93)$ years and in a study done in Oman, the Mean ($\pm$ SD) age was $21.6 (\pm 2.2)$ years.^{18,19} In a study carried out in Assam, the Mean ($\pm$ SD) age was $19.39 (\pm 0.77)$ and another Delhi study reported that 36.2% of participants were 17-19 years old, 51.9% were 20-22 years old, and 11.9% were above 23 years.^{23,24} The above studies indicate a consistent age range of around 18-23 years among participants, with mean ages varying slightly across regions, reflecting a focus on young adults in the research.

Table 2: Distribution of the study participants according to Religion

In the current study, out of the 500 study participants, 85.20% were Hindus by religion, 12.00% were Muslim, 1.60% were Christian and 1.20% of them were Jain by religion. As per National Family Health Survey (NFHS) 5 India, 81.90% are Hindu by religion, 12.40% Muslim, 2.80% Christian, 0.30% Jain and 2.60% belong to other religions.

In a study in Chandigarh, there were 81% Hindus, 12.5% Sikh, 3.6% Muslim and 3% Christian.¹¹ In the Kolkata study, 63.2% of the study population were Hindus, 32.75% Muslim and 4.03% belonged to other religions.¹⁴ A study conducted in Kerala, had 56.4% Christians, 32.4% Hindus and 10.6% Muslim by religion.²² In a Delhi study, there were 78.1% Hindus, 11.6% were Muslim, 6.5% were Sikh, 2.4% were Christian and 1.4% belonged to other religions.²⁴ The difference in data can be explained by the regional variations in religious composition across different parts of India.

Table 3: Distribution of the study participants according to the Type of Family

In our study, of the 500 students 64% of the study participant were staying in nuclear family, 32.80% were staying in joint family and 3.20% had a broken family. According to NFHS 5 data India, 58.20% are in nuclear families and 41.80% in non-nuclear families.

In a study in Chandigarh, 14.9% of participants lived in joint family, 70.8% were in nuclear family and 14.3% were living in extended nuclear family.¹¹ A study undertaken in Kolkata showed 60.71% of families were nuclear, 29.47% were joint and 0.098% were broken families.¹⁴ In the Delhi study, 67.8% of study subjects belonged to nuclear family and 32.2% from joint family.¹⁸ In a study done in Udupi, 67.45% of families were nuclear and 32.55% were joint families.²⁶ This slight variation can be due to the different sociodemographic characteristics in different regions in India and it also highlights the predominance of nuclear families in the country.

Table 4: Distribution of the study participants according to the Literacy status of Father

In the present study, regarding the literacy among the father of study participants, the majority 96% were literates. Among them 41.60% were educated till primary/secondary, 14.60% had completed PUC, 5.00% were diploma holder, 25.60% were degree holder and 9.20% were postgraduate. The education status of fathers of study subjects in the Vijayapur study showed that 1.6% were illiterate, 6.3% had primary level of education, 30.2% had secondary education, and 61.9% held a PUC, degree, or diploma.⁶ In a study done in Udupi, all the fathers of the study subjects were literates. Of them, 4.1% participants' fathers had primary education, 44.28% had secondary education, 27.65% had completed PUC and 23.97% had education above PUC level.²⁶

In our study, the literacy rate among fathers of the participants was lower compared to studies conducted in Vijayapur and Udupi, likely due to variations in educational standards and living conditions in the study area.

Table 5: Distribution of the study participants according to the Literacy status of Mother

In our current study, regarding literacy status of mother of study participants, 88.40% were literates. Among them, 47.60% were educated till primary/secondary, 16.40% had completed PUC, 3.20% diploma holder, 7.60% were degree holder and 3.60% were postgraduate. The education status of mothers of study subjects in a study undertaken in Vijayapur showed that 4.8% had no formal education, 19% had primary education level, 44.4% had studied up to secondary school and 31.7% held a PUC, degree, or diploma.⁶ In the study conducted in Udupi, 6.82% of participants' mothers were found to be illiterate, 47.34% had primary education, 23.88% had

secondary education, and 21.96% had completed PUC or higher education.²⁶ In the Delhi study, only 1.9% of participants' mothers were illiterate, 29.7% had high school education and 68.4% had studied above high school.¹⁸

In our study, the literacy status of the mother of study participants was lesser compared to Delhi, Vijayapur and Udupi studies which may be due to the difference in standards and living conditions of the study area.

Table 6: Distribution of the study participants according to Occupation of Father

In the present study regarding the occupation of the father of study participants, there 22.60% of them were self-employed, 14.80% were employed in the private sector, 15.80% were government employee, 19.00% laborer, 26.20% farmer and 1.60% unemployed. In a study performed in Pondicherry, 20.59% of participants' fathers were highly skilled, 22.94% were skilled, 27.84% were semi-skilled and 28.63% were unskilled.⁴ In the Udupi study, 6.64% of the fathers of the students were in professional roles, 43.98% were skilled, 17.63% were semi-skilled, 30.71% were unskilled, and 1.04% were engaged in other occupations.²⁶

The present study reveals a higher proportion of farmers and self-employed fathers, while Pondicherry and Udupi studies show more skilled and semi-skilled occupations, indicating regional variations in employment trends.

Table 7: Distribution of study participants according to Occupation of Mother

In our current study, regarding the occupation of the mother of study participants, 73% were homemaker and 27% working mothers. Out of them, 6.40% were self-employed, 5% were employed in the private sector, 3.80% were

government employee, 2.60% laborer and 9.20% farmer. In a study in Pondicherry study, 5.88% of participants' mothers were highly skilled, 19.22% were skilled, 16.08% were semi-skilled and 58.82% were unskilled.⁴ In the Udupi study, 0.41% of participants' mothers were in professional roles, 7.13% were skilled, 2.85% were semi-skilled, 18.94% were unskilled and 70.67% were homemakers.²⁶

When comparing our study to those conducted in Udupi and Pondicherry, the occupational status of the mothers of study participants was slightly different, with our study having the maximum proportion of mothers occupied as homemakers.

Table 8: Distribution of the study participants according to Socioeconomic status

In the present study in 500 students, applying Modified B. G. Prasad's classification, 24.40% students were from socio-economic class I, 22.00% belonged to class II, 22.20% in class III, 24.40% class IV and 7.00% class V, reflecting a better socioeconomic profile whereas in a research conducted in Chandigarh 61.3% of participants belonged to the low socioeconomic class, 19% to the lower-middle class, 8.3% to middle and 11.3% to upper-middle class.¹¹ In the Coimbatore study, 67.5% were in class 1 and 2 and 32.5% were in class 3 and 4 as per the Modified BG Prasad classification.²⁰ In a study conducted in Dindigul, 65% of people had a family monthly income of less than ₹10,000, while 35% had an income above ₹10,000.²¹ In the Delhi study, 80.8% were from upper class, 5.1% from upper-middle class, 2.4% from middle class, 0.5% from lower-middle class and 0.5% from lower class.²⁴

The differences in socioeconomic profiles across regions can be attributed to varying levels of industrialization and regional economic development, with areas like Delhi and Coimbatore showing higher SES concentrations compared to our study population.

Table 9: Distribution of the study participant according to Body Mass Index

In our study, the Median (IQR) BMI score was 20.43 (18.07 – 23.81) among the study participants. According to the Asian classification of BMI, 39.6% of the girls had normal Body Mass Index, 29.2% of them were underweight, 14.2% were overweight and 17.0% of the participants belonged to the obese category.

A study conducted in Pondicherry showed that the Mean ($\pm$ SD) BMI for females was 24.6 ($\pm$ 5.2), with 10% underweight, 34% normal weight, 16.1% overweight, and 39.6% obese participants.¹⁰

In a study in Mysore, the mean BMI of the participants was 22.53 ($\pm$ 3.55), ranging from 16.1 to 32.7, with 13.8% girls in underweight, 47.1% normal weight, and 39% overweight category.¹²

A study carried out in Kolkata had a comparatively higher proportion of students who were underweight (31.73%) while 44.33% of them had normal weight, and 23.93% of them were overweight.¹⁴

In the Delhi study, the mean BMI was 21.46 ($\pm$ 3.37), 52.2% students had normal weight, 27.8% overweight or obese, and 20% of them were underweight.¹⁸

A study undertaken in Oman revealed that 63% of the study subjects had normal value of BMI, 12% were undernourished and 25% were overnourished.¹⁹

A study conducted in Coimbatore reported 53.6% as normal, 26.7% had a low BMI and 19.6% students had high BMI.²⁰

In another study in Pondicherry, 48.8% of the students had a normal BMI, 39% were underweight, 9.6% overweight and 2.5% of them were obese.⁴

In contrast to the above studies, a survey in Shillong showed a very high percentage of participants with normal BMI. Around 83.8% students had normal BMI, 4.5% students were underweight, 10.9% overweight and 0.8% of them obese.¹⁶

In the Udupi study majority 84.9% students had a normal BMI, 5.27% were underweight, and 9.82% of them were overweight or obese.²⁶

Compared to our study, a higher proportion of overweight/ obese students was noted in studies from Pondicherry and Mysore. Kolkatta study had comparatively more underweight participants. These findings reflect varying BMI distributions across regions, with a significant proportion of participants falling into underweight, overweight or obese categories, highlighting the need for targeted health interventions.

Table 10: Distribution of the study participant according to body image concern

In the present study, the Median (IQR) of Body Image Score of the students was 21.00 (15.25 - 27.00). Around 35.2% of the participants had no body image concern, while 35.4% of the students had mild, 24.0% had moderate and 5.4% of them had severe body image concern. The prevalence of body image concern was **64.8%** and moderate and severe concern was **29.4%** among the study participants.

Similarly, in a study carried out in Pondicherry, 33% of participants had no body image concerns, while 36.1% had mild concerns, 24.3% had moderate concerns and 6.5% exhibited severe concerns.¹⁰

Another study in Pondicherry reported that 28.04% of respondents were not concerned with body shape, while 72.16% had body shape concerns. Among them, 17.45% students were highly concerned and 7.45% were moderately worried about their body shape.⁴

In the Udupi study, 57.82% of students displayed mild or moderate body shape concerns, while 42.18% of them reported no concerns.²⁶

A study done among participants from various regions of India found an average body image dissatisfaction score value 22.69 (SD=3.64) among the females, similar to our study findings.¹⁷

In a study in Delhi, only 30.6% of participants showed body shape concerns out of which 7.3% of the participants had severe concerns.¹⁸

The high level of body image concerns in our study aligns closely with findings from Pondicherry and Udupi but exceeds the lower rates reported in the Delhi study.

Table 11: Distribution of the study participants according to the perceived body image

In our study, among the 500 students, according to the Stunkard figure rating scale, around 56.6% of students felt their present body image as normal, 18.8% of the participants felt they were underweight and 34.6% of them perceived that they were of the overweight or obese body image.

Similarly, in a study conducted in Mysore, 52.4% of students perceived themselves as normal, 13.3% as underweight, and 34.3% as overweight.¹²

Likewise, a study in Oman study reported that 50% of students had seen their body shape as normal, 18.8% as underweight and 29.3% as overweight or obese.¹⁹

In the Delhi study, a comparatively higher percentage (64.6%) students considered themselves as normal, 16.2% thought they were too fat and 19.2% thought as too thin.²⁴

Around 43.3% participants perceived themselves as normal 38.6% as underweight, 17.6% as overweight and 0.4% as obese in a study undertaken in Pondicherry.⁴

In the study carried out in Shillong, the quantum of students who perceived to have normal body image was lower, only 34.9% viewed their body image as normal, 9.2% as underweight and 55.9% as overweight.¹⁶

In the Udupi study, only 37.64% regarded their body appearance as normal, while 29.82% viewed themselves as thin and 32.54% as fat.²⁶

Our study found that 56.6% of students perceived their body shape as normal, which is comparable to the study in Mysore (52.4%) and Oman (50%) but higher than the Shillong (34.9%) and Udupi (37.64%) studies. Delhi study had the maximum participant (64.6%) perceiving body image as normal.

Table 12: Distribution of the study participant according to body image dissatisfaction

In our present study, among the 500 study participants, 19.6% of them had no body image dissatisfaction, according to the Stunkard Scale and they felt their present body image was the ideal one. Majority **80.4%** of the students expressed body image dissatisfaction with 62.8% of participants desiring a thinner body and 17.6% of them desiring to have a heavier body.

Similarly, a study in Coimbatore revealed a 77.62% prevalence for body image dissatisfaction, with 52.2% of students desiring to be thinner and 25.4% of them wanting to be heavier.²⁰

In the Delhi study, 76.7% of the girls had body image dissatisfaction with 62% of them desiring to get thinner and 14.5% desiring to get fatter than their present body image.¹⁸

A study undertaken in Pondicherry revealed that 66.9% participants desired to be thinner, 5.6% desired to be heavier and 27.4% were contented with their present body image and wished to remain the same.¹⁰

A comparatively high negative body image perception rate of 84.9% among the study participants was revealed in a study done in Kerala.²²

In a study carried out in Oman, 19.4 % students were satisfied while 80.6% of them expressed dissatisfaction in their present body image, which is closer to our study report.¹⁹

Likewise, in a study performed in Sharjah, 19.1% of participants reported feeling satisfied with their body weight, 23.4% desired to be heavier, and 57.5% desired to be thinner.³⁷

Compared to our study, a better rate of body image satisfaction was reported in the Mysore study where 38.6% students were satisfied and the others were unsatisfied (24.3%) or neutral (37.1%) with their body shape and appearance.¹²

In a study from Udupi, 37.64% of participants wanted to remain the same, 33.27% desired to be thinner, and 29.09% wished to be heavier.²⁶

Similarly, 39.04% of students were satisfied while 60.94 % of them were not happy about their body shape as reported by a study in Kolkata.¹⁴

Whereas, a study in Assam indicated a favourable result showing that 61.5% girls were happy with their body image and 38.5% of them had body image dissatisfaction.²³

The findings from our study, where 80.4% of participants expressed body image dissatisfaction, align closely with studies from Coimbatore, Delhi, Oman, Pondicherry and Kerala highlighting a widespread desire for a thinner body. However, higher satisfaction rates were observed in studies from Mysore, Udupi, Kolkata, and Assam, indicating regional variations in body image perceptions.

Table 13: Distribution of study participant according to the factors related to body image

In the current study, out of the 500 study subjects, 49.4% of the girls had felt comparison of body image with others by a family member. A study done in Chandigarh found that 61.3% students had faced body image comparison by a family member.¹¹ In the Delhi study, 24% participants had experienced comparison of their appearance with siblings.¹⁸ In the Pondicherry study, around 32.3% of the study subjects had said that family significantly influenced self-perception of their body.⁴

In our study, around 46.8% of the students had experienced body shaming by a batchmate or a friend. Similarly, 47.8% students from a study carried out in Delhi said that they have experienced body image comparison by members of their friend circle.¹⁸ In Chandigarh, a study showed 29.8% of participants had faced body shaming by friend at school/ college/ playground/ parties.¹¹ Around 29.6% students from the Pondicherry study also acknowledged the impact of friends on their body image perception.⁴

In the present study, the felt compulsion from advertisement or social media in order to look beautiful was reported by 49.2% of the participants. Likewise, 48% of participants reported that media significantly influenced self-perception of their body shape in a study undertaken in Pondicherry.⁴ In a study done in Delhi, 40.6% of participants compared themselves with actresses, while another study in Delhi reported that 36.5% were influenced by models or actresses and 40.5% by athletic or sports personalities, with 27.6% feeling pressure to conform to ideal beauty standards set by popular figures.^{18,24}

The findings from our study, align with trends observed in studies from Chandigarh, Delhi and Pondicherry, highlighting the pervasive influence of family members, friends group and media on body image perception.

Table 14: Distribution of study participant according to the factors related to body image

In our study, among the 500 participants, 54.6% of the students had attempted to modify their weight and around 32.6% of the girls had adopted skipping meal as a method of dieting to reduce the weight.

In a study carried out in Mysore, 59.04% of participants reported making attempts to either increase or decrease their weight, reflecting a significant focus on body weight management and 24% of participants admitted to skipping meals, indicating a comparable trend.¹² In the Kerala study, 19.5% of participants reported that they had skipped meals.²² Around 12.31% of participants said that they adopted skipping meals as a weight control strategy in a study from Vijayapur.⁶

All the above study findings highlight a common reliance on meal-skipping as a weight control strategy among students.

Table 15: Distribution of study participant according to the factors related to body image

In the present study, 83% of the participants had engaged themselves in Physical activity like walking, running, jogging, cycling or sport activity while 17% of them did not do any routine physical activity. Around 15.8% students had regular physical activity of 4 to 5 days a week, while 67.2% of them were engaged in physical activity sometime 1 – 3 days a week. Among all the students, 43.4% of them were participant of competitive sports.

A study undertaken in Delhi revealed that 48.3% of participants reported that they engaged in physical activity for a minimum of half an hour a day for five days in a week and 20% of the students had participated in competitive sports.¹⁸ In a study carried out in Sharjah, 75% of the female participants said they did not engage in any physical exercise and 25% did some sort of physical activity.³⁷

Our present study reflects a comparatively better level of physical engagement and sports participation among the participants.

Table 16: Distribution of the study participants according to academic performance

In the present study, 13.8% of them had reported excellent academic performance in college. Majority, 69.2% had reported their academic performance as good whereas 19.4% and 4.6% students had reported their academic performance as regular and bad respectively. Regarding the marks secured by students from a study in Hyderabad, it was found that 10% students had a first division with distinction, 53.3% secured a first division and 36.7% achieved a second division or below.⁴⁶ In a study undertaken in Saudi, 41.7% students had a GPA of 4.5 – 5.0, 53.8% of them had GPA of 3.0 -4.49 and 4.5% had a GPA of less than 3 points.⁴⁷ The data indicates that most of the students achieve a satisfactory academic performance, while a small group of them face academic challenges.

Table 17: Distribution of the study participants according to self esteem

In our current study, the Median (IQR) score of self esteem was 17 (15 – 20) among the girls according to the Rosenberg scale for assessing self esteem. In a study done in various regions of India, Mean ($\pm$ SD) Self-Esteem score among the study subjects was 19.66 (SD=7.291), similar to our present study.¹⁷ Another pan India study reported a higher mean score of self-esteem 28.72 ($\pm$ 4.72).¹⁵

In the present study, out of the 500 students, **19.4%** participants had low self esteem, majority 78.4% students showed normal self esteem and 2.2% girls exhibited high self esteem. The prevalence of low self esteem was 19.40% among the study participants.

Comparable to our study findings, 20.54% students had low self-esteem, 71.46% had normal self-esteem while 8% had high self-esteem in a study carried out in Udupi.²⁶

Likewise, a study performed in Punjab reported that 21.6% of the participants had low self-esteem, 66.4% and 12% had normal level and high level of self esteem respectively.⁹

In the Saudi study, among the students, 24.1% reported low self-esteem, 67.2% had normal self-esteem score and 8.7% exhibited high self-esteem.⁴⁷

Another study done in Saudi found 26.1% prevalence of low self esteem among the study participants.⁴⁴

A higher prevalence of students with poor self esteem was found in a study undertaken in Kolkatta, where 46.34% of them had low self esteem and the remaining 53.65% had normal self esteem.¹⁴

In contrast, in the Hyderabad study, 80% of the students had a high self esteem and 20% had moderate self esteem.⁴⁶

The present study found a significant portion (19.4%) of participants with low self-esteem, aligning closely with findings of studies from Udupi, Punjab and Saudi, but lower than Kolkatta study and higher than the study in Hyderabad.

Table 18: Association between body image concern and self esteem among the study participants

In the current study, it was noted that majority 70.37% students reported low esteem among the Severe body image concern group. Around 35% girls with moderate body image concern had shown low level of self esteem whereas in the participants with mild and no body image concern 15.25% and 5.11% of them had low self esteem respectively. In Kendall's tau c test, there was a weak to moderate negative relation ($\tau_c = -0.266$, $p < 0.001$) between body image concern and self-esteem level, which suggests that as one tends to have more concern about the body image, the feeling of self-esteem tends to reduce.

Comparable to our study, in a study done in Uttarkhand, the results indicated that students with lower self-esteem demonstrated a poor body image, as indicated by a higher Body Image score of 61.34 ± 4.22 (Mean $\pm$ SD) compared to those with normal self-esteem 57.25 ± 6.52 (Mean $\pm$ SD).¹³

A study done across various regions of India found that higher concern about body image was linked with lower esteem ($t = 20.192$, $p < 0.001$).¹⁷

Collectively, these studies underscore the consistent and significant effect of body image concerns on the individual's self worth, emphasizing the necessity for targeted interventions to cater body image issues and improve self esteem among students.

Table 19: Association between perceived body image and self esteem among the study participants

In our study, we found that a higher percentage of students who considered themselves as having an oversized body image exhibited low self esteem, comparing with those who had thought to be having a normal and underweight body image.

Kendall's tau-b test showed an inverse association ($\tau_b = -0.308$, $p < 0.001$) between perceived body image and esteem, indicating that as perceived body image size increases, self-esteem tends to decrease.

These findings align with a study from Udupi, which discovered that individuals having low self-esteem had significantly increased odds of being associated with a fat body image perception (AOR = 6.19, 95% CI: 2.76–13.9)²⁶

Together, these results show the strong association between a negative conception about body shape, particularly overweight or obese self-perception and lower self-esteem.

Table 20: Association between body image dissatisfaction and self esteem among the study participants

In the current study, it was noted that people who displayed body image dissatisfaction, particularly those desiring for a thinner body had 26.6% participants with low esteem compared to 9% and 5.68% students with low level of self esteem in no body image dissatisfaction group and desiring for a heavier body image group respectively ($\chi^2 = 31.61$, $p < 0.001$).

Similarly, a study conducted in Kolkata showcased that among the study subjects with body image dissatisfaction, 52.1% of them had low self-esteem compared to 37.42% in those students who were contented with their body shape ($\chi^2 = 8.151$, $p = 0.004$).¹⁴

A study undertaken in Coimbatore also revealed that individuals without any body image dissatisfaction had a higher average score of self esteem 18.65 ± 3.20 compared to those with body image dissatisfaction who had mean score of 17.92 ± 3.30 ($p < 0.01$).²⁰

These results highlight the psychological impact of body image dissatisfaction, particularly the want for a thinner body, which appears to be related with low self-esteem.

Table 21: Association between Body Mass Index and self esteem among the study participants

. In our study, a significant proportion of obese (70.37%) and overweight (35%) students reported low self-esteem, compared to normal (15.25%) and underweight (5.11%) students, which was statistically significant. There was a weak negative association ($\tau_c = -0.183$, $p < 0.001$) between BMI and self-esteem, indicating that higher BMI correlates with lower self-esteem.

These findings align with a study performed in Punjab, where 25% of obese students had low self-esteem while compared to 17.94% in the normal category and 9.09% in the underweight category, further supporting the trend that higher BMI is associated with reduced self esteem.⁹

Table 22: Association between BMI and body image concern among the study participants

The current study found that the percentage of students with moderate and severe body image concerns was 65.88% among obese students, 43.52% among overweight students, 20.71% among those with normal weight and 8.22% among underweight students. Kendall's tau-b test showed a positive relation ($\tau_b = 0.473$, $p < 0.001$) between BMI and Body Image Concern, thus suggesting that as the BMI value increases, body image concern tends to increase.

In a study conducted in Pune, with respect to the different domains of Body Image assessed among the girls, in appearance evaluation ($p = 0.001$), in the aspect of health evaluation ($p = 0.004$) and body area satisfaction ($p = 0.001$), normal-weight

girls consistently scored the highest, followed by underweight and overweight participants, indicating that normal-weight individuals had more positive perceptions. Overweight preoccupation ($p = 0.001$) was most pronounced in those girls who had a high BMI value, while others showed lower levels of concern.²⁵

Both our study and the Pune study highlight the significant link between BMI and the concern regarding body image.

Table 23: Association between BMI and perceived body image

The present study demonstrates that majority of study participants with normal BMI (78.28%) correctly identified their body image, while a lower percentage of students in the overweight/obese (60.26%) and underweight (45.20%) categories had accurate body image perceptions aligning with their BMI ($\chi^2 = 40.18$, $p < 0.001$).

A study in Mysore found that 13.3%, 52.4%, and 34.3% of participants perceived themselves as underweight, normal, and overweight, respectively, which is almost same as the BMI classification of 13.8%, 47.1% and 39% among the students.¹²

In a study undertaken in Oman, a higher percentage of underweight students (78.6%) had correct body image perceptions, followed by normal (68.8%) and overweight/obese students (64.65%) ($\chi^2 = 293.9$, $p < 0.001$).¹⁹

Similarly, 73.3% of underweight students, 52.3% of normal BMI students and 53.1% of overweight/obese students had accurate body image perceptions in a study undertaken in Kerala.²²

In a study in Pondicherry, 60.2% of participants correctly comprehended their body shape, while 18.6% underestimated and 21.2% overestimated their body image.⁴

Our present research and others show the inaccurate body image perception among the students across the different BMI categories, and hence awareness should be targeted towards emphasizing healthy weight rather than beauty.

Table 24: Association between BMI and body image dissatisfaction

In our study, body image dissatisfaction was reported by majority 98.08% in the overweight/obese group, while 76.72% of underweight students and 68.18% of students with normal weight were dissatisfied with their body image ($\chi^2 = 210.73$, $p < 0.001$).

Similarly, other studies report high dissatisfaction rates, especially in the overweight and obese categories. A study in Oman showed 96.8% body image dissatisfaction in overweight participants and 100% dissatisfaction among obese participants ($\chi^2 = 251.7$, $p < 0.001$).¹⁹

The Coimbatore study further supports this trend, revealing that a higher BMI is significantly linked to body image dissatisfaction, with an odds ratio of 1.13 (95% CI: 1.08–1.18, $p < 0.001$).²⁰

Likewise, in a study undertaken in Kerala, students who were displeased with their body shape had a significantly higher mean BMI ($t = 3.894$, $p = 0.0001$).²²

These findings emphasize the psychological impact of body weight, especially among those in higher BMI categories, suggesting the need for targeted actions to manage body image discontent in these groups.

Table 25: Correlation among body image, self esteem and BMI among the study participants

In our current study, Spearman's correlation analysis revealed a significant moderate negative relation between Body Image Concern and Self-Esteem ($r = -0.50$, $p < 0.001$), Perceived Body Image and Self-Esteem ($r = -0.41$, $p < 0.001$), as well as

BMI and Self-Esteem ($r = -0.35$, $p < 0.001$). These results indicate that higher the Body Image Concern, Perceived Body Image dissatisfaction or BMI, lower will be the Self-Esteem.

Similarly, a study conducted across various regions of India reported a significant negative link between Body Image Concern and Self-Esteem ($r = -0.342$, $p < 0.01$).¹⁷

An inverse association ($r = -0.344$, $p < 0.01$) between body image dissatisfaction and esteem was noted in a study carried out in Dindugul region of Tamilnadu.²¹

Whereas, a comprehensive study conducted across India revealed a strong positive relationship between Body Image Satisfaction level and Self-Esteem ($r = 0.599$, $p < 0.01$).¹⁵

The current study and others consistently demonstrate a negative relationship between concerns or displeasure with one's appearance as well as higher BMI with the self-esteem of a person, underscoring the impact of body image on self-esteem.

In our current study, Spearman's correlation test found a moderate positive correlation between BMI and Body Image scores ($r = 0.59$, $p < 0.001$). A significant positive relation was also noted between how individuals perceive their current body image and their level of body image concern ($r = 0.58$, $p < 0.001$). This suggest that body image concerns often go hand in hand with higher BMI or a larger perceived body size.

A study conducted in Pondicherry found similar results, showing a strong positive relationship between BMI and Body Image Score ($r = 0.766$, $p < 0.01$). This means that as BMI increases, individuals tend to experience greater concerns about their body image.¹⁰

Both studies highlight a clear pattern: as BMI or the perception of body size increases, so do concerns about body image. In simpler terms, people with higher BMIs or those who see themselves as larger are more likely to feel worried about their appearance.

Table 26 and 27: Effect of sociodemographic and other variables on body image concern

In our study, Multiple linear regression analysis identified significant predictors of Body Image Concern. **Higher BMI** ($\beta = 0.761$, $p < 0.001$), **body image dissatisfaction** (desiring a thinner body: $\beta = 6.579$, $p < 0.001$; no dissatisfaction: $\beta = 2.619$, $p = 0.004$), **pressure from family** ($\beta = 1.208$, $p = 0.04$), **body shaming by peers** ($\beta = 2.452$, $p < 0.001$) and **attempts to change weight** ($\beta = 2.214$, $p = 0.005$) were significant positive predictors identified in our study. The model explained **46% of the variance (Adjusted $R^2 = 0.46$)** in Body Image Concern.

Findings from other studies support these results. In a study done in Mysore, significant factors associated with body image included relatives' opinions ($\chi^2 = 105.2$, $p < 0.01$), friends' opinions ($\chi^2 = 94.8$, $p < 0.01$), attempts to change body weight ($\chi^2 = 23.7$, $p < 0.01$), and skipping meals ($\chi^2 = 14.0$, $p < 0.001$).¹²

A study carried out in Delhi identified underweight or overweight nutritional status (AOR = 2.524, 95% CI: 1.160–5.493, $p = 0.020$), mother's lower educational status (AOR = 4.099, 95% CI: 1.020–16.475, $p = 0.047$) and body image comparison with actresses (AOR = 3.541, 95% CI: 1.525–8.224, $p = 0.003$) as key determinants of body image dissatisfaction.¹⁸

Higher BMI (AOR = 1.28, 95% CI: 1.06–1.54), higher socioeconomic status (AOR = 1.28, 95% CI: 1.06–1.54) and increased sociocultural pressure (AOR = 1.05,

95% CI: 1.02–1.07) significantly predicted body image dissatisfaction as per the findings from a study done in Coimbatore.²⁰

In a study in Dindigul, the results revealed that criticism from parents, peers, or media explained 8% of the variance in body esteem and 14% in body dissatisfaction.²¹

Also, body image satisfaction was negatively linked with family ($r = -0.153$, $p < 0.01$), peer ($r = -0.143$, $p < 0.01$), and media ($r = -0.142$, $p < 0.01$) influences according to a study carried out in Assam.²³

Similar to our study, the Palestinian study used the multiple regression model to identify predictors for a positive body image. BMI ($\beta = -0.194$, $p < 0.001$), being on a diet ($\beta = -0.155$, $p = 0.009$), following models/celebrities on social media ($\beta = -0.259$, $p = 0.006$), family criticism/mockery of body shape ($\beta = -0.396$, $p = 0.001$) and student criticism/mockery of body shape ($\beta = -0.670$, $p < 0.001$) were significant negative predictors of a good body image. Regular physical activity ($\beta = 0.155$, $p = 0.001$) was a significant positive factor.⁴⁰

Multiple studies, including ours, consistently identify higher BMI, body image dissatisfaction, family and peer pressure, and sociocultural influences as significant predictors of body image concern, while factors like maternal occupation and physical activity positively influence body image perceptions.

Table 28 and 29: Effect of sociodemographic and other variables on self esteem

In our study, multiple linear regression identified significant predictors of self-esteem. Higher **body image concern** ($\beta = -0.149$, $p < 0.001$) negatively impacted self-esteem while the absence of **body shaming by peers** ($\beta = 0.921$, $p = 0.001$), lack of **pressure from advertisements or social media** ($\beta = 0.845$, $p = 0.002$) were associated with higher self-esteem. Engaging in **regular physical activity** ($\beta = 1.247$,

$p = 0.001$) and achieving higher **academic performance** (Excellent: $\beta = 1.868$, $p < 0.001$; Good: $\beta = 1.467$, $p < 0.001$) also contributed positively. The model explained 44% of the variance in self-esteem (Adjusted $R^2 = 0.44$)

A study performed in Uttarakhand found that, an increase in the body image score led to a decrease in the Rosenberg's self-esteem score ($\beta = -0.587$, $p < 0.001$).¹³

A nationwide study carried out in India identified body image dissatisfaction to be a significant predictor of self-esteem ($R^2 = 0.11$, $p = 0.05$).¹⁷

A study in Turkey revealed a significant negative moderate correlation ($r = -0.35$, $p < 0.001$) between Rosenberg Self-Esteem scores and Social Media Disorder scores, indicating that higher social media disorder levels were associated with lower self-esteem. Also, there was a positive moderate correlation ($r = 0.40$, $p < 0.001$) between self-esteem and positive body image perceptions.⁴⁸

Higher levels of body shaming were associated with lower self-esteem among students ($r = -0.460$, $p < 0.01$) as indicated by a study in Indonesia.⁴⁹

Result from a study in Canada showed that greater engagement in physical activity was linked to higher self-esteem ($r = 0.259$, $p < 0.01$).⁴¹

A study in Lithuania found significant connection between and between vigor and self-esteem ($r = 0.54$, $p < 0.0001$), happiness and self-esteem ($r = 0.53$, $p < 0.0001$) and also happiness and vigor ($r = 0.49$, $p < 0.0001$).⁴²

The Hyderabad study found a positive relation ($r = 0.878$, $p = 0.01$) between the self-esteem level and academic performance of undergraduates.⁴⁶

Likewise, a positive link ($r = 0.48$, $p < 0.0001$) between academic performance and self-esteem was reported by a study in Murshidabad.⁴³

A study in Bhutan also found a concurrence of good academic performance and high self-esteem ($r = 0.170$, $p < 0.05$).⁴⁵

In a study undertaken in Saudi, multivariate regression analysis showed that females had lower self-esteem than males (AOR = 1.851, 95% CI = 1.365–2.511, $p < 0.001$). Similarly, students with a diagnosed mental illness had relatively lesser esteem than those without an issue (AOR = 1.971, 95% CI = 1.408–2.759, $p < 0.001$). Students with higher grade points in college had better self esteem values ($p < 0.05$).⁴⁷

Our study and others consistently highlight that higher body image concern negatively impacts self-esteem, while factors like absence of peer or media pressure, regular physical activity, and better academic performance significantly enhance self-esteem among the students.

CONCLUSION

The present study revealed many insights into the perception of body image and self esteem among the female students in degree colleges. The study showed that 64.8% students had concerns about their body image, with over a quarter experiencing moderate to severe concerns. A striking 80% were dissatisfied with how they viewed their bodies and more than a third inaccurately perceived their body, which was misaligning with their actual BMI. Additionally, nearly 1 in 5 students struggled with low self-esteem, underscoring the emotional toll of these insecurities

Our study found that as body image concerns increased, self-esteem tended to decline, revealing a clear emotional struggle for many students. At the same time, higher BMI levels were linked to greater body image concerns, suggesting that societal or personal pressures around weight play a significant role in how these young women view themselves.

Several factors such as higher BMI, dissatisfaction with their bodies, family pressures, body shaming from peers and attempts to change their weight all were related to the the level of body image concern faced by the students. Body image concern, body shaming by peers and pressure from advertisements or social media were the factors associated with lower self-esteem. On a positive note, students who engaged in regular physical activity and achieved higher academic performance had higher self esteem. These findings give a picture of the complex challenges the students face and also point the ways we can support them in building resilience and self-acceptance.

RECOMMENDATIONS

Based on our study findings the following recommendations are given:

- Organize **awareness campaigns in colleges and in community** to educate girls about balanced nutrition, healthy weight, positive body image and the dangers of unrealistic beauty standards
- Conduct **regular health check up and screening camps** for adolescent and young girls, check and advise on BMI, identify at risk individuals and include body image and mental health screening to provide timely interventions
- Conduct **workshops for parents** to make them understand the impact of body shaming, societal pressures and the importance of fostering a supportive home environment. Help them learn to communicate positively about body image and self-worth with their children
- Establish **peer education and mentorship programs** in colleges to encourage body positivity and self-esteem, avoid body shaming and peer pressure and create a relatable and supportive environment for students
- **Train teachers and counselors** to identify and support students struggling with body image issues or low self-esteem
- **Use online platforms** for broad and accessible information dissemination.
- Introduce community-level **mindfulness and stress management programs** to help people develop a healthier relationship with their bodies and minds.

STRENGTHS

The strengths of the present study were as follows:

- The use of multiple validated instruments, such as Body Shape Questionnaire BSQ scale, Stunkard Figure Rating Scale and Rosenberg self esteem scale which are the standardised and tested tools ensured the accuracy and consistency of data collection and enhanced the credibility of its findings.
- Robust statistical analyses, including Kendall's tau test, spearman's correlation and multiple linear regression analysis adds rigor to the study's methodology. These statistical tests enabled to gauge in depth, the association between body image and self esteem.
- The study adopted a comprehensive approach by including the probable factors affecting body image and self esteem among the students like body shaming by peer, family, media pressure and academic performance of students.
- Moreover, the sample size and diversity by including students from colleges in all four zones enhanced the generalizability of its findings.

LIMITATIONS

Limitations noted in the study were:

- The study was limited to female students in an urban area. Body image and self esteem perception among male students, those in rural area and in the community was not assessed. A comparative study could add more information in this area of research.
- The findings in this study reflect the body image perception and its impacts at the time of study and may not reflect the dynamism of how they may evolve and change with age and time.
- As the present study was cross sectional in nature, causal inferences could not be made.
- As the body image and self esteem assessment is self reported, there are possibilities that some students might have given answers that presented them in a positive light thereby non reflective of their original status.
- Certain other factors that could impact body image and self-esteem, such as mental health issues were not explored in our study.

SUMMARY

The present study “Perception of Body Image and self esteem among female college students in an urban area - A cross sectional study” was carried out to study the association between body image and self esteem among the students.

This study was conducted from 1st June 2023 to 31st May 2024 among 500 female degree college students randomly selected from four colleges in Belagavi city—one from each zone (north, south, east, and west). Standard questionnaires – Body Shape Questionnaire BSQ 8C and Stunkard Figure Rating Scale were used to assess body image, Rosenberg Self esteem scale was used to assess self esteem among the participants.

The mean $\pm$ SD age of the participants was 19.86 ± 1.40 years. Majority of the students 426 (85.20%) were Hindus, and 320 (64%) lived in nuclear families. Most parents, i.e 482 (96%) of the study participant’s fathers and 442 (88.40%) of the mothers were literate. Majority 492 (98.40%) fathers were employed and 365 (73%) mothers were homemakers. According to the modified BG Prasad classification, 343 (68.60%) students belonged to socioeconomic classes I, II and III

Among the 500 participants, 198 (39.6%) had a normal BMI, 146 (29.2%) were underweight, 71 (14.2%) overweight and 85 (17%) of them were obese. However, 283 (56.6%) students perceived their body image as normal, 94 (18.8%) as underweight and 123 (34.6%) of them perceived to be overweight/obese. Majority 402 (**80.4%**) expressed body image dissatisfaction with 314 (62.8%) of participants desiring a thinner body and 88 (17.6%) of them desiring a heavier body. The prevalence of body image concern was **64.8%** and that of moderate and severe concern was 29.4% among the study participants. Notably, 97 (**19.4%**) of

the participants had low self esteem, majority 392 (78.4%) of them had normal self esteem and 11(2.2%) of the girls exhibited high self esteem

In our study, nearly half of the students have felt body image comparison by family 247 (49.4%), body shaming by friends 234 (46.8%) and pressure from advertisement or media to look beautiful by 246 (49.2%) of them. More than half of our study participants had attempted to lose weight 273 (54.6%) and 1/3rd of them 163 (32.6%) had skipped meal to reduce weight. Majority 415 (83%) students had engaged themselves in physical activity and 217 (43.4%) had participated in competitive sports. Regarding academic performance, 69 (13.8%) had excellent performance, 311 (69.2%) had good performance and 100 (20%) reported regular or poor performance.

In Kendall's tau test, there was a negative association between body image concern and self-esteem level ($\tau_c = -0.266$, $p < 0.001$), perceived body image and self esteem ($\tau_b = -0.308$, $p < 0.001$) as well as BMI and self esteem ($\tau_c = -0.183$, $p < 0.001$). Low self esteem was reported in students with body image dissatisfaction ($\chi^2 = 31.61$, $p < 0.001$).

There was a positive association between BMI and body image concern ($\tau_b = 0.473$, $p < 0.001$) revealed in Kendall's tau test. Overweight/ Obese students had incorrect body image perception ($\chi^2 = 40.18$, $p < 0.001$) and more body image dissatisfaction ($\chi^2 = 210.73$, $p < 0.001$).

In the current study, Spearman's correlation analysis indicated that higher the Body Image Concern, Perceived Body Image dissatisfaction or BMI, Self-Esteem tends to decrease ($p < 0.001$). Also, as BMI or perceived body size increases, concerns about body image tend to rise ($p < 0.001$).

Multiple linear regression analysis identified significant predictors of Body Image Concern. Higher BMI ($\beta = 0.761$, $p < 0.001$), body image dissatisfaction (desiring a thinner body: $\beta = 6.579$, $p < 0.001$; no dissatisfaction: $\beta = 2.619$, $p = 0.004$), pressure from family ($\beta = 1.208$, $p = 0.04$), body shaming by peers ($\beta = 2.452$, $p < 0.001$) and attempts to change weight ($\beta = 2.214$, $p = 0.005$) were significant positive predictors identified in our study. The model explained 46% of the variance (Adjusted $R^2 = 0.46$) in Body Image Concern.

Higher body image concern ($\beta = -0.149$, $p < 0.001$) negatively impacted self esteem while the absence of body shaming by peers ($\beta = 0.921$, $p = 0.001$), lack of pressure from advertisements or social media ($\beta = 0.845$, $p = 0.002$) were associated with higher self-esteem. Engaging in regular physical activity ($\beta = 1.247$, $p = 0.001$) and achieving higher academic performance (Excellent: $\beta = 1.868$, $p < 0.001$; Good: $\beta = 1.467$, $p < 0.001$) also contributed positively. The model explained 44% of the variance in self-esteem (Adjusted $R^2 = 0.44$)

Based on the study findings, it is recommended that targeted awareness campaigns have to be conducted in educational institutions and in community to educate girls about balanced nutrition, healthy weight, positive body image and the dangers of unrealistic beauty standards. Peer education and mentorship programs should focus on avoidance of body shaming and peer pressure among the students. Teachers and Counsellors should be trained to identify and address concerns regarding body image and self esteem. Most importantly, parents shall be made to understand the importance of providing a supportive home environment to enhance self worth among the children.

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ANNEXURE – I

INFORMED CONSENT FORM

“PERCEPTION OF BODY IMAGE AND SELF ESTEEM AMONG FEMALE COLLEGE STUDENTS IN AN URBAN AREA - A CROSS SECTIONAL STUDY”

Introduction:

Body image is the way one thinks and feels about the physical appearance. Self-esteem is the feeling of valuing oneself or self worth. These are to be given importance during the formative phase of life, especially for the female students, as it is vital that one has to feel happy about oneself in order to give the best academic and overall performance in any front. This study shall help us know the association between perception of body image and self-esteem and other related factors among female students, which in turn shall throw light on the significance and ways of building a positive image and self esteem among young girls.

Explanation of procedure:

Data will be collected by personally interview of each student using a pre designed and pre tested questionnaire, which includes Socio-demographic factors, Body image perception questions, Factors related to body image and Self esteem assessment questions. Height and weight will be measured and Body Mass Index will be calculated. The interview will take not more than 20 minutes per participant.

Withdrawal from participation in the study: Participation in this study is voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You will not get any benefits by participating in this study. The data gathered will help population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person to identify you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purpose and or presented to scientific groups. However, your identity will never be revealed.

Questions: In case of any questions with regard to this study, you are free to contact: “DR. , Post graduate, Dept. of community medicine, J.N Medical College, Belagavi-590010, Mobile number: ” or If you have any question or complaints with regard to your right as study participant you may contact Dr Harsha Hegde, Chairperson, Ethical committee of JNMC, 0831-2473777 Extension 4052.

Legal rights: By signing this consent form, we are not waving any of your legal rights

CONSENT STATEMENT

I am making a voluntary decision to participate in the study “**PERCEPTION OF BODY IMAGE AND SELF ESTEEM AMONG FEMALE COLLEGE STUDENTS IN AN URBAN AREA – A CROSS SECTIONAL STUDY**”. My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was given the opportunity to ask questions and that they have been answered to my satisfaction.

Name of the participant:

Signature of the participant:

Name of the witness:

Signature of the witness:

Name of the investigator:

Signature of the investigator:

Date:

Place:

ANNEXURE – II

QUESTIONNAIRE

**"PERCEPTION OF BODY IMAGE AND SELF ESTEEM AMONG FEMALE
COLLEGE STUDENTS IN AN URBAN AREA - A CROSS SECTIONAL
STUDY"**

Sl. No: _____

A. Socio demographic details:

1. Name : _____
2. Age : ____ years
3. Religion i) Hindu ii) Muslim iii) Christian iv) Jain
v) others, specify _____
4. Type of the family i) Nuclear ii) Joint iii) Broken
5. Educational qualification of Father i) Illiterate ii) Primary (1st to 7th)
iii) High School (8th to 10th) iv) PUC
v) Diploma vi) Degree vii) Post graduate
6. Educational qualification of Mother i) Illiterate ii) Primary (1st to 7th)
iii) High School (8th to 10th) iv) PUC
v) Diploma vi) Degree vii) Post graduate
7. Occupation of Father i) Farmer ii) Laborer iii) Self-employed
iv) Govt. employee v) Pvt. Employee vi) Unemployed
8. Occupation of Mother i) Farmer ii) Laborer iii) Self-employed
iv) Govt. employee v) Pvt. Employee vi) Home maker
9. Total monthly income : Rs _____
10. Number of family members : ____

11. Per capita income : Rs _____/ month

12. Socioeconomic Status Type : _____

(Modified BG Prasad Scale)

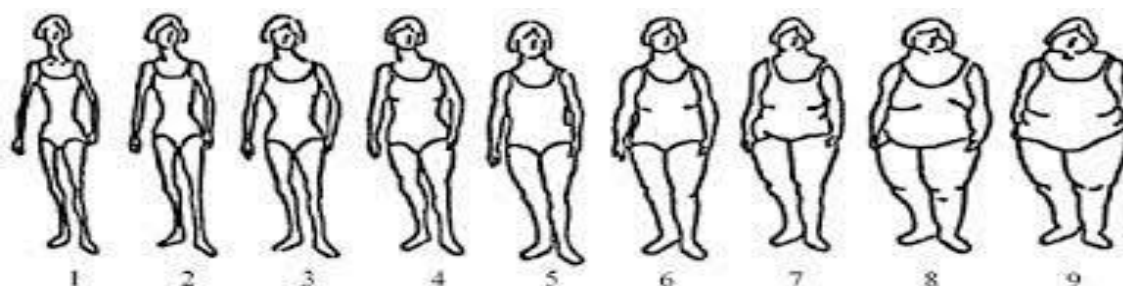
B. Body Image Perception Questions

We like to know how you have been feeling about your appearance over the PAST FOUR WEEKS. Please read each of the eight questions and circle the appropriate number to the right. Please answer all the questions.

Body Shape Questionnaire - BSQ 8C questionnaire

S.No		Never	Rarely	Sometimes	Often	Very often	Always
1.	Have you been afraid that you might become fat (or fatter)?	1	2	3	4	5	6
2.	Has feeling full (e.g. after eating a large meal) made you feel fat?	1	2	3	4	5	6
3.	Has thinking about your shape interfered with your ability to concentrate (e.g. while watching television, reading, listening to conversations)?	1	2	3	4	5	6

4.	Have you thought of getting rid of fleshy areas of your body?	1	2	3	4	5	6
5.	Have you felt excessively large and rounded?	1	2	3	4	5	6
6.	Have you thought that you are in the shape you are because you lack self-control?	1	2	3	4	5	6
7.	Has seeing your reflection (e.g. in a mirror or shop window) made you feel bad about your shape?	1	2	3	4	5	6
8.	Have you been particularly self-conscious about your body image when in the company of other people?	1	2	3	4	5	6

Stunkard Scale *

From the images 1 to 9 shown above,

(i) Choose the image that reflects your present shape. _____ (Write image number)

(ii) Choose the image that you think is the ideal shape _____ (Write image number)

C. FACTORS IN BODY IMAGE PERCEPTION

(Tick the appropriate answer/response for the below questions)

1. Have you felt the pressure of body image comparison with others by a family member?

i) Felt ii) Not felt

2. Have you felt the pressure of body image comparison with others/ body shaming by a batchmate or a friend? i) Felt ii) Not felt

3. Have you felt the pressure from advertisement or social media to look beautiful? i) Felt ii) Not felt

4. Have you made attempts to change weight (increase /decrease)? Yes / No, if yes what have you done? _____

5. Have you skipped meal as a method of dieting? Yes / No

6. Do you engage in any physical activity? (approx. 30 min of physical activity like walking, running, cycling, jogging /sports activity)

i) Regular (4-5 days / week)

ii) Sometime (1-3 days a week)

iii) None

7. Have you been a participant in any competitive sports team? Yes / No
8. How would you classify your academic performance in the course in college?
- i) Excellent ii) Good iii) Regular iv) Bad

D. Self Esteem Questions

Instructions: **Below is a list of statements dealing with your general feelings about yourself.** If you strongly agree, tick in that column. If you agree with the statement, tick in the agree column. If you disagree, tick disagree. If you strongly disagree, tick strongly disagree.

Rosenberg Self-Esteem Scale *

		Strongly Agree	Agree	Disagree	Strongly Disagree
1.	On the whole, I am satisfied with myself				
2.	At times, I think I am no good at all				
3.	I feel that I have a number of good qualities				
4.	I am able to do things as well as most other people				
5.	I feel I do not have much to be proud of				
6.	I certainly feel useless at times				
7.	I feel that I'm a person of worth, at least on an equal plane with others				
8.	I wish I could have more respect for myself				
9.	All in all, I am inclined to feel that I am a failure				
10.	I take a positive attitude toward myself				

D. Body Mass Index

1. Height = _____ (in metre)

2. Weight = _____ (in Kg)

3. BMI = _____ (Weight in Kg / Square of Height in metre)

ANNEXURE – III

KEY TO MASTER CHART

A] Sl. No: _____

B] Age (in years)

C] Religion

1) Hindu

2) Muslim

3) Christian

4) Jain

D] Type of the family

1) Nuclear

2) Joint

3) Broken

E] Educational qualification of Father

1) Illiterate

2) Primary (1st to 7th)

3) High School (8th to 10th)

4) PUC

5) Diploma

6) Degree

7) Post graduate

F] Educational qualification of Mother

1) Illiterate

2) Primary (1st to 7th)

3) High School (8th to 10th)

4) PUC

5) Diploma

6) Degree

7) Post graduate

G] Occupation of Father

1) Farmer

2) Laborer

3) Self-employed

4) Govt. employee

5) Pvt. Employee

6) Unemployed

H] Occupation of Mother

1) Farmer

2) Laborer

3) Self-employed

4) Govt. employee

5) Pvt. Employee

6) Home maker

I] Total monthly income (in Rs.)

J] Number of family members_____

K] Per capita income (in Rs.)

L] Socioeconomic Status Type : _____

(Modified BG Prasad Scale)

M] Have you been afraid that you might become fat (or fatter)?

1) Never

2) Rarely

3) Sometimes

4) Often

5) Very often

6) Always

N] Has feeling full (e.g. after eating a large meal) made you feel fat?

1) Never

2) Rarely

3) Sometimes

4) Often

5) Very often

6) Always

O] Has thinking about your shape interfered with your ability to concentrate (e.g. while watching television, reading, listening to conversations)?

1) Never

2) Rarely

3) Sometimes

4) Often

5) Very often

6) Always

P] Have you thought of getting rid of fleshy areas of your body?

1) Never

2) Rarely

3) Sometimes

4) Often

5) Very often

6) Always

Q] Have you felt excessively large and rounded?

- 1) Never
- 2) Rarely
- 3) Sometimes
- 4) Often
- 5) Very often
- 6) Always

R] Have you thought that you are in the shape you are because you lack self-control?

- 1) Never
- 2) Rarely
- 3) Sometimes
- 4) Often
- 5) Very often
- 6) Always

S] Has seeing your reflection (e.g. in a mirror or shop window) made you feel bad about your shape?

- 1) Never
- 2) Rarely
- 3) Sometimes
- 4) Often
- 5) Very often
- 6) Always

T] Have you been particularly self-conscious about your body image when in the company of other people?

- 1) Never
- 2) Rarely
- 3) Sometimes

4) Often

5) Very often

6) Always

U] Body Image Score _____

V] Stunkard scale image number that reflects your present shape. _____

W] Stunkard scale image number that you think is the ideal shape _____

X] Body image dissatisfaction score – Stunkard scale _____

Y] Have you felt the pressure of body image comparison with others by a family member?

1) Felt

2) Not felt

Z] Have you felt the pressure of body image comparison with others/ body shaming by a batchmate or a friend?

1) Felt

2) Not felt

AA] Have you felt the pressure from advertisement or social media to look beautiful?

1) Felt

2) Not felt

AB] Have you made attempts to change weight?

1) Yes

2) No

AC] If yes what for have you done?

1) Increase weight

2) Decrease weight

AD] Have you skipped meal as a method of dieting?

1) Yes

2) No

AE] How often do you engage in any physical activity? (approx. 30 min of physical activity like walking, running, cycling, jogging /sports activity)

- 1) Regular (4-5 days / week)
- 2) Sometime (1-3 days a week)
- 3) None

AF] Have you been a participant in any competitive sports team?

- 1)Yes
- 2) No

AG] How would you classify your academic performance in the course in college?

- 1) Excellent
- 2) Good
- 3) Regular
- 4) Bad

AH] On the whole, I am satisfied with myself

- 3) Strongly Agree
- 2) Agree
- 1)Disagree
- 0)Strongly Disagree

AI] At times, I think I am no good at all

- 0) Strongly Agree
- 1) Agree
- 2)Disagree
- 3)Strongly Disagree

AJ] I feel that I have a number of good qualities

- 3) Strongly Agree

2) Agree

1)Disagree

0)Strongly Disagree

AK] I am able to do things as well as most other people

3) Strongly Agree

2) Agree

1)Disagree

0)Strongly Disagree

AL] I feel I do not have much to be proud of

0) Strongly Agree

1) Agree

2)Disagree

3)Strongly Disagree

AM] I certainly feel useless at times

0) Strongly Agree

1) Agree

2)Disagree

3)Strongly Disagree

AN] I feel that I'm a person of worth, at least on an equal plane with others

3) Strongly Agree

2) Agree

1)Disagree

0)Strongly Disagree

AO] I wish I could have more respect for myself

0) Strongly Agree

1) Agree

2)Disagree

3)Strongly Disagree

AP] All in all, I am inclined to feel that I am a failure

0) Strongly Agree

1) Agree

2)Disagree

3)Strongly Disagree

AQ] I take a positive attitude toward myself

3) Strongly Agree

2) Agree

1)Disagree

0)Strongly Disagree

AR] Rosenberg Self esteem score _____

AS] Weight (in Kg)

AT] Height (in metre)

AU] Height² (in metre²)

AV] BMI = _____ (Weight in Kg / Square of Height in metre)

S.No	Age	Religion	Type of the Father	Educational qualification of Mother	Educational qualification of you	Occupation of Mother	Occupation of you	Total monthly income	Number of family members	Per capita income	Socioeconomic Status Type	Has thinking about your shape interfere with your ability to concentrate?	Has feeling about your shape interfere with your ability to concentrate?	Have you been afraid of eating a large meal?	Have you thought that you might become fat (or feel fat)?	Have you thought that you are in the shape you want because you lack self-control?	Has your reflection made you feel bad about your shape?	Have you been conscious about your body image when in the company of others?	Body Image	Present shape	Ideal Shape	Have you felt the pressure of body image comparison with others by a family member?	Have you felt the pressure of body image comparison with others by a friend?	Have you felt the pressure of body image comparison with others from advertisement or social media to look beautiful?	Have you made attempts to change your weight (increase/decrease)?	Have you skipped meal as a method of dieting?	How often do you engage in physical activity?	Have you been a participant in any competitive sports?	How would you classify your academic performance in the course in college?	1 On the scale, I am satisfied with myself.	2 At times, I think I am no good at all.	3 I feel that I have a number of good qualities.	4 I am able to do what I want with most people.	5 I feel I do not have much to be proud of.	6 I certainly feel useless at times.	7 I feel that I'm a person of worth, at least on an equal plane with others.	8 I wish I could have more respect for myself.	9 All at once, I am inclined to feel that I am a failure.	10 I take a positive attitude toward myself.	Self-esteem	Weight in kg	Height in m	Height in cm	BMI
1	20	1	1	6	6	3	6	60000	6	10000	1	3	2	3	2	3	3	3	22	3	22	3	2	2	2	2	2	3	1	2	3	3	3	3	29	56	1.54	23.7	23.63					
2	18	1	2	4	4	5	3	60000	10	6000	2	2	2	3	1	2	1	1	1	13	4	4	0	2	2	2	0	2	1	2	3	2	3	3	3	29	57	1.63	24.6	23.45				
3	21	1	1	2	2	1	2	1	2500	4	1	1	1	1	1	1	1	1	10	2	3	1	1	2	2	1	1	2	3	1	2	3	3	3	29	57	1.63	24.6	23.45					
4	19	1	1	1	6	6	3	40000	4	10000	1	3	5	1	1	1	1	1	1	17	4	3	1	2	2	1	1	2	2	3	1	2	3	3	3	3	28	72	1.63	24.6	23.21			
5	19	1	1	4	4	4	6	10000	4	2500	4	2	3	1	1	1	1	1	1	11	4	4	0	2	2	2	2	0	2	3	2	3	3	3	3	28	49	1.54	23.7	20.66				
6	19	1	1	1	1	1	1	10000	6	1666	1	1	1	1	1	1	1	1	1	16	3	3	0	2	2	2	2	2	3	2	3	3	3	3	3	28	52	1.62	24.6	26.29				
7	18	1	1	1	3	3	6	100000	4	25000	1	5	1	6	1	2	1	6	3	25	3	2	2	2	2	2	2	2	2	3	3	3	3	3	3	27	59	1.58	25.0	23.63				
8	18	1	2	6	5	4	5	60000	9	6666	2	3	3	2	3	2	3	2	3	21	4	3	1	2	2	1	2	2	3	1	2	3	3	3	3	3	26	45	1.4	1.96	22.96			
9	21	1	1	1	4	3	3	6	10000	5	2000	4	1	1	1	1	1	1	1	10	2	3	1	1	1	2	1	1	2	3	3	3	3	3	3	3	26	40	1.55	2.40	18.65			
10	19	1	6	8	8	2	6	50000	6	8333	2	2	9	2	1	1	1	1	1	13	9	3	0	6	1	2	2	1	3	3	3	3	3	3	3	26	45	1.66	2.76	16.31				
11	19	1	1	4	2	1	1	10000	6	1666	4	1	1	1	1	1	1	1	1	8	3	3	0	1	2	2	1	2	2	3	3	3	3	3	3	3	26	45	1.55	2.40	18.65			
12	20	1	1	1	3	4	4	6	20000	2	10000	1	3	4	2	5	2	4	6	5	31	5	3	2	1	1	2	2	1	3	3	3	3	3	2	1	2	3	25	64	1.66	2.76	23.21	
13	20	1	1	1	3	4	4	6	20000	2	10000	1	3	4	2	5	2	4	6	5	31	5	3	2	1	1	2	2	1	3	3	3	3	3	3	2	1	2	3	25	64	1.66	2.76	23.21
14	20	1	1	6	4	5	6	15000	3	5000	2	6	3	2	6	2	1	3	2	25	9	4	1	2	1	1	1	2	2	1	1	3	3	3	3	3	3	25	98	1.55	2.40	24.24		
15	22	1	2	6	4	4	4	60000	4	15000	4	2	3	3	2	3	2	3	1	22	3	2	1	2	2	1	1	2	1	2	3	3	3	3	3	2	0	2	3	25	65	1.6	2.56	25.39
16	19	2	2	6	4	3	3	6	60000	7	8571	1	4	3	2	3	2	6	1	22	5	4	1	2	2	2	2	2	2	3	3	3	3	3	3	25	59	1.54	2.37	24.88				
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21	21	1	1	3	3	2	6	5000	4	1250	5	1	3	3	1	1	1	6	1	17	2	4	-2	1	1	1	1	2	1	1	1	3	3	3	3	3	24	39	1.68	2.82	13.82			
22	20	1	1	3	3	5	6	27000	2	13500	1	2	1	3	2	1	1	1	2	2	16	1	4	-1	1	2	1	1	2	1	2	2	2	2	2	3	3	24	44	1.52	2.31	19.04		
23	20	1	1	2	3	2	6	27000	2	13500	1	2	1	3	2	1	1	1	2	16	1	4	-1	1	2	1	1	2	1	2	2	2	2	2	2	3	24	44	1.52	2.31	19.04			
24	18	2	1	5	4	3	6	30000	5	6000	2	2	2	2	2	2	3	1	2	15	3	2	2	1	2	3	2	2	2	1	2	2	3	3	3	3	24	48	1.55	2.40	19.98			
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28	19	1	1	6	6	3	4	20000	3	23333	1	1	1	2	3	1	1	1	2	12	2	3	-1	1	2	2	1	1	1	1	2	2	3	3	3	3	24	42	1.58	2.50	16.82			
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31	22	1	1	3	3	1	6	10000	6	1666	4	1	1	1	1	1	1	1	1	8	2	2	0	2	2	2	0	2	2	2	1	3	3	3	3	2	2	3	24	43	1.55	2.40	17.90	
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43	22	1	2	6	3	1	6	9000	8	1125	5	2	3	1																														

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447	23	1	2	2	2	1	6	10000	4	2500	4	3	3	4	3	3	4	3	3	26	5	4	1	1	1	1	2	0	1	2	2	4	1	1	2	1	1	1	1	2	2	13	55	1.42	2.02	27.28	
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452	23	1	1	2	2	2	6	8000	2	4000	3	3	3	2	3	4	3	4	3	25	6	4	2	1	1	1	2	0	1	2	2	2	2	1	1	1	1	1	2	0	2	2	13	60	1.58	2.50	24.03
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483	18	3	1	2	3	5	3	20000	5	40000	1	6	6	6	6	6	6	4	6	46	3	2	1	1	1	1	1	2	1	2	2	2</															