

# Social Media (SM) Effects on Self-Esteem (SE) and Body Image (BI) of Teenage Girls Using Artificial Intelligence (AI)

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## ABSTRACT

In the modern era social media (SM) plays a vital role in everyone's life; there are many challenging issues and problems in social media (SM). Among them, self-esteem (SE) and body image (BI) analysis of behavior are major concerns in this area. Therefore, in this article a data-driven model is proposed to analyze social networking sites affect the different attributes of teenage girls. In the current era, the key source of information is social media (SM) which targets different features such as body image (BI), self-esteem (SE), etc., among individuals. For this purpose, the authors perform data collection, cleaning, and data processing; then they apply an artificial intelligence technique to investigate the effect of social media (SM) among teenage girls.

## KEYWORDS

AI, BI (Body-Image), CNN, KNN, SE (Self-Esteem), SM (Social Media), Teenage Girls

## 1. INTRODUCTION

In modern life, most people spend their valuable time in multimedia tools and techniques such as WhatsApp, Facebook, etc. However, it is analyzed that teenagers are busy with this type of activity moreover especially girl child is more sensitive to these platforms. They share their personal, emotional, sensitive, etc. large amount of information on these platforms about themselves on these online sites. Therefore, Artificial Intelligence (AI) based automatic analysis is required for this purpose. Young generations are too much involved and are getting influenced through all such types of Social media (SM) which easily influenced feminine teenager's body shape or figure. Awareness among teenage girls is increased pertaining to their body image (BI) or figure through models in advertisements. Many scientists are on the way to identifying the complex effect of social media (SM), body image (BI) and self-esteem (SE) on teenage girls.

Besides this, several other health issues like overweight, the rate of obesity and BMI (Body Mass Index) have intensely amplified in the last ten years which represent an epidemic related to health in India along with different the world's regions. Abnormality in body weight and shape, unhygienic diet and social media (SM) has an adversative effect on the formation of the body along with the healthiness of teenage girls. Social media (SM) is trying to deliver the message pertaining

to recent fashion drift in our society. It has created a big effect in building up the body image (BI) and confidence of a teenage girls.

## 2. RELATED WORK

The impacts of Social Media (SM) on teenage girls' self-esteem (SE) and Body-Image (BI) are discussed in Paper [1] using a direct detection approach. This study focuses on teenage girls because they place a high value on physical appearance and because a slender, idealized image on social media (SM) has a big impact on how confident they feel.

### 2.1 Social Media (SM)

Social Media (SM) is a technical expansion that extends to a large number of audiences. Some magazines suggested that a female spends too much time on these platforms which not only reduce them from being more physically attractive but also affects their behaviour. Moreover, it has been observed that the Internet has larger audiences than other media. With respect to SM (Internet), peoples are more intends towards photos from different media channels. Though not all the images that are advertised are similar and only some advertisements show ordinary people in normal situations. Most commercials skewed and intentionally depicted the lives individually [2]. In the minor section of the population, in media, the most prominent factor is the degree of appearance and physical attractiveness. Furthermore, the use of this technique creates a distinct effect that makes it possible to extract lovely photos better than actual life. These images create a significant role in comparing two females because of the major shift in the perceptions of every image [3]. Therefore, for young generations, SM images are an issue. Gorgeous and confident models in the advertisements create a situation of lack of confidence and dissatisfaction with respect to their faces and bodies for young generations which can also lower self-esteem (SE) [4].

### 2.2 Body Image (BI)

Body image (BI) demonstrates how an individual recognize when they see themselves in the mirror. A robust form of the body represents when an individual support themselves regarding body shape and weight as anyone can have a positive or negative body form.

Several thoughts came across the mind when you see yourself in the mirror. Is it being observed favorably or advisably? Your appearance makes you happy or sad? Ahh, my hair seems horrific! I feel like I should lose my weight. I am looking awesome! These kinds of observations that we, as individuals shave feel into ourselves very often are directly associated with our BI. We feel negative when others believe that since they are not happy with their looks, hence they want to improve themselves.

The BI deals with the emotional state along with their belief which also affects mental health. [5]. It can also demarcate the complexity which includes emotions as well as an action pertaining to the body [6]. As per the data suggested approximately 1/4th of the adolescent girl's population have a scientific content of the body, which generates from the social stress from near and dear ones along with the SM [7]. It has been shown that young girls are more attracted to images on social- networks which leads to a loss of confidence, and satisfaction and makes them more depressed. Therefore, it has been understood that teenage girls who are often visible on SM platforms are possibly more confident with their body image as well as with their appearance. On the basis of such facts, the experimental hypothesis is proposed and is given below:

**Hypothesis 1:** At the college level all female students in teens having higher levels of exposure to SM (Facebook, WhatsApp, Instagram, YouTube and Twitter) will be connected with BI.

**Hypothesis 1a:** Lower level of body dissatisfaction is associated with the high level of SM exposure.

**Hypothesis 1b:** A lower level of overall appearance dissatisfaction is also associated with a high level of SM exposure.

**Hypothesis 1c:** High levels of SM exposure will be related to lower levels of appearance evaluation.

### 2.3 Self-Esteem (SE)

Self-Esteem (SE) has been explained as favorable or unfavorable aspects of any condition towards the self [8]. It scales how an individual thinks about themselves. The opponent aspect of SM platforms influences SE. An individual having a low confidence of SE estimates foremost concerns in weight in comparison to someone's upper level of self-confidence which improves health, better social activity as well as concerns.

Previous research has clearly suggested that, in spite of their weight, many women are having obesity issues which makes them unhappy due to their body image due to the skewed potentials of body size [9]. In the available studies, it has been clear that the better predictors for low SE [10] are surplus weight and distress among women. In today's world, young girl requires a strong basis that relates to their past images which develop a favorable opinion pertaining to their body which attracts, fat stereotyping, and disorders that result in body dissatisfaction [11]. Another hypothesis has been recognized since high exposure of SM exposure contributes to greater exposure to attractive pictures:

**Hypothesis 2:** Among teenage girls, high levels of exposure to SM (Facebook, WhatsApp, Instagram, YouTube and Twitter) will be seen and related to higher levels of SE.

Additionally, the relation between teenage girls' BI and SE can be seen and can be concluded by observation. It has been felt that most peoples evaluate themselves on their looks and hence being slim can be the best factor in their self-expression. The given below hypotheses were given:

**Hypothesis 3:** There will be a correlation between BI and SE among teenage girls.

**Hypothesis 3a:** There would be lower levels of physical discomfort coupled with higher levels of SE.

**Hypothesis 3b:** lower levels of overall appearance dissatisfaction can be correlated with higher levels of SE.

**Hypothesis 3c:** Higher levels of SE are related to Higher levels of test appearance.

## 3. METHODOLOGY

### 3.1 Procedure

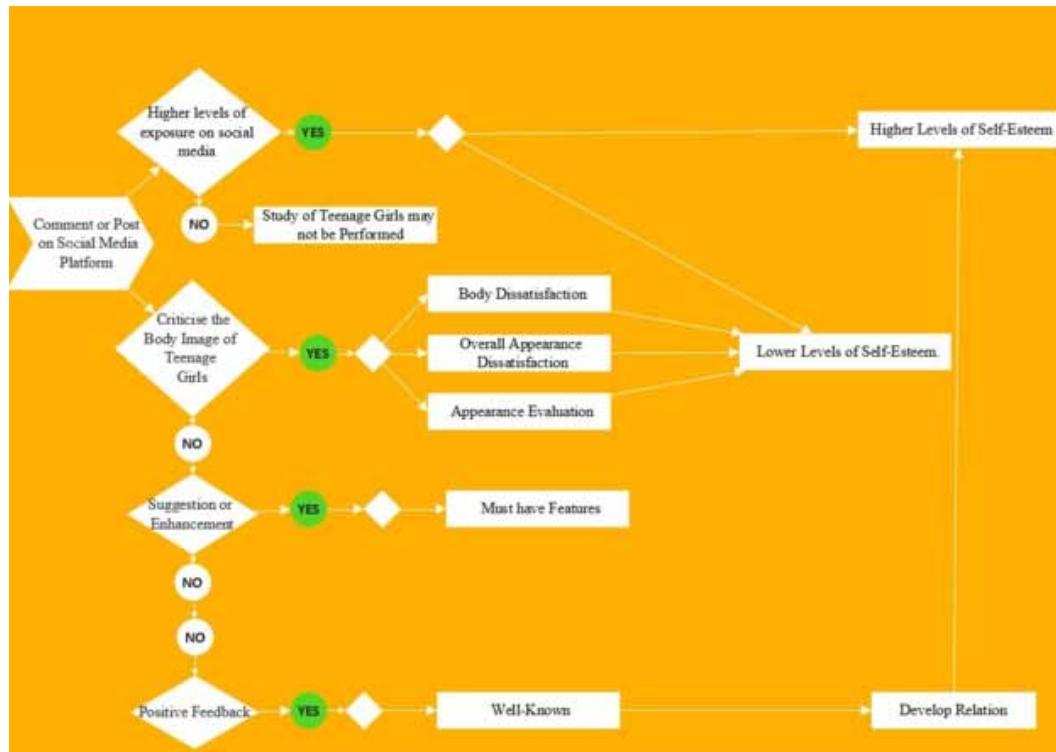
**Step I:** Firstly, gather the contact information of 1000 teenage girls from different Universities and Educational Institutions in India.

**Step II:** In this step, a set of questionnaires was created and disseminated to all teenage girls through SM.

**Step III:** We find that out of 1000 teenage girls, only 863 considered the reply and all replies were gathered by the researcher for data analysis.

**Step IV:** For the data analysis and evaluation method, we have used data-driven models for the effects of SM on BI and SE of teenage girls using Artificial Neural Networks (ANN), Artificial Intelligence (AI) techniques. Here we have used Convolutional Neural Network (CNN) and K-Nearest Neighbors (KNN) technology to satisfy our proposed hypothesis they are the subcategory of Artificial Neural Networks (ANN).

Figure 1. Model for representing the relations among exposure to social media, body image and self-esteem



### 3.2 Instruments

In the present study, exposure to internet platforms like SM was the principal and independent variable. Both SE and the BI were utilized, respectively, as independent and dependent variables. SM exposure was measured in time spent on SM per day and assessed by using a 5-point scale. (1 = 0 hours, 2 = 1 < hours < 2, 3 = 2 < hours < 3, 4 = 3 < hours < 5, 5 = 5 < hours) ("How many hours have you spent on SM in a day in the last 6 months?"). To analyze data, data was collected as the response to one SM exposure. Here, SM exposure was determined by the higher scores.

Data pertaining to different SM platforms were tested by their names which are visited very often. All the respondents were asked to "list social networking sites that they have frequently watched in the last six months". The unstructured reply was employed to know about which SM were most popular and visited very often with sensible and attractive images by the participants.

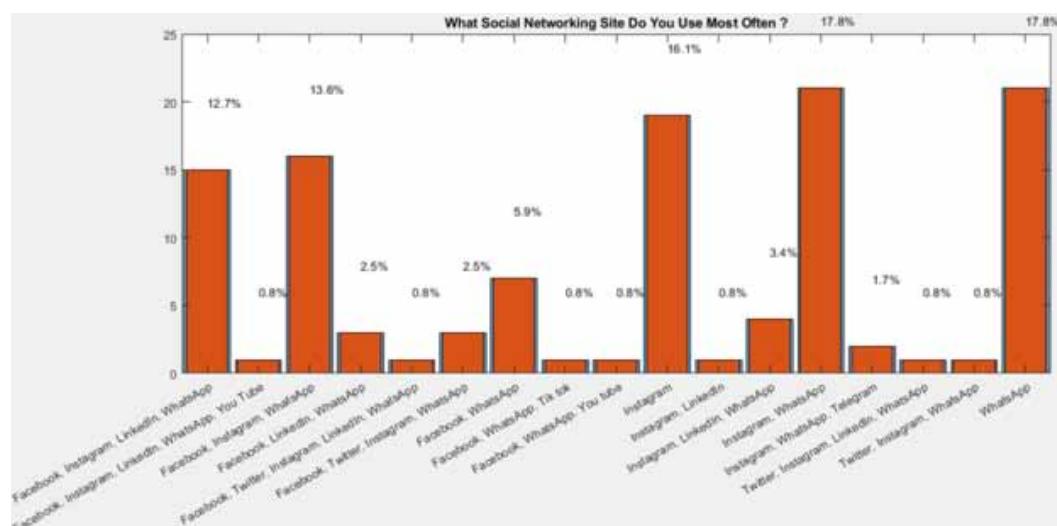
The SE scale of Rosenberg: Morris Rosenberg created the 10-item scale for SE. The structure is a 5-point Likert scale with endpoints that range from 1 stands for sturdily opposite to 5 stands for strongly agreeing to evaluate the overall or common SE of a person [8]. Ten multiple-choice questions were answered related to SM in order to evaluate the SE of teenage girls. Among ten questions five were down worded so they pressed back to score points and averaged the overall SE measuring; high scores identify situations that are more consistent with the self.

The appearance assessment test is one of the significant measures used to evaluate the subjective BI factor [12-13]. In this, seven products are included in the bag, which has a 5-point Likert-type structure with final scores that range from 1 = strong disagreement to 5 = strong agreement. "I like the way I look" is an example. Seven things are summed in the visual test points; high scores suggest a strong visual self-examination. The ranking's internal quality is 0.88, and its stability is 0.91 [14].

## 4. RESULTS AND DISCUSSION

The proposed model is assessed through a questionnaire developed to find out the association among social network platform, BI and SE. It shows the importance of SM on BI and SE as well as the impact of SE on BI. In this paper, CNN and KNN techniques are used to validate our proposed hypothesis which are the subcategory of Artificial Neural Networks (ANN). Results from Figure 2 to Figure 31 are obtained by using CNN and KNN techniques. Figures 2 and 3 in CNN and 17 and 18 in the KNN technique openly show the revelation to SM. Figure 3 and 18 shows that 15% of teenage girls are spending more than 3 hours, 33% 2 to 3 hours, 25% 1 to 2 hours, 17% 30 to 60 minutes and only 10% are spending less than 30 minutes but still they are spending their valuable time on SM. From the result attained from Figures 2 and 17, it has been summarized that all SM sites left a significant influence on teenage girls. Therefore, it has been summarized that there is abundant exposure to SM sites among teenage girls.

**Figure 2. Social networking sites used by teenage girls with different possibilities (in %) using CNN**



**Figure 3. Time spent by teenage girls on social media per day in hours (in %) using CNN**

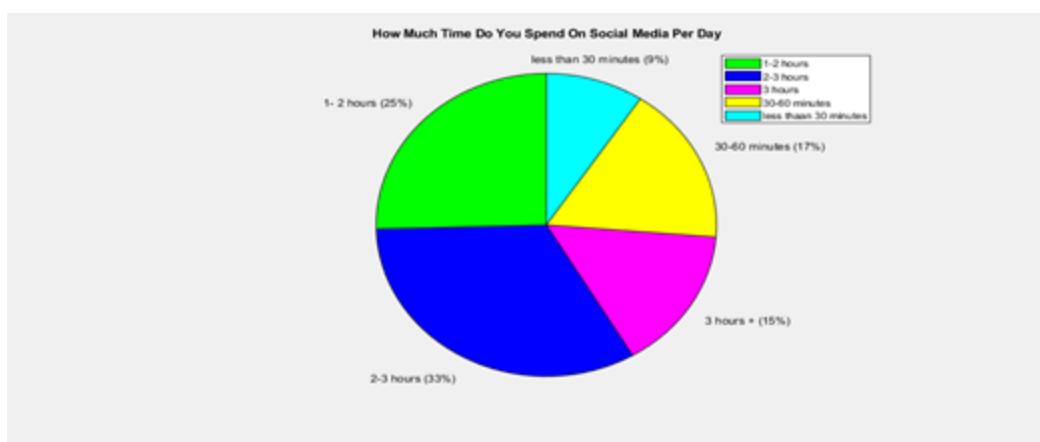


Figure 4, 5, and 6, in CNN and 19, 20, and 21 in KNN expands the correlation between SM and BI among teenage girls.

Figures 4 and 19 show that 45% of teenage girls using SM for making themselves fit whereas figures 5 and 20 show that 10% always and 14% often, 21% sometimes, and 14% of the girls hardly compared their BI with the images of SM which means that 60% BI of the teenage girls are affected by SM. Amongst them, it has been found that 42% of teenage girls are impacted by the likes, dislikes and comments over SM (figures 6 and 21). Therefore figures 9 and 24 concluded that now there is abundant knowledge and awareness among teenage girls pertaining to SM which affects them and only 27% are not getting affected.

We may infer from the explanation above that a higher level of SM exposure is correlated to BI.

The above results are shown in figures 8, 10, and 11 in CNN and 23, 25, and 26 in KNN related to the SE of teenage girls on internet platforms. It has been found that 3% of teenage girls have a great deal worse than usual, 13% of teenage girls have much worse than usual and 15% of teenage girls have somewhat worse than usual. It means only 31% of teenage girls have a lower level of SE

Figure 4. Fitness or health professionals followed by teenage girls on social media (in %) using CNN

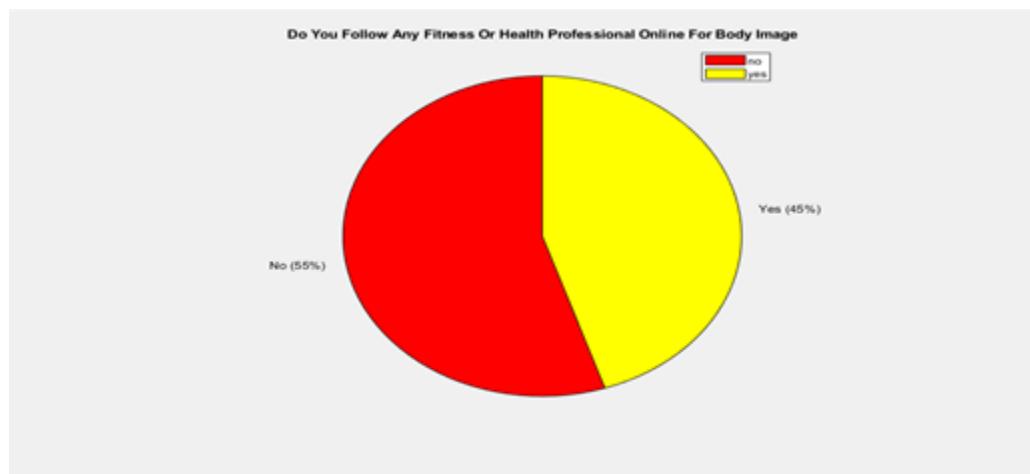
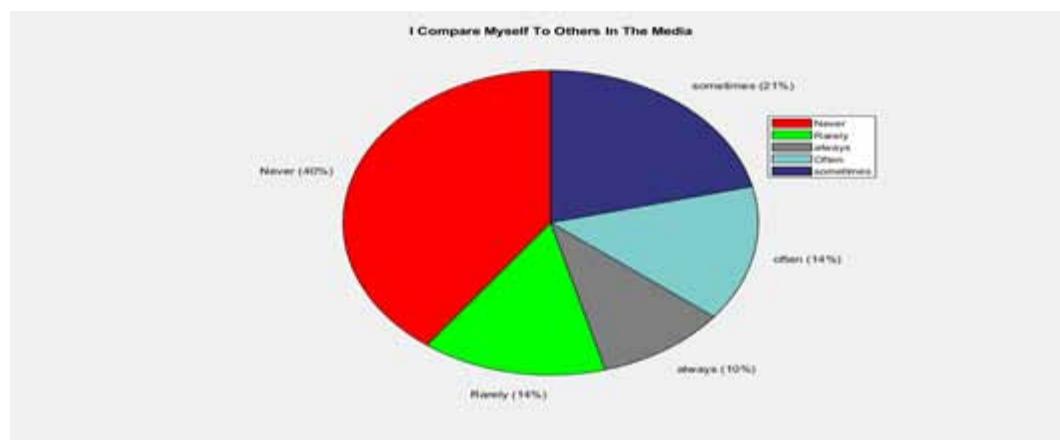


Figure 5. Teenagers compare their physical images on social media (in %) using CNN



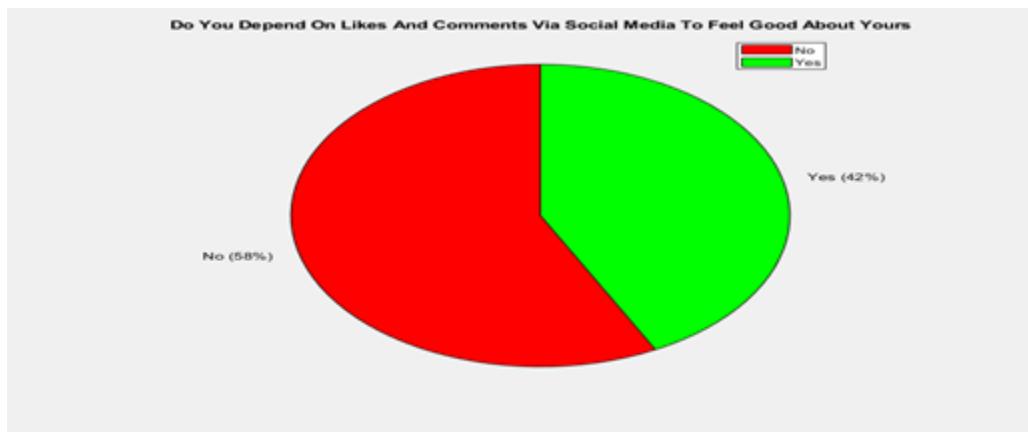
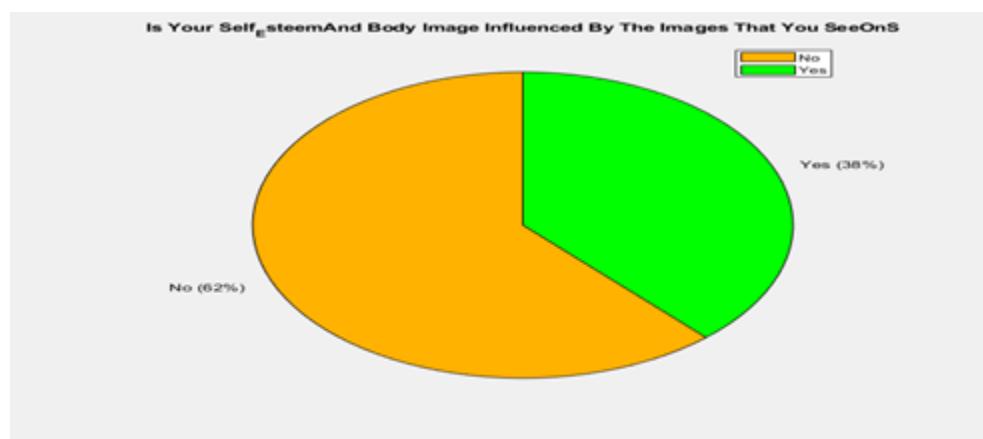
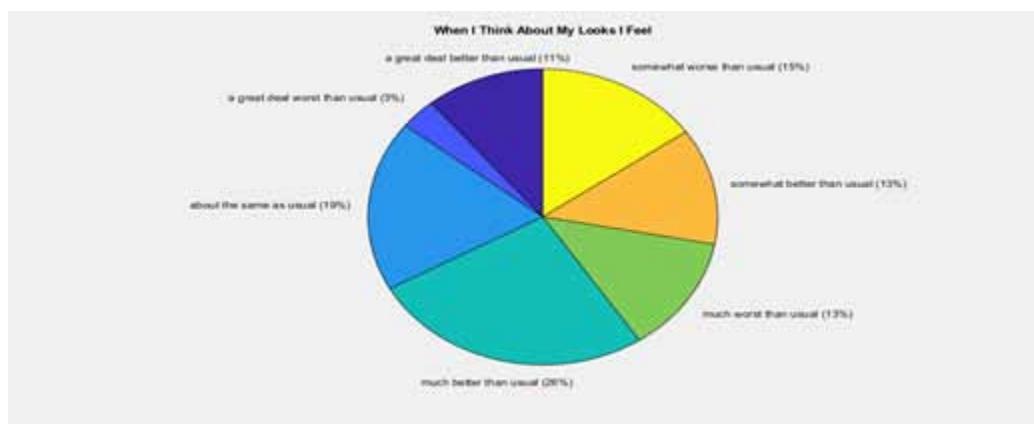
**Figure 6. Effects of social media likes and comments on teenage girls (in%) using CNN****Figure 7. Effects of social media pictures on teenage girls' self-esteem and physical image (in%) using CNN****Figure 8. Teenage girls' self-esteem after viewing photographs on social media (in %) using CNN**

Figure 9. Impact of social media on teenage girls (in %) using CNN

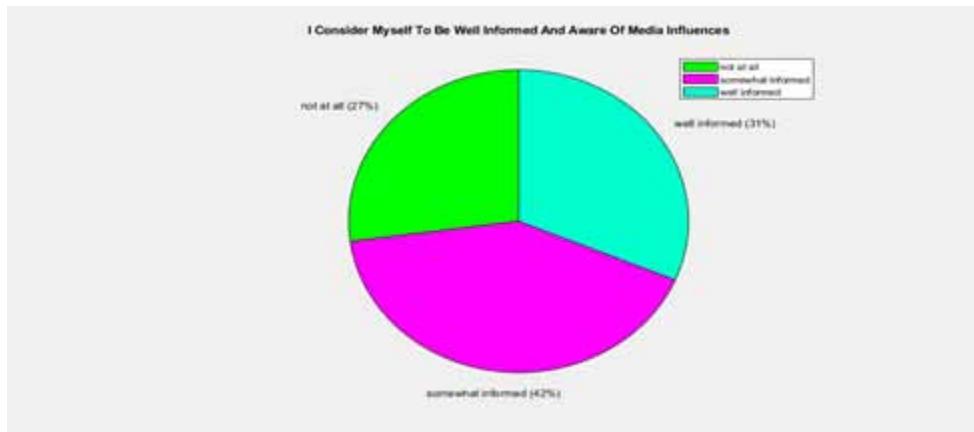


Figure 10. Impact of social media on teenage girls' behaviour (%) using CNN

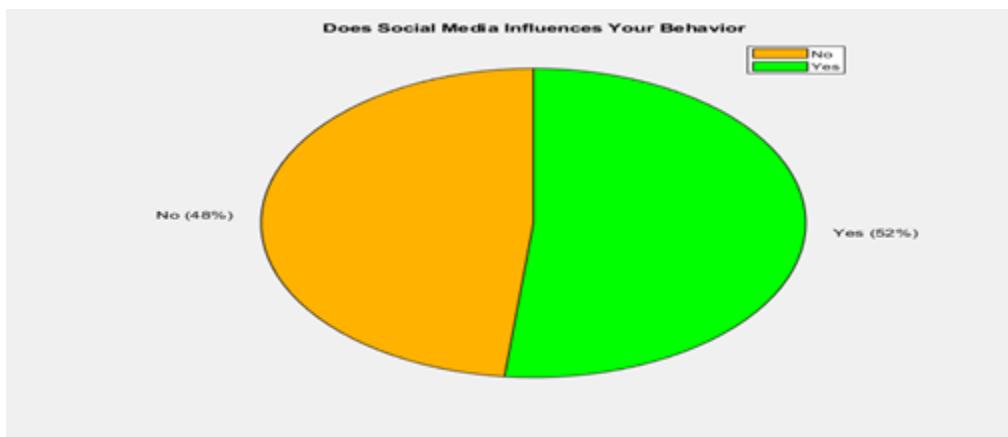
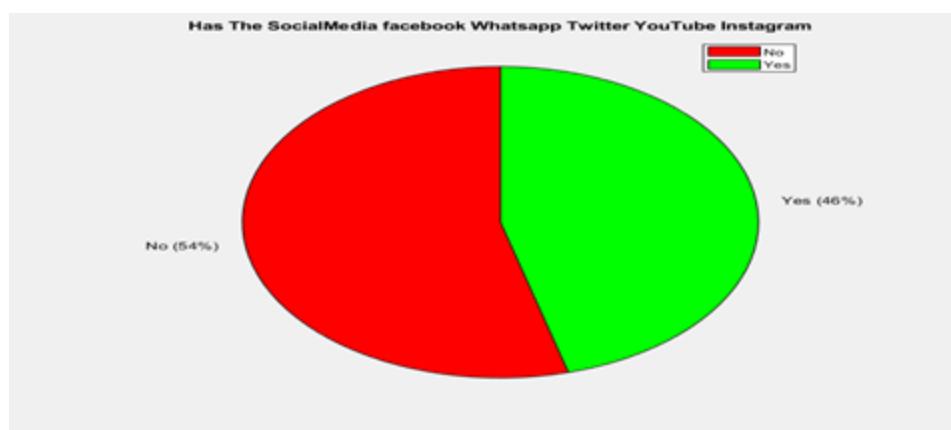


Figure 11. Positive effects of social media on teenage girls' body image (in %) using CNN

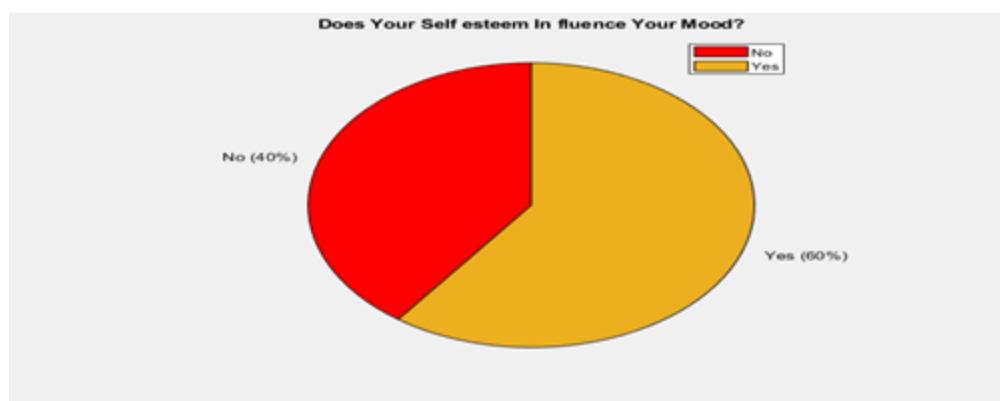


as compared to 69% who have a higher level of SE. Hence, we can summarize that an association between higher levels of exposure will be found related to a higher level of SE.

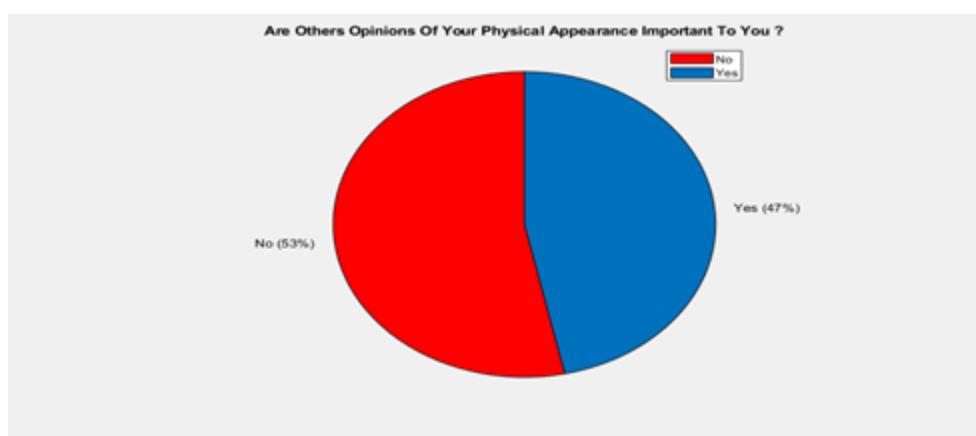
Figures 10 and 25 show that 52% of teenage girls' behavior is getting affected by social networking sites. From Figures 11 and 26, it has been shown that social networking sites have a positive impact on the BI and shape of teenage girls. From the above-mentioned results, it has been concluded that a higher level of SE exposure will be found associated with a lower level of body dissatisfaction, complete personality unhappiness and appearance assessment.

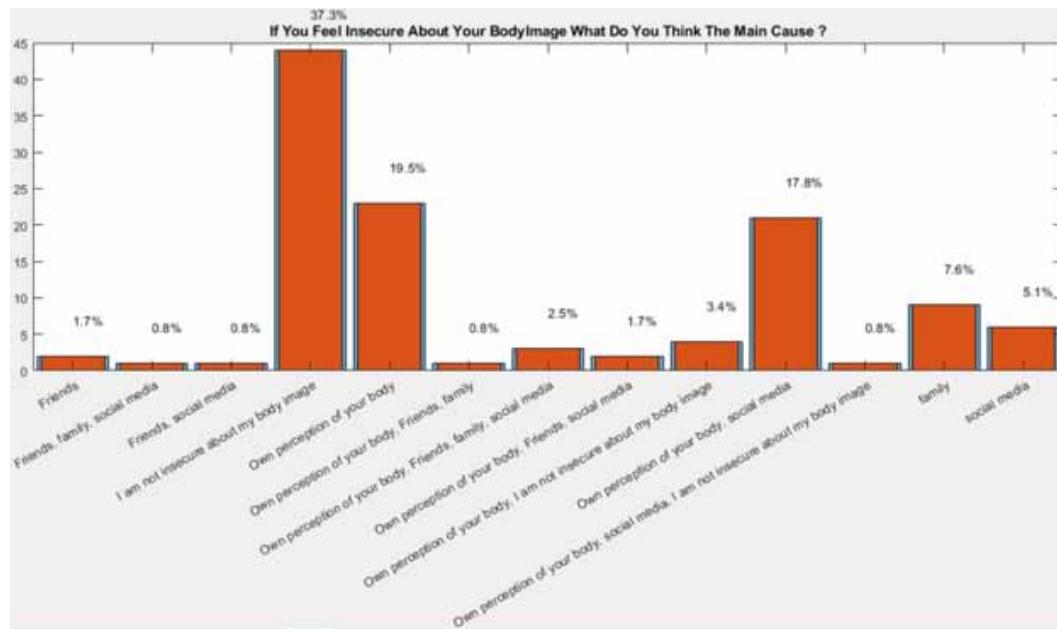
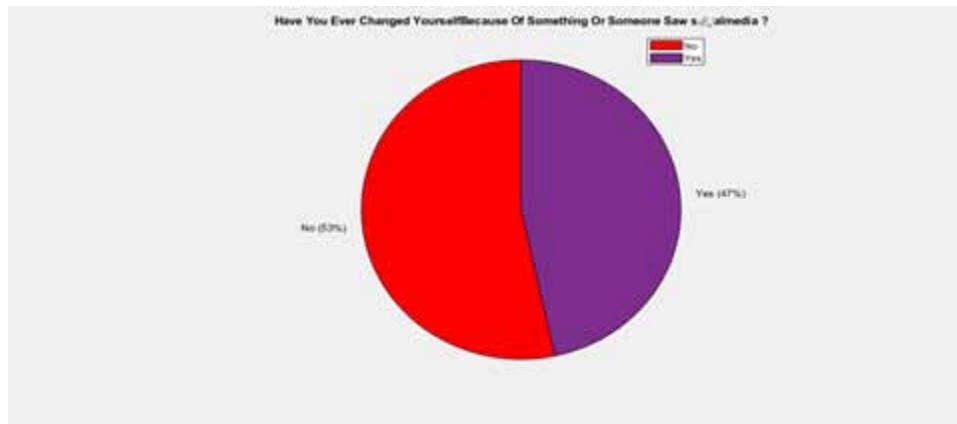
The result obtains from Figures 12 and 27, 60% of teenage girls SE affects BI. Therefore, it has been clear that there is an association between the SE and BI of teenage girls. Figure 14 and 29 depicted the aspects of body dissatisfaction and from the above results it has been concluded that our family, friends and our own perception related to ourselves is also getting influenced by these SM factors. Moreover, Figure 13, 15, and 16 in CNN and 28, 30, and 31 in KNN demonstrates the relationship between BI and SE. Hence it has been summarized that a higher level of SE will be found related to a lower level of body dissatisfaction, overall appearance dissatisfaction, and appearance evaluation. In this paper, the results obtained from Figures 2 to 31 are validated by the data-driven model using AI techniques. Here CNN and KNN techniques are used. These results obtained by using CNN and KNN techniques are satisfying our proposed hypothesis.

**Figure 12. Teenage girls' self-esteem and body image as a reflection (In %) using CNN**



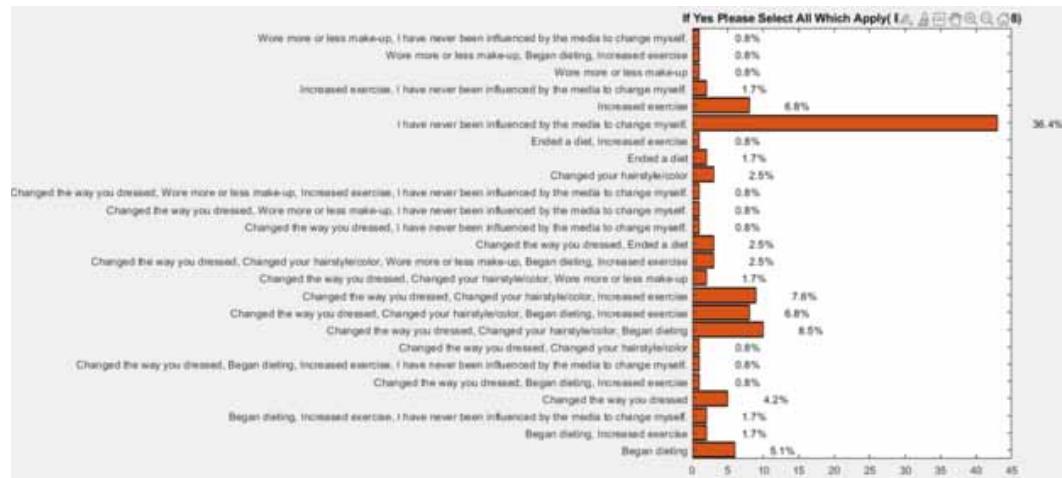
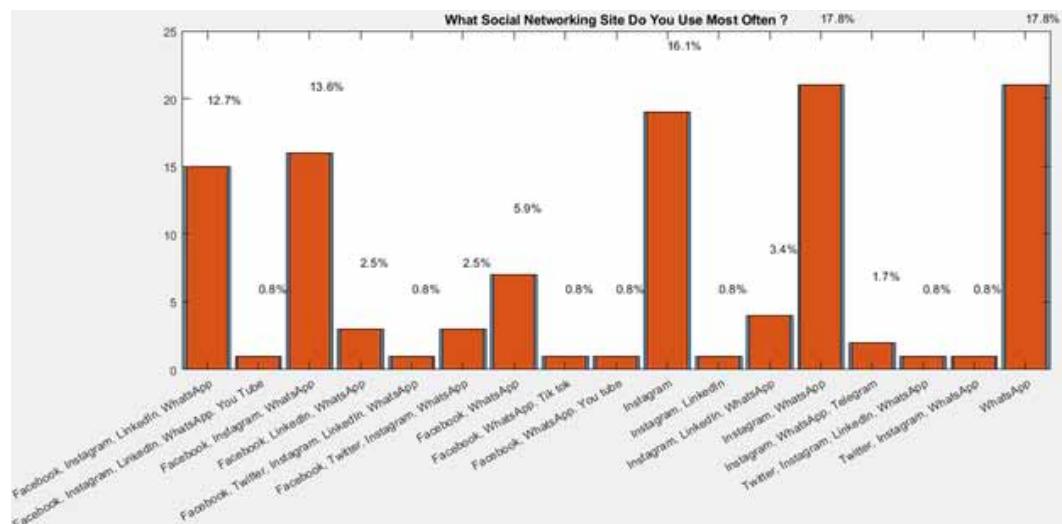
**Figure 13. Effects of other people's opinions on teenage girls' body images and self-esteem on social media (in %) using CNN**



**Figure 14. The elements that contribute to body dissatisfaction (in %) using CNN****Figure 15. Teenage girls' body images are changing in response to what they see on social media (in %) using CNN**

## 5. CONCLUSION AND FUTURE SCOPE

The current manuscript examines if SM affects the SE and BI of teenage girls. Mostly, the beauty or covetable feminine BI of teen girls is demarcated by pleasant faces and slim body shapes generally called zero figures. Nonetheless, the definition of this beauty is not always right as it totally depends on the experience of observation that is not all-encompassing. All in total, the

**Figure 16. Teenage girls' body image changes depending on how it is perceived on social media (in %) using CNN****Figure 17. Social networking sites used by teenage girls with different possibilities (in %) using KNN**

beauty is demarcated by combining the experiences like appearance, speaking, touching and several other perspectives. These days' SM has now become an important source to share data amid individuals. The current paper analyses the effects of SM on the SE and BI of teenage girls. It aims teenage girls due to physical allure has a personalized significance and a slim and attractive idealized image persuades their SE. Additionally, a data-driven model used CNN and KNN Artificial intelligence (AI) techniques which can see the effectiveness of the model and future challenges discussed.

Figure 18. Time spend by teenage girls on social media per day in hours (in %) using KNN

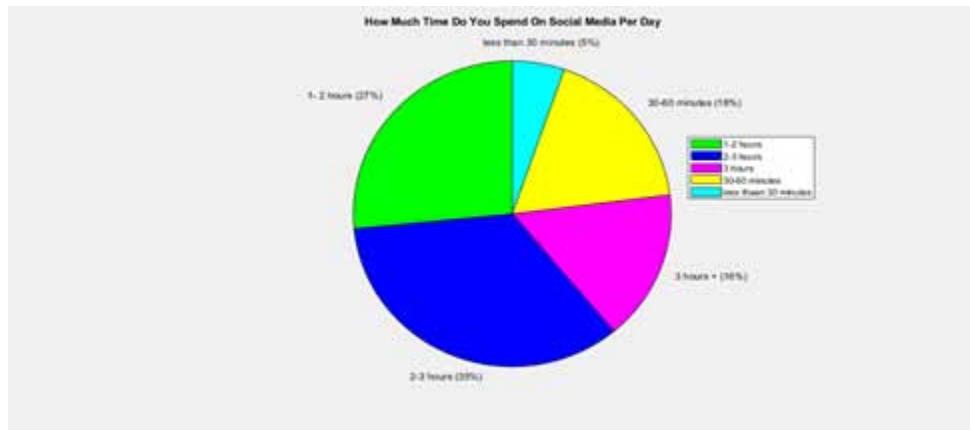


Figure 19. Fitness or health professional followed by teenage girls on social media (in %) using KNN

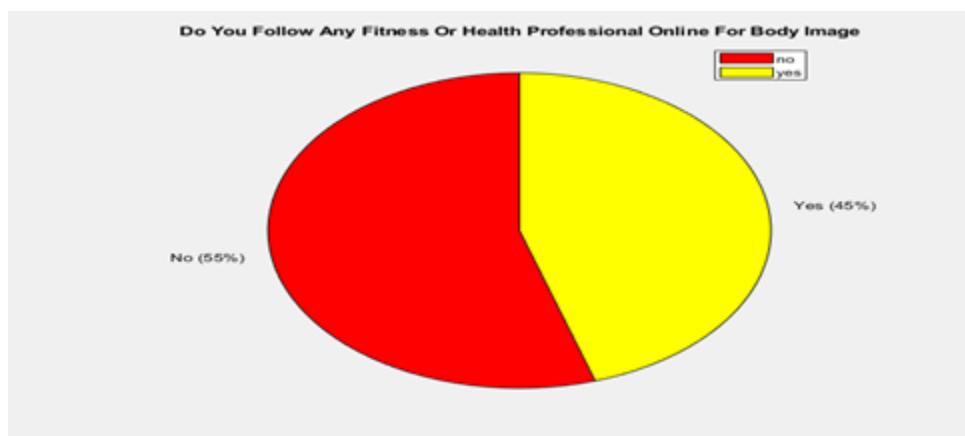
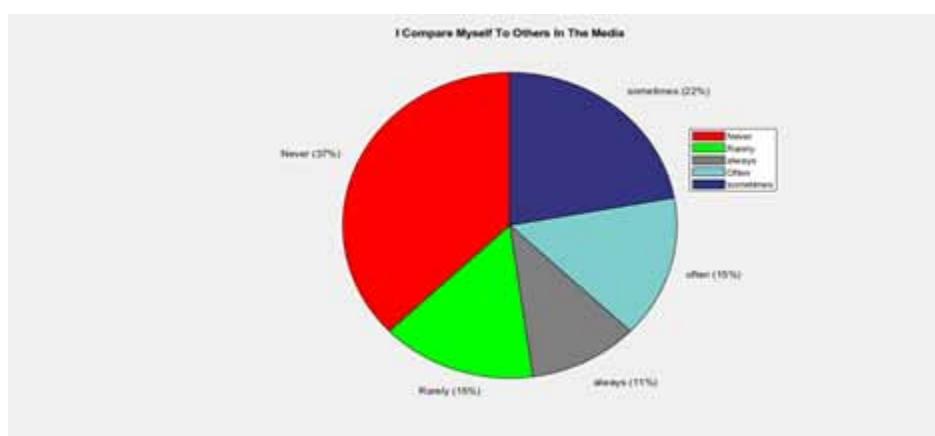


Figure 20. Teenagers compare their physical images on social media (in %) using KNN



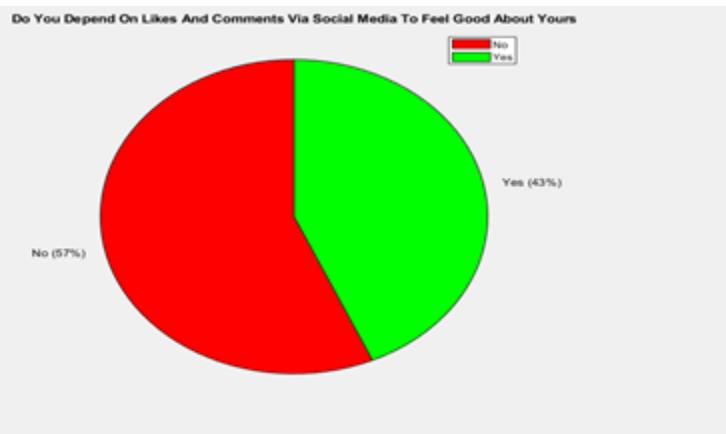
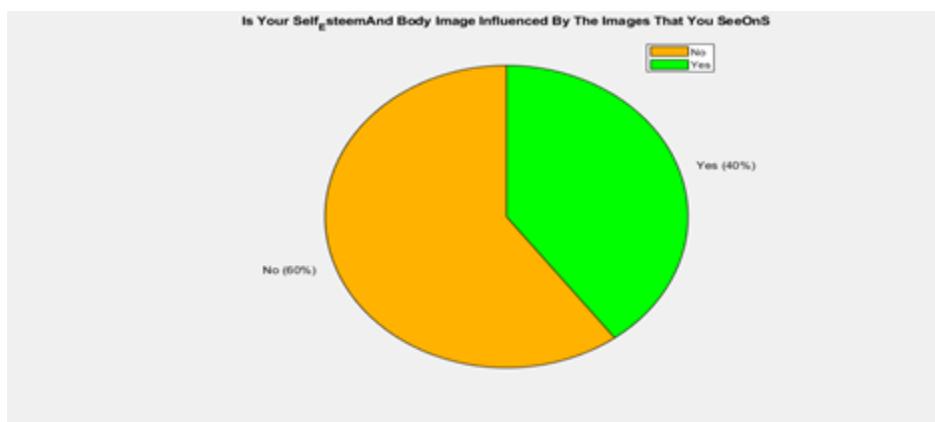
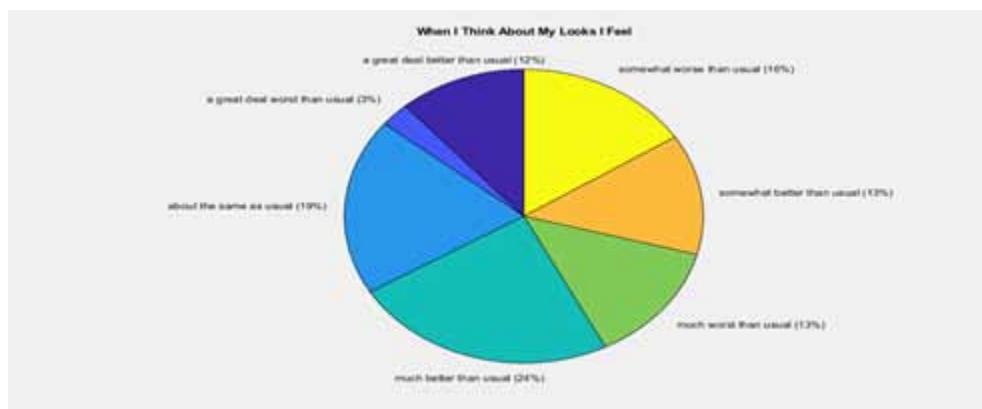
**Figure 21.** Effects of social media likes and comments on teenage girls (in%) using KNN**Figure 22.** Effects of social media pictures on teenage girls' self-esteem and physical image (in%) using KNN**Figure 23.** Teenage girls' self-esteem after viewing photographs on social media (in %) KNN

Figure 24. Impact of social media on teenage girls (in %) using KNN

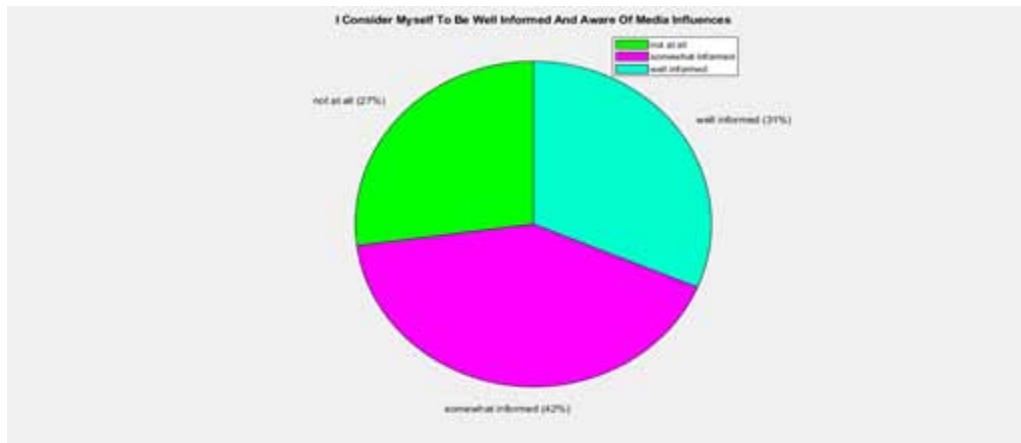


Figure 25. Impact of social media on teenage girls' behaviour (%) using CNN

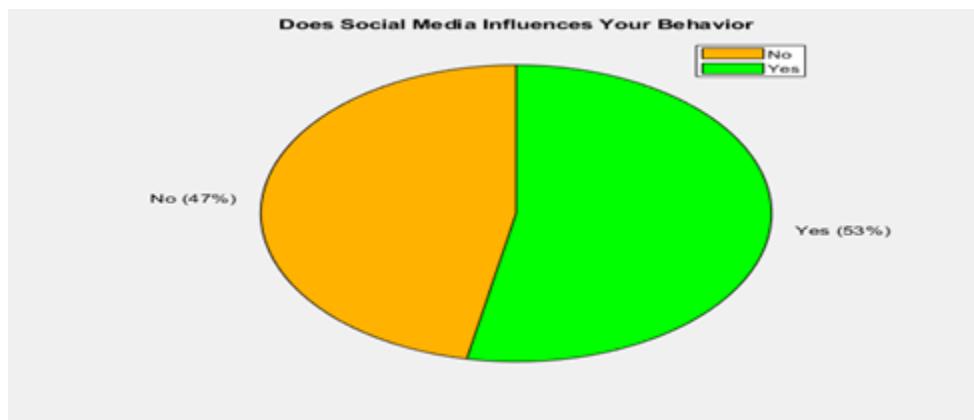
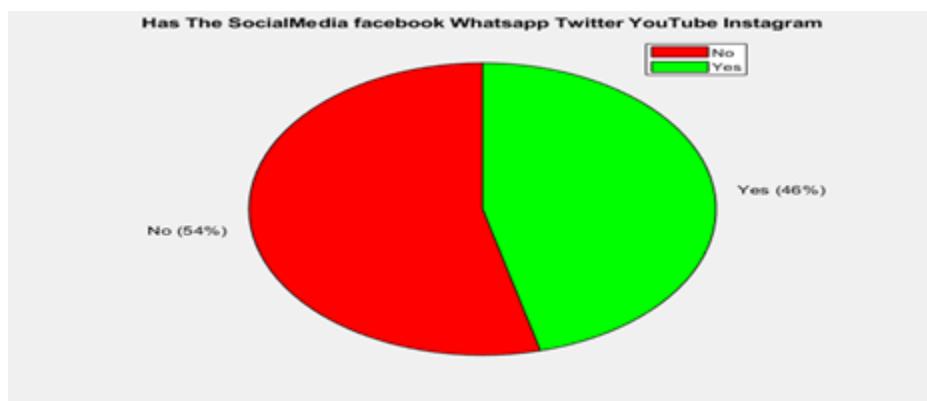
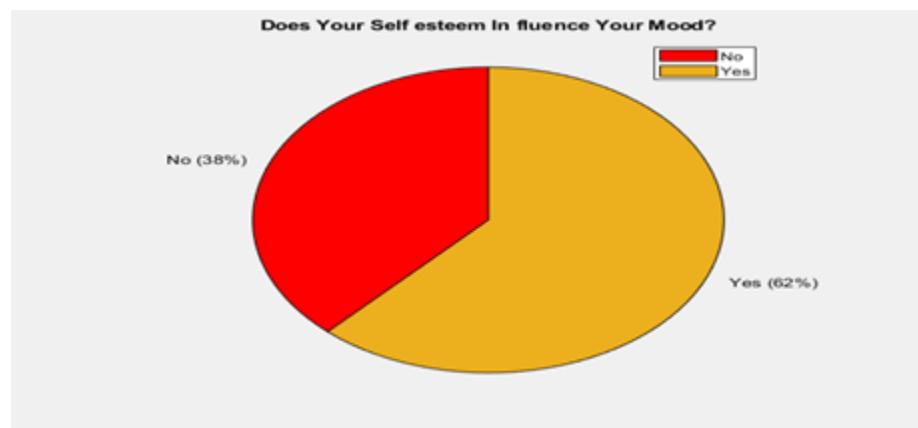
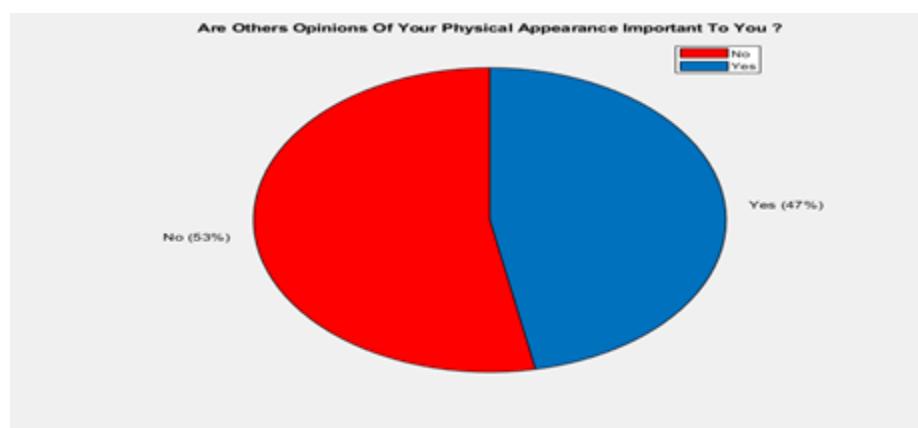


Figure 26. Positive effects of social media on teenager girls' body image (in %) using KNN



**Figure 27. Teenage girls' self-esteem and body image as a reflection (In %) using KNN****Figure 28. Effects of other people's opinions on teenage girls' body images and self-esteem on social media (in %) using KNN**

## CONFLICTS OF INTEREST

The authors have declared that they have no conflict of interest in this paper. A conflict of interest exists when a researcher has personal, financial, or other interests that may influence their research findings or the interpretation of their results. Disclosing conflicts of interest is important because it allows readers to evaluate the potential impact of these interests on the study's outcomes and conclusions.

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Figure 29. The elements that contribute to body dissatisfaction (in %) using KNN

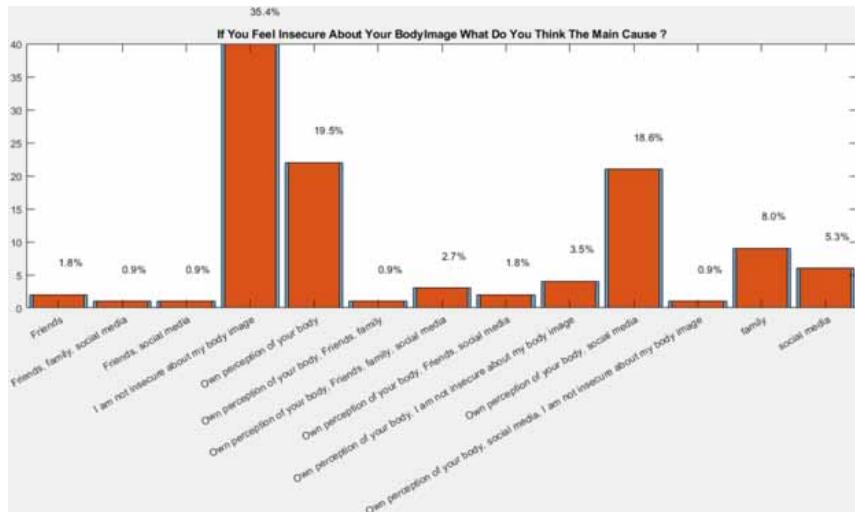


Figure 30. Teenage girls' body images are changing in response to what they see on social media (in %) using KNN

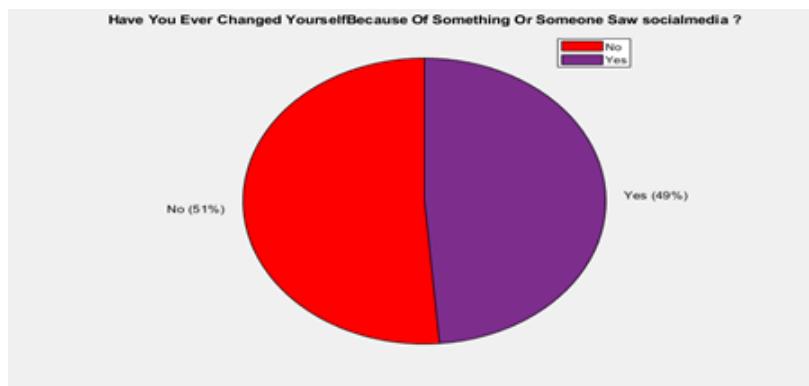


Figure 31. Teenage girls' body image changes depending on how it is perceived on social media (in %) using KNN



## REFERENCES

- Birtchnell, S. A., Dolan, B. M., & Lacey, J. H. (1987). Body image distortion in non-eating disordered women. *Journal of Psychosomatic Research*, 31(4), 513–520. doi:10.1016/0022-3997(87)90009-2 PMID:3668888
- Blowers, L. C., Loxton, N. J., Grady-Flesser, M., Occhipinti, S., & Dawe, S. (2003). The relationship between sociocultural pressure to be thin and body dissatisfaction in preadolescent girls. *Eating Behaviors*, 4(3), 229–244. doi:10.1016/S1471-0153(03)00018-7 PMID:15000967
- Brown, T. A., Cash, T. F., & Mikulka, P. J. (1990). Attitudinal body-image assessment: Factor analysis of the body-self relations questionnaire. *Journal of Personality Assessment*, 55(1/2), 135–144. doi:10.1207/s15327752jpa5501&2\_13 PMID:2231236
- Cash, T. F., & Pruzinsky, T. (1990). *Body images: Development, deviance, and change*. Guilford.
- Cash, T. F., & Szymanski, M. L. (1995). The development and validation of the body image ideals questionnaire. *Journal of Personality Assessment*, 64(3), 466–477. doi:10.1207/s15327752jpa6403\_6 PMID:16367722
- Cash, T. F., & Szymanski, M. L. (1995). The development and validation of the body image ideals questionnaire. *Journal of Personality Assessment*, 64(3), 466–477. doi:10.1207/s15327752jpa6403\_6 PMID:16367722
- Cooper, P. J., & Taylor, M. J. (1988). Body image disturbance in bulimia nervosa. *The British Journal of Psychiatry*, 153(2), 32–36. doi:10.1192/S0007125000298966 PMID:3072050
- Fallon, A. (1990). Culture in the mirror: Sociocultural determinants of body image. In T. F. Cash & T. Pruzinsky (Eds.), *Body images: Development, deviance, and change* (pp. 80–109). Guilford.
- Feingold, A., & Mazzella, R. (1996). Gender differences in body image are increasing. *Gender Psychologist*, 32, 90–98.
- Freedman, R. J. (1984, Summer/Fall). Reflections on beauty as it relates to health and adolescent females. *Women & Health*, 9(2-3), 29–45. doi:10.1300/J013v09n02\_03 PMID:6235678
- Richins, M. L. (1995). Social comparison, advertising, and consumer discontent. *The American Behavioral Scientist*, 38(4), 593–607. doi:10.1177/0002764295038004009
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press. doi:10.1515/9781400876136
- Shukla, V., & Srivastava, S. (2022). Effect of Mass Media on Body Image and Self-Esteem of Teenage Girls. [IJCBPL]. *International Journal of Cyber Behavior, Psychology and Learning*, 12(1), 1–14. doi:10.4018/IJCBPL.304905
- Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology*, 38(5), 669–678. doi:10.1037/0012-1649.38.5.669 PMID:12220046

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