Original Article :

The Use of Augmented Reality Social Media Filters and Interest to Pursue Aesthetic Procedures: Is There A Link?.

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Abstract

Background and Aims:

Social media plays a critical role in the way people perceive beauty standards. Through filtered photos and augmented reality, people are exposed to idealized images of beauty that can influence their desire to pursue cosmetic surgery. There is no scientific evidence to support the claim that social media is directly responsible for the increasing number of people seeking cosmetic surgery, but the trend is worth observing.

The aim of this study was to assess the effect of augmented reality social media filters on users' pursuit of aesthetic procedures

Methods:

This cross-sectional study was conducted using an online anonymous questionnaire between February and March 2022, to assess the effect of augmented reality social media filters on users' pursuit of aesthetic procedures. Inclusion criteria were a variety of populations above 18 years of age, both men and women who were living in Saudi Arabia. While exclusion criteria were people who were not living in Saudi Arabia and were under 18 years of age regardless of their sex. The survey was delivered through Google sheets, and the questionnaire data were exported into an Excel file. We used R Studio (v.4.1.2.) for summarizing, visualizing, and analyzing the data.

Results:

The majority of the respondents (52%) used social media for an average of two to five hours per day, while 33% spent more than five hours a day. A total of 473 (29%) respondents had previously had at least one cosmetic intervention which mostly included taking a cosmetic injection (OBT-A, filler, etc.) Moreover, 61% of the participants followed one or more social media influencers, of which 165 (10%) followed more than 10 influencers. Similarly, gender, previous cosmetic intervention, number of influencers followed, and wanting an appearance similar to the filters in real life showed a very high statistical difference (p-value < 0.001). This study found that men were more likely than women to choose surgery as a cosmetic intervention, and that people who had undergone previous cosmetic interventions were more likely to choose the same intervention again.

Conclusions:

The use of social media filters can be a significant factor in pursuing cosmetic procedures, especially among young women. While it may be used as a tool to help estimate the results of procedures, cosmetic surgeons should be aware of the potential dangers and be sure to prioritize patient safety.

Keywords:
social media filters, cosmetic procedures, Influence.

Introduction

Cosmetic surgery, as defined by the Australian Journal of Plastic Surgery, aims to achieve a more desirable appearance according to the patient's perception. This involves procedures that alter bodily appearances when they have normal features as perceived by the surgeon. Cosmetic treatments can be either surgical or nonsurgical[1]. The American Society for Aesthetic Plastic Surgery has reported a significant increase in the prevalence of cosmetic procedures in the past few decades as advances in cosmetic procedures have made them more easily accessible to patients [2].

Social media is a term used to describe electronic platforms that promote the dissemination of information to targeted users. Through visualized media, it plays a critical role in aesthetic procedures such as breast augmentation, liposuction, rhinoplasty and cosmetic injections[3]. In Saudi Arabia, there were 33.58 million internet users, which is equivalent to 95.72% of the Saudi population with active social media users reached 27.8 million representing 79.3% of total population, in 2021[4].

Over the decades, perceptions of beauty have changed, and technology has supported the development of applications using augmented reality, which alters photos to meet ideal beauty standards. The wide availability of photo-editing tools can be seen as a double-edged sword. Plastic surgeons have increasingly observed patients requesting to look like their filtered pictures, in contrast to past trends where patients would present celebrity photos or generic descriptions of what alterations were desired [5]. Body dysmorphic disorder is defined as an impaired preoccupation with a minor imagined or real defect in appearance. Body dysmorphia is a mental health issue in which patients are preoccupied with the belief that their physical appearance has certain flaws [5], which might have an impact on their self-esteem. According to one study, people with low self-esteem sought approval from others by posting their selfies on social networks and receiving positive comments and likes in return [6]. Furthermore, the strong association of other mental health issues such as depression, stress and anxiety disorders on pursuing such procedures was noticeable as it is believed that it will be their ultimate solution for their issues [6]

It is important for healthcare practition-

ers to recognize and adapt to filtered photograph trends and to have the skills to identify body dysmorphic disorders. Healthcare professionals should screen patients for warning signs and unrealistic expectations as they have professional and bioethical obligations to ensure patient safety. Motivations for performing cosmetic procedure should be in the best interest of the patient, regardless of what the patient may request at the time of consultation. Performing aesthetic procedures on those who are unable to make reality-based decisions regarding their features is not advisable. Patient education should be sensitive to those who are distressed by the harmful effects of comparative social media, including the use of filtered and edited images and the need for constant feedback [7]. In general, there are no robust scientific data on the effects of filtered photos on seeking cosmetic surgery. Neither is there any evidence on the effect of this current augmented reality of social media filters on the desire of people to pursue cosmetic surgery. Hence, this study aimed to assess the effect of augmented reality social media filters on users' pursuit of aesthetic procedures.

Methods

This cross-sectional study was conducted using an online anonymous questionnaire between February and March 2022.

Inclusion criteria:

A variety of population above 18 years of age, both men and women who were living in Saudi Arabia and agreed to participate in this study.

Exclusion criteria:

None.

Institutional Review Board:

Study proposal for the approval of Institutional Review Board at Imam Mohammad Ibn Saud Islamic University (Registration number: HAPO-01-R-0011). The study proposal was approved under project number: 190/2022.

The study procedures followed were in accordance with the Helsinki guidelines. Every participant knew the purpose of the study and Informed consent was obtained from all individuals included in the study.

Sample size:

The sample size was determined using Cochran's formula.

Sample size = (Z2pq) / e2

The minimum sample size were 385. The decided sample size was to get more than 1550 participants to decrease the margin of error from 5% to less than 2.5%.

The survey, which was sent out using Google forms, was divided into four parts. The first part included an introduction containing the team, the study process, the purpose, and the informed consent. The

second part asked for demographic data such as age, gender, marital status, educational level, and history of aesthetic procedures. The third section focused on the use of social media. The fourth and final section sought to evaluate the impact of augmented reality on people's decisions to pursue aesthetic procedures.

The questionnaire data were exported into an Excel file to be classified and organized for analysis. We used R Studio (v.4.1.2.) for summarizing, visualizing, and analyzing the data. Categorical data were summarized as numbers and percentages. Differences between groups were tested using Pearson's chi-squared test. We considered the difference to be statistically significant when the p-value was ≤ 0.05 and highly significant when the p-value was ≤ 0.001. Moreover, we fitted two logistic regression models to assess the factors associated with affection by augmented reality social media filters as well as the type of cosmetic intervention to be used by those who are affected by these filters. The logistic regression model was assessed by C-statistics (C-stat) and was considered with no predictive value when C-stat ≤ 0.5, fair predictive value when C-stat = 0.5-0.7, good predictive value when C-stat = 0.7-0.8, and strong when C-stat > 0.8.

Results

Our sample included 1640 adults, of which 1200 (73%) were women. The dominant age group was between 18 and 25 years, representing 45% of all respondents. Additionally, 83% of the participants had completed university education or higher. The majority of the respondents (52%) used social media for an average of two to five hours per day, while 33% spent more than five hours a day. Moreover, 61% of the participants followed one or more social media influencers, of which 165 (10%) followed more than 10 influencers. Further details are provided in table 1

Table (1) Demographic characteristics of all participants

Respondents Characteristic	
Variable	N = 1,640[1]
Age Groups	
18-25	732 (45%)
26-35	288 (18%)
36-45	382 (23%)
More than 45	238 (15%)
Gender	
Female	1,200 (73%)
Male	440 (27%)
Education Level	
Secondary education or below	283 (17%)
University education or higher	1,357 (83%)
Marital Status	
Married	778 (47%)
single	862 (53%)

Time using Social Media	
2-5 hours a day	851 (52%)
Less than two hours	243 (15%)
More than 5 hours	546 (33%)
Cosmetic Intervention	473 (29%)
Number of followed Influencers	
0	645 (39%)
1-5	631 (38%)
5-10	199 (12%)
More than 10	165 (10%)

[1] n (%)

A total of 473 (29%) respondents had previously had at least one cosmetic intervention which mostly included taking a cosmetic injection (OBT-A, filler, etc.; 473 participants); 292 of these 473 participants were injected only (Table 1). Contrarily, 181 of the 473 participants had undergone cosmetic surgery, of which only 49 underwent surgery alone. An illustration of the types of cosmetic interventions previously performed is shown in Figure 1.

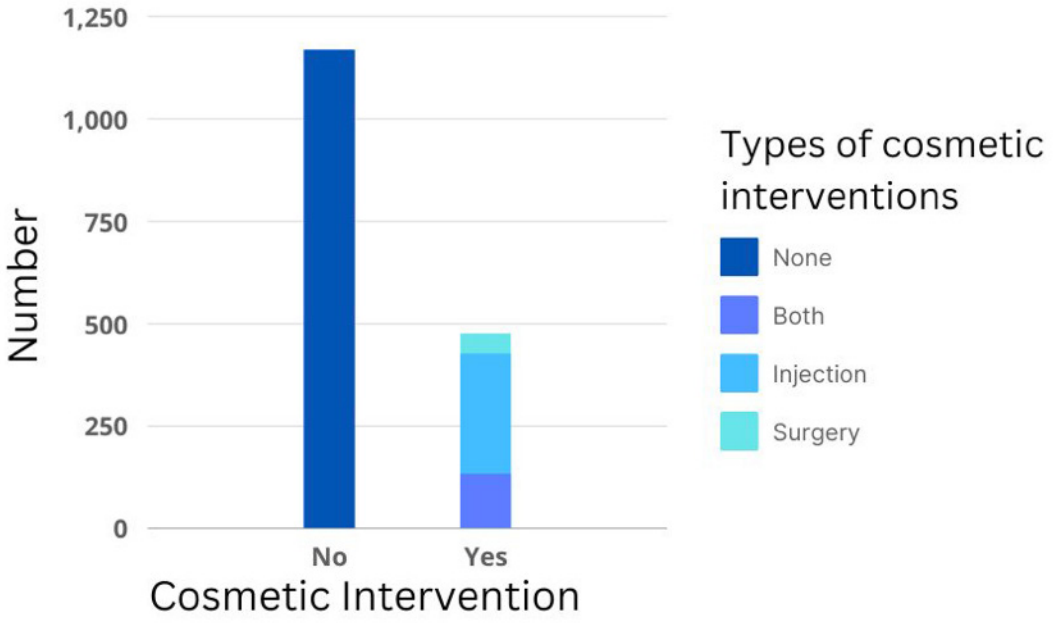


Figure (1) Types of previously performed cosmetic interventions

Participants were asked which social media they preferred for using filters, and the results showed that most Saudis chose Snapchat (1099), followed by Instagram (191) and TikTok (142).

Furthermore, to assess the effect of filters, participants were asked which cosmetic intervention they thought would make their appearance similar to what the filters provided. Participants who chose one of the two options (i.e., injection or surgery) were considered to be affected by the filters, whereas others were considered not affected. The factors that may be associated with this effect are shown in Table 2.

Table (2) Factors associated with being affected by filters

	Affected by Filters		
Variable Age Groups	Affected, N = 671[1]	Not Affected, N = 969[1]	p-value[2] <0.001
18-25	265 (36%)	467 (64%)	
26-35	141 (49%)	147 (51%)	
36-45	177 (46%)	205 (54%)	
More than 45	88 (37%)	150 (63%)	
Gender			<0.001
Female	578 (48%)	622 (52%)	
Male	93 (21%)	347 (79%)	
Education Level			0.2
Secondary education or below	107 (38%)	176 (62%)	
University education or higher	564 (42%)	793 (58%)	
Marital Status			0.2
Married	332 (43%)	446 (57%)	
single	339 (39%)	523 (61%)	
Previous Cosmetic Intervention	315 (67%)	158 (33%)	<0.001
Time using Social media			0.002
2-5 hours a day	324 (38%)	527 (62%)	
Less than two hours	90 (37%)	153 (63%)	
More than 5 hours	257 (47%)	289 (53%)	
Number of followed Influencers			<0.001
0	156 (24%)	489 (76%)	
1-5	297 (47%)	334 (53%)	
6-10	121 (61%)	78 (39%)	
More than 10	97 (59%)	68 (41%)	
Wishing Filters in real life	547 (57%)	405 (43%)	<0.001
[1] n (%) by row			
[2] Pearson's Chi-squared test			

The age groups differed between the two groups, with a highly significant p-value < 0.001. Similarly, gender, previous cosmetic intervention, number of influencers followed, and wanting an appearance similar to the filters in real life showed a

very high statistical difference (p-value < 0.001). The latter was assessed by asking participants whether they would be happier if they had the same appearance as those given by augmented reality social media filters. The results showed that 58% of the participants would be happier if they had the same appearance. Of these, 57% were willing to undergo cosmetic interventions to change their appearance.

A logistic regression model was used to assess the association (Table 3).

Table (3) Logistic regression model of factors associated with being affected by filter

Characteristic	OR[1]	95% CI[1]	p-value
(Intercept)	0.10	0.06, 0.18	<0.001
Age Groups			
18-25	—	—	
26-35	0.95	0.65, 1.39	0.8
36-45	0.87	0.58, 1.30	0.5
More than 45	0.99	0.62, 1.58	>0.9
Gender			
Female	—	—	
Male	0.46	0.34, 0.63	<0.001
Education Level			
Secondary education or below	—	—	
University education or higher	0.83	0.60, 1.15	0.3
Marital Status			
Married	—	—	
single	1.17	0.84, 1.63	0.4
Previous Cosmetic Intervention			
No	—	—	
Yes	4.01	3.06, 5.27	<0.001
Time using social media			
2-5 hours a day	—	—	
Less than two hours	1.12	0.78, 1.59	0.5
More than 5 hours	1.45	1.11, 1.90	0.006
Number of followed Influencers			
0	—	—	
1-5	2.18	1.66, 2.87	<0.001
6-10	3.19	2.16, 4.74	<0.001
More than 10	2.75	1.81, 4.20	<0.001
Wishing Filters in real life			
No	—	—	
Yes	5.32	4.12, 6.90	<0.001

[1] OR = Odds Ratio for being affected, CI = Confidence Interval

Men were less likely to be affected by augmented reality social media filters (OR = 0.46, [95% CI 0.34-0.63], p < 0.001) compared to women. Additionally, those

who had previously undergone a cosmetic procedure were more willing to get another intervention because of augmented reality social media filters (OR = 4.01, [95% CI 3.06-5.27], p < 0.001) compared to those who had not. The model also shows that spending more than five hours per day using social media was associated with getting influenced by the filters (OR = 1.45, [95% CI 1.11-1.90], p = 0.006) as compared to those who spent an average of two to five hours per day. In addition, the intention to get a cosmetic intervention was also affected by the number of influencers individuals followed on social media (OR = 2.18, 3.19, and 2.75 for those who followed 1-5, 6-10, and more than 10 influencers, respectively); these were all highly statistically significant (p-value < 0.001). The previous logistic regression model had a strong predictive value with a C-stat of 0.81.

Table (4) Summary and logistic regression model of factors associated with being affected by filters

Variable	Injection, N = 3541	Surgery, N = 317[1]	p-value[2]	OR[3]	95% CI[3]	p-value
Age Groups			0.007			
18-25	129 (49%)	136 (51%)		—	—	
26-35	64 (45%)	77 (55%)		1.28	0.81, 2.05	0.3
36-45	105 (59%)	72 (41%)		0.83	0.51, 1.36	0.5
More than 45	56 (64%)	32 (36%)		0.66	0.36, 1.18	0.2
Gender			0.002			
Female	319 (55%)	259 (45%)		—	—	
Male	35 (38%)	58 (62%)		2.03	1.26, 3.31	0.004
Education Level			0.3			
Secondary education or below	61 (57%)	46 (43%)		—	—	
University education or higher	293 (52%)	271 (48%)		1.35	0.87, 2.11	0.2
Marital Status			0.032			
Married	189 (57%)	143 (43%)		—	—	
single	165 (49%)	174 (51%)		1.2	0.81, 1.78	0.4
Previous Cosmetic Intervention			0.004			
None	191 (54%)	165 (46%)		—	—	
Both	51 (49%)	53 (51%)		1.28	0.81, 2.02	0.3
Injection	107 (58%)	79 (42%)		0.97	0.66, 1.43	0.9
Surgery	5 (20%)	20 (80%)		4.38	1.70, 13.6	0.004

[1] n (%), [2] Pearson's Chi-squared test, [3] OR = Odds Ratio for choosing surgery, CI = Confidence Interval

The data of participants who were affected by augmented reality social media filters were further divided according to the cosmetic intervention they were willing to choose to change their appearance to match filters (Table 4).

Gender differences in gender and their OR were statistically significant; most of the women (55%) chose injections, while 62% of the men chose surgery as a cosmetic intervention with a p-value of 0.002. Additionally, the logistic regression model showed that men were more willing to choose surgery (OR = 2.03, [95% CI 1.26-3.31], p = 0.004) as compared to women. Similarly, previous cosmetic interventions had a statistically significant effect on the choice of intervention. Most participants tended to choose the same intervention they had previously undergone. Subsequently, 80% of those who underwent surgery chose surgery again, while only 42% of those who used injections chose injections again. Additionally, the OR was 4.83, [95% CI 1.70-13.6], p = 0.004, for those who previously underwent cosmetic surgery to choose surgery again, compared to those who underwent no cosmetic intervention. The previous model had a C-stat value of 0.61, indicating a fair predictive value.

Discussion

Cosmetic procedures and plastic surgery have become popular in recent years, and their use continues to increase with the emergence of social media and the use of augmented reality social media filters. The rapid development of social media platforms and the new features that we see every day are motivated by the increasing competition between different platforms. Previously, photo-editing applications were used only by professionals because of their high cost, difficulty, and time consumption. Recently, we have seen that platforms are adapting augmented reality for photo-editing, which is free, easy, and can be done in seconds.

This study aimed to determine the relationship between social media filter usage and interest in pursuing cosmetic procedures in Saudi Arabia. The main finding of the study was that 57% of the respondents were influenced by social media filter usage in their decision to undergo cosmetic procedures, which is in line with previous research that confirmed that photo editing applications played a role in 56.5% of respondents pursuing cosmetic procedures [8]. The differences that others notice in one's daily life between a regular photo and reality are caused by diverse factors such as the camera type, lens, location, and pho-

tographer; these are beyond the scope of our study and discussion in this article, as we primarily focused on the effect of the filters in social media applications and their effect on the regular population.

Previous studies have suggested various factors, including life satisfaction, self-esteem, history of being bullied for appearance, and social media advertising, that influence patients to seek cosmetic surgery[2]. Studies have suggested a relationship between time spent on social media and body dissatisfaction without explaining the specific reasons for this effect [1]. Hence, the factors that contribute to the trend in cosmetic procedures remain a topic of interest.

In our study, using social media for more than 5 hours was associated with being affected by filters and an increased likelihood of considering cosmetic procedures ($p = 0.006$). These results are in line with those of previous studies that indicated that individuals who spend more time on social media are more likely to consider cosmetic procedures [9-11]. Further, more than one-fourth of the participants in this study had undergone at least one cosmetic procedure (figure 1); most of these procedures were cosmetic injections (OBT-A, filler, etc.). Additionally, the participants tended to choose the same intervention in the future, influenced by social media filters (table 3). More than half of the participants felt unattractive when not using augmented reality social media filters, considering undergoing cosmetic plastic procedures in the future, and the majority preferred cosmetic injection over surgery. Cosmetic plastic procedures are largely focused on women [12,13]. Another study had a similar result, in which women were the most common respondents. Unsurprisingly, women were more prone to using filters than men were. This suggests that women are more likely to be affected in this regard [14,15], and these filters, in conjunction with social media, are used to enhance one's self-esteem. Moreover, young adults were more likely to use augmented reality social media filters in this study. The current findings support those of the previous studies by demonstrating that young adults have the same tendencies to be influenced more likely than others by social media content as they are more familiar with the usage of social media filters and have a larger percentage of social media activity compared to older individuals. More than half of the respondents in this study reported that they were influenced by augmented reality social media filters. Overall, age groups 18-25 years and women were the most influenced, whereas older age groups and men were less likely to be affected by augmented reality social media filters. Some stud-

ies have shown that women are more likely to pursue cosmetic plastic procedures[16].

Othman et al. revealed several factors that influence the pursuit of cosmetic surgery in patients who reported using augmented reality social media filters. These influences included the fact that they were happy about the changes in their appearance and enjoyed the compliments received on their modified cosmetic appearance [8]. The present study is an essential starting point in determining the causative effects of augmented reality social media filter consumption on the desire for cosmetic surgery. Multiple studies supporting our research have suggested numerous factors, including life satisfaction, self-esteem, history of being bullied regarding appearance, and social media advertising, as influencing patients seeking cosmetic surgery [2]. Studies have also suggested a relationship between time spent on social media and body dissatisfaction without explaining the specific reasons for this effect[1].

This study had several limitations such as being conducted in a limited region and for a limited period of time, having a relatively small sample size which may have led to a potential bias in the results, the fact that the survey was conducted online which may have limited its reach to certain groups who do not have access to the internet, and the fact that the data was self-reported which can be subject to recall and social desirability bias. However, the results of this study could still provide valuable insights into the effects of augmented reality social media filters on people's pursuit of aesthetic procedures. Additionally, the survey was conducted online, which increases its reach to a larger population and is more efficient than traditional methods of data collection. Furthermore, the survey was anonymous, which may have encouraged participants to be more honest in their responses. Finally, the use of self-reported data can be justified in this case as it is the most reliable way to assess the participants' opinions and behaviors.

Other relevant aspects such as mental, physical and emotional aspects should be investigated in future studies to gain a better understanding of psychological motivations for cosmetic procedures. Based on the limitations of this study and other previous research, future studies should use longitudinal data in analyzing people who have undergone cosmetic procedures over time with an ethnically diverse population to gain more insight into the effects of augmented reality social media filters and how they influence people's decisions.

Conclusion

Our research explored the relationship

between social media filter use and interest in pursuing cosmetic procedures among the Saudi Arabian population. The findings of this study revealed that utilizing augmented reality social media filters and time spent on social media can be a significant factor in decision-making to pursue cosmetic procedures in the future. Young women were the most vulnerable to these influences.

The use of a social media filter could be a double-edged sword. It may be used as an alternative to expensive, time-consuming photo-editing applications to estimate the expected appearance post injections or surgeries. Cosmetic surgeons should be aware of these new evolving technologies and accommodate them to favor patient safety and satisfaction.

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