

# The Public's Awareness and Willingness to Undergo Plastic Surgery Procedures during the COVID-19 Pandemic

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**Background:** In March 2020, the Saudi Ministry of Health implemented mitigation measures to control the Coronavirus Disease 2019 (COVID-19) pandemic, including media campaigns, a nationwide lockdown, and closures of plastic surgery clinics. The aim of this study was to explore the public's knowledge of COVID-19, their willingness to undergo cosmetic surgery during the pandemic, and the factors influencing their decisions.

**Methods:** An internet-based cross-sectional survey was conducted. We collected data on demographic information, knowledge about COVID-19, and willingness to undergo cosmetic procedures. Participants also completed the cosmetic procedure screening questionnaire to assess body dysmorphic disorder.

**Results:** The sample included a total of 1643 participants (women, n = 1002; 61%). A total of 613 (37.3%) participants were aged between 30 and 40 years. The majority (n = 1472; 89.6%) referred to official government accounts for information regarding COVID-19. Most participants (n = 1451; 88.3%) felt that the pandemic was serious, and 1387 (85%) said they would not leave home to undergo cosmetic procedures during the outbreak. Being women, the presence of body-image concerns, and higher cosmetic procedure screening questionnaire scores were associated with an increased willingness to undergo cosmetic procedures.

**Conclusions:** This is the first study to explore the public's willingness to undergo cosmetic procedures during the COVID-19 pandemic. The public was well educated about the pandemic, via government actions. This was reflected in participants who wished to undergo a cosmetic plastic procedure; we identified factors associated with an increased willingness to undergo procedures, which may help design awareness initiatives. (*Plast Reconstr Surg Glob Open* 2020;8:e3170; doi: 10.1097/GOX.0000000000003170; Published online 30 September 2020.)

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## INTRODUCTION

Cosmetic surgery has gained popularity worldwide in recent years, as indicated by numerous reports from prominent plastic surgery societies. The American Society of Plastic Surgeons reported that 17.7 million cosmetic procedures were performed in 2017. Of these, 1.8 million were surgical procedures and 15.9 million were non-surgical cosmetic procedures. Breast augmentation and liposuction were the most common, with a 3% and 5% upsurge compared with 2016.<sup>1</sup>

In 2016, The International Society of Aesthetic Plastic Surgery stated that Saudi Arabia was among the top 20 countries and ranked first in the region with regard to the number of plastic surgery procedures performed.<sup>2</sup> Analogous reports released in 2019 from the Ministry of Health indicated a noticeable increase in the number of cosmetic procedures in the past 3–5 years, with more than 45,000 plastic surgery procedures performed that year. There has been a noticeable substantial increase in the number of plastic surgery clinics and day surgery centers;

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around 900 clinics applied for certification through the Ministry in 2019 alone.

Several factors make people more likely to undergo a plastic surgery procedure, such as being women, having low self-esteem, and having a low self-rated physical attractiveness. At the extreme of the latter are people who suffer from body dysmorphic disorder (BDD), which has been associated with seeking cosmetic or dermatological treatments.<sup>3,4</sup> Factors such as increasing social media exposure and access to plastic surgery websites, and surgeon portfolios may also contribute to the increase in seeking cosmetic procedures.<sup>5-7</sup>

In December 2019, a new cluster of pneumonia cases emerged in Wuhan, China, which was later identified to be due to severe acute respiratory syndrome coronavirus, which is the causative agent of COVID-19. Many studies have reported the mode of virus transmission, conceivable management options, and attempts to categorize at risk populations. In January 2020, COVID-19 cases had already begun to spread nationally and internationally,<sup>8,9</sup> and on March 11, 2020, the disease was declared a worldwide pandemic by the World Health Organization.<sup>10,11</sup>

The first case of COVID-19 infection in Saudi Arabia was discovered on March 2, 2020. This is not the first coronavirus to affect the country: the Middle East Respiratory Syndrome Coronavirus has been endemic in the country since 2012, with ongoing sporadic and nosocomial transmission. The Ministry of Health quickly and proactively implemented gradual but strict measures to control the spread of COVID-19 in Saudi Arabia.<sup>12</sup> Key strategies included social distancing, voluntary home quarantine, suspending the Umran (pilgrimage to Mecca), and the closure of schools, mosques, and airports for both national and international destinations. Other efforts included implementing curfews that stretched to complete 24 hour lockdowns, and launching extensive campaigns through TV ads, social media platforms, and phone SMS messages, to emphasize the importance of these measures and the seriousness of the outbreak and to decrease the load on the healthcare system.<sup>13-15</sup>

On March 16, 2020, all elective clinics and surgeries were suspended, cosmetic surgical procedures in public and private hospitals, as well as day surgery centers. Only emergency and vital surgical interventions were allowed to continue.<sup>16-18</sup> This measure was implemented to help reduce the community spread and congregations in hospital and clinic waiting areas, as well as to save beds and ventilators should they be needed by patients with COVID-19 who were in a serious or critical condition.<sup>19</sup> These measures were also implemented to protect asymptomatic patients with COVID-19, whose elective intubation could lead to serious postoperative pneumonia infections, that require intensive care unit admission in 44% of cases and result in a mortality rate of 20.5%.<sup>20</sup>

It was reported that some patients who were interested in plastic surgery or had planned to undergo plastic surgery procedures before the pandemic wanted to undergo the procedure during the quarantine period. They had contacted plastic surgery centers or the surgeons themselves through emails, phone calls, and messages. The

quarantine period was convenient to them, as they were home from work and would have plenty of time to conveniently and privately recover without having to apply for official sick leaves.

The aim of this study was to assess the willingness of the public to undergo cosmetic procedures during the COVID-19 outbreaks and identify factors that influenced their decisions. Identifying such misconceptions could help focus educational campaigns and material to help control these influencing factors. Surgeons should follow guidelines set by local authorities. It is worth nothing that it is the responsibility of each surgeon to weigh resource limitations and consider the risk of exposures to the infection according to the type of practice.<sup>21</sup>

## METHODS

This was a cross-sectional internet-survey-based study. Data were collected over a period of 2 weeks, from April 14 to April 28, 2020, through various social media platforms. Men and women aged between 20 and 65 years with access to internet and social media platforms who were willing and able to fill out the questionnaire were considered eligible for the study. Ethical approval was obtained through the Institutional Review Board at King Saud University Medical City IRB Project No. E-20-4841.

Informed consent to participate in the survey was obtained before starting the questionnaire and confidentiality was guaranteed. IP addresses of participants were automatically available to the researcher responsible for the data collection to ensure no data were duplicated.<sup>21</sup>

A 38-item questionnaire was developed by a panel of content experts in the fields of infectious disease, plastic surgery, and psychiatry. The 123FormBuilder electronic platform was used to host the questionnaire (123FormBuilder.com). This is a web-based, secure and flexible survey tool. The questionnaire collected demographic and socioeconomic information, and included questions related to cosmetic procedures, participants' preferences about these procedures, and general knowledge about COVID-19, as well as a validated screening tool for BDD called the cosmetic procedure screening questionnaire (COPS).<sup>22</sup> The COPS had already been translated and validated in Arabic.<sup>23</sup> The Arabic version of the COPS was reviewed and slightly adapted with authors' permission.

The entire survey was then piloted on 15 participants to ensure clarity and flow, and to gauge the time required to complete the questionnaire. Comments by these participants were taken into consideration, and adjustments were made accordingly. Internal consistency was assessed using the reliability analysis, which showed an acceptable Cronbach's alpha of 0.743.

### Statistical Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS version 24.0, IBM Inc., Chicago, Ill.) software. Descriptive statistics (frequencies and percentages) were used to describe categorical data and outcome variables. Pearson's  $\chi^2$  test was used to analyze the association between categorical data and outcome

**Table 1. Distribution of Sociodemographic Characteristics of Study Subjects (n = 1643)**

Characteristics	No. (%)
Age groups	
<20	39 (2.4)
20–30	549 (33.4)
30–40	613 (37.3)
40–50	300 (18.3)
>50	142 (8.6)
Gender	
Men	641 (39.0)
Women	1002 (61.0)
Level of education	
High school	308 (18.7)
University Bachelor	967 (58.9)
Higher education (Masters)	277 (16.9)
Other	91 (5.5)
Are you employed?	
Yes	935 (56.9)
No	708 (43.1)
Household monthly income	
<\$2666	571 (34.8)
\$2666–\$5333	593 (36.1)
\$5333–\$8000	196 (11.9)
>\$8000	283 (17.2)

variables. A regression analysis was performed to explore which factor best predicted the willingness to undergo plastic surgery. *P* value of  $\leq 0.05$  was considered to indicate statistical significance.

## RESULTS

There were a total of 1661 respondents. Of these, 18 participants were excluded because their data were incomplete or they resided outside Saudi Arabia, resulting in 1643 participants whose data were included in the

final analysis. Of these 1643 participants, 70.7% were aged between 20 and 40 years, more than 60% were women, 58.9% held a bachelor's degree, and 16.9% had higher educational degrees. Over half (56.9%) of the participants were employed, and the average monthly household income was 5300 USD (Table 1).

A total of 832 (50.4%) participants had family members who were elderly, and 832 (50.6%) had family members with chronic illness. Official government websites were the most common source to gather information about COVID-19 ( $n = 1472$ ; 89.6%), followed by general public media platforms ( $n = 503$ ; 30.6%). The overall knowledge of mode of transmission was good and accurate, as most participants understood that the virus was transmitted by droplets or by touching contaminated surfaces. While only 30.8% ( $n = 506$ ) strongly agreed that it could be transmitted by medical staff, the majority of participants ( $n = 1387$ ; 88.3%) felt that the COVID-19 pandemic was serious.

Most participants ( $n = 1387$ ; 85%) were not willing to leave home during the pandemic for cosmetic procedures. This remained constant even if the procedure was offered at a discounted price or for free. Among the sociodemographic characteristics, only gender was statistically significant; 9.8% of women were willing to leave home to have plastic surgery compared with 5.9% of men ( $P = 0.001$ ). Other demographic characteristics were not associated with the willingness to undergo cosmetic procedures (Table 2).

Fear of infecting a family member was the most common reason for refraining from undergoing cosmetic surgery during the pandemic ( $n = 1294$ ; 78.8%), followed by fear of becoming infected ( $n = 1230$ ; 48.9%). Finally, 1230 participants (74.9%) said that they would

**Table 2. Association between Sociodemographic Characteristics and Responses to "Are You Willing to Leave Home to Have Plastic Surgery?"**

Characteristics	Are You Willing to Leave Home to Have Plastic Surgery			$\chi^2$	<i>P</i>
	Yes	No	I Don't Know		
Age groups					
>20	6 (15.4)	31 (79.5)	2 (5.1)	8.54	0.383
20–30	42 (7.7)	462 (84.2)	45 (8.2)		
30–40	54 (8.8)	519 (84.7)	40 (6.5)		
40–50	25 (8.3)	248 (82.7)	27 (9.0)		
>50	9 (6.3)	127 (89.4)	6 (4.2)		
Gender					
Men	38 (5.9)	567 (88.5)	36 (5.6)	13.31	0.001
Women	98 (9.8)	820 (81.8)	84 (8.4)		
Level of education					
High school	25 (8.1)	264 (85.7)	19 (6.2)	6.23	0.398
University Bachelor	76 (7.9)	822 (85.0)	69 (7.1)		
Higher education Masters	24 (8.7)	232 (83.8)	21 (7.6)		
Other	11 (12.1)	69 (75.8)	11 (12.1)		
Household monthly income					
>\$2666	49 (8.6)	469 (82.1)	53 (9.3)	6.93	0.327
\$2666–\$5333	45 (7.6)	507 (85.5)	41 (6.9)		
\$5333–\$8000	17 (8.7)	170 (86.7)	9 (4.6)		
>\$8000	25 (8.8)	241 (85.2)	17 (6.0)		
No. persons at home					
$\leq 5$	82 (7.7)	897 (84.6)	81 (7.6)	1.54	0.463
>5	54 (9.3)	490 (84)	39 (6.7)		
Any one above 50 at home					
Yes	73 (8.8)	685 (82.7)	70 (8.5)	4.17	0.124
No	63 (7.7)	702 (86.1)	50 (6.1)		
Any one at home with chronic illness					
Yes	72 (8.7)	691 (83.1)	69 (8.3)	2.92	0.232
No	64 (7.9)	696 (85.8)	51 (6.3)		

**Table 3. Association between the Knowledge Responses to COVID-19 and Willingness to Leave Home to Have Plastic Surgery**

Knowledge Items	Willing to Leave Home to Have Plastic Surgery			$\chi^2$ Value	P
	Yes	No	I Don't Know		
Is COVID-19 causing a pandemic?				10.65	0.223
Strongly agree	81 (7.8)	865 (85.2)	73 (7.0)		
Agree	35 (7.8)	374 (83.5)	39 (8.7)		
Not sure	16 (14.8)	87 (80.6)	5 (4.6)		
Disagree	2 (5.9)	29 (85.3)	3 (8.3)		
Strongly disagree	29 (14.3)	12 (85.7)	0		
Can COVID be transmitted by droplets?				20.15	0.010
Strongly agree	99 (7.6)	1110 (85.3)	92 (7.1)		
Agree	26 (9.2)	232 (81.7)	26 (9.2)		
Not sure	9 (22.0)	31 (75.6)	1 (2.4)		
Disagree	0	10 (100)	0		
Strongly disagree	2 (2.8)	4 (57.1)	1 (14.3)		
COVID transmission by touching surfaces				19.08	0.014
Strongly agree	103 (7.9)	1108 (85.5)	85 (6.6)		
Agree	24 (8.1)	240 (81.1)	32 (10.8)		
Not sure	8 (17.8)	35 (77.8)	2 (4.4)		
Disagree	0	3 (75)	1 (25)		
Strongly disagree	1 (50)	1 (50)	0		
COVID transmission through air				12.08	0.148
Strongly agree	12 (13)	78 (84.8)	2 (2.2)		
Agree	13 (7.6)	146 (85.9)	11 (6.5)		
Not sure	47 (7.9)	499 (84)	48 (8.1)		
Disagree	39 (8.6)	374 (82.2)	42 (9.2)		
Strongly disagree	25 (7.5)	290 (87.3)	17 (5.1)		
COVID transmission through blood				7.70	0.463
Strongly agree	18 (10.7)	140 (82.8)	11 (6.5)		
Agree	14 (10)	115 (82.1)	11 (7.9)		
Not sure	59 (7.4)	668 (84.1)	67 (8.4)		
Disagree	22 (7.3)	261 (86.1)	20 (6.6)		
Strongly disagree	23 (9.7)	203 (85.7)	11 (4.8)		
COVID transmission through medical equipment				14.35	0.073
Strongly agree	40 (9.7)	355 (85.7)	19 (4.6)		
Agree	32 (7.9)	333 (82)	41 (10.1)		
Not sure	42 (6.8)	524 (85.3)	48 (7.8)		
Disagree	14 (10.6)	109 (82.6)	9 (6.8)		
Strongly disagree	8 (10.4)	66 (85.7)	3 (3.9)		
COVID transmission through medical staff				59.10	<0.0001
Strongly agree	28 (5.5)	450 (88.9)	28 (5.5)		
Agree	40 (7)	495 (86.4)	38 (6.6)		
Not sure	39 (8.8)	366 (82.2)	40 (9)		
Disagree	22 (25.3)	54 (62.1)	11 (12.6)		
Strongly disagree	7 (21.9)	22 (68.8)	3 (9.4)		

only consider cosmetic surgery 2 months after the end of the pandemic.

We tested correlations between the willingness to leave home to have plastic surgery and knowledge about COVID-19 (response to each of the 7 items testing participants' knowledge about COVID-19 scored on a 5-point scale). Three of the 7 knowledge items were significantly correlated with the willingness to undergo surgery. Twenty-two percent of subjects who were "not sure" if infection could be transmitted by droplets were willing to leave home to have plastic surgery, compared with only 7.6% and 9.2% of subjects who strongly agreed or agreed with this knowledge item ( $P = 0.010$ ). For the knowledge item regarding whether COVID-19 was transmitted by touching surfaces, subjects who were "not sure" about this statement were more willing to leave home to have plastic surgery (17.8%), compared with those who strongly agreed and agreed with this statement (7.9% and 8.1%, respectively). This difference was significant ( $P = 0.014$ ). Finally, for the knowledge item about the possibility of COVID-19 being transmitted by medical staff, subjects who responded with "disagree" and "strongly disagree" were significantly more willing to

leave home to have plastic surgery. The responses of the 4 other knowledge items of COVID-19 showed no significant correlations with the responses to the outcome variable (Table 3).

The 5 items measuring the perception of COVID-19 were scored on 3-point and binary scales; 3 items were significantly correlated with the "willingness to leave home to have plastic surgery." For the perception item "feelings towards the COVID-19 pandemic," subjects who felt it was "not serious" (16.8%) or who selected "I don't know" (21.8%) were significantly more willing to leave home to have plastic surgery compared with the 7% of subjects who felt it was "serious" ( $P < 0.0001$ ). Subjects who were not afraid of infecting a family member were significantly more willing to leave their homes to have plastic surgery (11.2%), compared with those who were afraid of infecting a family member (7.5%;  $P = 0.040$ ). The third perception item "loss of normal daily routine" (yes/no) was also significantly associated with the willingness to leave home to have plastic surgery ( $P = 0.022$ ; Table 4).

Just under half of the participants ( $n = 771$ ; 46.9%) reported that there was a part of their body that they wished

**Table 4. Association between the Perception Responses toward COVID-19 and Willingness to Leave Home to Have Plastic Surgery**

Perceptions Items	Willing to Leave Home to Have Plastic Surgery			$\chi^2$ Value	P
	Yes	No	I Don't Know		
Feelings toward COVID pandemic					
Serious	101 (7)	1242 (85.6)	108 (7.4)	30.31	<0.0001
Not serious	23 (16.8)	104 (75.9)	10 (7.3)		
I don't know	12 (21.8)	41 (74.5)	2 (3.6)		
Fear of getting infected					
Yes	58 (7.2)	692 (86.1)	54 (6.7)	3.40	0.182
No	78 (9.3)	695 (82.8)	66 (7.9)		
Fear of infecting a family member					
Yes	97 (7.5)	1107 (85.5)	90 (7)	6.43	0.040
No	39 (11.2)	280 (80.2)	30 (8.6)		
Fear of staying home					
Yes	30 (11.4)	219 (83)	15 (5.7)	4.83	0.089
No	106 (7.7)	1168 (84.7)	105 (7.6)		
Loss of normal daily routine					
Yes	51 (9)	459 (81.4)	54 (9.6)	7.61	0.022
No	85 (7.9)	928 (86)	66 (6.1)		

to improve upon, and 115 (7%) respondents had COPS scores suggestive of BDD. Those who reported that they would like to improve a part of their body were significantly more willing to leave home to have plastic surgery (14.3%) than the 3% willing to undergo surgery who did not have a desire to improve a part of their body ( $P < 0.0001$ ).

The presence of BDD, as measured by the COPS, was significantly associated with the willingness to leave homes to undergo plastic surgery; 36.6% of those with BDD were willing to leave their homes to have plastic surgery, compared with the 6.6% of those who were not ( $P < 0.0001$ ). Finally, there was a significant association between the number of hours per day spent on social networks browsing and tips the willingness to leave home for surgery ( $P = 0.03$ ; Table 5).

## DISCUSSION

In recent years, the number of plastic surgery procedures has been increasing globally and particularly in Saudi Arabia. Low self-esteem, satisfaction, and self-rated physical attractiveness have been reported as the most common reasons among women for choosing to undergo plastic surgery procedures.<sup>6,24</sup> As part of a physician's obligation to maintain superlative care and patient safety in their cosmetic practice, they should update their knowledge, and

reviewing society and medical authority recommendations is crucial during the COVID-19 outbreak.<sup>25</sup>

Knowledge and attitudes regarding the coronavirus outbreak have been well documented and studied among medical workers, such as nurses, intensive care unit staff, emergency physicians, and food handlers.<sup>26-31</sup> However, to our knowledge, no studies have explored knowledge and attitudes of the general public, concerning plastic surgery procedures during the pandemic. Most of our participants were not willing to undergo plastic surgery procedures during the pandemic, and women seemed more willing to do so than men. Most participants understood that the virus could be transmitted through droplets (81.67%) and by touching contaminated surfaces (82.04%).

Participants who were not sure about the possibility of virus transmission via medical staff were more likely to undergo surgical procedures. Around 40.41% thought that the virus could be transmitted through the air, and 50% said they were not sure if it could be transmitted through blood. A reported 73.76% of the public have concerns about the sterility of medical equipment in hospitals, even after thorough decontamination and sanitization and feel that this would not necessarily stop the virus transmission.<sup>32,33</sup>

**Table 5. Association between the Perception Responses toward Their Self Body Image, BDD, and Willingness to Leave Home to Have Plastic Surgery**

Perceptions Items	Willing to Leave Home to Have Plastic Surgery			$\chi^2$ Value	P
	Yes	No	I Don't Know		
Is there a part of your body that you would like to improve?					
Yes	110 (14.3)	562 (72.9)	21 (2.4)	146.80	<0.0001
No	26 (3)	825 (94.6)	99 (12.8)		
No. hours spent daily on social networks for beauty					
1	64 (6.6)	845 (87.1)	61 (6.3)	19.49	0.003
2	33 (11.4)	224 (77.5)	32 (11.1)		
3	19 (8.7)	184 (84)	16 (7.3)		
4	20 (12.1)	134 (81.2)	11 (6.7)		
Presence of BDD					
Yes	34 (36.6)	38 (40.9)	21 (22.6)	148.91	<0.0001
No	102 (6.6)	1349 (87)	99 (6.4)		

Most participants (89.6%) stated that their source of knowledge about COVID-19 was official government media account. Participants were aware of the risks involved in undergoing cosmetic surgery during the COVID-19 pandemic as well as the potential harm if surgery was performed on asymptomatic patients with COVID-19.

Fear of being infected was a common reason to delay cosmetic surgery (42.11%); however, we found that people were more afraid of infecting their family members (67.37%), even for participants who lived alone. This finding is similar to those reported by Rohrich et al,<sup>18</sup> who found that college students had strong concerns about infecting their high-risk family members.

In our study, 74.9% of participants reported that they would consider undergoing cosmetic procedures 2 months after the end of the COVID-19 outbreak, while 9.6% stated that they would undergo cosmetic procedures immediately. Around 84% of participants were not willing to leave their homes to undergo elective cosmetic procedures, even for free or at a discounted price.<sup>34,35</sup> Optimizing hospital sanitization and protective measures was not a strong enough measure to encourage the public to leave home for elective cosmetic procedures. Finally, the most commonly cited reason for undergoing surgery during the pandemic was to take advantage of the quarantine to recover while at home without having to use vacation days.

A total of 771 participants (46.9%) wished to improve a body part, and 115 (7%) had scores that were suggestive of BDD. The desire to improve a body part, the presence of BDD, and being women were associated with an increased willingness to undergo cosmetic plastic surgery during the outbreak.

This mirrors findings that women are more likely to undergo plastic surgery than men,<sup>6</sup> and that most patients in plastic surgery clinics with BDD are women.<sup>4,23</sup> Al Arfaj et al reported a BDD prevalence of 6.63% in a plastic surgery clinic in Saudi Arabia, which is higher than the prevalence for the general Saudi population (3.33%).<sup>23</sup> Similarly, a study showed that 75% of patients referred to cosmetic surgery clinics fulfilled the criteria for BDD, and therefore recommended that psychiatric preoperative assessment be carried out, especially given that most patients with BDD are unsatisfied with the outcome of surgery.<sup>36</sup>

## CONCLUSIONS

The COVID-19 pandemic is an unprecedented event that has affected almost every aspect of our lives. In this study, we evaluated the knowledge, attitude, and willingness of the general public in Saudi Arabia to undergo cosmetic procedures during this outbreak. We found that the public seems to have a good level of knowledge and awareness regarding the nature and seriousness of the pandemic, and information was sourced from materials released by the Saudi government and the imposed mitigation measures.

Most respondents stated that they would not undergo cosmetic procedures during the outbreak due to the fear of getting infected or infecting others. Being a woman and

having concerns about body image were associated with a great willingness to undergo cosmetic surgery. The majority of respondents felt that two months after the resolution of the pandemic was an appropriate timeframe to undergo cosmetic surgery procedures.

The results of this study highlight the need for more educational campaigns that target those identified to be at a higher risk for elective plastic and cosmetic procedures, especially during the pandemic. Such initiatives should involve plastic surgeons and other professionals in the field of cosmetic surgery and encourage them to be proactive advocates for both health care workers and patient safety.

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## REFERENCES

1. American Society of Plastic Surgeons. *Plastic surgery statistics report—2016 cosmetic plastic surgery statistics*. Chicago, IL: American Society of Plastic Surgeons; 2016.
2. ISAPS International Survey on Aesthetic. *Cosmetic procedures performed in 2015*. Hanover, New Hampshire: ISAPS Media Office; 2015.
3. Anderson RC. Body dysmorphic disorder: recognition and treatment. *Plast Surg Nurs*. 2003;23:125–128; quiz 129.
4. Ribeiro RVE. Prevalence of body dysmorphic disorder in plastic surgery and dermatology patients: a systematic review with meta-analysis. *Aesthetic Plast Surg*. 2017;41:964–970.
5. Montemurro P, Porcnik A, Hedén P, et al. The influence of social media and easily accessible online information on the aesthetic plastic surgery practice: literature review and our own experience. *Aesthetic Plast Surg*. 2015;39:270–277.
6. Furnham A, Levitas J. Factors that motivate people to undergo cosmetic surgery. *Can J Plast Surg*. 2012;20:e47–e50.
7. Oranges CM, Schaefer KM, Gohritz A, et al. The mirror effect on social media self-perceived beauty and its implications for cosmetic surgery. *Plast Reconstr Surg Glob Open*. 2016;4:e1088.
8. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382:727–733.
9. Coronavirus COVID-19 Global case by the center for systems science and Engineering (CSSE). Baltimore, Md.: Johns Hopkins University (JHU). Available at <https://coronavirus.jhu.edu/map.html>. Accessed April 1, 2020.
10. World Health Organization. Rolling updates on coronavirus disease (COVID-19). 2020. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>. Accessed July 31, 2020.
11. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020. 2020. Available at <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020>. Accessed September 17, 2020.

12. Barry M, Al Amri M, Memish ZA. COVID-19 in the shadows of MERS-CoV in the Kingdom of Saudi Arabia. *J Epidemiol Glob Health.* 2020;10:1–3.
13. Barry M, Ghonem L, Alsharidi A, et al. Coronavirus disease-2019 pandemic in the Kingdom of Saudi Arabia: mitigation measures and hospital preparedness. *J Nat Sci Med.* 2020;3:155–158.
14. Koo JR, Cook AR, Park M, et al. Interventions to mitigate early spread of SARS-CoV-2 in Singapore: a modelling study. *Lancet Infect Dis.* 2020;20:678–688.
15. Ebrahim SH, Ahmed QA, Gozzer E, et al. Covid-19 and community mitigation strategies in a pandemic. *BMJ.* 2020;368:m1066.
16. Saudi Center for Disease prevention and Control. *Novel Corona Virus (2019-nCoV) Infection Guidelines VI.2.* Kingdom of Saudi Arabia: Saudi Center for Disease Prevention and Control Ministry of Health; 2020.
17. Plastic Surgery Care Society Executive Board. Recommendation regarding elective, non-essential, and urgent patient care COVID-19 Report. Available at [Saudiplasticsurgery.org](http://Saudiplasticsurgery.org). Accessed September 17, 2020.
18. Rohrich RJ, Hamilton KL, Avashia Y, et al. The COVID-19 pandemic: changing lives and lessons learned. *Plast Reconstr Surg Glob Open.* 2020;8:e2854.
19. American Society of Plastic Surgeons. *ASPS statement on breast reconstruction in face of COVID-19 pandemic.* 2020. Available at: <https://www.plasticsurgery.org/documents/medical-professionals/COVID19-Breast-Reconstruction-Statement.pdf>. Accessed September 17, 2020.
20. Lei S, Jiang F, Su W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EClinicalMedicine.* 2020;21:100331.
21. Sarac BA, Schoenbrunner AR, Wilson SC, et al. Coronavirus disease 2019 State guidelines on elective surgery: considerations for plastic and reconstructive surgeons. *Plast Reconstr Surg Glob Open.* 2020;8:e2904.
22. Veale D, Ellison N, Werner TG, et al. Development of a cosmetic procedure screening questionnaire (COPS) for body dysmorphic disorder. *J Plast Reconstr Aesthet Surg.* 2012;65:530–532.
23. Al Arfaj AM, Al Otaibi TM, Obeid AA, et al. Development, validation and testing of an arabic version of the cosmetic procedure screening questionnaire COPS for body dysmorphic disorder. *Kuwait Med J.* 2016;48:38–41.
24. Morait SA, Abuhaimeid MA, Alharbi MS, et al. Attitudes and acceptance of the Saudi population toward cosmetic surgeries in Riyadh, Saudi Arabia. *J Family Med Prim Care.* 2019;8:1685–1690.
25. Schoenbrunner AR, Sarac BA, Janis JE. A summary of recommendations for plastic surgeons during the COVID-19 outbreak. *Plast Reconstr Surg Glob Open.* 2020;8:e3039.
26. Shi Y, Wang J, Yang Y, et al. Knowledge and attitudes of medical staff in Chinese psychiatric hospitals regarding COVID-19. *Brain Behav Immun Health.* 2020;4:100064.
27. Angelillo IF, Viggiani NM, Greco RM, et al. HACCP and food hygiene in hospitals knowledge, attitudes, and practices of food-services staff in Calabria, Italy. *Infect Control Hosp Epidemiol.* 2001;22:363–369.
28. Anuradha M, Dandekar R. Knowledge, attitude and practice among food handlers on food borne diseases: a hospital based study in tertiary care hospital. *Int J Biomed Adv Res.* 2014;5.
29. Askarian M, McLaws ML, Meylan M. Knowledge, attitude, and practices related to standard precautions of surgeons and physicians in university-affiliated hospitals of Shiraz, Iran. *Int J Infect Dis.* 2007;11:213–219.
30. Paudyal P, Simkhada P, Bruce J. Infection control knowledge, attitude, and practice among Nepalese health care workers. *Am J Infect Control.* 2008;36:595–597.
31. Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry.* 2020;7:e15–e16.
32. Chinese Academy of Sciences. *Wuhan coronavirus has strong ability to infect humans.* 2020. Available at [https://view.inews.qq.com/w2/20200121A0M08X00?tbkt=F&strategy=&openid=o04IBALMrLyGDxbWNOPoDM1HfGs&uid=&refer=wx\\_hot](https://view.inews.qq.com/w2/20200121A0M08X00?tbkt=F&strategy=&openid=o04IBALMrLyGDxbWNOPoDM1HfGs&uid=&refer=wx_hot). Accessed January 29, 2020.
33. Wang C, Horby PW, Hayden FG, et al. A novel coronavirus outbreak of global health concern. *Lancet.* 2020;395:470–473.
34. Wilson SC, Soares MA, Reavey PL, et al. Trends and drivers of the aesthetic market during a turbulent economy. *Plast Reconstr Surg.* 2014;133:783e–789e.
35. Lee S, Ryu K. Plastic surgery: investment in human capital or consumption? *J Hum Cap.* 2012;6:224–250.
36. Alavi M, Kalafi Y, Dehbozorgi GR, et al. Body dysmorphic disorder and other psychiatric morbidity in aesthetic rhinoplasty candidates. *J Plast Reconstr Aesthet Surg.* 2011;64:738–741.