

Community's Mask Wearing Practice and its associated Undesirable Side Effects Among Iraqi Population Group in COVID-19 Era

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DOI: 10.31080/ASMS.2023.07.1495

Received: February 08, 2023

Published: February 27, 2023

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Abstract

Assessing the principles, knowledge, attitude, and compliance of the Iraqi population group with regard to mask use; raising awareness and accountability, counseling them on the value of wearing masks, and researching the most common negative effects of mask use among them.

Materials and Methods: 1205 responses to an online survey with a cross-sectional design were gathered from healthy Iraqi backgrounds, ranging in age from 11 to 65 and with varying levels of education. The survey was divided into 5 components that were relevant to the major goals and objectives of the research. Gender differences were expressed as frequencies and percentages using the chi-squared fisher exact test, with statistical significance set at $p < 0.05$. Data were analyzed using SPSS between various variables.

Results: Among the 1205 people enrolled in the study, females comprised of (723,60%), and males (482,40%) with age range (11-65 years old).

Concerning adherence to wearing mask: The majority of the sample (73% female, 68% male) were adherent to wearing masks, whereas (25%-28%) were non-adherent, with no significant difference between them owing to uncomfotability, with social stigma being the predominant source of this uncomfotability; the overall sample was 30.80% female and 43% male.

Concerning association between health problems side effects of wearing mask: More than half sample (54% females) and (59.7% males) didn't suffer from any health conditions, while (44.40% females, 36.30% males) suffered from health conditions with highly significant difference at $p < 0.001$ sequentially: respiratory problems, psychological problems, and others with non-significant difference between these problems at $p < 0.18$.

For children, nearly half of the sample (50% girls and 47.90% boys) had the same health problems as in adults, following the same order; respiratory, psychological, and others with a non-significant difference at $p = 0.096$.

Concerning knowledge and attitude: A relatively good percentage of total sample (61.90% females, 54% males) change their mask daily in comparison with (22.10% females, 23.90% males) who wore the mask more than 2 days with highly significant difference at $p = 0.001$, also a good knowledge and attitude percentage concerning disposing mask after frequent use (75.30% females, 72.30% males) with significant difference at $p = 0.03$.

Concerning knowledge and attitude of general population regarding the best type of mask to wear: Less than half of the total sample (47.90% females, 47.70% males) responded that N-95 is the best type with non-significant difference at $p = 0.2$ and (53.50% females 44.30% males) use regular, medical or non-medical mask with highly significant difference at $p = 0.006$.

Concerning the need to wear double masks during the Delta variant: One third of the sample (36.50% females, 28.80% males) felt the urge to wear a mask, while the other third (32% females, 37% males) felt it was not required to wear a mask with a highly significant difference at $p = 0.008$.

Concerning advocating for people to wear masks: More than half of the sample (56.90% females, 56.70% males) advice other people to wear masks more frequently in public places with non-significant difference at $p = 0.051$.

Conclusion: The study revealed good knowledge and attitude level of participants towards; adherence, principles, disposing masks, and promoting the necessity of mask-wearing, with fair level toward the best type of mask to wear; the type they utilize the most, unsatisfactory low level toward hand washing, sanitizing after wearing mask, and for the need to wear double masks during the delta variant with approximately half of the total sample (adults and children) suffered from health issues due to the side effects (respiratory, psychological etc...) it's imperative to identify solutions to manage these adverse effects.

Keywords: Mask-wearing; Practice; Iraqi Population; Side Effect

Introduction

Several public health and hygiene initiatives have been undertaken; arguably the most obvious is the use of face masks. Health officials first provided inconsistent advice, and medical studies on the use of face masks as personal protective equipment (PPE) against SARS-CoV-2 transmission was viewed rather carefully [1].

As part of a comprehensive strategy to prevent the spread of SARS-CoV-2, the World Health Organization (W.H.O.) has updated its guidelines to advise that governments should encourage the general public to wear masks in specific situations and settings in order to effectively prevent COVID-19 transference in areas of community transmission [2].

Face mask use has gradually gained support from the scientific community [3-7] unless a result of the "precautionary principle" being used in the event of a serious emergency [8,9]. In the intervening years, empirical findings have supported this [10,11].

Different, mandated, or voluntary procedures as well as conflicting information on the value of face mask use were implemented in all impacted nations. Its usage is intricately linked to social and cultural customs, political and ethical issues, health-related problems, and individual and communal meanings [12, 13].

Several nations used both medical and non-medical face masks as a non-pharmaceutical intervention to lessen the transmission and contagiousness of corona virus disease in 2019 (COVID-19). It is known that there are negative physiological, psychological, and health impacts. The advantages and hazards of wearing masks in public places have been the subject of contentious scientific debate on a global scale; at the same time, they have supplanted other forms of apparel in many nations as the new norm for social interaction [14].

Medical professionals concur that face masks are important, but they also note that for certain people, regular use might result in acne, rashes, allergic reactions, migraines, or even anxiety. The heat

of the summer, the material of your mask, or the pressure of the mask over your ears might all contribute to these reactions [15].

Prolonged use of N95 and surgical masks by healthcare professionals during COVID-19 has caused adverse effects such as headaches, rash, acne, skin breakdown, and impaired cognition in the majority of those surveyed. As recurrent waves of COVID-19 are expected and in preparation for future pandemics, it is imperative to identify solutions to the effects [16].

The combined impacts of cold weather mean that the pandemic can be even more harsh on the scarred skin of healthcare professionals [17].

Some dental practitioners are finding new obstacles as they adjust to providing care in the COVID-19 age by donning additional personal protective equipment. Headaches were the most frequently reported adverse effect, with 71% of survey participants reporting that they had become more frequent following the adoption of the revised PPE procedures. Dental professionals who are now wearing many layers at once, including a surgical mask, face shield, and respirator mask, have experienced breathing difficulties [18].

Dentists are noticing an increase in dental issues as a result of the use of face masks. According to Dr. Rob Ramondi in an interview with the New York Post, the 'mask mouth' epidemic currently affects approximately half of his patients. People who previously had healthy teeth and gums are suddenly experiencing new dental problems, which are caused by face masks rather than unsanitary habits. Using face masks has increased mouth dryness, which allows germs and viruses to spread. Our saliva acts as a protective barrier and contains anti-microbial components that aid in the defense against germs [19].

Masks should be used as part of a comprehensive strategy of measures to suppress transmission and save lives; the use of a mask alone is not sufficient to provide an adequate level of protection against COVID-19 [20].

Different governments are now suggesting that people use non-medical face masks or homemade face coverings when physical distance cannot be maintained. These have occurred mostly as a result of the growing realization of the relevance of

pre-symptomatic and asymptomatic transmission, as well as the potential value for source control [21-23].

Dr. Garrido says that "aside from social distancing, it is the only weapon we can use to fight COVID" [24].

Always maintain a strict 6-foot distance. As long as you don't have major breathing problems, wear a mask whenever and wherever it's hard to keep physical distance [25,26].

Aims of the Study

- To investigate knowledge and attitude of the Iraqi population regarding principles to adherence, practices, and the best type of mask to wear.
- To study the most prevalent adverse effects among the population of children, adults, and to identify solutions to manage these adverse effects.
- Increasing awareness and accountability among Iraqi population as well as advising them on the importance of wearing a mask.

Materials and Methods

Study design, setting, and participants

The study employed a cross sectional online survey (google form) design approach to conduct the procedures between September 2021- February 2022) (6 months). The participants of the Iraqi population had various backgrounds with different educational levels. The authors of this study were among the contributors. An online cross-sectional questionnaire with 23 items pertaining 5 sections was circulated to the participants according to their most common side effects of wearing masks via e-mail and social media platform.

These 5 sections include: adherence to wearing masks, most common health side effects, knowledge, and attitude of general population regarding principles of wearing masks, children's most common side effects, knowledge, and attitude of general population regarding the best type of mask to wear with promotion advising people.

Sample size determination

1205 google forms were collected from various healthy Iraqi background society, the participants were asked to complete

the questionnaire after distribution via e-mail and social media by choosing one answer to each question. Five common side effects were included in the questionnaire: social, respiratory psychological, visual, and dermatological.

Inclusion criteria

Anybody (healthy ones) who was knowledgeable and owned an e-mail account to fill in the questionnaire.

- Age: 11-65 years old.
- All gender (female 723, male 482) total 1205.

Exclusion criteria

- Anybody who can’t fill in the questionnaire and does not own an e-mail account.
- Incomplete google forms were excluded.

Statistical analysis

All data from Google forms were uploaded into Microsoft Excel sheets, where they underwent statistical analysis using the proper data system, Statistical Program for Social Science (SPSS) version 19. In tables using chi-square and fisher exact test analysis, the relationship between gender and various variables will be shown as frequencies and percentages with a statistical significance threshold of $p < 0.05$.

Results

- Among the 1205 people who enrolled in the study, majority of them were females comprising (723,60%), while males were (482,40%).
- Overall range of the participants was 11-65 years old. The mean age was 20.51 years.
- Among females the age ranged between 11-65 years old with 20.61 years mean age.

Among males the age ranged between 11-63 years with 20.36 mean age.

Variable	Categories	Sex		p value
		Female	Male	
Are you adherent on wearing a mask in public places?	Not answered	7	14	0.013*
		1.00%	2.90%	
	No	185	136	
		25.40%	28.60%	
	Yes	537	326	
		73.70%	68.50%	
	Total	729	476	
		100.00%	100.00%	
If not adherent, is it because they are uncomfortable?	Not answered	3	0	0.25
		1.60%	0.00%	
	No	51	32	
		27.60%	23.50%	
	Yes	131	104	
		70.80%	76.50%	
	Total	185	136	
		100.00%	100.00%	
If not adherent, is it because of stigma (the disapproval of, or discrimination against, a person based on perceivable social characteristics)?	Not answered	11	7	0.06
		5.90%	5.10%	
	No	117	70	
		63.20%	51.50%	
	Yes	57	59	
		30.80%	43.40%	
	Total	185	136	
		100.00%	100.00%	

Figure 1: Gender distribution of total sample size.

Do you come closer to other people when wearing a mask while talking?	Not answered	9	17	0.001**
		1.20%	3.60%	
	No	322	169	
		44.20%	35.50%	
	Yes	398	290	
		54.60%	60.90%	
	Total	729	476	
	100.00%	100.00%		

Table 1: Adherence to wearing masks.

** Highly significant.

*Significant.

Table 1 describes the association between social side effects of wearing masks across gender.

- Majority of females (73.70%) and males (68.50%) were adherent on wearing masks while (25.49%) of females, (28.60%) of males were not adherent on wearing masks, this association was statistically significant at (p value 0.013).
- Among those who were not adherent, both females (70.80%) and males (76.50%) opinions’ it was uncomfortable, this association was not statistically significant at (p value 0.25).

Variable	Categories	Sex		p value
		Female	Male	
Does wearing a mask mess with your eyesight?	Not answered	9	13	0.014*
		1.20%	2.70%	
	Have not noticed	113	56	
		15.50%	11.80%	
	No	291	169	
		39.90%	35.50%	
	Yes	316	238	
		43.30%	50.00%	
Total	729	476		
	100.00%	100.00%		

Do you feel the need to take other safety precautions (hand washing, using sanitizers, social distancing etc.), while wearing a mask?	Not answered	7	16	0.001**
		1.00%	3.40%	
	No	136	114	
		18.70%	23.90%	
	Yes	586	346	
		80.40%	72.70%	
	Total	729	476	
	100.00%	100.00%		
Have you suffered from any health problems because of wearing a mask?	Not answered	11	19	0.001**
		1.50%	4.00%	
	No	394	284	
		54.00%	59.70%	
	Yes	324	173	
		44.40%	36.30%	
	Total	729	476	
	100.00%	100.00%		
If so, were such health problems:	Not answered	5	3	0.18
		1.50%	1.70%	
	Other (if so, please specify in the comment section)	64	42	
	Headache and other side effects (3)	19.80%	24.30%	
	Psychological (2)	79	52	
		24.40%	30.10%	
	Respiratory (1)	176	76	
		54.30%	43.90%	
	Total	324	173	

Have you suffered from any skin irritation problems due to wearing a mask?	Not answered	10	18	0.005**
		1.40%	3.80%	
	No	333	237	
		45.70%	49.80%	
	Yes	386	221	
		52.90%	46.40%	
	Total	729	476	
	100.00%	100.00%		

Table 2: Side effects of masks among genders.

** Highly significant.

*Significant.

Table 2 describes the association between health problems side effects of wearing masks among genders.

- When asked if wearing a mask interferes with your vision, 43.3% of females said yes, while 39.9% of females responded ‘no’.
- Males (50%) said it messed up their eyesight, whereas 35.5% said it doesn’t muck up; this correlation was statistically significant at (p value of 0.014).
- The association between (need to take other safety precautions, hand washing, using sanitizers, social distancing, etc... while wearing a mask) and gender was highly statistically significant at (p value 0.001), with the majority of females (80.40%) and males (72.7%) responded that there was a need to take precautions.
- (54% females, 9.7% males) didn’t suffer from any health conditions when wearing a mask.
- (44.40% of females, 36.30% of males) suffered from health conditions when wearing masks, this association was highly significant difference at p value 0.001.
- Among the health problems they faced, majority of the issues were:
- Respiratory problems: for both females (54.30%) and males (43.90%).

- Psychological side effect (24.40% females, 30.10% males).
- Other side effects (headache, heat, fatigue, dizziness, impaired thinking, oral dehydration, pulse rate) occupied (19.80% females, 24.30% males).
- These differences were not statistically significant at (p value 0.18).
- For skin irritation or dermatological problems:
- Half of females (52.90%) replied that they suffered from skin irritation or dermatological problems and (46.4% of males) they replied they had skin irritation, this difference was highly significant at (p value 0.005).

Variable	Categories	Sex		p value
		Female	Male	
For how long do you wear a mask then change it?	Not answered	5	14	0.001**
		0.70%	2.90%	
	1 day	451	257	
		61.90%	54.00%	
	2 days	112	91	
		15.40%	19.10%	
	More	161	114	
		22.10%	23.90%	
	Total	729	476	
		100.00%	100.00%	
Do you dispose your mask after frequent usage?	Not answered	11	18	0.03*
		1.50%	3.80%	
	No	169	114	
		23.20%	23.90%	
	Yes	549	344	
		75.30%	72.30%	
	Total	729	476	
		100.00%	100.00%	

If not disposed, do you wash or sanitize your mask after wearing it?	Not answered	4	0	0.2
		2.40%	0.00%	
	No	90	58	
		53.30%	50.90%	
	Yes	75	56	
		44.40%	49.10%	
	Total	169	114	
		100.00%	100.00%	

Table 3: Knowledge and attitude of general population regarding principles of wearing masks.

** Highly significant.
*Significant.

Table 3 explains the association between knowledge and attitude of general population regarding principles of wearing masks among genders.

- (61.90%) of females and (54%) of males change their mask daily.
- (22.10%) of females and (23.90%) of males wore it for more than 2 days, this association was highly statistically significant at (p value 0.001).
- (75.30%) of females and (72.30%) of males dispose the mask after frequent use, this association was statistically significant at (p value 0.03).
- If not disposed, only (44.40%) of females and (49.10%) of males wash or sanitize it, this association was found statistically insignificant at (p 0.02).

Variable	Categories	Sex		p value
		Female	Male	
Do you know any child under the age of 2 years who wears a mask?	Not answered	10	20	0.002**
		1.40%	4.20%	
	No	487	287	
		66.80%	60.30%	
	Yes	232	169	
		31.80%	35.50%	
	Total	729	476	
		100.00%	100.00%	

If they do, have they suffered from any health problems?	Not answered	1	0	0.81
		0.40%	0.00%	
	No	115	88	
		49.60%	52.10%	
	Yes	116	81	
		50.00%	47.90%	
	Total	232	169	
		100.00%	100.00%	
If so, were such health problems:	Not answered	1	0	0.096
		0.90%	0.00%	
	Other (if so, please specify in the comment section) (3)	20	12	
		17.20%	14.80%	
	Psychological (2)	22	27	
		19.00%	33.30%	
	Respiratory (1)	73	42	
		62.90%	51.90%	
Total	116	81		

Table 4: Side effects of wearing masks in children.

** Highly significant.
*Significant.

Table 4 explains the side effects of wearing masks in children and its association with gender.

- (66.80%) of females and (60.30%) of males were unaware of children under the age of 2 years wearing a mask.
- (31.80%) of females and (35.50%) of males knew about children below 2 years old wearing masks, this association was highly statistically significant at (p value 0.002).
- Nearly half of females (50%) and (47.90%) of males found that children below 2 years old wearing masks suffered from health issues. This association was not statistically significant at (p value 0.81).
- Both females (62.90%) and males (51.90%) felt the majority of health issues faced were:
- Respiratory problems

- psychological problems
- Other side effects (headache, fever, dry mouth impaired thinking, mentally, dizziness), this association was not statistically significant difference at 0.09.

Variable	Categories	Sex		p value
		Female	Male	
Which mask type is the best?	Not answered	19	18	0.2
		2.60%	3.80%	
	Cloth mask	143	109	
		19.60%	22.90%	
	N95 (expensive one)	349	227	
		47.90%	47.70%	
	Regular mask/ medical or non-medical (cheap)	218	122	
		29.90%	25.60%	
	Total	729	476	
	100.00%	100.00%		
Which mask type do you wear the most?	Not answered	15	17	0.006**
		2.10%	3.60%	
	Cloth mask	163	112	
		22.40%	23.50%	
	N95 (expensive one)	161	136	
		22.10%	28.60%	
	Regular mask/ medical or non-medical (cheap)	390	211	
		53.50%	44.30%	
	Total	729	476	
	100.00%	100.00%		

Do you feel the need to wear double masks during the current delta variant Covid-19?	Not answered	11	16	0.008**
		1.50%	3.40%	
	Maybe	266	137	
		36.50%	28.80%	
	No	233	176	
		32.00%	37.00%	
	Yes	219	147	
		30.00%	30.90%	
	Total	729	476	
	100.00%	100.00%		
Do you feel unsafe when you are in a public place surrounded by people who are not wearing masks?	Not answered	12	17	0.06
		1.60%	3.60%	
	No	153	117	
		21.00%	24.60%	
	Sometimes	222	135	
		30.50%	28.40%	
	Yes	342	207	
	46.90%	43.50%		
Total		729	476	
		100.00%	100.00%	
Do you advise other people to wear a mask more frequently while being in public?	Not answered	11	18	0.051
		1.50%	3.80%	
	No	142	98	
		19.50%	20.60%	
	Sometimes	161	90	
		22.10%	18.90%	
	Yes	415	270	
		56.90%	56.70%	
	Total	729	476	
	100.00%	100.00%		

Table 5: Knowledge and attitude of general population regarding the best type of mask to wear with promotion advising people.

** Highly significant.

*Significant.

Table 5 depicts the association between knowledge regarding the best type of mask to wear among gender.

- (47.90%) of females and (47.70%) of males their opinion was that N-95 masks were the best ones to wear. This association was not statistically significant at (p value 0.2).
- (53.50%) of females and (44.30%) of males mostly use regular mask/medical or non-medical (cheap one), this association was highly statistically significant at (p value 0.006).
- There was a mixed opinion for the (need to wear double masks) during delta variant covid-19,
- (36.50%) of females and (28.80%) of males felt it may be required.
- (30%) of females and (30.90%) of males' opinion was "yes it's required".
- (32%) of females, (37%) of males felt it was not required. This association was highly statistically significant at (p value 0.008).
- (46.90%) of females and (43.50%) of males felt unsafe in a public place surrounded by people who were not wearing masks. While (21%) of females and (24.60%) of males did not feel unsafe, this association was statistically insignificant at (p value 0.06).
- (56.90%) of females and (56.70%) of males' advice other people to wear a mask more frequently while being in public, this association was statistically insignificant at (p value 0.051).

Discussion (Table 1)

All of the scientific information discovered during the COVID-19 era broadened the body of knowledge for a differentiated perspective on the requirement to wear a mask as well as for doctors who may counsel their patients based on this information. It is vital to see a doctor for some disorders in order to evaluate the advantages and disadvantages of wearing a mask [26].

Our study revealed (in table 1) that the majority of our sample (73.70% female, 68.50% male) were adherent to wearing masks with a significant difference. With non-adherent participants, mask adherence may in part, be a function of whether mask wearing

is perceived to be normative. Specifically, during the COVID-19 pandemic; it has shown how strongly one identifies, corresponds to their level of positively and negatively towards mask wearing [27].

Among those who were not adherent, both females (70.80%) and males' (76.50%) opinions were that it was uncomfortable. This was in accordance with several randomized controlled trial studies measured mask wear discomfort [28-32] and with another study from 2011, all tested masks caused a significantly measurable increase in discomfort and a feeling of exhaustion [33], it is possible that these attitudes and non-compliant behaviors could be elicited if there were mandates against wearing masks and people felt like they did not have freedom of choice to wear face coverings for protection during COVID-19 pandemic, this leads to diminished feelings of autonomy, this is in turn may be partially what is leading to negative attitudes toward mask wearing.

(30.80%) females and (43.40%) of males responded positively if social stigma was the reason for non-adherence, this may be related to the fact that social connections and relationships are basic human needs, which are innately inherited in all people, whereas reduced human-to-human connections are associated with poor mental and physical health [34,35], scientific findings show that people are becoming increasingly more socially isolated and the prevalence of loneliness is increasing in the last few decades [34,36], poor social connections are closely related to isolation and loneliness. These are considered significant health related factors [34-37]. Wearing masks entails a feeling of deprivation from freedom and loss of autonomy and self-determination which can lead to suppressed anger and constant distraction, especially since the usage of masks is mostly dictated and ordered by others.

Social anxiety is characterized by negative self-perception and fear that one's appearance or behavior will fail to conform to social expectations and norms. Social anxiety disorders are an extreme manifestation that affects up to 13% of the population. They also have difficulty detecting ambiguous social cues and are more likely to interpret them negatively [38,39].

When the participants were asked whether they came closer to other people while talking, their answers suggested that they would come closer with a highly statistically significant difference

between (60.90%) males and (54.60%) females, this may be related that mask wearers were prevented from interacting normally in everyday life due to impaired clarity of speech which tempts them to get closer to each other [40].

Experts point out that masks disrupt the basics of human communication (verbal and non-verbal). The limited facial recognition caused by masks lead to a suppression of emotional signals. Masks therefore disrupt social interaction, erasing the positive effect of smiles and laughter but at the same time greatly increasing the likelihood of misunderstandings because negative emotions are also less evident under masks [41].

Accordingly, the expression (social distance) tends to be avoided nowadays (physical distancing) has been adopted by the W.H.O., which they define it as keeping a distance and avoiding spending time in crowded places or in groups [42].

Table 2

Eye involvement

Our study found that, with a significant difference, (43.3%) of female participants and (50%) of male participants said that the mask interfered with their vision, compared to (39.9%) of female participants and (35.5%) of male participants who said that it didn't. This finding may be related to the increased eye involvement during smiling that occurs when people wear face masks as opposed to when they don't [43], this confirms the enhancement and the replication in a setting of increased ecological validity, concerns about mask interference with emotional communication may be alleviated. In addition to the vapor arising during speaking that accumulates on eyeglasses, this will interfere with eyesight, so our result is in accordance with other studies that impair the field of vision [40,41,44-50].

Among the health problems they faced, (44.49% females, 36.60% males) of the total sample, they suffered from health problems with a significant difference.

Respiratory problems

(54.30% females, 43.90% males) suffered from respiratory problems, this may be due to wearing face mask mechanically to restrict breathing by increasing resistance of air movement during the inhalation and exhalation process [12,13]. A trapped

air remaining between the mouth and nose and the face mask is rebreathed repeatedly in and out of the body containing low O₂ and high CO₂ concentration causing hypoxemia and hypercapnia [51-55], challenging the body's homeostasis with high bacteria and toxic particles concentrations causing self-toxicity and immunosuppression [56-60]. An increased respiratory rate, fatigue, dizziness, impaired thinking and mask related breathing resistance is of utmost importance [61-63], our result is in accordance with (75%) of all these previous studies, if these effects decrease O₂ and increase CO₂, this may result in decreased psychomotor abilities that confirm our result of messed up eyesight [61,62,64-66] and also impaired field of vision [40,41,44,45,49,50,58,61,64].

Psychological problems

Theoretical evidence suggests that there may be a psychological impact during the COVID-19 era, perhaps the most powerful psychological symbol for the general public. People feel like they did not have the freedom to choose to wear face coverings for protection during the pandemic, other factors like altruism, self-efficacy, risk assessment, need for control, certainty, ability to engage in hot vs cold cognition, short term vs long term, orientation, socioeconomic status, educational level, personal experience, this is partially leading to negative attitude towards mask wearing [40].

This study revealed that males (30.10%) complained more than females (24.40%), this may be related to social pressure in places for men to be tough and not appear weak, this result is accordance with [64], also men are less likely to wear masks than women both during H1N1 [66,67] and SARS [68] pandemic. Men who endorse the belief that men should be tough [63], is also in accordance with [69], which revealed the negative findings that men may predict actual intentions to wear a mask in public; that it's shameful, a sign of weakness, leading to negative attitude towards wearing masks.

Additionally, people tend to pay great attention to factors that confirm their beliefs [70,71] such as potentially focusing more on minor discomforts associated with mask wearing (e.g., facial temperature, breathing resistance, headaches) to provide validation and feelings of competence, which may enhance discomfort.

Among other side effects are

Headache

There are several studies that indicate the emergence of headache due to mask wearing during the COVID-19 pandemic [67-69].

Both an aggravation of pre-existing headache and the emergence of (DENOVO) headache has been shown to increase with mask usage regardless of mask duration like tension headache with accompanying symptoms such as throbbing and migraines, the new type starts shortly after putting on a mask and disappear after removal. With other side-effects like impaired cognition, fatigue, dizziness, dry mouth, thermal equilibrium, and facial temperature as it was recorded in our study collectively for all these effects with (19.80% females, 24.30% males) so it's in accordance with (Lim., *et al.* 2006) [16]. In China the factor that was focused on was headache related to mask use, also with the Indian study [70] that comprised of (23%), while it's much lower than the U.S. study, (71.4%) was for headache [71] and also lower than an important study among HCW (health care workers) using N-95 masks reported (81%) of workers developed new headache (DE-NOVA) during their shift work as it becomes mandatory as approximately 4 times higher than the other types, they developed headaches \leq 10-50 minutes [68].

Headache related to daily mask usage can be attributed to mechanical factors, hypercapnia (increase in CO₂), hypoxemia (decrease in O₂). Tight strip and pressure on superficial and cervical nerves are mechanical factors causing headache [16], due to insufficient ventilation and inhalation of CO₂ between the mask and face caused an increase in respiratory activity and increased lung ventilation [69]. Another mechanism that explains headache pathophysiology may be external compression which is more common in those who wear eyeglasses [72] that reported headache percentage was (30.9%), of this percentage (85.3%) of participants developed DE-NOVO headache.

Another side effect is thermal equilibrium. A hot and humid environment found in facial region covered by masks causes discomfort and hyperthermia that may create situation of inability to recognize dangers and perform manual tasks and significantly affects motor skills, the moist environment, and pressure from wearing masks. That may also block facial ducts [16].

Dental problems

An extensive time of wearing mask can lead to an increase dryness of mouth leading to a trend called (MASK MOUTH) that was noted in (50%) of New York city patients that had healthy teeth and gums before the COVID-19 pandemic, now they show dental problems, not because of unhygienic practices, but because of face mask that has increased dryness in the mouth which helps bacteria and viruses propagate. There is not enough saliva to flush food particles in our teeth with bacteria thriving in presence of sugar. They will start to breed from food particles and cause tooth decay, also abundance of bacteria in our mouth attacking the gums, due to lack of antimicrobial components of saliva. If left untreated, it can lead to periodontal disease. Prolonged dryness in the mouth may lead to Halitosis or bad breath which is due to the odor-causing bacteria present in our mouth [73], also extensive mask wearing can lead to profuse sweating [74].

Skin irritation side effect

The moist environment and pressure from wearing mask blocks facial ducts that explains the increase of acne [75], our study revealed that half of the females (52.90%) and (46.4%) males suffered from skin irritation, this result is in accordance with (Foo., *et al.* study) [76] where participants complained from skin irritation, rashes, acne, and itching from mask use. A breakdown of skin, breakdown of the nose bridge, and cheekbones can be attributed to tight fitting mask and goggles that put pressure on these specific areas. Also, in accordance with the Indian study [70] where skin breakdown was reported to be (5%) and the U.S. study (18.1%) [71].

Urticaria and contact dermatitis can occur from sensitivity to components of masks. Formaldehyde is a chemical that is used in PPF (personal protective equipment), some individuals are sensitive and/or allergic, others may react to THIURAM which is found in the ear loops of surgical masks [77].

Table 3

Table 3 explains the association between the knowledge of the general population toward principles of wearing masks, (61.90%) of females and (54%) of males change their masks daily while (22.10%) of females and (23.90%) of males wear masks for more than 2 days, these findings were approximately the same as the

study of Ethiopia [78] (57.1%) of good mask wearing practice, and was consistent with that of Cameroon (60.8%) [79] and India (60.05%) [80], this could be due to the effort of government and media in providing information at the time of the pandemic, it also could be due to prolonged exposure of information since its global issue of discussion in the media and public [78].

However, it was higher than the Addis Ababa study 33.3% [81] Malaysia 51.2% [82], Pakistan 35.2% [83] and China 51.6% [84], this difference might be due to socio-demographic features and the study was done due to the active phase of Delta and Omicron variants of the COVID-19 virus. When public participants were exposed to a lot of information about the virus and under a state of emergency.

It was lower than other Ethiopian studies (67.3%) [85] and Uganda 83.5% [86], this discrepancy might be due to culture, living conditions, people's background difference in technology access, and educational level among the study participants [78].

To wash hands before and after wearing masks or sanitizing, only (44.40%) of females, and (49.10%) of males practised these rules, this was in contrast with [78] where (39.7%) of participants didn't perform these rules and it was better in comparison with the study of (Lee, *et al.*) Hong Kong [87] where the majority of participants did not perform hand hygiene before putting on (91.5%), taking off (97.3%) or after disposing of 91.5% of face mask, so our study indicates reasonable infection preventive control level. Mistakes are made by general population when using masks as hygienically correct mask use is by no means intuitive, 78% of the general population use masks incorrectly [88].

Table 4

Side effects of wearing masks in children

Evidence on the benefits and harms of children wearing masks mitigating COVID-19 virus is limited, our study revealed that (66.80% of females, and 60.30% of males) were unaware of children under the age of 2 years wearing a mask, while (31.80% of females, 35.50% of males) were aware of children using masks, this result is in accordance with Japan study where children between [5-11] years old were significantly less protected by mask-wearing compared to adults, possibly related to the inferior fit of the mask [89]. Another study in Japan noted the use of masks was more effective in higher school grades than in lower grades [90].

Although the overall compliance with consistent mask-wearing, especially among children under the age of 15-year-olds, was poor. Our study revealed that half the sample (50% females, 47.90% males) suffered from health problems, this result is in accordance with the Chinese study among primary school children during COVID-19 in which it was reported (51.6%) complied [91].

Many studies found the acceptability of mask-wearing to be highly variable among children from very low to acceptable levels and decreasing over time while wearing masks [28,32,91-94].

Among side effects, our result revealed, respiratory problems followed by psychological problems, and other problems. This is in accordance with other studies that found that factors such as breathing difficulties, warmth, skin irritation, discomfort, distraction, low social acceptability, and poor mask fit are reported by children when wearing masks [28,32,92,93].

The benefits of wearing masks among children for COVID-19 control should be weighed against potential harm associated with wearing masks including discomfort, social and communication concerns, age groups, sociocultural, contextual considerations, and adult supervision.

Table 5

Despite reasonable knowledge regarding the best type of mask to wear, (47.90% of females) and (47.70% of males) declared that N-95 masks were the best one. This result is in accordance with a study that stated the most used personal particulate matter protective equipment in the COVID-19 pandemic is the N-95 mask due to its characteristics filtering function and more dead space volume than other masks, 68% is even advantageous within the framework of our thread [62].

When they were asked which type of mask they wear most, their reply was that (53.50% of females) and (44.30% of males) wear a medical or non-medical mask, this may be related to economic reasons although these types provide a barrier against large respiratory particles, they're ineffective at providing protection from small particles and don't provide enough protection when performing direct care for patients with COVID-19 [95].

This result is in accordance with another study that stated for disposable masks, only half of all eight mask types tested were

efficient enough at filtering to retain 70% of particles of 1 mm in size [96] and 44% penetration for particle size [97].

W.H.O. guidelines recommended only medical masks for influenza and viruses for the entire patient treatment except for strongly aerosol-generating measures, for which finer filtering N-95 masks are suggested [88,92,98,99]. When they were asked if they felt the need to wear double masks during the delta variant of COVID-19 (36.50% of females) and (28.8% of males) replied it may be required, while (30% of females) and (30.90% of males') opinion was 'yes it's required' while (32% of females) and (37% of males) felt it was not required.

With a highly significant difference, this result is lower than a study reported (95.03%) of the study participants were aware of the concept of double masks but still lacked a clear understanding of the correct method of wearing them [100] and also lower than another study that reported double masking can block 85.4% of stimulated cough droplets, significantly more than 60% blocking efficiency for a single cloth/surgical mask [101].

More fully understanding the potential risks and benefits of double masking is very relevant for both the general public and for providers practising in current and future clinical environments subject to personal protective equipment scarcity [102], the growing proportion of mutant variants of SARS-CoV-2 virus that cause COVID-19 makes double masking or N-95 mask a must in order to keep mutant variants at bay [103].

Double masks provide better contour with the face in comparison to single-used masks, the wearer should be able to breathe rightly and talk freely with double masks on, CDC during 2021 conducted various experiments concluded that double-mask wearing could improve the fit of the mask and reduce the receiver's exposure to droplet particles and aerosols based on a simple principle that wearing 2 masks reduce the transmission of the number of virus-laden respiratory droplets and offer better protection due to extra layer of filtration [104,105].

This recommendation is in accordance with the Iraqi study that stated to reduce the impact of the new Delta variant B.1.617.2 infection, wearing double masks is a major significant option against this variant [106].

Our study revealed that (46.90% of females) and (43.50% of males) feel unsafe in public places surrounded by people who are not wearing masks, this result is in accordance with Singh., *et al.* study where (49.6%) of participants agreed on the fact of perceived benefits of wearing masks i.e. self-protection and protection from of perceived benefits of wearing masks i.e., self-protection and protection from for prevention of COVID-19 transmission while they are in public places [107] and also in coherence with Rieger study where (50-80%) of participants stated they would feel unsafe to wear masks in public places in most scenarios [108], the reason might be increased stigma and violence, which might have created hesitation among them for using masks in public places.

Our study revealed only 21% of females and 24.60% of males didn't feel unsafe when they were in public places, this percentage was lower than Singh., *et al.* study where around more than one-third of the participants (34.1%) were not using masks in public places [107] and was coherent with Nepal., *et al.* study, where the good practice of mask-wearing in public places was observed among more than 80% of the study participants [109] and Gunasekaran., *et al.* study where a high saturation (99.7%) of face mask usage in a public place was observed which indicates high social adaptability among the general population in response to local disease outbreak.

Our study revealed that approximately (57%) of the study participants advised other people to wear masks in public places, this indicates good perception and practices for the prevention of COVID-19 in public places. Education is one way to fight stigma, and it is important for making all communities and community members safer and healthier by getting facts about COVID-19 from reliable reputable sources such as W.H.O., CDC various guidelines, and sharing it with family and friends.

Conclusion

Wearing facemasks has been demonstrated to have substantial adverse physiological and psychological effects. These include respiratory, headache, rash, acne, skin breakdown, dry mouth, and impaired cognition in the majority of the surveyed population, it's imperative to identify solutions to manage these adverse effects. The beneficial mask effect in reducing the spread of coronavirus is unlikely to be cancelled out by the adverse risk compensation effects of mask-wearing in public settings.

Recommendations

Frequent breaks, improved hydration and rest, skin care, and potentially new designed comfortable masks are recommendations for future management of adverse effects of wearing masks. Mask wearing will need to be continued until the cessation of this pandemic and maybe required if there is another.

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