

## Moderating Effect of Psychological Antecedents and Conspiracy Mentality on COVID-19 Vaccine Hesitancy among a Sample of Egyptians

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### Abstract

**Background:** Vaccine hesitancy is an important public health problem as it could prolong the pandemic. **Aim:** To assess moderating effect of psychological antecedents and conspiracy mentality on COVID-19 vaccine hesitancy among a sample of Egyptians. **Design:** Cross-sectional research design was adopted during COVID-19 outbreak. **Sample:** Convenience sample of 1390 participants were recruited through a web-based survey. **Tools:** Four tools were used for data collection: Demographic and Medical Data questionnaire, Oxford COVID-19 Vaccine Hesitancy Scale, Conspiracy Mentality Scale, and 5 Cs Psychological Antecedents of Vaccination Scale. **Results:** About 45.3% reported vaccine hesitancy that was highly significantly correlated to conspiracy beliefs. Confidence, complacency, constraints, and responsibility appeared as major psychological factors that separates the vaccine acceptance group from the hesitancy group. Social media was the main source of information about COVID-19 vaccine. About (59.2% & 38.5%) had moderate and high conspiracy mentality respectively. **Conclusion:** Psychological factors and conspiracy beliefs impacted vaccine hesitancy among participants. **Recommendations:** Educational programs should be implemented to increase the awareness about the safety and efficacy of COVID-19 vaccines.

**Keywords:** COVID-19 vaccine, hesitancy, conspiracy and psychological antecedents.

### Introduction

The coronavirus disease pandemic of 2019 (COVID-19) is a significant public health disaster that could cause respiratory distress as well as physical and psychological effects. It also has direct and indirect consequences on persons with chronic diseases, reducing their ability to prevent or control the condition, as well as disrupting lives and causing social and economic burdens (Karen, Peter, Lisa, Janet & Ruth, 2021). As a result, the COVID-19 vaccine is a critical preventive strategy for halting the pandemic, and adoption of (COVID-19) immunization looks to be a critical factor in maintaining control of the ongoing epidemic (Al-Sanafi & Sallam, 2021). To limit the virus, researchers must first figure out what factors influence people's willingness to participate (Cummings, 2020).

Vaccine hesitation is described by WHO (2014) as "a delay in accepting or refusing vaccines notwithstanding the availability of vaccination services." Vaccination is an invasive medical practice with well-defined (if

minor) dangers to the individual (Cousins, Blencowe & Blazeby, 2019). As a result, it is viewed as an individual medical decision in certain countries, requiring informed consent, while it is treated as a public health policy in others, allowing it to be mandated without the option of consent or refuse (O'Neill, 2020). The majority of vaccination hesitancy research comes from countries that are Western, educated, industrialized, affluent, and democratic (WEIRD) (Lazarus et al., 2021; Sallam, 2021). As a result, less is known about developing, low-, and middle-income countries' settings (Betsch et al., 2018).

Betsch and colleagues (2018) developed a new framework of 5C psychological antecedents of vaccination by incorporating and expanding existing vaccination behavior measurements. Confidence (belief in vaccine effectiveness, safety, and necessity, as well as the system that delivers them), complacency (perceiving the disease as low risk), constraints (perceived low vaccine availability, affordability, accessibility, and other barriers to

vaccination), calculation (weighing the benefits and drawbacks of vaccination), and collective responsibility are all part of it (willingness to take the vaccine for protecting others via herd immunity).

Understanding the effects of conspiracy beliefs on pro-health behaviors and in the context of COVID-19 preventive and treatment measures is crucial. During the COVID-19 epidemic, conspiracy theories have spread quickly, such that COVID-19 is part of a government bioweapons program, that 5G cell towers are spreading COVID-19, and that pharmaceutical corporations are profiting from the spread of COVID-19 (Muller, 2020). Conspiracy theories describe major events as secret conspiracies devised by powerful and wicked institutions, groups, and/or individuals (Oliver & Wood, 2014; Douglas, Sutton & Cichocka, 2017). People who believe in conspiracies may be against public health programs that empower the very institutions they despise.

Despite the fact that vaccines, in the form of successful mass immunization programs, have saved millions of lives and improved health and wellbeing around the world in the past, such achievements have always been challenged by a small but vocal minority of "vaccine-hesitant individuals and groups" for a variety of environmental, cultural, political, and psychological reasons (Hossain, 2021). Successful vaccination programs appear to be one of the most important public health tools for reducing the increase in cases and the burden on healthcare systems (Dagan et al., 2021; Baraniuk, 2021). However, aversion to COVID-19 immunization could be a major impediment to efforts to mitigate the pandemic's destructive physical, economic, and psychological effects (Mukaetova-Ladinska & Kronenberg, 2021).

Individual attitudes regarding vaccination, in general, and COVID-19 vaccination, in particular, appear to be influenced by psychological variables (Murphy, 2021). This is primarily due to the psychological effects of the current pandemic, which was accompanied by an information age. The COVID-19 infodemic resulted in the spread of misinformation and deception about the

disease, including immunization (Sallam et al., 2021). Primary prevention is often the most cost-effective type of health care, and it involves a variety of preventative measures ranging from vaccines to health promotion through health education. So, the aim of this study was to assess moderating effect of psychological antecedents and conspiracy mentality on COVID-19 vaccine hesitancy in a sample of Egyptians.

### Significance of the Study

Vaccine hesitancy is on the rise globally; however, it differs by country (Hornsey, Harris & Fielding, 2018). Given the rise in conspiracy theories concerning COVID-19, it's critical to learn more about the factors that influence vaccine hesitancy (Kennedy, 2019). As a result, it's critical to understand which psychological factors or drivers influence vaccine denial or refusal so that focused interventions could be developed to minimize vaccine apprehension and enhance vaccine demand (de Figueiredo, Simas, Karafillakis, Paterson & Larson, 2020). Therefore, American Psychiatric Association (APA) (2021) reported that psychiatric professionals should play an important role in assisting healthcare systems and other entities within the community in developing and delivering culturally and contextually relevant public health messages to help overcome vaccine hesitancy.

Vaccine hesitancy affects vaccine demand and uptake, lowering vaccination coverage and perhaps jeopardizing Egypt's ability to control the COVID-19 epidemic. As a result, the goal of this study was to discover psychological characteristics that separate those who are cautious or resistant to vaccines. As a result, the topic of "vaccine rejection" as a public health problem can be clarified further, and public health interventions could be focused on a wider range of targets. Therefore, the obstacles to vaccination, which is the most significant weapon in the pandemic's combat, could be overcome (Nazl, Yman, Sevindik & Ozturan, 2021).

### Aim of the Study

To assess moderating effect of psychological antecedents and conspiracy

mentality on COVID-19 vaccine hesitancy among a sample of Egyptians.

### Research Questions

- 1- What are the psychological antecedents contributing to COVID-19 Vaccine Hesitancy in a sample of Egyptians?
- 2- What are the relations between COVID-19 vaccine hesitancy, conspiracy mentality and psychological antecedents of vaccine?

### Methods

#### Study Design

A cross-sectional web-based survey was conducted to assess moderating effect of psychological antecedents and conspiracy mentality on COVID-19 vaccine hesitancy in a sample of Egyptians. The survey was conducted in the period from 5 of August to 10 of September 2021.

#### Sample

Convenience sampling was employed to enroll participants using an anonymous web-based survey. The survey link was distributed to various social media groups and forums (generic Facebook pages, What's-app groups). Surveys were sent and evaluated on the web using "Google form," a platform that allows them to be distributed and analyzed. According to official records from the Central Agency for Public Mobilization and Statistics (2020), there were 80 566 000 Egyptians over the age of 18 in 2020. Open Epi version 3 was used to calculate a sample of the Egyptian population. The sample size was estimated to be 768 people. The total number of people who took part in the study was 1390. Inclusion criteria: Egyptians aged 18 years old or more who can read and write and who have mobile literacy.

#### Study Tools:

Data was collected by using a demographic and medical data questionnaire, Oxford COVID-19 Vaccine Hesitancy Scale, Conspiracy Mentality Scale, and 5 Cs Psychological Antecedents of Vaccination Scale.

- 1- **Socio-Demographic and Medical Data Questionnaire:** It was developed to collect the personal data such as participants' age,

gender, level of education, occupation, marital status, place of residence, medical illness, source of vaccine information (AstraZeneca, Sinopharm, Sinovac, Johnson, & Johnson,...), trust in this information, whether they have previously been infected with COVID-19, family history of COVID-19 infection, and mortality rate among relatives during COVID-19 infection.

- 2- **Oxford COVID-19 Vaccine Hesitancy Scale:** It was created by Freeman and colleagues (2020). The instrument was translated into the Arabic language by using the back translation technique. Three bilingual translators who are fluent in both languages and familiar with the content of the instrument were contacted to back translate the instrument. The reliability was (0.85), which is considered to be acceptable. Specialized professionals, including one mental health psychiatrist professor and two community health nursing professors, examined the face and content validity. Participants were asked to reply to a series of statements using a 5-point Likert scale. It is made up of seven components that are coded from 1 to 5. A 'Don't know' option is also available, which is not scored. "I would define my attitude toward receiving a COVID-19 vaccine as..." and "Would you take a COVID-19 vaccine if offered?" are two examples of questions. Low hesitancy/willingness to accept vaccine (50 percent), moderate/hesitant (50-70 percent), and extreme hesitancy/refuse to accept vaccine (> 70 percent) were the three categories of total score. A higher score indicates a higher level of *vaccine hesitancy*.
- 3- **Conspiracy Mentality Scale (CMS):** Bruder and Manfred came up with the idea (2009). They used five items to assess conspiracy apprehension. The researchers translated it into the Arabic language by using the back translation technique, and the reliability was 0.80, which is considered to be acceptable. Face and content validity were assessed by 5 nursing professors. Participants were asked to reply to a set of statements using a 5-point Likert scale. 'I believe many extremely important things

happen in the world about which the public is never informed,' and 'I believe that there are hidden organizations greatly influence political decisions,' among other things. The total score was divided into three categories: low (less than 50%), moderate (50-70%), and high (more than 70%). The higher the score, the more conspiracy mentality there is.

- 4- **5 Cs Psychological Antecedents of Vaccination Scale:** The original form of the 5C scale uses a short 5-item scale (1 item per antecedent; an item is a question in a questionnaire) and a long 15-item scale to assess these antecedents in English (3 items per antecedent). Ghazy et al. (2021) translated the scale into Arabic. It has 15 questions that span five primary domains or subscales: confidence (Q1-Q3), complacency (Q4-Q6), constraints (Q7-Q9), calculation (Q10-Q12), and group responsibility (Q13-Q15). The 5C scale is used to measure how people feel about COVID-19 vaccinations and getting vaccinated. The scale's Cronbach's alpha was 0.95. Participants were asked to reply to a series of statements using a 7-point Likert scale. Question no.13 is a reversal of the previous question. "I am absolutely confident that vaccines are safe, yet everyday worry keeps me from being vaccinated". A positive (favorable) response is indicated by higher scale values. Confidence, complacency, constraints, calculation, and collective responsibility each had cutoff points of 5.7, 4.7, 6.0, 6.3, and 6.2, respectively.

#### **Ethical Considerations**

The Faculty of Nursing at Cairo University approved the study research through Scientific Research Ethics Committee (IRP Approval Number: 2019041701). The study aim and advantages were explained to all participants. All participants were notified that their participation is entirely voluntarily. Their rights were secured; anonymity and confidentiality were assured through coding the data. The information gathered was used for the purposes of the study only. The completion of the online questionnaire was interpreted as consent.

#### **Procedure:**

First step, the approval was granted from Scientific Research Ethics Committee of Faculty of Nursing - Cairo University with (IRP Approval Number: 2019041701). At the second step, the study tools were developed through an online internet application using Google form platform. Response rate was high because around 95% of questionnaires were filled in by participants. At the third step, the survey link was distributed from 5 August to 10 September 2021 through various social media groups and forums (generic Facebook pages, What's-app groups). During the fourth step, the questionnaire was evaluated on the web using "Google drive".

#### **Statistical Analysis:**

The statistical package for social science (SPSS) version 25 was used to examine the data. The mean and standard deviation were used to express numerical data. Frequency and percentage were used to express quantitative data. The t-test was used to compare two variables in quantitative data, and the ANOVA test was used to compare more than two variables. Pearson correlation was used to investigate the relationships between distinct numerical variables. A p-value of less than 0.05 was considered significant, while a p-value of less than 0.001 was regarded extremely significant.

#### **Results**

Table 1 displays the socio-demographic data of 1390 participants in the study, whose ages ranged from 18 to 65 years old; 43.1 % of them were between the ages of 15 and 25, with a mean age of (28,73 ±10.7). Females made up the majority of the participants (64.3 %). In all, 45.5 % of the participants were married, 57.8% had a baccalaureate, more than half of the participants (55.4 %) resided in an urban region, and 58.2 % worked.

The distribution of medical data among research participants was shown in table 2. In conclusion, 91.4 % of the participants did not have a chronic disease, 41.7 % had never been exposed to COVID, 50.9 % did not have a family history of COVID-19 infection, and 85.1% did not record any mortality rate among family/friends due to COVID-19 infection.

Figure (1) shows that two thirds of the participants (59.9%) learned about COVID-19 vaccine through social media, whereas Figure (2) presents that the majority of the participants (57.4%) had quite trust in the source of COVID-19 vaccine information. Figure (3) illustrates that 45.3 % of the participants were hesitant to accept the vaccine, while 44.8 % were willing to receive it; additionally, 9.9 % of participants were refuse the vaccine. Regarding conspiracy beliefs, (59.2%) held moderate conspiracy ideas about COVID-19 vaccination.

#### Research question 1:

Figure (4) reveals that the participants exhibited high levels of responsibility, confidence, calculation, complacency, and restrictions in relation to the 5 Cs psychological antecedents of vaccination scale (96.6%), (92.8 %), (92.3%), (90 %), (64.6%). Table 3 reveals a highly statistically significant association between COVID vaccination reluctance and psychological antecedents and demographic and medical characteristics such as education, place of residence, occupation, and working in the medical field (at  $p=0.000$ ). There was a statistically significant relation between marital status and vaccine hesitation (at  $p = .039$ ), and a high statistically significant relation between marital status and psychosocial antecedents (at  $p = .001$ ). At ( $p=.010, .037$ ), there was a statistically significant relation between conspiracy mentality and married status and residency.

Table 4 shows that there was a statistically significant positive correlation between age and vaccine hesitancy (with  $r=.061^*$ , and  $p=.023$ ). There was highly statistically significant negative correlation between age and CMS (with  $r=-.115^*$ , and  $p=.000$ ). Age and psychological antecedents had a statistically significant negative correlation (with  $r=-.084^*$ , and  $p=.002$ ).

Table 5 reveals that there were highly statistically significant differences in COVID vaccine hesitancy as a function of psychological antecedents such as confidence, complacency, constraints, and responsibility, as well as conspiracy mindset (at  $p$  value .000).

#### Research question 2

Table 6 presents that conspiracy mentality had a highly significant beneficial effect on vaccine hesitancy (with  $B= 315$ ,  $t=-5.294$ , and  $p=0.000$ ). Psychological antecedents exhibited a substantial negative effect on vaccine hesitancy (with  $B= -.100$ ,  $t=-7.927$ , at  $p=0.000$ ). Vaccine hesitancy was also explained by conspiratorial mentality and psychological antecedents (with  $R = .24$ , and  $F$  change = 41.009).

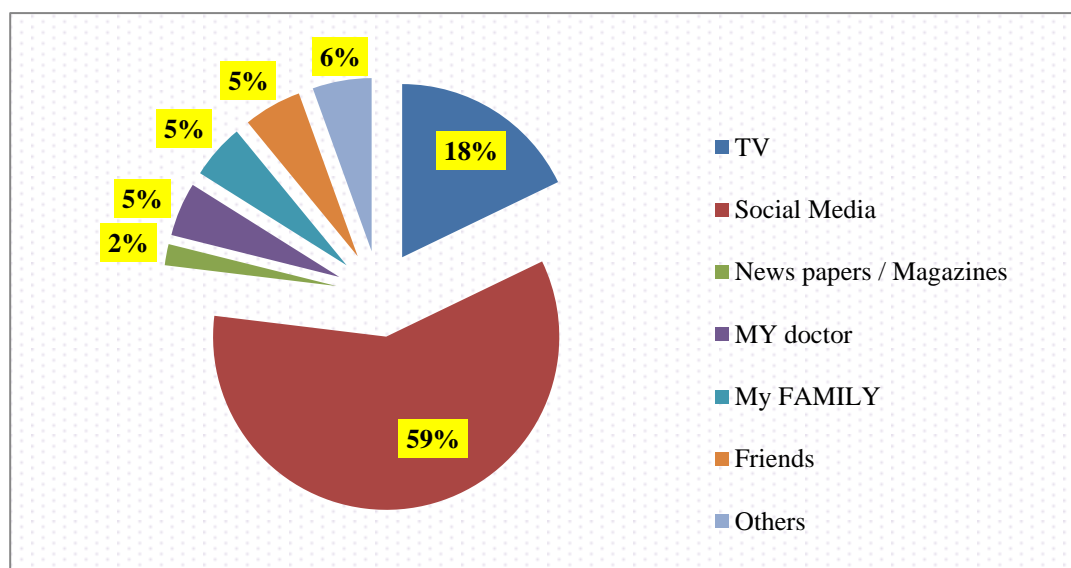
It is inferred from table 7 that there was highly positive statistically correlation between CMS and both vaccine hesitancy where ( $r=.114^{**}$ , at  $p= .000$ ) and psychological antecedents where ( $r=.119^{**}$ , at  $p= .000$ ). There was highly negative statistically correlation between vaccine hesitancy and psychological antecedents where ( $r=-.192^{**}$ , at  $p= .000$ ).

**Table (1):** Distribution of Socio-Demographic Data among the Study Sample (n=1390)

Variable	No.	%	Variable	No.	%
Age			Level of education		
15 <25	600	43.1	Can read and write	7	.5
25 <35	309	22.2	Primary education	20	1.4
35 <45	253	18.2	Secondary or Diploma	399	28.7
45 <55	90	6.6	Baccalaureate	803	57.8
55 <65	35	2.5	Post graduate	161	11.6
≥ 65	103	7.4	Working in medical field		
Mean ± SD	28,73±10.75		Yes	889	64
			No	501	36
Gender			Job		
Male	496	35.7	Working	809	58.2
Female	894	64.3	Not working	581	41.8
Marital status			Place of residence		
Single	732	52.7	Rural	620	44.6
Married	633	45.5	Urban	770	55.4
Divorced	16	1.2			
Widowed	9	.6			

**Table (2):** Distribution of Medical Data among the Study Sample (n=1390)

Variable	No.	%
Suffer from chronic disease		
No	1270	91.4
Yes	120	8.6
Exposure to COVID infection		
Yes	387	27.8
No	579	41.7
Not Sure	424	30.5
Family infection with COVID		
Yes	514	37.0
No	708	50.9
Not sure	168	12.1
Death in your family/friends by COVID		
Yes	204	14.7
No	1183	85.1
Not sure	3	0.2

**Figure (1):** Distribution for the source of information about COVID 19 vaccine among the study sample (n=1390)

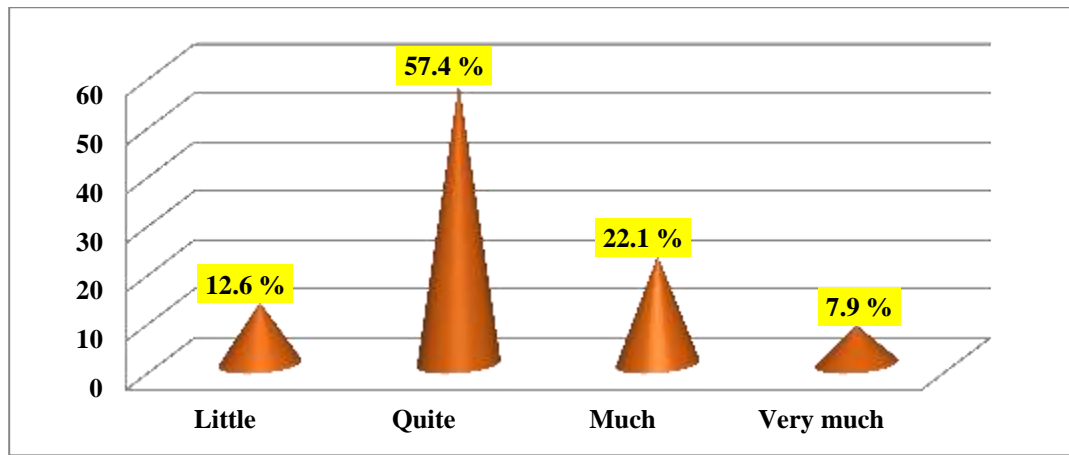


Figure (2): Distribution of trust in the source of COVID-19 vaccine data among the study sample (n=1390).

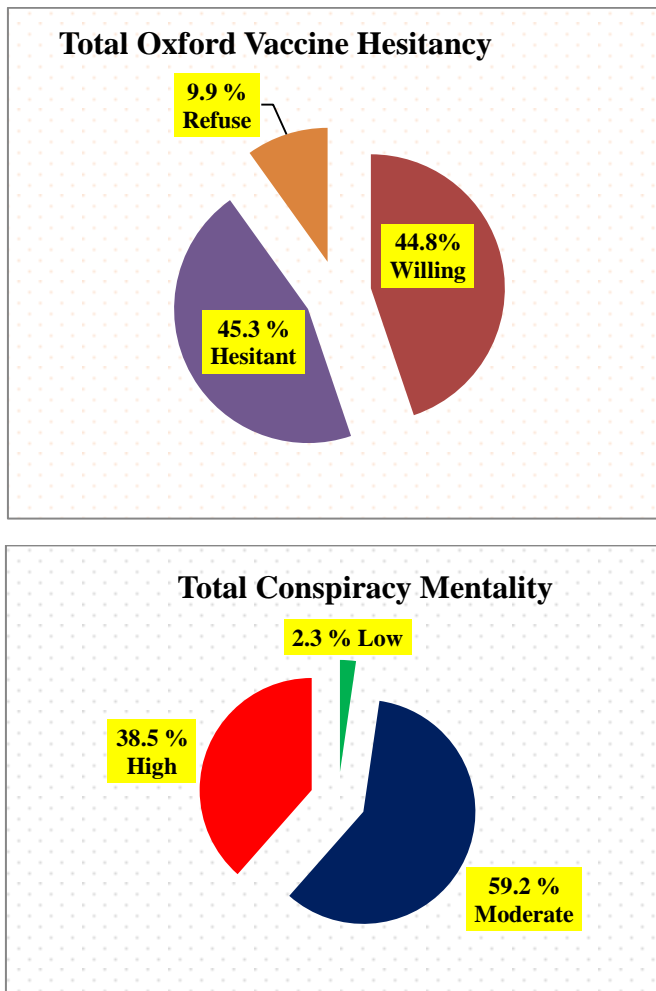
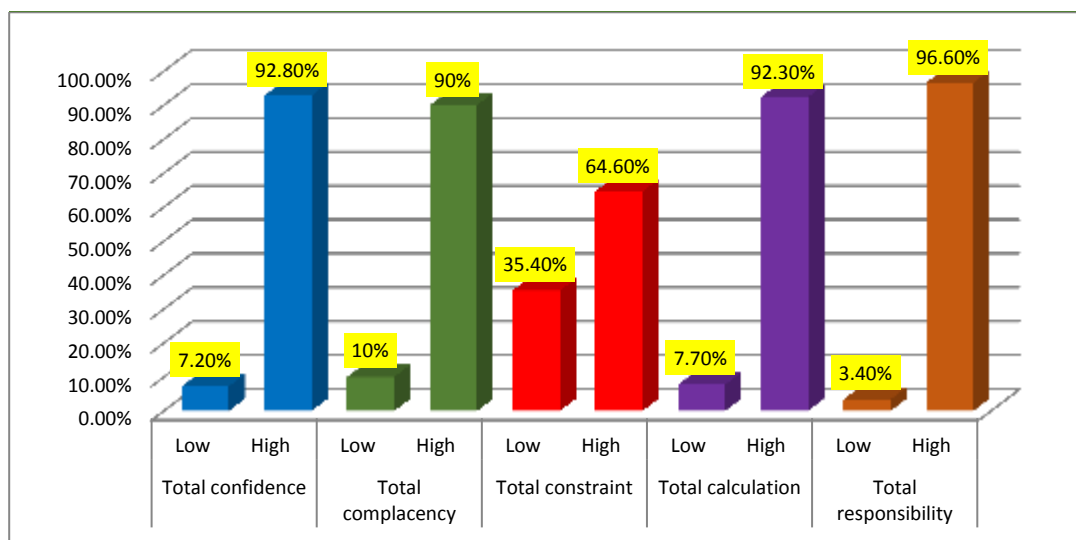


Figure (3): Distribution of total scores vaccine hesitancy and CMS among the study sample (n=1390)



**Figure (4):** Distribution for 5 Cs psychological antecedents of vaccination scale among the study sample (n=1390)

**Table (3):** Relation between Demographic, Medical Data and Oxford COVID-19 Vaccine Hesitancy Scale, CMS, and Psychological Antecedents (n=1390)

Variables	Oxford Vaccine Hesitancy		Conspiracy Mentality Scale		Psychological Antecedents	
	F/T	P	F/T	P	F/T	P
Gender	1.64	.11	.45	.32	2.38	0.78
Education	14.47	.000**	1.99	.093	7.03	.000**
Marital status	2.79	.039*	3.77	.010*	5.50	.001**
Residence place	20.76	.000**	4.33	.037*	13.35	.000**
Occupation	7.35	.000**	2.33	.054	7.02	.000**
Working in medical field	19.64	.000**	.119	.730	21.67	.000**
Suffer from chronic illness	.13	.11	4.47	.55	2.10	.01*

\*Significant at P<0.05

\*\* Highly Significant at P<0.001

**Table (4):** Correlation between Age and COVID-19 Vaccine Hesitancy Score, CMS and Psychological Antecedents among the Study Sample (n=1390)

Variables	Age	
	r	p
Total Vaccine Hesitancy	.061*	.023
Total CMS	-.115**	.000
Total psychological antecedents	-.084*	.002

\*Significant at P<0.05

\*\* Highly Significant at P<0.001



**Table (5):** Relation between Oxford COVID-19 vaccine hesitancy scale, CMS, and Psychological Antecedents (n=1390).

Psychological antecedents	Vaccine Hesitancy Level			
	Mean	St. Deviation	Chi square test $\chi^2$	P
Total confidence	14.021	5.134	109.45	.00**
Total complacency	9.897	4.135	19.67	.00**
Total constraints	8.846	4.358	13.58	.001**
Total calculation	15.889	4.920	4.03	.13
Total responsibility	16.046	4.604	36.71	.00**
Total Psychological antecedents	64.700	13.563	66.31	.00**
Total CMS	17.65	2.88	22.24	.00**
Total Vaccine Hesitancy	13.69 ± 6.53			

\*Significant at P&lt;0.05

\*\* Highly Significant at P&lt;0.001

**Table (6):** Multiple Regression of Oxford COVID-19 Vaccine Hesitancy, CMS and Psychological Antecedents among the Study Sample (n=1390)

Multiple regression model	Unstandardized Coefficients		Standardized Coefficients Beta	F	R	t	Sig. P
	B	Std. Error					
(Constant)	14.622	1.264				11.572	.000**
CMS	.315	.059	.139	41.009	.24	5.294	.000**
Psychological Antecedents	-.100	.013	-.208			-7.927	.000**

a. Dependent Variable: Total Vaccine Hesitancy

\*Significant at P&lt;0.05

\*\* Highly Significant at P&lt;0.001

**Table (7):** Correlation between COVID-19 vaccine hesitancy score, and CMS, Psychological Antecedents among the Study Sample (n=1390)

Variables		CMS	Psychological antecedents
Oxford Vaccine Hesitancy	r	.114**	-.192**
	p	.000	.000
CMS	r		.119**
	p		.000

\*Significant at P&lt;0.05

\*\* Significant at P&lt;0.001

## Discussion

Although there is a global consensus in favor of COVID-19 vaccines to fight the pandemic (Excler, Saville, Berkley & Kim, 2021), the psychological behaviors related with COVID-19 vaccine hesitancy are still unknown. Controlling the continuing pandemic requires an assessment of psychological antecedents and associated conspiratorial mentality that contribute to COVID-19 vaccination aversion among Egyptians. Given the scarcity of research on COVID-19 vaccine hesitancy and its psychological antecedents in Egypt, the goal of this study was to determine the psychological factors that moderate COVID-19 vaccine

hesitancy among Egyptians. A web-based poll was used to collect 1390 responses from 18 governorates.

In terms of demographic characteristics, more than half of the current study participants were adults, with 10% being pre-old or elderly; additionally, more than two-thirds of the participants were females. Furthermore, nearly half of the participants were married, more than half had a baccalaureate degree, and more than half of the present research participants live and work in cities, with more than two-thirds working in medical field. Furthermore, majority of participants didn't suffer from any chronic conditions, whereas less than one third of the

current study participants had been exposed to COVID-19 infection, furthermore, around one half of them reported neither family history of COVID-19 nor an incidence of death among family/friend from COVID-19 infection.

These findings matched those of Chen et al., (2020), who looked at corona virus pneumonia in Chinese residents and found similar demographic characteristics in terms of age, sex, and educational level in an online survey. Karen et al., (2021) also investigated preventing chronic illness during the COVID-19 pandemic and concluded that chronic diseases are influenced by a variety of coexisting and interactive elements such as psychological disorders, socioeconomic level, culture and history, access to health care, and so on. Karen further stated that the COVID-19 pandemic had shown that these factors worsen chronic disease inequalities in a variety of populations that are disproportionately affected by COVID-19. Sallam (2021) also conducted a study in Jordan, Kuwait, and among other Arab countries, and discovered those respondents with lower educational levels and those who rely on social media platforms as their primary source of information.

More than half of the participants in the current research learned about the COVID-19 vaccine through social media. This finding was in line with Yue, Zhang, Cae & Chen (2020); Shi et al., (2020), and Chen et al., (2020), who discovered in a study about COVID-19 vaccination knowledge that the internet, particularly the social media, was presently the most used information source. This conclusion contradicts the findings of Al-Sanafi and Sallam (2021) that studied the rates of COVID-19 vaccine hesitancy and found that the scientists and scientific journals were the primary sources of information among Kuwaiti healthcare personnel, and the reliance on the social media was higher among those who refused to take the vaccine. From researchers' point of view, these findings necessitate an urgent need for accurate scientific information about vaccine efficiency by the medical staff through awareness campaigns about vaccine misconceptions is strongly recommended.

In terms of vaccination hesitancy among current research participants, more than half were either hesitant or unconvinced about effectiveness

of the vaccine, although just (9.9 percent) were refusing to take the vaccine. Gatwood et al. (2021) observed in a comparable survey that more than half of the participants expressed some apprehension about immunization against COVID-19, with one third citing a lack of proof of vaccine effectiveness as the primary reason. According to comparable research conducted in Egypt, only (13.5percent) of people completely agree to obtain the vaccine, one third agree slightly, and more than one third refuse. Reasons of vaccine-refusal include absence of safety, concern of genetic mutation, modern approaches, and belief that the vaccine is ineffective were the reasons for disagreement (Aliae et al., 2021). Fares et al., (2021) determined that vaccine reluctance and rejection were mostly motivated by concerns about the vaccine's negative effects. A comparable study by Dzieciolowska et al. (2021) discovered that vaccine novelty, a desire for others to receive it first, and a lack of time for decision-making were all factors in refusal. More than two thirds of those who declined said that they might embrace immunization in the future. According to academics, policymakers should impose an obligatory vaccination program, particularly for vulnerable groups. Researchers from the current study also advocate for a nationwide awareness campaign regarding the COVID-19 epidemic.

There was a statistically significant association between demographic and medical data such as education, residency, occupation, and working in the medical profession of COVID vaccine hesitancy, according to the Oxford COVID-19 Vaccine Hesitancy Scale, CMS, and psychological antecedents. In this respect, Sallam (2021) discovered that respondents with higher levels of education were more inclined to accept vaccines, which could be related to their lower proclivity for conspiracies. People with a history of chronic diseases were more likely to receive COVID-19 vaccination, which could be linked to the higher rates of morbidity and mortality seen in chronic disease patients. The researchers in this study found that social media posts highlighting the vulnerability of patients with chronic illnesses to COVID-19 problems and death were common motivator to accept vaccine. According to a recent study by Al-Sanafi & Sallam (2021), Kuwaiti health-care personnel had a high intention rate to receive vaccination, which could

be due to the huge number of cases in the community, vaccine availability, educational initiatives, and government laws. According to the researchers of this study, who believed that a crucial part of a person's life which cannot be simply changed, is the need to greater education, attention, and understanding about the importance of the COVID-19 immunization.

The following trends were discovered in a sample of Egyptians for the psychological antecedents of COVID-19 vaccine hesitancy: Four of the five Cs were found to be substantially associated with an increased likelihood of adopting COVID-19 immunization. COVID vaccination hesitancy was found to have a statistically significant relationship with confidence, complacency, constraints, and responsibility (at  $p$  value .000). The only component that did not indicate a statistical difference was between the acceptance and hesitant groups as calculated (Abol fotouh, 2020; Pauci et al, 2020). According to the current study finding, this outcome could be linked to perception of COVID-19 hazards awareness. For the other factors, past research had indicated a correlation between vaccination uptake and higher levels of confidence, as well as the necessity need for adequate and reliable information about the vaccine in Egypt.

Daniel (2020) investigated "Conspiracy theories as barriers to controlling the spread of COVID-19 in the United States" and found that "conspiracy beliefs and their associations with perceptions of vaccine harm present continuing challenges to the control of the coronavirus pandemic because of their persistence and association with non-acceptance of recommended action, particularly vaccination." A study by Romer and Jamieson, (2020) titled "Conspiracy theories as barriers to halting the spread of COVID-19 in the United States" found that conspiracy beliefs predicted later mask-wearing and vaccination intentions even after controlling for actions taken and intentions.

Because the believing in COVID-related conspiracy theory predicts resistance to both preventative behaviors and future vaccination for the virus, Romers and Jamieson (2020) advise challenging both conspiracy theories and vaccination misinformation to stop the virus from spreading further. According to current

researchers, conspiracy theory culture and opinions among the current study participants were a major impediment to vaccine uptake. Current researchers suggest that nurses and other medical professionals could help to change the conspiratorial culture by offering continual health education using items like posters and brochures.

In this study, confidence, complacency, constraints and responsibility emerged psychological factor as a key that separated the vaccine acceptance group than the vaccine hesitancy group. This research highlights the need of comprehending the physical and psychological barriers that make COVID-19 vaccination difficult to accept. Increases in the number of skilled healthcare workers who can administer COVID-19 immunizations, as well as the creation of newer vaccination centers, may be able to help overcome these challenges. Continuing required training of nurses on the COVID-19 immunization is necessary, according to the current research finding, because many health professionals are skeptical of the vaccine's efficacy.

Furthermore, in this study, collective responsibility was found to be the key element in COVID-19 vaccination adoption. Individual vaccination should be emphasized as a priority in order to achieve the herd immunity needed to control the ongoing epidemic, which will assist in increasing the number of people wanting to get COVID-19 vaccines. Furthermore, in this study, calculating was another psychological element that contributed to the acceptance or aversion to COVID-19 vaccination. According to preliminary evidence from research conducted during the COVID-19 epidemic, conspiracy beliefs are also linked to decreased adherence to public health guidelines aimed at preventing the spread of COVID-19. Higher collective responsibility was significantly linked with lower COVID-19 vaccination reluctance, whereas increasing complacency was strongly associated with increased COVID-19 vaccine hesitancy, according to a comparable study done by Belal et al. (2020).

There was statistically significant relation between COVID vaccination hesitancy and CMS, as well as psychological antecedents, in the Oxford COVID-19 Vaccine Hesitancy Scale, CMS, and psychological antecedents. Vaccine

hesitancy, according to the current research finding, it is a significant public health issue that puts public health at risk, particularly during epidemics. Also, nurses who are not adequately prepared may act as a barrier to vaccine adoption by propagating incorrect information about the vaccine.

#### Strengths and Limitations of the study:

The novelty of the subject, as well as the representation of a broad sample of Egyptians of various ages from several governorates, facilitated the detection of significant gaps in COVID-19 vaccination reluctance. Strength of the study is that it reports on the prevalence of COVID-19 vaccination hesitancy and its predictors when the vaccine was still available to the public. The use of a convenient sampling online distribution of the study instrument, as well as sample size determination that did not follow the normal approach, would limit the study's generalizability. Furthermore, because vaccination hesitancy is context specific, particularly for the place and time, the cross-sectional feature of this study should not be neglected.

#### Conclusion

The findings of this study reveal high rates of vaccine hesitancy (nearly half) and its relation to conspiracy beliefs which considered nearly all the entire sample. These findings highlight the importance of understanding the role of psychological factors and conspiracy mentality that had moderating effect in vaccine hesitancy, as well as the serious negative consequences of spreading misinformation about COVID-19. Furthermore, Confidence, complacency, constraints, and responsibility emerged as major psychological factors that separates vaccine acceptance from vaccine rejection. It would be beneficial to seek for rules for disseminating reliable vaccine information.

#### Recommendations

- Raise community awareness regarding COVID-19 vaccines safety and efficacy through social media, campaigns, schools, universities and different organization.
- Design and implement educational programs to disassemble irrational beliefs and conspiracy mentality about COVID-19 vaccine.

- Replication of the study using larger sample size to gain more generalization of the results.

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