



Motivational Factors to Receive the COVID-19 Vaccine in the United Arab Emirates: A Cross-Sectional Study

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Abstract

The United Arab Emirates has been very successful in its vaccination campaign for the COVID-19 injection, and vaccine hesitancy is not currently a major concern. Nevertheless, the motivations of residents in the UAE to receive the COVID-19 vaccine are varied. In this study with 426 vaccinated participants, 55% expressed health motivations to receive the vaccine, whereas 45% expressed non-health motivations. Nationality was a predictive factor in motivation, as expatriates from South Asian countries expressed the lowest motivation to get the vaccine on the basis of intrinsic health reasons, followed by expatriates from Arab countries, Emiratis, and expatriates from the rest of the world. The same nationality pattern was observed in vaccine readiness and vaccine knowledge. Both of these variables had a correlation with intrinsic health motivation in receiving the vaccine. No significant difference across nationalities was observed regarding vaccine conspiracy beliefs, and this variable only had a weak negative correlation with motivations to receive the vaccine.

Keywords UAE · Vaccine · Motivation · Nationality · COVID-19

Introduction

The United Arab Emirates (UAE) has had an unqualified success in its COVID-19 vaccination campaign. As of October 2021, the vaccination rate for UAE's residents is 95.78%. By July 2020, Phase III trials for Sinopharm were started, in order to test the effectiveness of its vaccine in the UAE. Given its success, in September 2020, the Emirati government approved Sinopharm's emergency use [1]. In later phases of the campaign, additional injections were also available and widely administered, most notably the Pfizer injection [2].

These efforts have materialized into impressive results. The UAE now occupies second place in the list of countries with the fastest vaccination campaigns, far ahead of industrialized nations such as the United States of America and the United Kingdom [3].

One important aspect in the success of the vaccination campaign pertains to its wide availability. For example, the UAE'S Ministry of Health and Prevention (MOHAP) and the Dubai Health Authority (DHA) have instrumented the Hasana program, which offers Sinopharm and Pfizer injections for free and with great accessibility to all UAE citizens and residents [4].

Furthermore, seeking a way to obtain sanitary sovereignty and to avoid excessive dependence on other countries, the UAE has also begun to develop a vaccine of its own. The country is engaging in efforts to come up with the Hayat-Vax vaccine, a joint venture with Sinopharm, thus becoming a pioneer in the Arab world in this area of accomplishment [5].

This is also consistent with the UAE's active role in providing medical assistance to countries that are struggling with maintaining optimum sanitary conditions. In this regard, the UAE has contributed massive donations in medical supplies in attempts to curb the COVID-19 pandemic. This includes more than 500 million syringes, a significant number, given that it constitutes about 25% of UNICEF'S needs [6].

The UAE has strong logistical capacities in its accessibility and delivery system, with more than 120 vaccination centers [7]. It also has a very efficient digital infrastructure

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that allows to keep record of vaccination procedures, as well as quick reporting of any potential complications through the Al Hosn and Malaff applications.

Yet, despite all these major technological advantages, the UAE government still recognizes that vaccine hesitancy may be an obstacle in the satisfactory completion of the vaccination campaign. Due to the fact that vaccine hesitancy may always pose a problem worldwide, the UAE government has put in place some restrictive measures. Especially in the emirate of Abu Dhabi, citizens and residents are required to disclose their vaccine status to enter leisure facilities (malls, restaurants, etc.). Likewise, complete vaccinations are required to attend large events (wedding, concerts, etc.), and in most cases, workplaces and educational venues (universities) [8].

This prompts an important question: in the UAE, are mandates necessary for a satisfactory vaccination program? Although the UAE has been largely successful, conventional wisdom in public health policy indicates that any sort of sanitary endeavor is more successful when the population at large is willing to comply, regardless of government mandates. To a large extent, the COVID-19 pandemic was a wake-up call to public health officials worldwide, because it is highly likely that in the not-so-distant future, a new pandemic will arise, and new vaccines will have to be rolled out. This implies that, in the long term, populations will have to get used to be routinely vaccinated, as it should already be the case with other controlled (but not eradicated) diseases, such as influenza, measles, etc. This will be done more smoothly and efficiently, if vaccination programs rely on the public's own awareness of the need for vaccines, instead of government mandates.

Consequently, although the UAE may have a very high level of vaccination rate, it is still important to consider what are the motivations for citizens and residents to get vaccinated in the first place. Once that information is known, it is also important to focus on those sectors of the population that have received the injection not out of their own will and emphasizing health reasons, but rather, only as response to government mandates.

Likewise, it is important to find some correlates of the motivational aspects to receive the vaccine injections. With that information, the UAE government may direct more educational and awareness efforts to those sectors of the population that may not be properly motivated to get vaccinated, even though they may have complied (but only because of government mandates). Ultimately, an important goal of the UAE government should be to increase the population's inner motivation to get vaccinated for health reasons, regardless of the mandates that may be in place.

In answering these questions, one important focus should be on nationalities. Roughly only 15% of the UAE population are Emirati citizens [9], whereas the rest of the

population is made up of expatriate laborers and their families. Demographic studies conventionally segment the UAE population into nationals (Emiratis), expatriates from Arab countries, expatriates from South Asian countries (India, Pakistan, Bangladesh, Sri Lanka, Nepal), and expatriates from the rest of the world. While the UAE population has been successfully integrated and there is very little potential for ethnic confrontations, there are important social and cultural disparities amongst residents of different nationalities. Likewise, many governmental and social programs in the UAE are structured around the nationality of their targets. Consequently, when considering the motivation to get the COVID-19 vaccine, the present study evaluates correlations with nationality.

Furthermore, prior research has also established that knowledge, readiness, and conspiracy beliefs are important predictive factors in motivations to be vaccinated. The present study also assesses those variables, seeking to establish if there are any correlations with the sort of motivation to get the COVID-19 vaccine.

In this regard, two hypotheses will be tested in this study. First: in the UAE, nationality correlates with motivation to receive the COVID-19 vaccine. Second: in the UAE, vaccine acceptance, vaccine knowledge and vaccine conspiracy beliefs are correlated with the motivation to receive the COVID-19 vaccine.

Methods

426 persons who are resident in the UAE, were recruited on the basis of non-probabilistic sampling. The selection criterion for sampling was accessibility and willingness to answer the survey. Exclusion criteria was not having yet been vaccinated for COVID-19. The survey questions were approved by the Research Ethics Committee of Ajman University, # M-H-F-Sep-9. Participants expressed their informed consent and were told that their answers would remain anonymous.

The survey first collected demographic information, asking participants about their age, gender, nationality, and emirate of residence.

The second part of the survey asked participants to report their main motivation to get the COVID-19 vaccine choosing from the following options: because it is important for my health, to be able to travel, to be able to go to malls and restaurants, employer/academic institution requires it, other (please specify).

The third part of the survey incorporated questions from the 7C Scale of Vaccination Readiness [10]. This is a questionnaire that assesses the willingness of subjects to accept vaccination procedures, on the basis of seven items. It asks participants to rate their agreement with statements such as

“Vaccinations are so important to me that I prioritize getting vaccinated over other things.” Participants express their level of agreement with each of those statements, on a Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate higher readiness for vaccination. The 7C scale has been validated in a previous study in a study with 681 participants, and in Arab countries [11]. It is also considered to have acceptable reliability, with a factor of 0.81.

The fourth part of the survey incorporated questions from a Vaccine Knowledge Scale, as devised by Zingg and Siegrist [12]. This scale consists of 11 items, asking participants to report their level of agreement with statements such as “The efficacy of vaccines has been proven”, and “The immune system of children is not overloaded through many vaccinations.” Participants express their level of agreement with each of those statements, on a Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate greater knowledge of how vaccines work. This scale is considered to have good reliability, as previous studies have returned an alpha value of 0.79, and it has been properly validated, including in Arab countries.

The fifth part of the survey incorporated questions from the Vaccine Conspiracy Belief Scale (VCBS) [13]. This is a questionnaire that assesses the level of acceptance of conspiracy theories about vaccines amongst participants. This scale consists of 7 items, asking participants to report their level of agreement with statements such as “People are deceived about vaccine safety.” Participants express their level of agreement with each of those statements, on a Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate higher acceptance of conspiracy theories regarding vaccines. The VCBS has been validated in various studies, including in Arab countries [14], and is considered to have good reliability [15].

The responses to the question about motivations to get the COVID-19 vaccine were divided in two groups: health reasons and non-health reasons (to be able to travel, to be able to go to malls and restaurants, employer/academic institution requires it). Participants’ nationalities were clustered in 4 groups: Emiratis, expatriates from Arab countries, expatriates from South Asian countries, expatriates from the rest of the world.

A chi-square analysis was done assessing the relationship between nationality and motivation to get the COVID-19 vaccine. Statistical significance was placed at $p \leq 0.05$.

A One-Way ANOVA analysis was done comparing the results of 7C Scale of Vaccination Readiness, amongst four UAE residents’ groups: Emiratis, expatriates from Arab countries, expatriates from South Asian countries,

expatriates from rest of the world. Statistical significance was placed at $p \leq 0.05$.

A One-Way ANOVA analysis was done comparing the results of Vaccination Knowledge Scale, amongst four UAE residents’ groups: Emiratis, expatriates from Arab countries, expatriates from South Asian countries, expatriates from rest of the world. Statistical significance was placed at $p \leq 0.05$.

A One-Way ANOVA analysis was done comparing the results of Vaccine Conspiracy Beliefs Scale, amongst four UAE residents’ groups: Emiratis, expatriates from Arab countries, expatriates from South Asian countries, expatriates from rest of the world. Statistical significance was placed at $p \leq 0.05$.

A point-biserial coefficient was calculated for the correlation between motivations to get the COVID-19 vaccine (1 = health motivation; 0 = non-health motivation) and scores of 7C Scale of Vaccination Readiness. Statistical significance was placed at $p \leq 0.05$.

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Results

Descriptive statistics are presented in Table 1.

Chi square analysis of nationality and reasons to get the vaccine is presented in Table 2.

One-way ANOVA comparing results of 7C Scale of Vaccination Readiness, Vaccination Knowledge Scale and Vaccine Conspiracy Beliefs Scale, across the four nationality groups (Emiratis, expatriates from Arab countries, expatriates from South Asian countries, and expatriates from the rest of the world) are presented in Table 3.

Point biserial coefficients for correlations between motivations to get the vaccine (1 = health motivation; 0 = non-health motivation) and scores of 7C Scale of Vaccination Readiness, Vaccination Knowledge Scale and Vaccine Conspiracy Beliefs Scale, are presented in Table 4.

Discussion

Results come out showing that although the UAE has been very successful in its vaccination campaign, motivations amongst residents to get the COVID-19 vaccine have

Table 1 Descriptive statistics

	Emiratis	Expatriates from Arab countries	Expatriates from South Asian countries	Expatriates from rest of the world	Total
Males	33	108	60	16	217
Females	30	112	52	15	209
Age (mean ± SD.)	32.8 ± 8.1	31.7 ± 9.5	29 ± 8.4	30 ± 7.3	31.5 ± 8.5
Health reasons as motivation to get COVID-19 vaccine	38 (60%)	121 (55%)	52 (46%)	31 (74%)	234 (55%)
Non-health reasons as motivation to get COVID-19 vaccine	25 (40%)	99 (45%)	60 (54%)	23 (26%)	192 (45%)
7C Scale of Vaccination Readiness	20.35 ± 3.37	20.76 ± 3.78	19.63 ± 3.27	21.16 ± 4.08	20.22 ± 3.74
Vaccination knowledge scale	39.85 ± 5.07	39.85 ± 6.60	37.97 ± 3.28	40.29 ± 4.45	38.92 ± 4.32
Vaccine conspiracy beliefs scale	14.30 ± 4.62	14.55 ± 5.17	14.66 ± 3.54	13.54 ± 5.49	14.45 ± 4.31
Total	63	220	112	31	426

Table 2 Chi square analysis of nationality and reasons to get the vaccine

	Health reasons as motivation to get the COVID-19 vaccine	Non-health reasons as motivation to get the COVID-19 vaccine	Total
Emiratis	38	25	63
Expatriates from Arab countries	121	99	220
Expatriates from South Asian countries	52	60	112
Expatriates from the rest of the world	23	8	31
Total	234	192	426

χ^2 : 8.65

p: 0.03

Table 3 One-Way ANOVA comparing 7C Scale of Vaccination Readiness, Vaccination Knowledge Scale and Vaccine Conspiracy Beliefs Scale across nationality groups (Emiratis, expatriates from Arab countries, expatriates from South Asian countries, and expatriates from the rest of the world)

	f-ratio	p value
7C scale of vaccination readiness	2.73	0.04*
Vaccination knowledge scale	3.38	0.02*
Vaccine conspiracy beliefs scale	0.46	0.70

*Result is statistically significant

been far from ideal. In this study, 55% of the participants expresses health as the primary motivation to get the vaccine. While that is a majority number, it is still low against the expectations of public health officials, who aspire to a

much higher standard in terms of motivation amongst the population [16].

In her seminal study on the anthropology of vaccination, Larson [17] argues that “while medical and scientific powers somehow expect the old rules and hierarchies to hold their ground, hoping that publics will finally come to their senses and that a few disease outbreaks will motivate them to line up for their vaccinations, new rules of engagement are being decided outside of esteemed Institutions.” This means that intrinsic health motivations to get the vaccine should no longer be taken for granted, and public health officials must continuously strive for new health motivational factors in vaccination campaigns.

After doing the chi-square analysis, results come out showing that there is a statistically significant relationship

Table 4 Point biserial coefficients for correlations between motivations to get the vaccine and scores of 7C Scale of Vaccination Readiness, Vaccination Knowledge Scale and Vaccine Conspiracy Beliefs Scale

	7C scale of vaccination readiness	Vaccination knowledge scale	Vaccine conspiracy beliefs scale
Motivation to get the vaccine (1 = health motivation; 0 = non-health motivation)	R: 0.63, p: 0.00001*	R: 0.57, p: 0.00001*	R: - 0.14; p: 0.004*

*Result is statistically significant

between nationality and motivations to get the vaccine. The group with the lowest health motivation to get the COVID-19 vaccine was expatriates from South Asian countries, as only 45% of them expressed health reasons as the motivation to get vaccinated. These results are somewhat expected, given what other studies have shown regarding the lived experiences of South Asian communities in the Gulf region.

Although the UAE has gone to great lengths accommodating to multicultural expectations and enforcing a very ambitious and strict program of cultural and religious tolerance for expatriates, some dissatisfaction amongst expatriates from South Asia still persists [18]. Anthropological studies suggest that expatriates from South Asia in general feel gratitude for the labor opportunities that are given to them (and that may not be available in their home countries) [19], but many still perceive themselves to be in marginalized positions vis-à-vis the rest of society [20]. Furthermore, although the UAE has also put on a significant effort to accommodate proper living and working conditions, some sense of alienation persists. For example, in her ethnography of Indian expatriates in Dubai, Vora comments that “not only were these [Indian] neighborhoods becoming more segregated from the newly developed areas of New Dubai, but the people that lived there and their historical connections to the emirate were in a state of heightened uncertainty due to their increasing alienation from the rest of the city” [21].

Prior research has shown that vaccine hesitancy and low intrinsic health motivation to be vaccinated, tend to be higher amongst dissatisfied ethnic minorities and groups with higher levels of social alienation [22]. One plausible explanation for this association is that, to the extent that minorities do not feel sufficiently integrated to the rest of society, they do not trust the system when it informs them about the health necessity to get the vaccine. Inasmuch as they feel excluded from the benefits of society, they believe that they can and should take care on their own, and ultimately receive vaccines only if forced by social circumstances, but not out of their own will based on health reasons [23].

Prior research has also shown that subjects from immigrant communities with a greater sense of alienation engage more frequently in behavior that is ultimately detrimental to their own health. This has been documented with habits such as smoking [24], alcohol consumption [25], junk food consumption [26] and sugar consumption.

Similar patterns are observed regarding vaccination. One study by Tankwanchi et al. [27] stipulates that amongst immigrant communities in most countries, lack of intrinsic motivation to get the vaccine is “largely associated with fears and misinformation about vaccine harms, limited knowledge of both preventable diseases and vaccines, distrust of host countries’ health systems and their attendant intentions,

language barriers, and perceived incompatibility between vaccine uptake and migrants’ religion.”

Another study on the relationship between motivations to get vaccinated and ethnic marginalization, concludes that “perceived ethnic discrimination conditions both trust in and compliance with different authority types” [28] and ultimately, when subjects from these communities accept vaccination, it happens far more due to the constraints put in place by the government, than due to intrinsic motivations about the importance of maintaining health status.

Research also reports that when groups feel marginalized, they grow a sense of alienation towards the scientific establishment’s views regarding the need of vaccines to maintain proper health standards. Larson considers that marginalized communities “feel alienated from the “system” and anxious about more and more vaccines, and combinations of vaccines, being recommended and sometimes required. Some are also harboring anger and frustration at the medical and scientific community’s defensiveness around vaccines, which sometimes seems devoid of human emotion” [17].

In comparison, in this study expatriates from Arab countries had a higher rate of intrinsic health motivation to get the vaccine (55%). Again, this is expected (especially when compared with expatriates from South Asia), given that Arabs’ experience in the UAE is vastly different from South Asians [29]. Given their cultural proximity to the UAE, Arab expatriates have managed to occupy higher positions in businesses and private enterprises [30]. There may be some dissatisfaction concerning citizenship laws [31], but overall, expatriates from Arab countries feel a sense of connection with the rest of society in the UAE, and alienation is not a big concern. Ultimately, this successful integration with the rest of society mediates a higher tendency to get vaccinated for intrinsic health reasons, especially when compared to South Asian migrants.

Nevertheless, the intrinsic health motivation rate for expatriates from Arab countries is still not satisfactory. Prior research suggests that Arab culture as a whole still does not place sufficient emphasis on the importance of vaccines as part of individual health management [32], although rapid modernization across the Arab region is inducing changes in this regard [33].

As compared to the rest of Arab residents in the UAE, Emiratis have a higher intrinsic health motivation to get the COVID-19 vaccine (60%). Interestingly, similar results were reported in a study before the development of the COVID-19 vaccine, in which it was concluded that about 60% of Emiratis in that study were willing to take the vaccine [34]. Again, given the structure of society in the UAE, this is largely expected [35]. The Emirati government is very generous with nationals, providing them with extensive welfare support and socio-economic advantages. Consequently, by and large Emiratis have a strong national allegiance towards

their government, and largely trust sanitary government programs, such as vaccination.

Interestingly, in this study, participants who are expatriates from the rest of the world had an even higher rate for intrinsic health motivation to receive the COVID-19 vaccine (74%). Although the category “rest of the world” encompasses a diverse set of countries from all continents, in this study they were mostly from North America and Europe. In the UAE societal structure, expatriates from these regions largely occupy skilled professional positions, but they are still underneath Emiratis in terms of socio-economic position and status [36]. Yet, although they may have lower socio-economic status, they have higher intrinsic health motivation to get the COVID-19 vaccine. One possible explanation may be that Western countries have stronger historical traditions of vaccine campaigns [37], and consequently, expatriates from those nations are in a better psycho-social position to understand the relevance of vaccines for the maintenance of health [38].

One possible confounding variable at play, may be educational level. To the extent that expatriates from South Asia tend to occupy unskilled labor positions in the UAE [39], their educational level may be lower amongst UAE residents. Likewise, expatriates from regions apart from South Asia and the Arab world, tend to occupy skilled labor positions, and consequently, their educational level may be higher. This may partly explain why expatriates from South Asia have the lowest rate for intrinsic health motivation to receive the vaccine, whereas expatriates from the rest of the world have the highest rate.

Due to the sensitive nature of questions regarding educational level, in this study such information was not collected. But the Vaccine Knowledge Scale does test knowledge about vaccines. And the results come out showing that knowledge about vaccines is indeed a predictor of the type of motivation to receive the COVID-19 vaccine.

As per the biserial correlation analysis, results show that there is a statistically significant moderate correlation between the level of knowledge of how vaccines work, and the intrinsic health motivation to receive the COVID-19 vaccine. This is not surprising, given that prior research has shown that in the decision to receive the vaccine, cognitive factors play a significant role [40].

Furthermore, the participants’ nationality groups offer statistically significant different levels of vaccine knowledge. On the basis of results concerning intrinsic health motivation to receive the vaccine, we may predict that expatriates from South Asian countries have the lowest vaccine knowledge, followed by expatriates from Arab countries, Emiratis, and expatriates from the rest of the world. Indeed, this very same pattern is confirmed by the one-way ANOVA analysis, which returned a statistically significant result.

Prior research across various countries has firmly established that vaccine knowledge is a strong bulwark against vaccine hesitancy, and a facilitator of intrinsic health motivation in receiving vaccines [41]. The most plausible explanation for this finding is that, once it is adequately understood how vaccines work, their limited scope of risk, and the great advantages that they offer, subjects by and large make the rational decision, as they are in a position to understand that vaccines work to their advantage, and consequently, they seek vaccination on their own, without the need of governmental coercion.

Apart from the cognitive factors assessed by the Vaccine Knowledge Scale, the intrinsic health motivation to receive the vaccine may also be mediated by attitudinal factors. This is what the 7C Vaccination Scale measures, and it may be posited that such attitudes also correlate with the type of motivation to receive the vaccine. Once again, this is confirmed by the results of this study. As per the biserial coefficient analysis, there is a statistically significant moderate correlation between vaccine readiness and motivation to get the vaccine on the basis of health reasons.

And, again, these results cohere with the results that are returned when vaccine readiness is compared across the nationality groups. As per the one-way ANOVA of the vaccine readiness variable, there is a statistically significant difference between all four nationality groups, with expatriates from South Asia scoring the lowest, followed by expatriates from Arab countries, Emiratis, and expatriates from the rest of the world.

This finding is relevant, to the extent that apart from knowledge, attitudes manifested in readiness also predict the sort of motivation in receiving the vaccine. Prior research has shown that the decision to get vaccinated is a complex process, in which various psychological factors are at play [42]. Apart from the purely cognitive aspect pertaining to information, attitudes towards vaccination itself (that ultimately become manifest in vaccine readiness) also play a part [43].

Extensive research has also been done on the relationship between motivations to get the vaccine (along with vaccine hesitancy) and beliefs in conspiracy theories [44]. One particularly relevant aspect in the study of conspiracy theories is that belief in one conspiracy theory leads to belief in other conspiracy theories [45]. The anti-vaccination movement gained a boost in recent years, largely due to the conspiracy theories put forth by Andrew Wakefield [46]. Consequently, it was almost inevitable that in the wake of the COVID-19 pandemic, vaccine conspiracy theories boomed [47].

Yet, one very surprising finding in this study is that only a weak negative correlation (although still statistically significant) was found between the level of belief in vaccine conspiracy theories (as measured by the Vaccine Conspiracy Beliefs Scale), and intrinsic health motivation to receive the

vaccine. Likewise, although expatriates from South Asia scored highest in the Vaccine Conspiracy Beliefs Scale, followed by expatriates from Arab countries, Emiratis, and expatriates from the rest of the world, one-way ANOVA results indicate that the differences across nationality groups are not statistically significant. Both of these findings run counter to our expectations at the onset of this study.

One possible explanation for these findings is that, as opposed to the cognitive factors of vaccine knowledge, and the attitudinal factors of vaccine readiness, belief in conspiracy theories is concerned with larger narratives that do not necessarily become manifest in specific actions. Indeed, some studies suggest that conspiracy theories ultimately become a form of entertainment [48]. But precisely because they may be entertaining, they may not necessarily influence subjects' health decisions, in the same manner that being immersed in fantasy literature as entertainment may not necessarily subjects' mundane behavior. Nevertheless, many studies do suggest that vaccine conspiracy beliefs ultimately influence people's behavior when it comes to receiving vaccines [49], and in other Arab countries, some studies suggest that vaccine hesitancy and motivations to get the COVID-19 vaccine are associated with beliefs in conspiracy theories [50]. Further studies about vaccine conspiracy beliefs amongst residents and citizens of the UAE are needed in order to clarify this.

Limitations

This study's sample size was sufficiently large to warrant statistically significant conclusions, but in future studies larger samples could further clarify some of the trends observed. Likewise, the sample's composition largely reflected the UAE' social composition at large, but one particularly important group of expatriates was underrepresented: migrants from the Philippines. In future studies, sampling should ensure that expatriates from the Philippines form a nationality group of their own.

Educational level and socio-economic status may have been two confounding variables in the hypotheses of this study. They were not included in the survey because of the sensitive nature of these questions, but in future studies, they ought to be included.

Conclusion

The UAE has been very successful in its vaccination campaign, and as compared to other countries, vaccine hesitancy is not a major concern, given that a large percentage of the population has been vaccinated with the COVID-19 injection. However, it appears that a significant percentage of the

population in the UAE has received the COVID-19 vaccination, not out of intrinsic health motivations, but rather, due to non-health reasons, such as the desire to travel, going to entertainment venues, and workplace and educational institutions' requirements.

These findings have some implications in terms of public policy. The results suggest that for the time being, the UAE government must not abandon the enforcement of vaccine mandates, as it appears that a significant portion of the population will not receive the vaccine out of their own will.

Nevertheless, the UAE government must also focus on attempting to persuade the population about the need for vaccination, so that the percentage of people who receive the vaccine out of their own will increases, and consequently, vaccination campaigns are more effective, to the extent that they may not require extensive government enforcement.

In this endeavor, the educational aspect of the vaccination campaign is crucial, as the results of this study show that there is a correlation between knowledge about vaccines, and intrinsic health motivations to receive the vaccine. Likewise, results show that attitudinal factors towards vaccines also correlate with the motivations to get vaccinated.

As part of this educational endeavor, the UAE government needs to target particular segments of the population on a nationality basis. Although societal integration has been largely accomplished [51], much of cultural and social life in the UAE is structured around nationalities. When it comes to motivations to get vaccinated, expatriates from South Asia manifest the lowest knowledge about how vaccines work, followed by expatriates from Arab countries, Emiratis, and expatriates from the rest of the world. The same nationality pattern is observed in regard to vaccine readiness, and the motivation to get the vaccine on the basis of health reasons.

This difference across nationalities may be a reflection of the societal structure of the UAE, as expatriates from South Asia tend to occupy lower socioeconomic positions and may have a greater sense of alienation vis-à-vis the rest of society. In turn, this sense of alienation may prevent them from fully trusting the health establishment. For that very reason, the most important public policy implication from this study is that the UAE government must increase its attempts to integrate expatriates from South Asia to the rest of society, and in turn, it must target them in educational campaigns about the importance of vaccines for health.

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Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Code Availability Not applicable.

Declarations

Conflict of interest The author declares no conflict of interest.

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