Acceptance Towards COVID-19 Vaccination Among the Lebanese Population: A Cross-Sectional study

MHD Bahaa Aldin Alhaffar (bhaa.alhafar@gmail.com)
university of Debrecen https://orcid.org/0000-0002-9147-189X

Molham Alhaffar
Lebanese American Univeristy

Joanna Kreid
Lebanese American Univeristy

Elissa Massoud
Lebanese American Univeristy

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Abstract

Introduction: the emergence of the covid-19 pandemic has created major health risks to humanity as a whole, in turn, the world have been waiting for a solution to end this pandemic. This research aims to study the acceptance towards the covid-19 vaccine among the Lebanese population and investigate the factors affecting the descision towards the vaccine.

Methods: In order to obtain a clear insight about the propensity of the Lebanese population to take the vaccine, a cross-sectional study was conducted, data collected through a questionnaire based on google forms and distributed among the population via social media platforms (Instagram, whatsapp, facebook, etc). the survey consisted of different types of questions and 1157 participants of different age groups respomnded to the survey.

Results: The findings of this study reveals that the majority of the population (ovr 95%) know soemone who caught the corona virus. In addition (86.3%) of the population believe that the pandemic poses major health risks to the society in Lebanon. Moreover the respondants consider the source of the vaccine as a major determinant to whether or not they will take the vaccine, in fact (73.3%) trust the Pfizer-BioNtech vaccine. However, 77.1% of the sample worry that the vaccine will have side effects. in addition over 90% of the population was observed to be following the restrictions and measures implemnented to stop the spread of the virus.

Conclusion: Within the limitations of this study, we can conclude that this study is the earliest attempt to assess the acceptance toward COVID-19 vaccination among the Lebanese population. The Lebanese population showed a moderately high acceptance rate for the vaccination, however, there is a notable percentage that needs to be directly addressed with any future awareness campaign which are the youth, and the people with low socioeconomic status.

Introduction

The emergence of the SARS COV-2 (Covid-19) virus in Wuhan, China, has been posing major risks to human health and putting the entire world in jeopardy as it was classified by the world health organization (WHO) as a global pandemic on the 11th of March 2020 (1). The ramifications of the pandemic on different economic sectors were catastrophic, the isolation and distancing regulations implemented paved the way towards an economic collapse (2). This economic recession affecting most countries has been anticipated by the World Bank (3). Such restrictions involved shutting down the frontiers, and limiting the number of flights unless necessary (4). In fact, according to The World Travel and Tourism Council, about 50 million jobs in the global travel sector might be at risk (5). The lockdowns led to panic-buying and food stocking which caused a shortage of everyday products (6). With millions of active cases and hundreds of thousands of deaths (7, 8), research centers and pharmaceutical companies have been working at unprecedented rates to develop a vaccine to fight against this global pandemic (9). According to the WHO, only two mRNA vaccines have been approved by the United States

Food and Drug Administration (FDA); Pfizer-BioNTech Covid-19 Vaccine on the 11th of December 2020 and Moderna Covid-19 Vaccine on the 18th. Several companies developed vaccines based on different modes of action (10). The Oxford-AstraZeneca vaccine is a double-stranded DNA vaccine that uses a modified version of a chimpanzee adenovirus that has been used in many countries such as the UK as an emergency vaccine in December 2020 (10, 11). Besides, China developed the Sino-pharm Covid-19 vaccine which is an Inactivated Coronavirus Vaccine where the virus is modified by a protein-denaturing treatment to make it noninfectious (12).

On the microscopical level, Lebanon is a third world country with an estimated population of 6,825,445 that has been plagued with political turbulence and economic crisis over the past year and a half(13), on the 21st of February 2020, Lebanon witnessed its first Covid-19 case and since then around hundreds of thousands (387.000 confirmed cases on the fourth of march 2021) of cases have been recorded (14). The government has been trying to implement various restrictions to limit the number of cases from curfews to complete lockdown, these Covid-19 related regulations had repercussions on employment since in June 2020, one out of three were unemployed and one out of 5 had their salary reduced (15). Regardless, as the regulations and recommendations administered by the WHO and the ministry of public health did not achieve their target, the number of confirmed cases is still increasing in an alarming manner(16). The hospitals' intensive care units (ICU) reached their maximum capacity and a shortage of medical supply needed has been witnessed. On the 28th of January 2021, the minister of health, Dr. Hamad Hassan declared that the World Bank will be providing the government hospitals with 117 ICU beds for coronavirus patients (17). Thus, it is being discussed that the vaccine is the sole method to limit the transmission and spread of the virus. The target of the ministry of health is to reach 70% of a vaccinated Lebanese population by the end of the year 2021-2022 by introducing the Pfizer-BioNTech and Oxford-AstraZeneca Covid-19 Vaccines while giving the priority to the elderly, the health workers, and susceptible patients (18). However, concerns about the safety of the vaccine due to its fast development, short testing, its unknown long-term side effects, and the emergence of conspiracy theories and political underlying benefits have been raised. Misconceptions and misinterpretation about certain aspects of the pandemic have been circulating alarmingly. For instance, it is being discussed that the vaccine is being developed for monetary gains, while others believe that the purpose of the vaccine is to implant microchips into people's bodies (19). As a result, these factors have affected the Lebanese population's acceptance and opinion regarding the proposed vaccines against the Covid-19. To date, this growing public health concern in Lebanon has received scant attention in the research literature. Therefore, this cross-sectional study examines the propensity to which the Lebanese population is willing to take the new covid-19 vaccine once available or not. Thus, the importance of this research is to study the possibility of reaching a 70% herd immunity by vaccination (20).

Aim of the research:

This research aims to study the acceptance of COVID-19 vaccination among the Lebanese population, moreover, it aims to study the general attitude and behavior during the pandemic.

Materials And Methods

Study design:

A cross-sectional study was conducted to collect the data, due to the restrictions to conduct face-to-face research, an electronic questionnaire was used based on Google Forms, and the participant was asked to fill the questionnaire anonymously, and the questionnaire consisted of four parts:

1. demographic variables.
2. willingness to take the vaccine.
3. attitude and behavior during the pandemic.
4. measurements were taken during the pandemic.

The questionnaire was distributed one week after the announcement of the Lebanese governments that they are willing to bring the vaccination to the Lebanese population, and data were collected over 1 week (the second week of January 2021). The final sample size consisted of (1157) after excluding all participants under 18 years old, and the sample was balanced between the Lebanese governance.

Statistical analysis:

Data were analyzed using descriptive and inferential statistical methods using SPSS V.22 software, Pearson's Correlation, T-test, ANOVA Test was used to analyze the data.

Results

1- Sample analysis and demographic variables:

The final sample size consisted of (1157) participants, age ranged between 18-79 and on average (33.3), and the sample balanced between males and females (41.4%, 57.9%) retrospectively. Most of the sample were Lebanese living inside Lebanon (85.2%), and (5.3%) were not Lebanese. Financial status, education, parental education information was used to calculate the socio-economic status index (SES), and the majority of the sample had moderate SES (42.1%), while (33.7%) had low SES, and (24.2%) had high SES **Chart N.1**. Most of the participants had health insurance (86.3%), and only (19.3%) of the participants were from the medical field. **Table N.1** represents the sample demographic variables.

2- Behavior during the pandemic:

Table N.2 represents the sample behavior during the COVID-19 pandemic, among the participants (15.6%) are confirmed cases with COVID-19, however, over (95%) of the sample know someone who had coronavirus or symptoms related to the virus. The majority of the sample (86.3%) think that the COVID-19

pandemic holds a major risk toward the society in Lebanon, and only (50.8%) think the pandemic holds a major risk on them.

The decision of (65.6%) of the sample regarding the vaccination is affected by the source of the vaccine, and the most trusted vaccine among the Lebanese population was the German-American vaccine (BioNTech- Pfizer) (73.4%), followed by the Chinese vaccine (10.5%), and the least trusted vaccine was the Russian vaccine (7.9%). Most of the sample will take the vaccine even if it is not free (51.9%), while (32.2%) will never take the vaccine even if it is free, and (15.8%) will only take a free vaccine.

3- Opinions toward the vaccination and measurements taken among the Lebanese population:

Table N.3 represents the Lebanese population's opinion toward the vaccination, and the measurement taken by them. (77.1%) are worried about the side effects of the vaccine, and (65.7%) are not certain about its safety, and (64.8%) will take the vaccination if it is recommended by the doctors and the health specialist.

On the other hand, the Lebanese population showed high responsibility following the restrictions and health measurements during the pandemic, as shown in **table N.3**, most questions are answered with "yes" from over (90%) of the sample, except for following a certain diet or taking supplements and vitamins (46.1%).

Chart N.2 represent the reasons why the Lebanese population is worried regarding the COVID-19 vaccine, the majority are worried because of the possible side effects (77.1%), and (33.1%) are worried because the development of the vaccine took little time to be finished, and (19.7%) believe that there is a conspiracy behind the vaccination.

4- The relation between the research variables:

Inferential statistical analysis was used to test the relation between the different research variables. Pearson's correlation test was used to identify the correlation between the age variable and the willingness to take the vaccine, and the result is represented in **Table N.4**, there is a significant positive correlation between the age and the willingness to take the vaccine among the sample (sig= 0.048, PC= 0.042).

Moreover, Pearson's correlation showed a significant positive correlation between the socio-economic status and the willingness to take the vaccination, which means the higher the SES gets, the more willing the population becomes towards taking the vaccine (sig=0.003, PC=0.042).

Discussion

The Covid-19 pandemic has reshaped our lives; therefore, it is considered that up till now, the vaccine is the best solution to eradicate the virus and stop its spread (21). The Pfizer-BioNTech Covid-19 Vaccine arrived in Lebanon on the 14th of February and was distributed to hospitals and vaccination centers (22).

Thus, it was incumbent to conduct a study that aims to investigate the level of acceptance of the SARS COV-2 vaccine among the Lebanese population and the various factors that affect their decision. Hence, the importance of this study stems from the fact that it is among the first to discuss the acceptance in Lebanon, moreover, the big sample size that participated in this study can help to generalize the results of this study. Of our sample, over half of the population (58.8%) are willing to take the vaccine. This result is in direct contrast to the results of other studies since the acceptance observed in Lebanon is lower than the one in Iraq (77.6%), China (91.3%), Saudi Arabia (64.7%), and the United States of America (69%), however, a survey conducted in England revealed a lower tendency to take the vaccine (55.8%) (23-26).

The majority of the sample stated that they know someone who caught the coronavirus, and as a result, it is concluded that the virus poses major risks to society. The findings suggest that most of the participants who perceive the virus as a threat might be more inclined to protect themselves from the pandemic, this is consistent with the results of a longitudinal study concerning the first year of the H1N1 Pandemic which stated that the risk of infection is directly related to the acceptance of vaccination (27). This goes in line with the previous result that stated that 58.8% of the sample is willing to take the vaccine. However, this acceptance is related to the source of the vaccine for over two-thirds of the sample. The majority prefer to take the German-American vaccine (BioNTech- Pfizer) while the Chinese vaccine; Sinopharm was the second most trusted vaccine among the Lebanese population, and the Russian vaccine Sputnik V was the latest. This repartition might be due to the 95% efficacy of the Pfizer vaccine and its mode of action which could be reassuring (28). The preference for the Pfizer vaccine is consistent with the results of a cross-sectional study conducted in Indonesia in July 2020 which shows that higher acceptance towards vaccination was associated with the choice of a 95% effective vaccine (23). Also, the Pfizer vaccine is an RNA vaccine that introduces the RNA coding for the viral protein to generate the corresponding antibodies(28). In contrast, Sinopharm is an Inactivated Coronavirus vaccine that introduces the virus into the body (29) and Sputnik V is a double-stranded DNA vaccine that relies on a modified adenovirus(30). Both Chinese and Russian vaccines have lower effectiveness compared to the German Pfizer vaccine (30, 31). Based on these findings, the participants trust the Pfizer vaccine more than the others due to the difference in effectiveness and mode of action. The distribution of the Pfizer vaccine starting the 14th of February 2021 in Lebanon is in line with the participants' preference which suggests that 73.4% might be amongst the people registering to get vaccinated.

The acceptance toward the vaccine among the Lebanese population is affected by the fear of the unknown and un-well-documented side effect of the vaccine and the uncertainty of its safety, similar results were found in other studies which concluded that the fast production of the vaccine resulted in worries among the people about the effectiveness and safety of the vaccine (24, 32-34), moreover, it is important to document that about one-fifth of the Lebanese population are convinced that there is a hidden agenda behind the fast development of the vaccine, which raises again the conspiracy theory about the COVID-19 pandemic, this results can be directly related to psychological status (35), political trust (36), religious beliefs (37), and social status of the population (38). In addition, the source of information can lead to misinformation regarding the vaccination and the spread of conspiracy theories. In fact, 26.4% of the sample rely on common conversation and words of mouth and 4.6% trust what is

shared on social media platforms. However, the Lebanese population showed high responsibility towards the rules and restrictions applied during the pandemic in Lebanon, which might have been a key factor to prevent a further spread of the infection in the community (39-41).

Social determinants played a key role in the acceptance of the vaccine among the Lebanese population, gender, age, and higher socioeconomic status were significant factors affecting the willingness to take the vaccine, this can be explained as the following, COVID-19 pandemic affected seniors more than youth therefor, the older the person gets, the more willing to take the vaccine he/ she becomes (42-44), furthermore, the socioeconomic status is higher when the education level is higher, and the higher education level can be a protective factor against the wrong information about the vaccination programs (45), similar results were found in many other studies, in Saudi Arabia, older age groups and education level were significantly associated with the vaccine acceptance(32), in other Arab community, males were more willing to accept the vaccine (33). 15.8% of the sample stated that they would consider taking the vaccine only if it would be free of charge. In fact, the Pfizer vaccine which arrived in February is costless (reference). Therefore it is expected that more than the 51.8% of the participants who are willing to be vaccinated no matter the price will be taking the vaccine.

As stated earlier, the vaccination program is the only solution to pass the current pandemic and protect the communities around the world from a further speared of this virus and to protect the world economy from collapsing, therefore, the results of this study can be a cornerstone for the development and implications of the vaccination program in the Lebanese community, and it can give an in-depth overview for the groups that are least to accept the vaccine to start an awareness campaign aiming to raise the awareness toward COVID-19 vaccine.

Further research might investigate the reason why the number of active Covid-19 cases keeps on increasing even if the participants are claiming to respect the majority of the safety measurements. Another further study could assess the updated data once people start getting the vaccine.

Conclusions

Within the limitations of this study, we can conclude that this study is the earliest attempt to assess the acceptance toward COVID-19 vaccination among the Lebanese population. The Lebanese population showed a moderately high acceptance rate for the vaccination, however, there is a notable percentage that needs to be directly addressed with any future awareness campaign which are the youth, and the people with low socioeconomic status.

Abbreviations

COVID-19: Corona Virus disease 2019

Declarations

Ethics approval and consent to participate:

Ethical approval was obtained from the ethical committee at ResAid medical research organization, N. 116/s.

Consent for publication:

Not applicable

Availability of data and materials:

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare that they have no competing interests

Funding:

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Authors' contributions:

- **MBA:** supervised the research, wrote the manuscript, analyzed the data, finalized the research.
- **MA:** collected the data, helped writing the manuscript
- **EM:** collected the data, helped writing the manuscript
- **JK:** collected the data, helped writing the manuscript

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Tables

Table N.1 - Sample analysis and demographic variables							
Variables		Count	%	Variables		Count	%
preferred language	English	813	70.3%	**educational level**	university student	413	35.7%
	Arabic	344	29.7%		postgraduate student	267	23.1%
gender	Male	479	41.4%		graduate from university	349	30.2%
	Female	670	57.9%		high school	120	10.4%
	Prefer not to say	8	0.7%		elementary school	8	0.7%
social status	in a relationship	127	11.0%	**father education**	university degree or higher	538	46.5%
	Single	592	51.2%		primary school	274	23.7%
	Married	416	36.0%		high school	321	27.7%
	Divorced	22	1.9%		cannot read or write	24	2.1%
citizenship	Lebanese living in Lebanon	986	85.2%	**mother education**	university degree or higher	541	46.8%
	not Lebanese living in Lebanon	61	5.3%		primary school	232	20.1%
	Lebanese living abroad	110	9.5%		high school	345	29.8%
financial status	less than my needs	221	19.1%		cannot read or write	39	3.4%
	almost equal to my needs	611	52.8%	**health insurance?**	Yes	999	86.3%
	more than my needs	325	28.1%		No	158	13.7%
socio-economic status	low SES	390	33.7%	**are you in the medical field?**	Yes	223	19.3%
	medium SES	487	42.1%		No	934	80.7%
	high SES	280	24.2%				

Table N.2 – behavior during the pandemic							
Variables		Count	%	Variables		Count	%
have you caught the Covid-19 virus?	yes, confirmed by PCR test	180	15.6%	**risks of corona virus on you**	major risk	588	50.8%
	no, i did not caught the virus	928	80.2%		minor risk	396	34.2%
	yes, i had symptoms (personal)	49	4.2%		i don't know	125	10.8%
do you know anyone who caught the corona virus? *	Yes	1110	95.9%		no risk at all	48	4.1%
	No	47	4.1%	**which source of vaccine do you trust the most?**	German-American vaccine (BioNTech-Pfizer)	607	73.4%
	i don't know	0	0.0%		Russian vaccine (Sputnik V)	65	7.9%
risks of corona virus on the society	major risk	998	86.3%		Chinese vaccine (Sinopharm)	87	10.5%
	minor risk	89	7.7%		Other	68	8.2%
	i don't know	64	5.5%	**Would free vaccine affect your decision whether or not to take it?**	I will never take the vaccine free or not	373	32.2%
	no risk at all	6	0.5%		no, I will take the vaccine even if it is not free	601	51.9%
would the source of the vaccine affect your decision to take vaccine?	Yes	759	65.6%		yes, I will take the vaccine if it was free	183	15.8%
	No	398	34.4%				

*** confirmed by PCR test**

e N.3 – opinion toward the vaccination and measurements taken among the Lebanese population

Opinion toward the vaccination	agree		disagree		I don't know	
	count	%	count	%	count	%
ı the vaccine is just a way for manufacturing companies to earn money	455	39.3%	85	7.3%	617	53.3%
rried of the side effects of the vaccine	879	77.1%	26	1.1%	252	21.8%
will allow us to go back to our normal lives	378	32.7%	69	6.0%	710	61.4%
should be mandatory for everyone with access to it	501	43.3%	154	13.3%	502	43.4%
:he vaccine, I will be immune to the corona virus	313	27.1%	89	7.7%	755	65.3%
might make me susceptible to the corona virus	208	18%	77	6.7%	872	75.4%
is still new; hence I am not certain about its safety	761	65.7%	37	3.2%	359	31.0%
:ion about covid-19 is enough for me to decide whether or not I am going to take the	573	49.5%	74	6.4%	510	44.1%
:ion about the vaccine is enough for me to decide whether or not I am going to take	416	35.9%	99	8.6%	642	55.5%
ı						
ıment recommends to take the vaccine then I will take it	303	26.2%	138	11.9%	716	61.9%
ıd specialists recommend to take the vaccine then I will take it	749	64.8%	81	7.0%	327	28.3%

Measurements against COVID-19	yes		no	
	Count	%	Count	%
e masks in closed places or when around a lot of people	241	99.2%	2	0.8%
ng to school, university or job	222	91.4%	21	8.6%
ıstpone a certain event such as going out with friends, going to restaurants or sports event	230	94.7%	13	5.3%
ıumber of times you go to stores or shopping	236	97.1%	7	2.9%
.ed places	237	97.5%	6	2.5%
d sanitizing the objects that you touch (door k2bs, etc)	223	92.5%	18	7.5%
.and sanitizer when you go out and use it to sanitize your hands	230	94.7%	13	5.3%
; number of times you touch your eyes, mouth or nose	221	90.9%	22	9.1%
certain diet or taking supplements and vitamins	112	46.1%	131	53.9%
:d people who are showing symptoms of flu	237	97.5%	6	2.5%
ns when coughing or sneezing	217	89.3%	26	10.7%
ır hands more than usual	234	96.3%	9	3.7%

Table N.4 – correlation between age, SES and the willing to take the vaccination

	N	Minimum	Maximum	Mean	Std. Deviation
w willing are you to take the vaccination	1157	1.00	10.00	6.0596	3.20749

		willing to take the vaccination
age	Pearson Correlation	.042
	Sig. (2-tailed)	.048
	N	1157
Socio-economic status	Pearson Correlation	.032
	Sig. (2-tailed)	.003
	N	1157
gender	male	.006
	female	

Figures

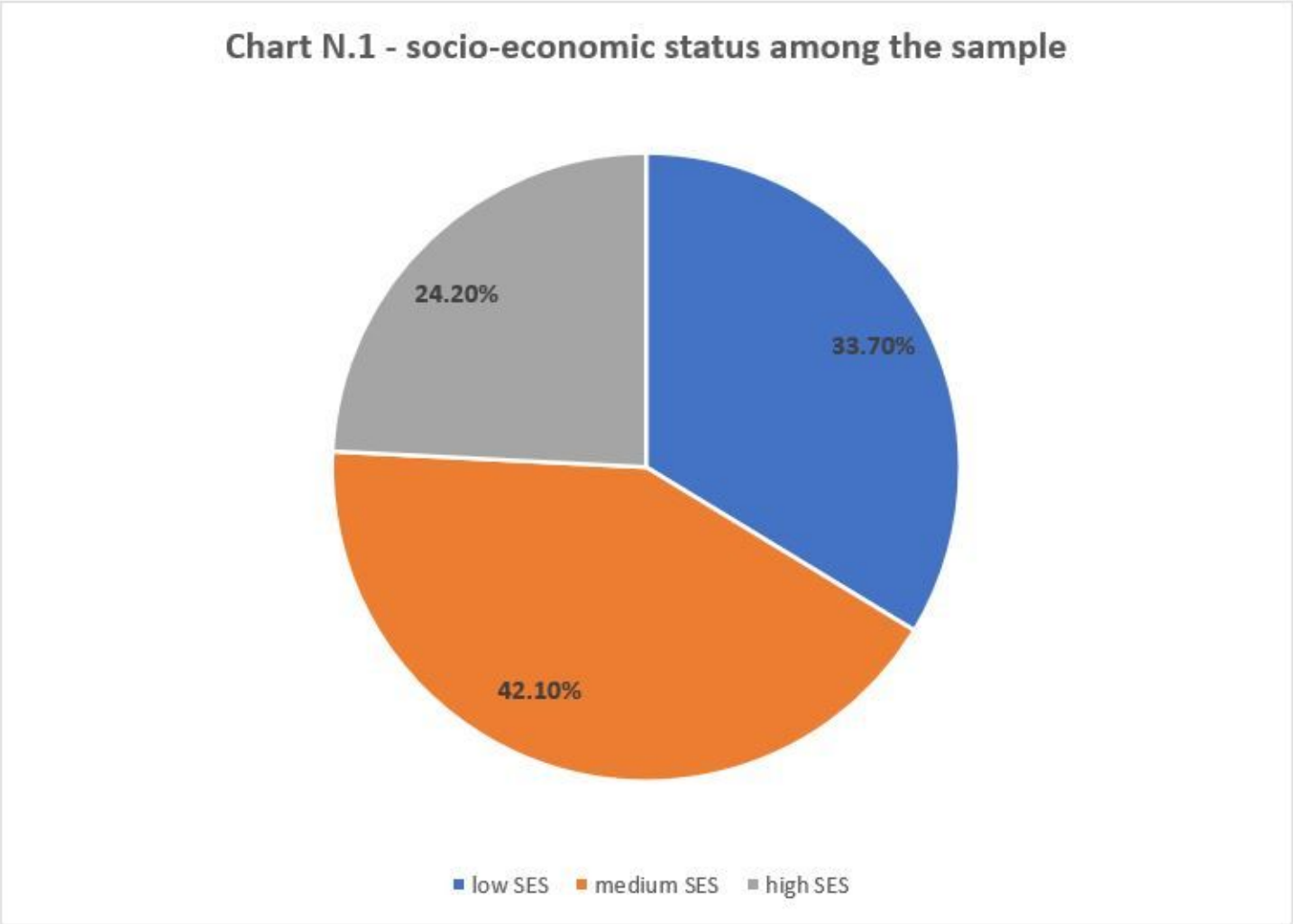

Figure 1

Chart N.1 - socioeconomic status among the sample

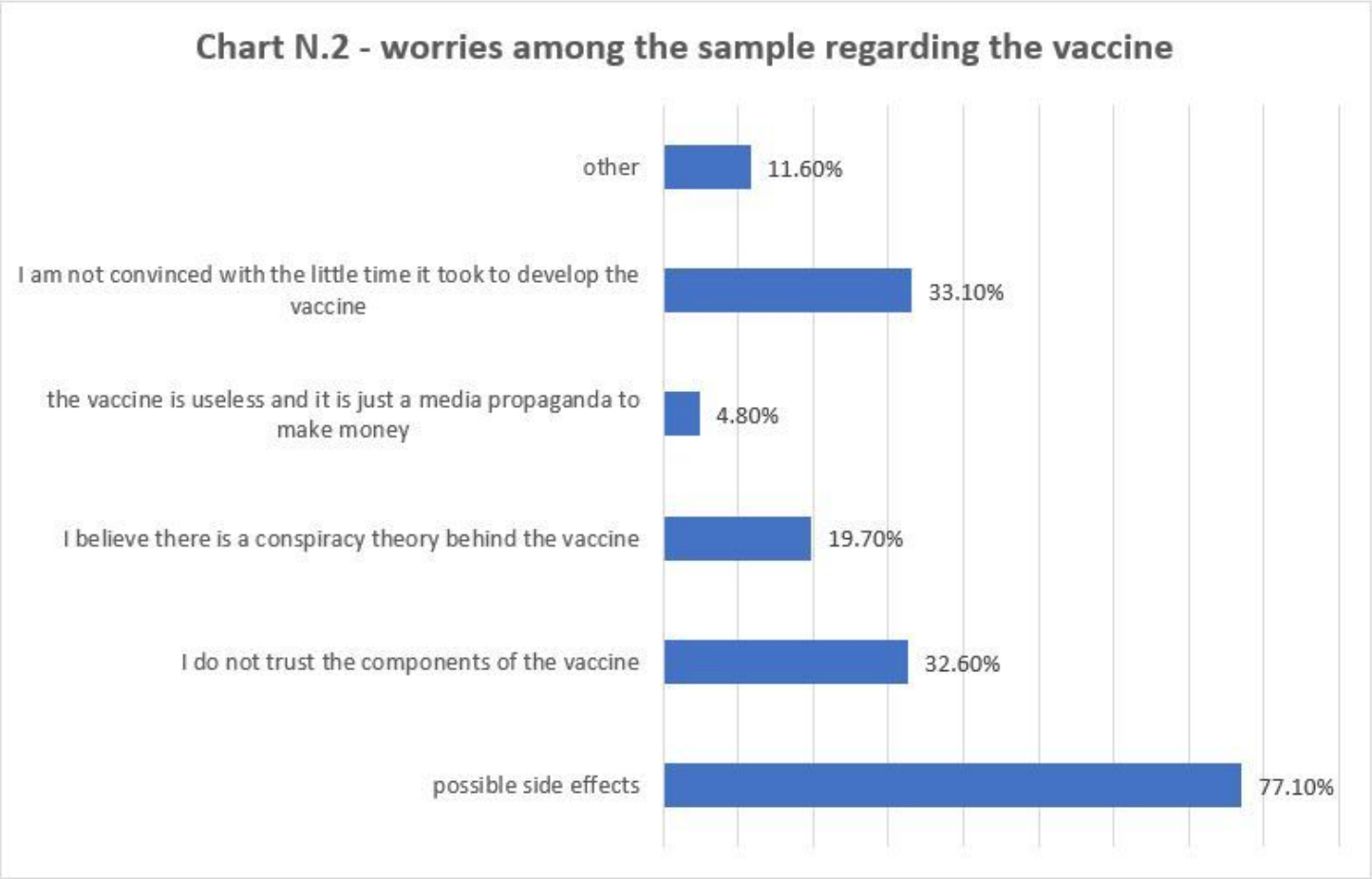

Figure 2

Chart N.2 - worries among the sample regarding the vaccine

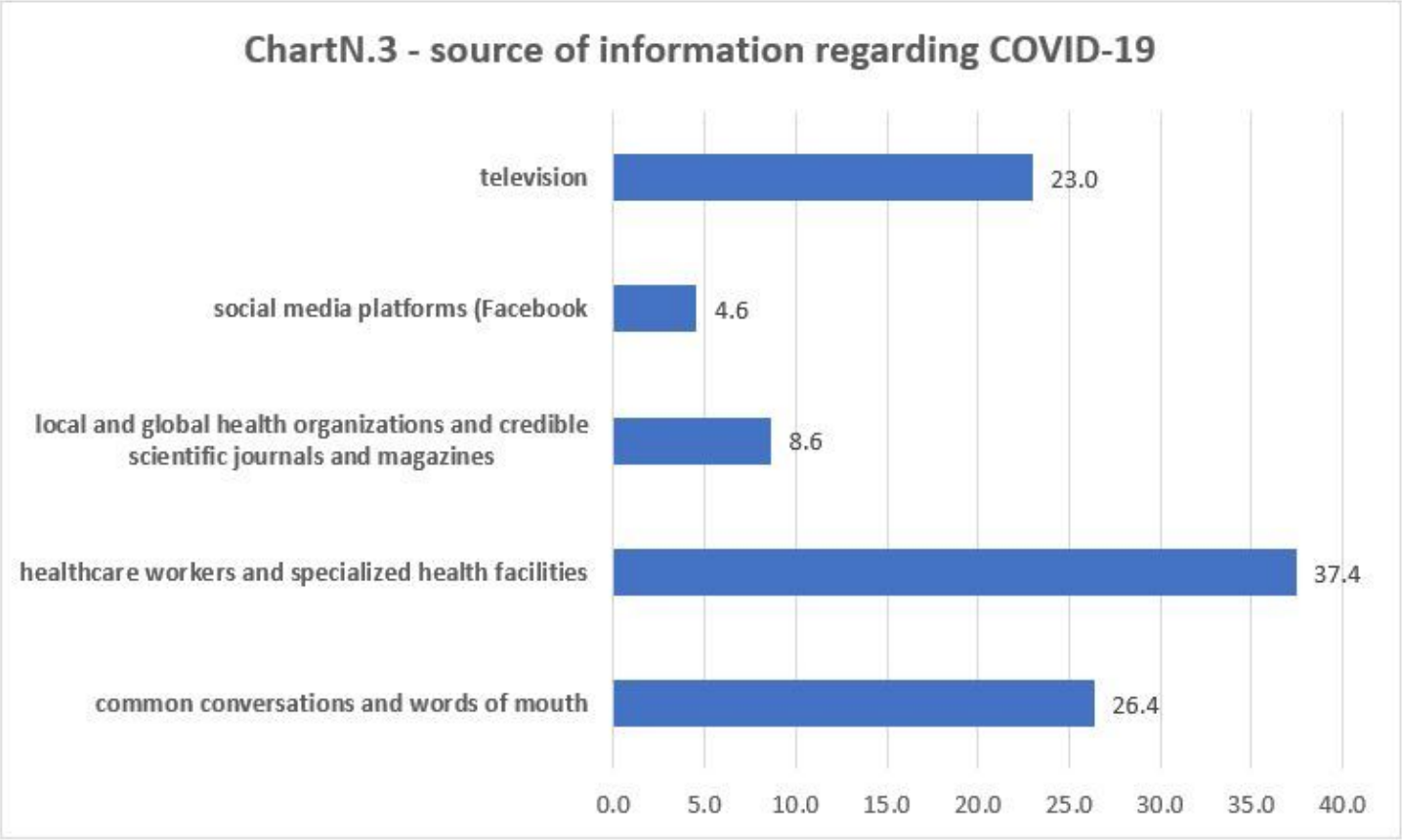

Figure 3

Chart N.3 - source of information regarding COVID-19

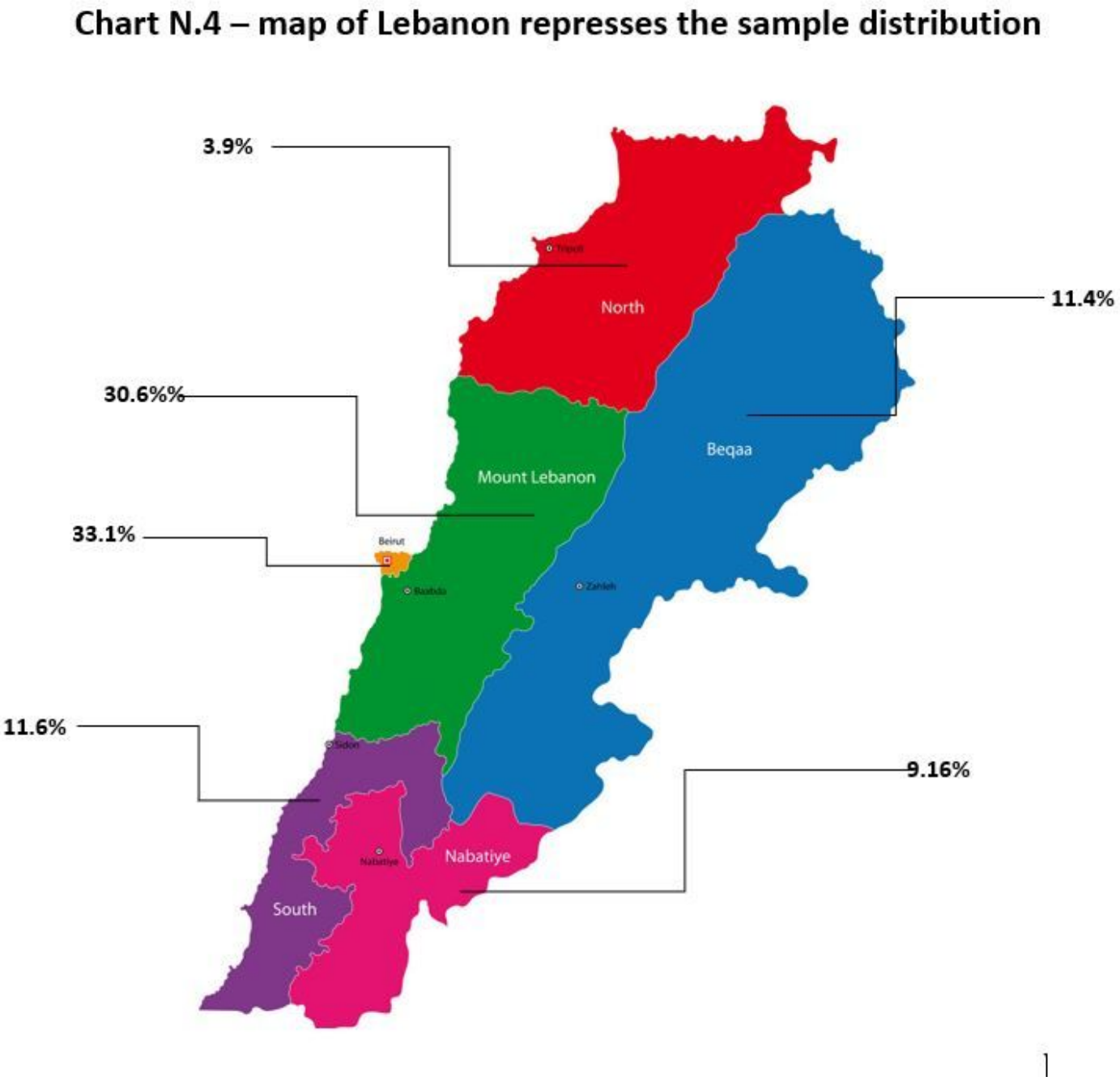

Figure 4

Chart N.4 – map of Lebanon represses the sample distribution