

April 2023

## KNOWLEDGE AND MISCONCEPTIONS AMONG LEBANESE COMMUNITY ON IMMUNIZATIONS

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### Recommended Citation

Ahmadieh, Hala; Safa, Tala; Nahle, Ihab; Obeid, Yahya; Hariri, Dalal; Rawass, Etaf; Kanaan, Tala; and Sabalbal, Ahmad (2023) "KNOWLEDGE AND MISCONCEPTIONS AMONG LEBANESE COMMUNITY ON IMMUNIZATIONS," *BAU Journal - Health and Wellbeing*: Vol. 5: Iss. 2, Article 9.

DOI: <https://doi.org/10.54729/2789-8288.1192>

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# KNOWLEDGE AND MISCONCEPTIONS AMONG LEBANESE COMMUNITY ON IMMUNIZATIONS

## Abstract

Two centuries ago, immunization practices have become the greatest land mark in medical history as they significantly contributed to a decline in several major infectious diseases worldwide thus decreasing both the mortality and morbidity. Moreover, they have been able to eradicate small pox and eliminate poliomyelitis in most regions of the world. However, in recent years the general opinion towards vaccination began shifting due to the emergence of certain opposing views to it, questioning the vaccine's safety and efficacy. This study aims to shed light on the vaccination status in Lebanon by assessing the knowledge, attitude, awareness, and misconceptions among the Lebanese community concerning immunization. This article was a descriptive cross-sectional study that enrolled 388 randomly selected adults in Lebanon. A 23-item questionnaire was distributed among the Lebanese population in Beirut, Mont Lebanon, North, South, Al Bekaa and Al Nabatieh. In total, 388 participants completed the questionnaire. 53.4% were females, and 60% reached the university level. 96.4% agreed to vaccinate their children. 92.5% believed that vaccination protects from diseases, and a significant relationship was found with educational level ( $p=0.026$ ). Moreover, 96.9% believed that vaccination is safe in general, but we didn't find any significant relation with their educational level ( $p=0.13$ ). 73.5% believed that vaccines should not be given in certain health conditions. Only 2.8% thought that vaccination causes learning disabilities like autism with no significant association with educational level ( $p=0.264$ ). 34.6% thought that it shouldn't be given to pregnant women. 3.1% assumed that vaccination can cause chronic illnesses and a significant relation was established with their educational level ( $p=0.01$ ). Furthermore, 8.8% of the participants presumed that natural infection is better than immunization and 15.5% said that better hygiene is actually responsible for decreasing infections and not vaccines. However, both were not significantly related to educational level with ( $p=0.517$ ) and ( $p=0.170$ ), respectively. The Lebanese population's attitude towards immunization was found to be mostly positive with a few misconceptions that didn't seem to affect their vaccination practice. What influenced their practice was their fear of side effects which may be due to untrustworthy sources of knowledge such as media and family members. Therefore, implementing an awareness system regarding vaccination would further improve the Lebanese population's attitude towards this subject.

## Keywords

vaccines, immunization, prevention, infectious diseases, health

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## 1. INTRODUCTION

Over decades, humankind has been striving to create vaccines in order to eradicate infectious diseases, and thus reduce the morbidity and mortality of common communicable diseases. Vaccination, unquestionably, is known to be the cornerstone of public health intervention, which has significantly contributed to a decrease in major illnesses worldwide, preventing 2 to 3 million deaths globally each year (Orenstein & Ahmed, 2017).

Ever since the inception of modern immunization practices two centuries ago, vaccination has been able to eradicate smallpox, eliminate poliomyelitis in most regions of the world, and significantly reduce the morbidity and mortality of various infectious diseases. It was even recognized as the most influential accomplishment of the 20<sup>th</sup> century by The Centers for Disease Control and Prevention (CDC), regarding public health achievements (Czajka et al., 2020).

This protective effect of vaccines is attributed to the individual immunity granted by this practice, and to the overall general protective effect it assures when the majority of the population is immunized. The latter effect is known as herd immunity (Fine et al., 2011).

In recent years, the general opinion towards vaccination began shifting, attributed to the emergence of certain opposing views to it. Questioning vaccines' safety and efficacy became a rather common social topic. One study assessed over 22 papers that reported general attitudes held regarding vaccination in various countries in North America and Europe. The study highlighted how the effectiveness of vaccination programs was hindered by immunization related misconceptions seen in parents and healthcare workers alike; leading in return to a decrease in vaccine uptake and an increase in vaccine hesitancy. (Gualano et al., 2019)

Those decreases in vaccination rates, wherever they took place, were not without consequences. In Nigeria for instance, a drop in immunization against measles was recorded from 81.63% to 52.17%, between the years of 2007 to 2011; which resulted in an increase of cases of measles/1,000,000 population from 0.68 to 16.81 (Umeh & Ahaneku, 2013). Similarly, an increase in measles cases was also seen in both the United States and Europe in recent years, largely attributed to a drop public confidence in the MMR vaccine (Nowicka et al., 2019).

Possible causes for this new trend of vaccine hesitancy were described by various articles, in different regions of the world. A study analyzing the possible factors affecting one's decision regarding vaccination, proved that the willingness to support immunization dropped 8 times lower than usual, especially when participants started to believe that a relationship exists between vaccination and autism. A negative attitude towards vaccination was also seen among participants that relied on family, friends and media as a source of information about immunization. In contrast, the study showed that vaccine acceptance doubles in the group with a higher level of knowledge. It also deems supplying the community with high-quality information as the most important factor in molding positive attitudes, through competent healthcare professionals assuring adequate counselling regarding vaccination, especially by disproving pre-set false beliefs.

On a local level, the research done in Lebanon concerning vaccination habits was rather limited, leaving a gap in the literature. A study however, was done surveying the knowledge, attitude and practice of influenza vaccination among Lebanese parents. It showed that common barriers for the influenza vaccination included low economic status, fear of possible side effects, questioning its effectiveness, lack of recommendation by healthcare professionals, concerns about accessibility, and financial issues (Zakhour et al., 2021). Although those results are directed specifically at the influenza shot, however they might also be reflective of the general attitude of the population towards vaccination at large.

This paper strives to fill the above-mentioned gap. It aims to assess knowledge, attitude, awareness and misconceptions among the Lebanese community concerning immunization. The results obtained would optimally shed light on the vaccination situation in Lebanon, identifying potential barriers, setting the stage for future organized plans targeting the problems if present.

## 2. METHODS

A descriptive cross-sectional study was conducted in Lebanon between January 2019 and January 2020. Ethical approval was obtained from the directors of the health care centers by presenting a formal request from Beirut Arab University Institutional Review Board (BAU IRB) (Approval code: 2019A-0095-M-R-0351). The study included competent Lebanese adults, whose age was above 18 years. Those who fit the inclusion criteria were invited to participate in the study. Participants were selected by convenient sampling from places like malls, streets, restaurants, coffee shops, and supermarkets. Our participants were selected proportionally to the geographic distribution of Lebanese residents, respecting the percentage of people living in each governorate (9% Beirut, 21% North, 19% South, 37% Mount Lebanon, 14% Beqaa). Participants who were willing to participate were asked to sign a written informed consent and were clearly told about their rights to withdraw at any time point during their participation. They were also told about the aims of the study in advance.

In this study, convenient sampling was applied, considering a minimum sample size of 384. This sample size was calculated based on a confidence level of 95%, considering the total population size in Lebanon is estimated to be around 6 million).

After an extensive literature review, scouting studies similar to ours, a questionnaire was designed with the help of a group of experts. This questionnaire took around fifteen minutes to be completed on average. The questionnaire consisted of three main sections. The first section included general basic demographic information about our participants such as age, gender, education, marital status and other important demographic data. The second section tested the knowledge and attitude of our participants towards vaccination. Finally, the last section assessed probable misconceptions that Lebanese people might have had about vaccination.

Subsequently, data was then entered into the Statistical Package of Social Science (SPSS version 25). Analysis was carried out by calculating the mean and standard deviation for continuous variables, and calculating the number and percentage for categorical ones. Continuous variables included items like age. Categorical variables included items like educational level, gender, and work. Throughout the study, chi-square, ANOVA, t-test, as well as exploratory tests were used.

## 3. RESULTS

388 participants were included in the study, out of which 179 (46.1%) were males and 207 (53.4%) were females. Around 60 % had a university degree and around 70 % were employed. 323(83.2%) had an education not related to the medical field and only 8% of the participants work in the medical field. The monthly income varies widely between them. 97(25%) of the participants live in Beirut. 228(58.8%) are single and 66% has no children. Please refer to **Table 1** for more details on basic demographic data.

**Table 1: Basic demographic data of participants**

	Number(%)	
<b>Gender</b>	<b>Male</b>	180 (46.3%)
	<b>Female</b>	208 (53.6%)
	<b>total</b>	388 (100%)
<b>Educational level</b>	<b>Elementary School</b>	7 (1.8%)
	<b>Middle school</b>	39 (10.1%)
	<b>High School</b>	77 (19.8%)
	<b>University</b>	227 (58.5%)
	<b>Higher Education</b>	37 (9.5%)

		Number(%)
<b>Education related to medical field</b>	<b>yes</b>	64 (16.5%)
	<b>no</b>	324 (83.5%)
<b>Work</b>	<b>Employed</b>	277 (71.4%)
	<b>unemployed</b>	103 (26.5%)
	<b>Retired</b>	6 (1.5%)
<b>Work related to medical field</b>	<b>yes</b>	29 (7.5%)
	<b>no</b>	359 (92.5%)
<b>Monthly income range</b>	<b>300-600\$</b>	102 (26.3%)
	<b>601-1000\$</b>	91 (23.5%)
	<b>1001-1500\$</b>	67 (17.3%)
	<b>1501-2500\$</b>	17 (4.3%)
	<b>more than 2500\$</b>	23 (5.9%)
<b>Residence</b>	<b>north</b>	67 (17.3%)
	<b>south</b>	84 (21.6%)
	<b>Beirut</b>	97 (25%)
	<b>Mount Lebanon</b>	83 (21%)
	<b>Beqaa</b>	57 (14.7%)
<b>Marital status</b>	<b>Married</b>	147 (37.9%)
	<b>Single</b>	229 (59.1%)
	<b>Divorced</b>	9 (2.3%)
	<b>Widow</b>	3 (0.8%)
<b>Presence of children</b>	<b>yes</b>	133 (34.3%)
	<b>no</b>	255 (65.7%)

Participants were asked about their personal vaccination history. 200 (51.5%) of the participants mentioned that they have a vaccination card, and around 60% get their vaccines in a private hospital/clinic. 243(62.6%) have gotten their fully recommended vaccinations. However, 80% did not get their yearly influenza shot, and 232(59.8%) of participants mentioned that they do not get the optional vaccines, meaning those that are not mandatory by the standards of the Lebanese Ministry of Public Health.

Regarding the perception of the population towards vaccination, 374 (96.4%) agreed that they would accept vaccinating their children. Among those who did not like to provide vaccines for their children, the main reasons included their belief that the vaccines have side effects, were ineffective, and expensive. Moreover, when asked whether they agree that one should be vaccinated against human papilloma virus, 270 (69.6%) of the population agreed. 375 (96.9%) of the population would recommend vaccination for others. When asked about their source of information about vaccination, the majority 180 (46.4%) mentioned that it is from doctors, and 131 (33.8%) from family. **Table 2** has more details about perception of participants about vaccination and their source of knowledge about immunization.

**Table 2: View on Vaccination and Source of Knowledge**

<b>With vaccination of his/her children</b>	<b>yes</b>	374 (96.4%)
	<b>no</b>	14 (3.6%)
<b>Why not with vaccination of his/her own children</b>	<b>Side effects</b>	7 (38.5%)
	<b>Ineffective</b>	5 (27.5%)
	<b>expensive</b>	4 (22%)
	<b>Religious Reasons</b>	1 (5.55%)
	<b>fear of needle/pain</b>	1 (5.5%)
	<b>Total</b>	18 (100%)
<b>With vaccination against HPV</b>	<b>yes</b>	270 (69.6%)
	<b>no</b>	22 (5.7%)
	<b>I don't know</b>	96 (24.7%)
<b>Recommends for others?</b>	<b>yes</b>	375 (96.6%)
	<b>no</b>	13 (3.4%)
<b>Source of knowledge about vaccination</b>	<b>Media</b>	124 (32%)
	<b>Healthcare profession</b>	67 (17.3%)
	<b>Family</b>	131 (33.8%)
	<b>Friends</b>	32 (8.2%)
	<b>Doctor</b>	180 (46.4%)
	<b>Neighbors</b>	14 (3.6%)
	<b>Books</b>	78 (20.1%)

In this study, several questions were asked to assess the participants' general perception of vaccination. 376 (96.9%) believed that vaccination is safe in general. 359 (92.5%) thought that vaccination protects from diseases. Furthermore, 245 (36.5%) perceived that vaccination could be given to any age groups. 241 (62.3%) believed that vaccines contain attenuated or killed organisms that cause disease. In addition, 343 (88.4%) considered vaccines to have different types. 285 (73.5%) believed that vaccines are not given in certain health complications. Lastly, 263 (68%) thought that vaccines should not be given for children who have flu like symptoms such as fever or cough until they have recovered.

Concerning the misconceptions held by this population towards vaccination, 71 (18.3%) believed that vaccines are not necessary to prevent diseases. 33 (8.5%) thought that vaccination causes serious side effects, 11 (2.8%) thought that it causes learning disabilities and autism, and 28 (7.2%) believed that it always leads to fever. Moreover, 71 (18.3%) thought that vaccines are not worth to be taken given their risk. 55 (14.2%) presumed that getting multiple shots in one visit can increase the immunity against the disease. In addition, 24 (6.2%) assumed that ingredients of vaccines are not safe and 37 (9.5%) believed that vaccines are not tested enough. 12 (3.1%) supposed that vaccines lead to chronic disorders, 84 (21.6%) thought that they don't prevent serious illnesses, and 7 (1.8%) saw that they caused more disease than they prevent. 53 (13.7%), believed that vaccines cannot be given to the elderly, 39 (10.1%) thought it should not be given to infants less than 1 year of age. 134 (34.6%) thought that it should not be given to pregnant women and 215 (55.6%) thought that it should not be given to sick people. Furthermore, 30 (7.7%) of the participants supposed that vaccination weakens immunity, and 32 (8.3%) thought that vaccines

increased the occurrence of allergies. Lastly, 34 (8.8%) of the participants believed that natural infection is better than immunization, and 60 (15.5%) believed that better hygiene is actually responsible for decreasing infections and not the vaccines. Refer to **Table 3** for more details.

**Table 3: Perception and Misconceptions about vaccination**

	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
<b>Vaccination is safe</b>	231 (59.5%)	145 (37.4%)	9 (2.3%)	3 (0.8%)	0
<b>Vaccination Protects from diseases</b>	203 (52.3%)	156 (40.2%)	23 (5.9%)	6 (1.5%)	0
<b>Vaccination can be given for any age</b>	108 (27.8%)	137 (35.3%)	92 (23.7%)	48 (12.4%)	3 (0.8%)
<b>Vaccines contain attenuated or killed organisms that cause the disease</b>	121 (31.3%)	120 (31.0%)	123 (31.8%)	17 (4.4%)	6 (1.6%)
<b>There are different types of vaccines</b>	175 (45.1%)	168 (43.3%)	40 (10.3%)	3 (0.8%)	2 (0.5%)
<b>Vaccines are not given in certain health complications</b>	109 (28.1%)	176 (45.4%)	84 (21.6%)	16 (4.1%)	3 (0.8%)
<b>Vaccines should not be given for children with flu or cough until symptoms are gone</b>	116 (30.0%)	147 (38.0%)	94 (24.3%)	27 (7.0%)	3 (0.8%)
<b>Vaccination is not important for protection from many diseases</b>	14 (3.6%)	57 (14.7%)	56 (14.4%)	187 (48.2%)	74 (19.1%)
<b>Vaccination always cause side effects</b>	6 (1.5%)	27 (7.0%)	89 (22.9%)	206 (53.1%)	60 (15.5%)
<b>Vaccination is not important</b>	15 (3.9%)	56 (14.4%)	80 (20.6%)	174 (44.8%)	63 (16.2%)
<b>Increasing the number of vaccines in one session, increases the immunity of the body against the disease</b>	17 (4.4%)	38 (9.8%)	102 (26.3%)	157 (40.5%)	74 (19.1%)
<b>Vaccines cause increase in body's temperature</b>	36 (9.3%)	166 (42.9%)	126 (32.6%)	50 (12.9%)	9 (2.3%)
<b>Vaccines cause learning difficulties including autism</b>	4 (1.0%)	7 (1.8%)	87 (22.5%)	154 (39.7%)	136 (35.1%)
<b>Vaccines always cause increase in body's temperature</b>	5 (1.3%)	23 (5.9%)	107 (27.6%)	184 (47.4%)	69 (17.8%)
<b>Ingredients of vaccines are not safe</b>	7 (1.8%)	17 (4.4%)	97 (25.0%)	185 (47.7%)	82 (21.1%)
<b>Vaccines are not tested before being used</b>	14 (3.6%)	23 (5.9%)	109 (28.1%)	146 (37.6%)	96 (24.7%)
<b>Vaccination cause chronic diseases</b>	4 (1.0%)	8 (2.1%)	61 (15.7%)	195 (50.3%)	120 (30.9%)

	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
<b>Vaccination doesn't protect against dangerous diseases</b>	16 (4.1%)	68 (17.5%)	79 (20.4%)	138 (35.6%)	87 (22.4%)
<b>Vaccination cause diseases more than protecting from diseases</b>	2 (0.5%)	5 (1.3%)	58 (14.9%)	212 (54.6%)	111 (28.6%)
<b>Don't vaccinate elderly</b>	17 (4.4%)	36 (9.3%)	178 (45.9%)	111 (28.6%)	46 (11.9%)
<b>Vaccines are not given for children below 1 year of age</b>	12 (3.1%)	27 (7.0%)	87 (22.4%)	175 (45.1%)	87 (22.4%)
<b>Vaccines are not given for pregnant women</b>	60 (15.5%)	74 (19.1%)	167 (43.0%)	68 (17.5%)	19 (4.9%)
<b>Vaccines are not given for sick people</b>	70 (18.1%)	145 (37.5%)	115 (29.7%)	45 (11.6%)	12 (3.1%)
<b>Vaccination weakens immunity</b>	6 (1.5%)	24 (6.2%)	98 (25.3%)	175 (45.1%)	85 (21.9%)
<b>Vaccination causes more allergy</b>	8 (2.1%)	24 (6.2%)	136 (35.1%)	162 (41.8%)	58 (14.9%)
<b>Natural infection is better than vaccination</b>	7 (1.8%)	27 (7.0%)	115 (29.6%)	157 (40.5%)	82 (21.1%)
<b>Personal hygiene protects better than vaccination</b>	19 (4.%)	41 (10.6%)	124 (32.0%)	142 (36.6%)	62 (16.0%)

It was noted that there was no significant relationship between educational level and the belief that vaccination is safe ( $p=0.13$ ), however there was a noted significant, weak, and negative correlation between these two ( $r= -0.18$  ( $p\text{-value} <0.001$ )). We discovered a significant relation between educational level and the fact that vaccination prevents from disease ( $p=0.026$ ), and there was a significant, weak, and negative correlation ( $r=-0.145$  ( $p=0.004$ )). Moreover, participants with different educational levels were asked about their perception that vaccination could be given at any age, however, we didn't find any significant relationship ( $p=0.839$ ). Regarding the fact that vaccines contain attenuated or killed organisms that cause the disease and its relationship with the different educational level, there was a significance noted ( $p=0.005$ ), and there was a tendency for a significant, weak, and negative correlation between them ( $r= -0.216$  ( $p<0.001$ )). Furthermore, no significant association was found between educational level and that vaccines are not given in certain health complications ( $p=0.83$ ). In addition, the misconception about vaccination always causing side effects is not significantly related to the different educational levels ( $p=0.527$ ). We discovered a significant association between educational level and the misconception that increasing the number of vaccines in one session increases the immunity of the body against the disease ( $p=0.003$ ), with a tendency for a weak, significant, and positive correlation which means that the percentage of people with this misconception increases with educational level ( $r=0.1$  ( $p=0.049$ )). Also, we didn't find any significant affiliation between educational level and the misconceptions about vaccines causing learning difficulties like autism and it being unsafe, with ( $p=0.264$ ) and ( $p=0.772$ ) respectively. Whereas a significant relationship was established between the perception that vaccination causes chronic diseases and educational level ( $p=0.01$ ). Finally, no significant relation existed between educational level and the different misconceptions that vaccines should not be given to pregnant women ( $p=0.344$ ), or that they're a cause for more allergic conditions ( $p=0.454$ ). Refer to **Table 4** for more information.

**Table 4: Perception of People towards Vaccination with Respect to their Education Level**

vaccines	Elementary school	Middle school	High school	University	Higher education	p-value	Correlation and significance
<b>Vaccination is safe</b>	7 (100%)	38/39 (97%)	74/77 (96%)	219/227 (96%)	24/37 (64.8%)	0.130	-0.18 (p-value <0.001)
<b>Vaccination protects from diseases</b>	6/7 (85.7%)	35/39 (89.7%)	72/77 (93.5%)	211/227 (92.9%)	34/37 (91.8%)	0.026	-0.145 (p-value 0.004)
<b>Vaccination can be given to any age</b>	5/7 (71.4%)	25/39 (64.1%)	49/77 (63.6%)	141/227 (62.1%)	24/37 (64.8%)	0.839	-0.26 (p-value 0.608)
<b>Vaccines contain attenuated or killed organisms that cause the disease</b>	3/7 (42.8%)	15/39 (38.4%)	40/77 (51.9%)	152/227 (66.9%)	30/37 (81%)	0.005	-0.216 (p-value <0.001)
<b>Vaccines are not given in certain health complications</b>	5/7 (71.4%)	28/39 (46.1%)	56/77 (72.7%)	169/227 (74.4%)	27/37 (72.9%)	0.830	-0.06 (p-value 0.241)
<b>Vaccines should not be given for children with flue or cough until symptoms are gone</b>	5/7 (71.4%)	29/39 (74.3%)	54/77 (70.1%)	146/227 (64.3%)	29/37 (78.3%)	0.589	-0.02 (p-value 0.694)
<b>Vaccination always causes side effects</b>	0%	4/39 (10.2%)	8/77 (10.3%)	17/227 (7.4%)	4/37 (10.8%)	0.527	0.09 (p-value 0.075)
<b>Increasing the number of vaccines in one session increases the immunity of the body against the disease</b>	3/7 (42.8%)	6/39 (15.3%)	17/77 (22%)	26/227 (11.4%)	3/37 (8.1%)	0.003	0.1 (p-value 0.049)
<b>Vaccines cause learning difficulties including autism</b>	0%	2/39 (5.1%)	0%	7/227 (3%)	2/37 (5.4%)	0.264	0.07 (p-value 0.171)
<b>Ingredients of vaccination are not safe</b>	1/7 (14.2%)	4/39 (10.2%)	3/77 (3.8%)	15/227 (6.6%)	1/37 (2.7%)	0.772	0.052 (p-value 0.31)
<b>Vaccines cause chronic diseases</b>	1/7 (14.2%)	2/39 (5.1%)	3/77 (3.8%)	6/227 (2.6%)	0%	0.010	0.097 (p-value 0.056)
<b>Vaccines are not given for pregnant women</b>	2/7 (28.5%)	12/39 (30.7%)	34/77 (44.1%)	76/227 (33.4%)	10/37 (27%)	0.344	0.046 (p-value 0.369)
<b>Vaccination causes more allergy</b>	0%	4/39 (10.25%)	7/77 (9%)	17/227 (7.2%)	4/37 (10.8%)	0.454	0.04 (p-value 0.431)
<b>Personal hygiene protects better than vaccination</b>	2/7 (28.5%)	8/39 (20.5%)	19/77 (24.6%)	29/227 (12.7%)	2/37 (5.4%)	0.170	0.138 (p-value 0.007)
<b>Natural infection is better than vaccination</b>	2/7 (28.5%)	4/39 (10.2%)	10/77 (12.9%)	16/227 (7%)	2/37 (%)	0.517	0.107 (p-value 0.036)

#### 4. DISCUSSION

The aim of this study is to know about the Lebanese population's attitude and knowledge regarding vaccination, and to show the prevalence of misconceptions about that topic within this group. Surveys were distributed to participants in Lebanon's five main governorates (North, South, Beirut, Beqaa and Mount Lebanon). This study showed that 96% of parents would vaccinate their children. However, refusing vaccination has become a sort of a trend recently. Out of the 388 participants, 18 (3.6%) did not feel the need to vaccinate their children, which was mainly due to fear of side effects (38.5%), a feeling that the vaccine would be ineffective (27.5%), or expensive (22%). This is comparable to a study done in England, which also showed that (21.7%) of parents fear the side effects, thus refuse to vaccinate their children (Smith et al., 2017).

The fear of side effects is one of the main misconceptions people have towards immunization, as 8.5% of participants agreed that vaccines always cause side effects. This fear was also shown in another study done in Lebanon, where 47% of the participants agreed that the influenza vaccine causes side effects (9). These supposed feared side effects include fever, as 7.2% of our participants believed that vaccines always cause fever, a considerably lesser percentage than the previously mentioned Lebanese study (86%) (Zakhour et al., 2021).

Moreover, 3.1% of participants believed that vaccines cause chronic diseases, considerably less than in other studies where percentages were about 16% (Sebastian & Ravi, 2017).

Furthermore, 2.8% of the participants also reported a concern that vaccines cause autism and learning disabilities, a concern also seen in more than 50% of parents in a survey done at the Autism Society of America back in the year 2000 (Roberts & Harford, 2002). However, it is important to note that the link between MMR vaccines and autism has repeatedly been disproved in other studies (Taylor & Eslick, 2014).

18.3% of participants believed that vaccination is not important for protection from many diseases, the percentage was close to a study done in Jordan which showed that 17.6% of their participants disagreed that immunization protects their children from diseases (Masadeh et al., 2014)

Also, 7.7% believed that vaccination weakens the immunity, whereas around 45% reported that vaccination overloads their immune system in a survey done in England (Roberts & Harford, 2002).

Vaccine safety was also a topic of concern. It's important to note that the majority of our participants agreed that vaccination is safe. However, 6.2% believed that vaccine ingredients are unsafe, while in the USA this percentage was considerably higher and approached 26% in the parent population used (Kennedy et al., 2011). 9.5% also believed that vaccines are not tested well before being used, then again with the percentage being higher (17%) in the same study mentioned earlier (Kennedy et al., 2011).

Moreover, it's a must to note that a considerable part of participants said that media (32%) and family (about 34%) are the sources of knowledge when it comes to vaccination, this can be compared with a study done in Poland which found that 65% of participants have the media as the main source of information regarding immunization followed by family and friends 19% (Czajka et al., 2020). While healthcare professionals may carry a vital role in convincing patients of the importance and safety of vaccinations leading to better outcomes (Czajka et al., 2020).

A study done in the American state of Connecticut showed the presence of disparities in immunization of children among various areas with different socioeconomic statuses, with under-immunization being related to a poor socioeconomic status (Kennedy et al., 2011). However in Lebanon there wasn't a relationship found connecting low economic status directly to unfavorable attitudes toward vaccination.

Additionally, a significant weak correlation was found between the educational level of our participants and the fact that vaccination prevents from diseases. However, vaccination rates were higher in children with higher educated parents in Istanbul (Torun & Bakirci, 2006).

## 5. CONCLUSION

In conclusion, the Lebanese population's attitude towards vaccination was found to be generally positive with the presence of few misconceptions that didn't affect their positive attitude in a drastic way. The main reason found for vaccine refusal was the fear of side effects, which may originate from untrustworthy sources of information like media (32%) and families (34%). Therefore, implementing an awareness system that aims to spread correct trusted information about immunization, as well as training practitioners to encourage patients towards vaccination, would further improve the Lebanese population's attitude toward this subject.

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