

KNOWLEDGE, ATTITUDE AND ACCEPTANCE OF PARENTS TOWARDS COVID-19 VACCINATION FOR CHILDREN UNDER 12 YEARS OF AGE

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ABSTRACT

Introduction: The Covid-19 had a significant impact on the health of both adults and children; the number of cases and deaths among children was quite high. It was acknowledged that vaccines were the most effective way to prevent the Covid-19. The parents have expressed their interests in the Covid-19 vaccination campaign for children aged from 5 to 11 years of age. The research purposes were: 1) To determine parents' acceptance rate of the Covid-19 vaccination for children aged from 5 to 11 years of age; 2) To investigate knowledge and attitudes of parents about the Covid-19; 3) To examine association among information, knowledge, and attitudes of parents towards the Covid-19 vaccination for children aged from 5 to 11 years of age.

Methods: A cross-sectional descriptive survey was conducted on 388 parents with children aged from 5 to 11 years of age; undertaking online self-report format from May to July, 2022. Data analysis, using SPSS 25.0 software, analytic statistics with Binary logistic, odds ratio (OR) and 95% confidence interval were used to report the relationships

Results: The acceptance rate for children receiving the Covid-19 vaccine was 72.4%. Parents with knowledge and attitudes were at the moderate level, accounting for 56.7% and 52.3%, respectively. In all three knowledge levels, the parents who gave incorrect answers were nearly 50% of the questions: "the Covid-19 vaccine should be given alone and not combined with other vaccines; reduce the effect on which cases; future health problems; the relationship between

influenza vaccine and Covid-19". For attitudes, there were parents who choose "no" accounting for nearly 50% of all the sentences: "If the vaccine is not available in Vietnam, you are able to ask for it from another country which has it; and accept to participate in vaccine testing trial, voluntary". Parents with high knowledge and high attitudes accounted for high rates of vaccination acceptance for their children (OR = 0.081; 95% CI: 0.033 - 0.201; OR = 0.023; 95% CI: 0.009 - 0.059 with $p < 0.05$).

Recommendations: In order to increase level of knowledge of the people/parents, closed coordination among organizations was required: 1) Experts needed to provide more in-depth materials on Covid-19 and Covid-19 vaccines; 2) Medical staffs needed to organize more communication sessions - health education, provide easy-to-understand and easy-to-remember documents, official websites to help them access easily; 3) Educators should incorporate emerging infectious diseases in general, and Covid-19 in particular, for references into teaching contents; 4) Further research should be conducted to broaden population who do not have the ability to approach the internet access to take the survey

Key word: Knowledge, attitude, acceptance of Covid-19 vaccination

I. INTRODUCTION

In January, 2020, a new strain of Corona virus (SARS-CoV-2) caused an acute respiratory infection in Wuhan, China. Corona virus has spread across continents and complicated evolution with numerous variants: Alpha, Beta, Gamma, Delta, Omicron, and the most recent variant was BA.4, BA.5. By July 31rd, 2022, the world had 576,816,688 infected people, and 6,399,498 deaths; Vietnam had 10,778,1547

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infected people, and 43,093 deaths [8]. In September, 2022, according to the American Academy of Pediatrics and the Children's Hospital Association reports, the number of children infected by Covid-19 updated in 49 countries was 14,777,067 [6]. To reduce the number of infections and deaths, the World Health Organization recommends many preventive strategies, among which vaccines were recommended as the optimal one, helped to create a protective barrier against Corona virus. On April 14th, 2022, Vietnam began to administer the Covid-19 vaccine to children aged 5 - 11 years old. Yet, many parents still hesitated to accept for their children to receive injections. They concerned about effectiveness of the vaccine, side effects of the drug on the child's body. The research aims: 1) To determine parents' acceptance rate of Covid-19 vaccination for children aged from 5 to 11 years of age; 2) To investigate knowledge and attitudes of parents about the Covid-19; 3) To examine association among information, knowledge, and attitudes of parents towards the Covid-19 vaccination for children aged from 5 to 11 years of age.

II. RESEARCH SUBJECTS AND METHOD

2.1. Research design: Cross-sectional survey

2.2. Sample size: 382 parents with children aged 5 - 11 years old, were recruited through convenient sampling process.

2.3. Inclusion criteria: Parents of children aged 5 - 11 years old living in Vietnam; had the ability to read and understand; using devices connected to the Internet.

2.4. Exclusion criteria: Children with doctor's diagnosis of contraindications to the

Covid-19 vaccination (history of anaphylaxis to the vaccine or components of the Covid-19 vaccine)

2.5. Data collection: Data were collected online, using Google Form software. The data collection period was from May to July, 2022.

2.6. Data collection tools: The questionnaire Zawahrah (2021) [3] was used and its layout was adjusted to match the research objectives. The questionnaire had 65 questions, divided into four parts: 1) Part A of 15 questions: Demographic data (parents and children); 2) Part B of 33 questions: Knowledge related to the Covid-19 and Covid-19 vaccine; 3) Part C of 16 questions: Attitudes related to the Covid-19 vaccines; and 4) Part D of one question: Acceptance for children to receive the Covid-19 vaccine.

Measurements: In terms of knowledge, each correct answer was counted one point. The highest possible score was 33, and the lowest possible score was 0. There were three levels of knowledge: 1) Low level: from 0 - 11 scores; 2) Moderate level: from 12 - 22 scores; and 3) High level: from 23 - 33 scores. According to attitudes, each answer "Yes" was counted for one point, and zero point for the answer "No/ Don't know". The question 53 and question 63 were reversed questions, which means the answer "No" was counted one point. "Yes/ Don't know" answer was zero point. Scores are ranged from zero to 16. The attitude score was divided into three levels: 1) Low level: from 0 to 5 scores; 2) Moderate level: from 6 to 11 scores; and 3) High level: from 12 to 16 scores [3]

2.7. Content validity and reliability: The questionnaire was translated into Vietnamese according to the translation model of Doris (2004) [2]. To ensure the content validity

(CVI), the questionnaire was sent to six experts in infectious diseases with I-CVI > 0.96; and S-CVI/Ave \geq 0.97. The internal consistency rating with the Cronbach's alpha of knowledge section was 0.85; and the attitude section was 0.71.

2.8. Data analysis: The SPSS 25.0 software was undertaken. Descriptive statistics was used to report variables related to demographic data of parents and children, knowledge, attitude and acceptance of parents towards the Covid-19 vaccine.

Analytic statistics with Binary logistic, odds ratio (OR) and 95% confidence interval were used to report the relationships.

2.9. Ethics considerations: Ethical approval was achieved by the ethics committee in biomedical research, the University of Medicine and Pharmacy at Ho Chi Minh City, Decision No. 446/HĐĐ-ĐHYD dated May 9th, 2022. The research ensured voluntary consent of participants, confidentiality, and the research results were used for research purposes only.

III. RESULTS

3.1. Participant characteristics

Table 3.1. Parents characteristics

| Characteristics | n | Ratio (%) |
|---|-------------------|------------------|
| <i>Relationships with children</i> | | |
| Father | 126 | 32.5 |
| Mother | 262 | 67.5 |
| <i>Age*</i> | 36.99 \pm 5.992 | (23 - 59) |
| <i>Age group</i> | | |
| \leq 30 | 47 | 12.1 |
| 31 - 40 | 233 | 60.1 |
| \geq 41 | 108 | 27.8 |
| <i>Academic level</i> | | |
| From university and up | 260 | 67.0 |
| College | 84 | 21.6 |
| High School and below | 44 | 11.3 |
| <i>Job</i> | | |
| Medical staff | 83 | 21.4 |
| other jobs | 305 | 78.6 |
| <i>Living area</i> | | |
| City | 295 | 76.0 |
| Countryside | 93 | 24.0 |
| <i>Regions</i> | | |
| North | 40 | 10.3 |
| Centre | 61 | 15.7 |
| South | 287 | 74.0 |
| <i>Popular sources of information</i> | | |
| Social Network | 217 | 55.9 |
| Scientific article | 38 | 9.8 |
| Medical staff | 57 | 14.7 |
| TV, radio, ... | 76 | 19.6 |
| <i>Number of people living together/family</i> | | |
| \leq 3 | 68 | 17.5 |

| Characteristics | n | Ratio (%) |
|--|-----|-----------|
| 4 | 170 | 43.8 |
| ≥ 5 | 150 | 38.7 |
| Children aged 5 - 11 years old/family | | |
| 1 child | 263 | 67.8 |
| 2 children | 117 | 30.2 |
| ≥ 3 | 8 | 2.1 |
| Family has been infected with Covid-19 | | |
| Yes | 317 | 81,7 |
| No | 71 | 18,3 |
| Family with underlying medical conditions | | |
| Yes | 76 | 19.6 |
| No | 312 | 80.4 |

*Average ± standard deviation, (minimum value - maximum value)

Table 3.2. Children characteristics

| Characteristics | n | Ratio (%) |
|--|-----|-----------|
| Children with underlying medical conditions | | |
| Yes | 12 | 3.1 |
| No | 376 | 96.9 |
| Children who are taking medications for chronic diseases/immunosuppressants | | |
| Yes | 6 | 1.5 |
| No | 382 | 98.5 |
| Children who have had their nose and throat swabbed | | |
| Yes | 279 | 71.9 |
| No | 109 | 28.1 |
| Children who have been infected with Covid-19 | | |
| Yes | 193 | 49.7 |
| No | 195 | 50.3 |

3.2. Knowledge, attitude and acceptance of Covid-19 vaccination for children

Table 3.3. Knowledge, attitude and acceptance of Covid-19 vaccination for children

| Characteristics | n | Ratio (%) |
|--|-----|-----------|
| Knowledge | | |
| Low | 30 | 7.7 |
| Moderate | 220 | 56.7 |
| High | 138 | 35.6 |
| Attitude | | |
| Low | 49 | 12.6 |
| Moderate | 203 | 52.3 |
| High | 136 | 35.1 |
| Acceptance of Covid-19 vaccine for children aged 5 - 11 years old | | |
| Yes | 281 | 72.4 |
| No | 107 | 27.6 |

Parents who have a moderate knowledge is 56.7%, the highest percentage compared to the high level is 35.6%, and the low level of 7.7%. Parents have a moderate attitude of 52.3%, the highest percentage compared to the high level of 35.1% and the low level of 12.6%. The percentage of parents who accept to give their children the Covid-19 vaccine is 72.4%, and the group of parents who do not accept the vaccination is 27.6%.

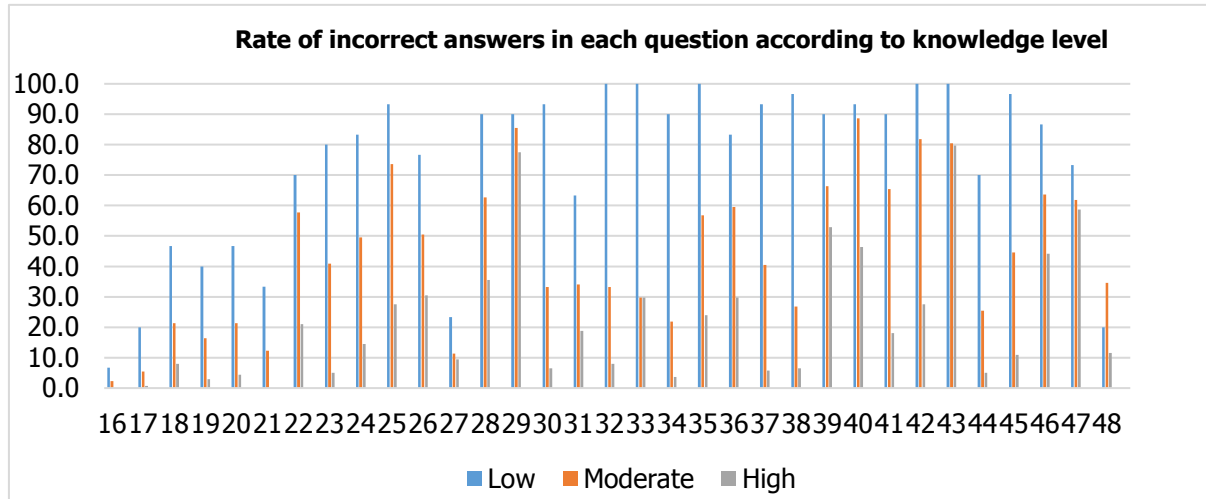


Chart 3.1. Rate of incorrect answers in each question according to knowledge level

Most of the 3 levels of knowledge (low, moderate and high) have parents answer incorrectly. Notably, the rate of incorrect answers is nearly 50% of all 3 levels of knowledge, which focuses on question 29, "Do you think corona vaccine should be given alone and not combined with other vaccines?" with the ratio of 90%, 85.5%, 77.5% respectively; question 39 is "Do you think that the effect of vaccine will be less in smokers?" with the ratio of 90%, 66.4%, 52.9% respectively; Question 40 is "Do you think corona vaccine could cause chronic health problems?" with rates of 93.3%, 88.6%, 46.4%, respectively; question 43 is "Do you think influenza vaccine can prevent the corona infection?" with rates of 100%, 80.5%, 79.7%, respectively.

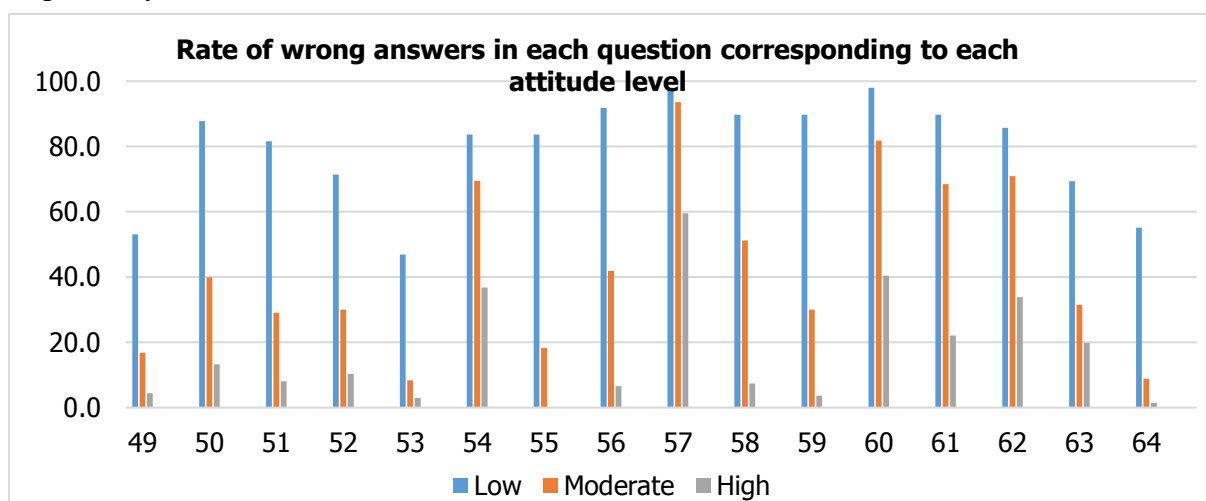


Chart 3.2. Rate of wrong answers in each question corresponding to each attitude level

Most of the 3 levels of attitude (low, moderate, high), there were parents who answered “No”. Notably, the response rate is not close to 50% in all 3 attitude levels, focusing on the question 57, "If the vaccine is not available in Vietnam, would you ask for it from another country which has it?" with the rate of 98%, 93.6%, 59.6% respectively; the question 60 is "Would you accept to participate in voluntary vaccine trial,?" with rates of 98%, 81.8%, and 40.4%, respectively.

3.3. The relationship between

demographic data and acceptance of Covid-19 vaccination for children aged 5 - 11 years old

The relationship between demographic data and parents' acceptance of children aged 5-11 years old to receive the Covid-19 vaccine was not statistically significant, with $p > 0.05$.

3.4. The relationship between knowledge, attitude and acceptance of the Covid-19 vaccination for children aged 5 - 11 years old

Table 3.4 The relationship between knowledge, attitude and acceptance of the Covid-19 vaccination for children aged 5 - 11 years old

| Characteristics | Acceptance | | OR (KTC 95%) | Value p |
|--|--------------|-------------|-----------------------|---------|
| | Yes n (%) | No n (%) | | |
| Knowledge related to the Covid-19 | | | | |
| Low | 9 (30) | 21 (70) | 1 | |
| Moderate | 156 (70.9) | 64 (29.1) | 0.176 (0.076 - 0.405) | 0.000 |
| High | 116 (84.1) | 22 (15.9) | 0.081 (0.033 - 0.201) | 0.000 |
| Attitude towards the Covid-19 vaccine | | | | |
| Low | 13 (26.5) | 36 (73.5) | 1 | |
| Moderate | 140 (69) | 63 (31) | 0.163 (0.081 - 0.327) | 0.000 |
| High | 128 (94.1) | 8 (5.9) | 0.023 (0.009 - 0.059) | 0.000 |

Binary Logistic

The acceptance rate for children to receive the Covid-19 vaccines in the group of parents with high knowledge is higher than that of the moderate knowledge group and the low knowledge group. In particular, the acceptance rate for children to receive the Covid-19 vaccine in the moderate knowledge group is 0.176 times higher than the low knowledge group; the high knowledge group is 0.081 times higher than the low knowledge group. The difference was statistically significant (OR = 0.176; KTC 95%: 0.076 - 0.405; OR = 0.081; KTC 95%: 0.033 - 0.201 with $p < 0.05$).

The acceptance rate for children to receive the Covid-19 vaccines in the group of parents with high attitude is higher than that of the moderate knowledge group and the low knowledge group. In particular, the acceptance rate for children to receive the Covid-19 vaccine in the moderate attitude group is 0.163 times higher than the low attitude group; the high attitude group is 0.023 times higher than the low attitude group. The difference was statistically significant (OR = 0.163; KTC 95%: 0.081 - 0.327; OR = 0.023; KTC 95%: 0.009 - 0.059, with $p < 0.05$).

IV. DISCUSSION

4.1. Participant characteristics

4.1.1. Parent characteristics

The mean age of parents was 37 (31 - 43). The majority of parents participating in the study were mothers. This might be caused by the main role of child care of women in the Vietnamese families. Parents with university education or higher were at the highest percentage. Parents must have some knowledge of information technology to do online surveys. So, people with low education might have difficulties to access the survey link. Parents working in the medical field counted for one-fifth of the participants. This might be caused by the interest of health workers towards the Covid-19 epidemic. Participants came from all three regions of Vietnam. Parents mainly accessed information related to the Covid-19 from social networks since various information was available, quick and easy to access. Families infected with the Covid-19 counted for a higher proportion than those who were not. This might be explained by the number of infections in Vietnam, which increased dramatically from 17,727 to 1,714,743 cases from July to December, 2021. The data were collected after the epidemic peaked.

4.1.2 Children characteristics

Children with underlying medical conditions, who were taking drugs for chronic diseases/immunosuppressants had a much lower rate than children without underlying medical conditions. The majority of children who have ever had a nose-and-throat swab for Corona virus counted for a much higher percentage than children who have never had a nose-and-throat swab. Nearly half of the children were infected with the Covid-19. The results were

completely consistent with the situation of the Covid-19 epidemic from August to September, 2021 in Vietnam. When the Covid-19 epidemic broke out strongly across the country, the number of people infected with the Covid-19 increased significantly at that time. The Government had not provided the Covid-19 vaccine to children, so it was inevitable that children had Covid-19 or a nose-throat swab.

4.2. Knowledge, attitude and children's acceptance of Covid-19 vaccination

Parents had a moderate knowledge of 56.7%, taking for the highest percentage when compared to the group of high and low level. Parents had moderate attitude of 52.3%, taking the highest percentage when compared to the group of high and low level. The findings differed from Yoseph et al. (2021). Knowledge, attitudes, and practices related to the Covid-19 pandemic among adult population in Ethiopia were 1,278 Ethiopian adults. The percentage of people with good knowledge was 90%, and the percentage of people with a positive attitude was 82.4% [1]. In this study, the participants accessed information of the Covid-19 and the Covid-19 vaccine from social networks. From that, the accessed information was not accurate sometimes. Thus, it might lead to low knowledge and attitudes about the Covid-19 vaccines.

There were 72.4% of parents who agreed to give their children the Covid-19 vaccine. Soo-Han Choi (2021) discovered that 64.2% of parents intended to give their children injections [5]. According to the research, parents' acceptance rate for the Covid-19 vaccines was also relatively high, which was completely consistent with the current global and Vietnamese epidemic situation. The Covid-19 epidemic remained complicated in

the community despite the fact that social distancing directives had been nearly abolished in many countries. People returned to their "new normal" condition of living and working that all children return to school, and thus children required vaccinations to help their bodies develop antibodies against the Covid-19.

4.3. The relationship between background information and children's acceptance of Covid-19 vaccination

The relationship between background information and parents' acceptance of children to receive the Covid-19 vaccine was not statistically significant with $p > 0.05$. This finding was similar to Al-Qerem (2022) [7], Hassan J Zawahrah (2021) [3], but different from Nguyen Thi Ha et al (2022), which was conducted on 15,245 parents with children aged 5-11 years of age in Hanoi [4]. The reason for this could be that our sample size and the above authors were much smaller than Nguyen Thi Ha's study.

4.4. The relationship between knowledge, attitude and children's acceptance of the Covid-19 vaccination

The relationship between knowledge, attitude and acceptance for children receiving the Covid-19 vaccine is statistically significant with $p < 0.05$. If parents' knowledge and attitude are high, the acceptance rate for children receiving the Covid-19 vaccine is high. The results are consistent with a number of studies in the world conducted on people and parents [3], [7]. This shows that, when parents are provided with full information related to the Covid-19 by experts. Especially, the information about the Covid-19 vaccines for children, they will feel secure and accept children to receive higher Covid-19 vaccines.

V. CONCLUSION - RECOMMENDATIONS

The acceptance rate for children receiving the Covid-19 vaccine was 72.4%. Parents with moderate knowledge and attitudes accounted for the majority of 56.7% and 52.3%. Parents with high knowledge and high attitudes were more likely to accept the Covid-19 vaccination for their children ($p < 0.05$). Based on these findings, it was suggested that collaboration between organizations was required to increase the knowledge level of parents: 1) Experts should provide more scientific evidence about Covid-19 vaccines, particularly on children. 2) Health care providers should organize Communication - Health education sessions related to the Covid-19, so that it is easy-to-understand, easy-to-remember documents, and easy-to-access official website; 3) Educators should incorporate emerging infectious diseases in general, and Covid-19 in particular, for references into teaching contents; 4) Further research should be conducted to broaden population who do not have the ability to approach the internet access to take the survey

VI. ACKNOWLEDGEMENT

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REFERENCES

- 1. Amanuel Yoseph, Alemu Tamiso, Amanuel Ejeso (2021)**, Knowledge, attitudes, and practices related to COVID-19 pandemic among adult population in Sidama Regional State, Southern Ethiopia: A community based

- cross-sectional study, Plos One, 2021, 16 (1), pp. 1-19, doi: 10.1371/journal.pone.0246283
2. **Doris S F Y, Diana T F L, Jean W (2004)**, Issues and challenges of instrument translation, Western journal of nursing research, 2004, 26 (3), pp. 307-320
 3. **Hassan J Zawahrah, Hanan Sacahazboun, and Shatha S Melhem (2021)**, Acceptance of COVID-19 vaccines in Palestine: a cross-sectional online study, BMJ Open, 2021, 11 (10), pp. 1-9, doi: 10.1136/bmjopen-2021-053681
 4. **Nguyễn Thị Hà, Ngô Văn Lăng, Đặng Hùng Dũng và cộng sự (2022)**, Chấp nhận của cha/ mẹ cho trẻ từ 5 - 11 tuổi tiêm vắc xin phòng Covid-19 tại các quận nội thành thành phố Hà Nội và một số yếu tố liên quan năm 2022, Tạp chí Y học Việt Nam, 2022, 512 (2), pp. 71-77
 5. **Soo-Han Choi, Yoon Hee Jo, Kyo Jin Jo, et al. (2021)**, Pediatric and Parents' Attitudes Towards COVID-19 Vaccines and Intention to Vaccinate for Children, Jkms, 2021, 36 (31), pp. 1-12, doi: 10.3346/jkms.2021.36.e227
 6. **The American Academy of Pediatrics and the Children's Hospital Association (2022)**, Children and COVID-19: State Data Report, Version: 9/29/2022, pp. 1-25, <https://downloads.aap.org/AAP/PDF/AAP%20and%20CHA%20-%20Children%20and%20COVID-19%20State%20Data%20Report%209.22.22%20FINAL.pdf>
 7. **Walid Al-Qerem, Abdel Qader Al Bawab, Alaa Hammad (2022)**, Parents' attitudes, knowledge and practice towards vaccinating their children against COVID-19: a cross-sectional study, Human vaccines & immunotherapeutics, 2022, 18 (5), pp. 1-10
 8. **World Health Organization (2022)**, Coronavirus (COVID-19) Dashboard, 2022, <https://covid19.who.int/>