

Parental knowledge, attitude, and practice towards COVID-19 vaccination for children aged 6 to 11 years

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Abstract

Background The COVID-19 pandemic significantly impacted the well-being of both adults and children, leading to a high number of cases and fatalities among the younger population. Acknowledging the effectiveness of vaccination in preventing COVID-19, parents have shown keen interest in the vaccination campaign for children aged 6 to 11 years.

Objective To evaluate parents' knowledge, attitude, and practices towards COVID-19 vaccination for children aged 6 to 11 years. **Methods** This descriptive, cross-sectional study included 262 parents of children aged 6 to 11 years, conducted via an online self-reported survey from February to May 2023. Parents' knowledge, attitudes, and practices towards COVID-19 vaccination were assessed using a questionnaire with 14 true/false knowledge items (maximum score: 14), a 10-item Likert scale for attitudes (maximum score: 50), and nine practice questions (maximum score: 9).

Results Good knowledge was shown by 30.2% of participants, while good attitude was demonstrated by only 15.6%. The majority of participants demonstrated good practice at 62.2%. Most participants had a moderate level of knowledge and attitude, at 46.2% and 76.3%, respectively. Knowledge was moderately correlated with practice ($r=0.333$; $P=0.001$), as was attitude and practice ($r=0.432$; $P=0.001$). Good knowledge was significantly associated with higher income (OR 2.2; 95%CI 1.08 to 4.61; $P=0.03$) and higher education (OR 3.2; 95%CI 1.47 to 7.07; $P=0.003$).

Conclusion The majority of participants demonstrated good practice, while their knowledge and attitude levels were moderate. Education emerged as a significant factor influencing good knowledge. [Paediatr Indones. 2025;65:197-206; DOI: <https://doi.org/10.14238/pi65.3.2025.197-206>].

Keywords: COVID-19; children; vaccination; parents

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged globally in late 2019. The number of cases increased in the months and years that followed.¹ The virus has undergone multiple mutations throughout the years.² Various vaccines against SARS-CoV-2 have been developed. Vaccination is important for reducing the risk of infection and preventing severe symptoms in most vaccinated patients.^{3,4}

Indonesia began its coronavirus vaccination program in early 2021, following recommendations from the Ministry of Health. The program was rolled out in several phases, starting with healthy adults. However, it was not until December 2021 that the Indonesian Pediatric Society (IDAI) published a recommendation to include school-aged children, specifically those between 6 and 11 years, in the COVID-19 vaccination program.⁵

Most children with COVID-19 infection remain asymptomatic or only exhibit mild symptoms. Nonetheless, post-infection effects may be long-lasting

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and can severely impact the children's future health, particularly in cases of multisystem inflammatory syndrome in children (MIS-C).⁶ Children with comorbidities are also at an increased risk of hospitalization and death.⁴ Children are therefore an important population to vaccinate. In Indonesia, COVID-19 vaccination became a requirement for the reopening of face-to-face school activities.⁵

Parents and guardians make important decisions about children's lives, including their health and medical care. Misinformation and exaggeration of the risks and side effects of COVID-19 vaccination spread amongst parents could interfere with their decisions. In many instances, parents and guardians were divided as to whether they would want their children to be vaccinated.^{7,8} This study aimed to evaluate parents' knowledge, attitude, and behavior towards the COVID-19 vaccination program for children aged 6-11 years.

Methods

Between February and May 2023, a cross-sectional study was conducted in Jakarta and cities within its proximity. The study targeted parents of children aged 6 to 11 years. Participants were recruited through convenience sampling: teachers from selected schools informed parents who met the inclusion criteria of the study and provided the parents with the questionnaire link. Inclusion criteria were parents with children aged 6 to 11 years who had either been vaccinated against COVID-19 or were scheduled to be vaccinated, were willing to participate in the study by providing informed consent, and were able to complete an online questionnaire. The exclusion criteria were individuals who were unable to understand and/or comprehend the questionnaire in the Indonesian language. Based on rule of thumb, the minimum required sample size was estimated to be 180.

Data collection was carried out through a self-administered questionnaire distributed online. Participants completed the questionnaire voluntarily and anonymously. Personally identifiable information such as full names, email addresses, and telephone numbers were not recorded to ensure confidentiality. The study was approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas

Indonesia/Cipto Mangunkusumo Hospital.

The questionnaire was developed by conducting a literature search and adapting a previously validated questionnaire.⁹⁻¹¹ This modified version was translated into Indonesian through both backward and forward translation by three of the authors. Validity of the questionnaire was assessed in two stages: face validity and a pilot test. Two experts evaluated the questionnaire to ensure its validity, adequacy, and appropriateness. A pilot study involving 30 participants was conducted to enhance item comprehension and assess validity. Cronbach's alpha was employed to assess the variables of knowledge, attitude, and practice, yielding P values of 0.709, 0.771, and 0.622, respectively. No changes were made to the questionnaire after the pilot survey.

The questionnaire comprised four primary sections: sociodemographic characteristics, knowledge on COVID-19 vaccines, attitudes towards COVID-19 vaccination, and parental practices regarding COVID-19 vaccination. Sociodemographic data encompassed variables such as gender, age, education, monthly income, occupation, and domicile.

Participants' age were categorized into three groups (20-39, 40-60, and >60 years) to account for potential variations in knowledge and attitude. Educational levels were classified as middle school, high school, or higher education (academic and/or vocational degrees). Monthly household income in Indonesian rupiah (IDR) was classified based on salary ranges. The knowledge section of the questionnaire comprised 14 true-or-false questions about COVID-19 vaccination. Each correct answer was assigned one point, resulting in a maximum score of 14. Attitudes were evaluated using a 10-item Likert-scale questionnaire, gauging opinions on the importance of COVID-19 vaccination, concerns about safety, and perceptions of vaccine effectiveness. The maximum attainable score for the attitude assessment was 50 points. The practice section contained nine questions addressing vaccine acceptance, information sources, and the intention to vaccinate their children. Each question carried a score of one point, yielding a total practice score of 9 points. Within the scope of this study, the term "practice" specifically referred to parental behaviors and intentions related to COVID-19 vaccination for their children. All participants were required

to respond to all questions in the questionnaire to minimize the likelihood of missing or incomplete data.

Data storage and processing were conducted utilizing MS Excel® for Office 365 ver. 2018 (Microsoft Corporation, Redmond, Washington), while data analysis was performed using SPSS 25.0 (IBM, Armonk, New York). The analysis considered various factors that could influence the levels of knowledge, attitude, and practice. The levels of participants' knowledge, attitudes, and practices were categorized as poor, moderate, and good, adopting Bloom's cutoff ratio (<60%=poor, 60-79%=moderate, and 80-100%=good);¹² where a "good" score indicated adequate knowledge, positive attitude and good practice, respectively. The requirements for a favorable response/good level of insight were a knowledge score of 12 out of 14, an attitude score of 41 out of 50 (on a Likert scale), and a practice score of 8 out of 9.

Goodman-Kruskal gamma bivariate correlation test was used to analyze correlation between knowledge, attitude, and practice. Logistic regression was used to analyze correlation between sociodemographic factors (such as sex, age, education, income) and knowledge, attitudes, and practices. We computed the correlation coefficients (r) between variables and classified them following the 1992 Rea and Parker classification.¹³ A P values of <0.05 was considered statistically significant.

Results

Two hundred and sixty-four parents/guardians met the inclusion criteria and completed the questionnaire. Their demographic characteristics are shown in **Table 1**. Participants were predominantly mothers (86.3%); most were aged 40 to 60 years (53%). More than half of participants had attained higher education (51.5%), while 47.3% had attained high school or lower educational level. Three participants were considered not to have received formal education (1.2%). The occupation of participants was broadly distributed. Private employee (32.4%) was the most common occupation, while 95 (36.3%) participants were housewives. Furthermore, 57.3% of participants had an average monthly income of <4.5 million IDR. Geographically, the participants resided in the Greater Jakarta area comprising Jakarta, Bogor, Depok, Tangerang, and Bekasi.

General knowledge about COVID-19, particularly regarding vaccination, was considered poor in 23.7% and good in 30.2% of participants (**Table 2**). More than 95% of participants knew about the appropriate diagnostic methods for COVID-19 and the formation of antibodies. However, participants were almost evenly split in their understanding of the availability of COVID-19 treatment, with 52% answering correctly.

Table 1. Characteristics of participants

Characteristic	N=262
Relation to child, n (%)	
Mother	226 (86.3)
Father	31 (11.8)
Guardian	5 (1.9)
Age group, n (%)	
20-39 years	122 (46.6)
40-60 years	139 (53)
>60 years	1 (0.4)
Educational level, n (%)	
No formal education	3 (1.2)
Elementary school	23 (8.8)
Middle school	26 (9.9)
High school	75 (28.6)
Higher education	135 (51.5)
Occupation, n (%)	
Private employee	85 (32.4)
Entrepreneur	40 (15.3)
Freelance	22(8.4)
Housewife	95 (36.3)
Others	20 (7.6)
Monthly income, n (%)	
<4.5 million IDR	150 (57.3)
4.5-10 million IDR	31 (11.8)
>10 million IDR	81 (30.9)
Place of residence, n (%)	
Jakarta	142 (54.2)
Bogor	5 (1.9)
Depok	2 (0.8)
Tangerang/South Tangerang	112 (42.7)
Bekasi	1 (0.4)

Table 2. Level of insight knowledge, attitude, and practice regarding COVID-19 vaccination in in children aged 6-11 years (N=262)

Variables	Poor	Moderate	Good
Knowledge, n (%)	62 (23.7)	121 (46.2)	79 (30.2)
Attitude, n (%)	21 (8.0)	200 (76.3)	41 (15.6)
Practice, n (%)	8 (3.1)	91 (34.7)	163 (62.2)

A "good" score indicates adequate knowledge, positive attitude, and practices, respectively. The requirements for a favorable response/good level of insight were a knowledge score of 12 out of 14, an attitude score of 41 out of 50 (on a Likert scale), and a practice score of 8 out of 9.

Approximately 15% of participants tended to have a more positive attitude towards COVID-19 vaccination (Table 2). Less than half of the participants (48.9%) agreed that vaccination is crucial for protecting children from COVID-19. The remaining participants were divided into several different responses, ranging from highly disagreeing to somewhat agreeing, according to the Likert scale. Most parents/guardians still expressed doubts about COVID-19 vaccinations for children (32.8%). Regarding vaccine safety, the responses exhibited noticeable disparity, with 29.4% expressing concerns, outnumbering the 16% who did not.

Practice results revealed that 62.2% of participants had good COVID-19 vaccine practices, as shown in Table 2. The most intriguing result was found in the statement that parents/guardians only let their children get vaccinated so that they could enter public places, including schools. More than half of participants agreed with this statement. Before COVID-19 vaccines were available, only three participants did not follow the national children's immunization program. Therefore, we observed that parents/guardians placed considerable trust (96%) in the stakeholders responsible for policies linked to COVID-19 vaccination for children.

Goodman–Kruskal gamma analysis did not show a significant correlation between knowledge and attitude ($r=0.018$; $P=0.8$). In contrast, a moderate correlation was observed between knowledge and practice ($r=0.333$; $P=0.001$). Similarly, the correlation between attitude and practice was also found to be moderate and positive ($r=0.432$; $P=0.001$) (Table 3).

The scatterplot of knowledge and attitude, which had an R^2 value of 0.018 (Figure 1), illustrates a very weak, non-significant linear relationship ($R^2=0.018$; $P=0.8$).

The relationship between knowledge and practice shows a slightly stronger correlation, with an R-squared value of 0.071 (Figure 2), meaning that 7.1% of the variation in practice can be explained by knowledge ($P=0.001$).

Table 3. Analysis of knowledge, attitude, and practice regarding COVID-19 vaccination in 6 children aged 6-11 years (N=262)

Variables	r	P value
Knowledge and attitude	0.018	0.8
Knowledge and practice	0.333	0.001
Attitude and practice	0.432	0.001

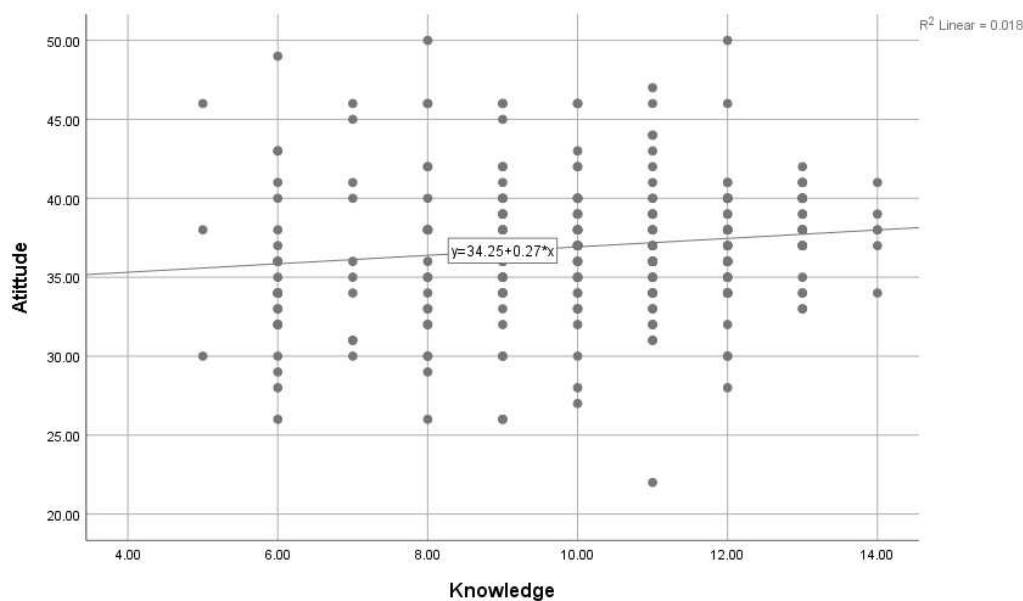


Figure 1. Correlation of knowledge and attitude of parents towards COVID-19 vaccination in children aged 6-11 years. Each dot represents one person in the study. Similar values may result in overlapping dots.

We found a weak relationship between attitude and practice ($R^2=0.077$; $P=0.001$) (Figure 3), indicating that 7.7% of the variation in practice can be explained by attitude. Logistic regression analysis of socio-demographic variables revealed that higher educational level and income were significantly

associated with good knowledge outcomes ($P=0.001$). Parents/guardians with a diploma or higher educational level were 3.2 times more likely to have better scores in the knowledge section (95%CI 1.48 to 7.07) (Table 4). Age and gender, however, were not significantly associated with knowledge scores.

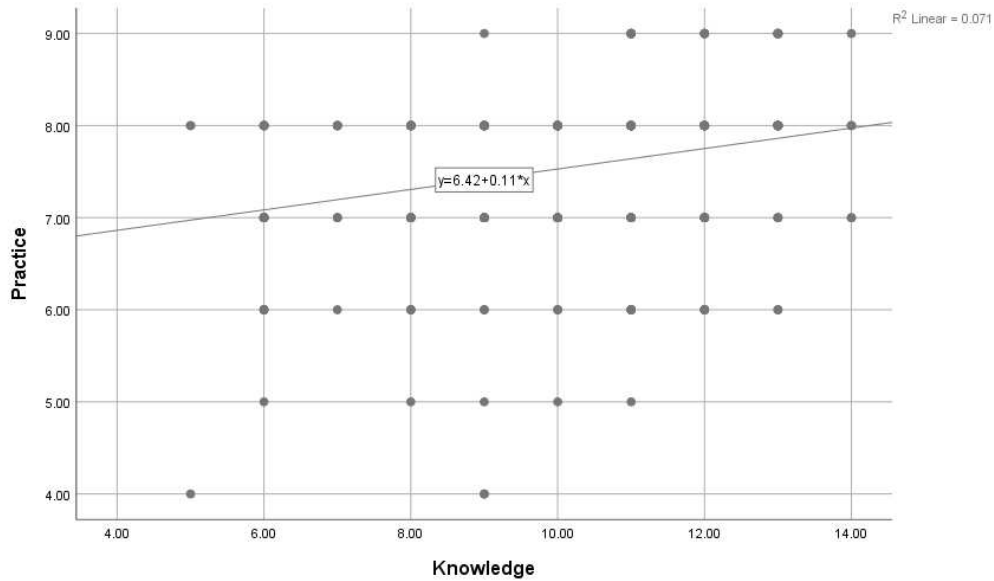


Figure 2. Correlation of knowledge and practice of parents towards COVID-19 vaccination in children aged 6-11 years. Each dot represents one person in the study. Similar values may result in overlapping dots.

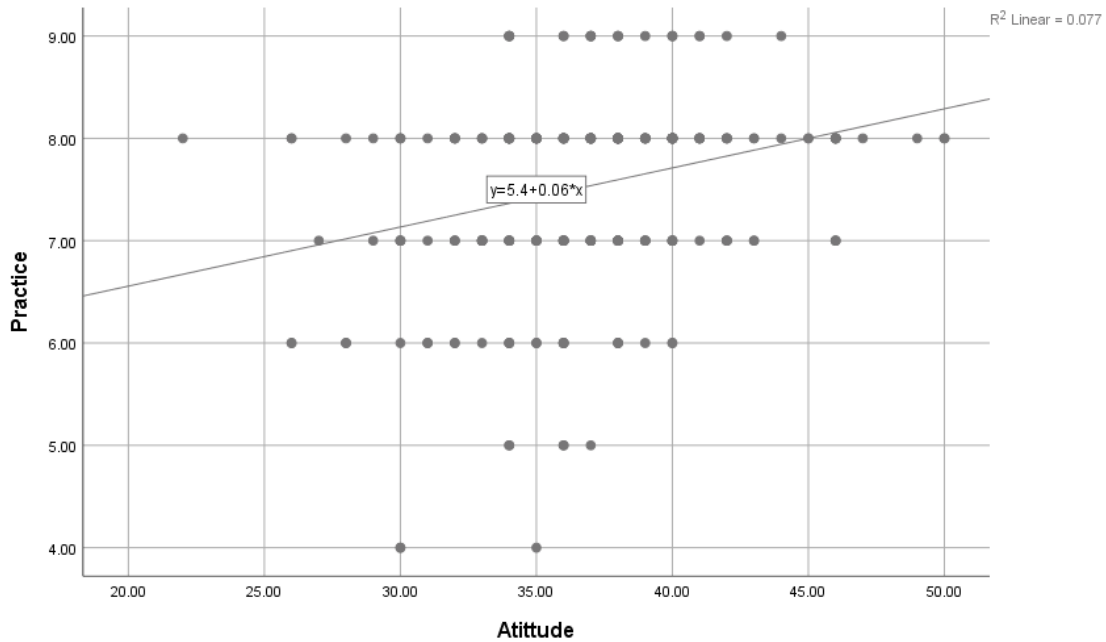


Figure 3. Correlation of attitude and practice of parents towards COVID-19 vaccination in children aged 6-11 years. Each dot represents one person in the study. Similar values may result in overlapping dots.

Table 4. Logistic regression analysis of sociodemographic factors and knowledge, attitudes, and practice towards COVID-19 vaccination in children aged 6 to 11 years (N=262)

Variables	Parameter attaining "good" level scores					
	Knowledge		Attitude		Practice	
	OR (95%CI)	P value	OR (95%CI)	P value	OR (95%CI)	P value
Gender						
Female	1.27 (0.51 to 3.15)	0.6	1.62 (0.45 to 5.79)	0.455	0.88 (0.38 to 2.06)	0.781
Male*						
Age group						
≥ 40 years	1.185 (0.648 to 2.167)	0.58	0.63 (0.31 to 1.29)	0.21	1.14 (0.65 to 1.97)	0.639
<40 years*						
Educational level						
Higher education	3.22 (1.48 to 7.07)	0.003**	0.719 (0.30 to 1.71)	0.457	1.80 (0.92 to 3.5)	0.086
Lower education*						
Monthly income, n(%)						
≥ 10 million IDR	2.23 (1.08 to 4.61)	0.03**	0.617 (0.22 to 1.72)	0.357	1.69 (0.79 to 3.62)	0.174
<10 million IDR*						

*indicates as reference; **indicates significant correlation; lower education=junior and high school; higher education=academic and vocational degrees.

Discussion

The COVID-19 pandemic necessitated rapid decision-making in both personal and public health, including the urgent acceleration of mass vaccine production and distribution. In 2021, Indonesia implemented a mandatory COVID-19 vaccination program, initially targeting healthy adults.¹ Children were included in the program following a series of recommendations issued by the Ministry of Health and the Indonesian Pediatric Society, an independent national association of pediatricians.^{5,14-16} Given the need to adapt and resume face-to-face learning, prioritizing COVID-19 vaccination for school-aged children was a logical step.⁴ At the time of these recommendations, children accounted for up to 13% of the country's total COVID-19 cases.^{14,15}

The rapid production of COVID-19 vaccines raised questions, particularly regarding their safety and efficacy.¹⁷⁻¹⁹ In Indonesia, severe side effects were reported, but no deaths occurred.²⁰ A study in Indonesia found that doubts about the obligatory COVID-19 vaccine program stemmed from perceived uncertainty of its effectiveness.⁷ Similar reasons were garnered from research in England and in Saudi Arabia.^{8,17} In line with these findings, a multicenter study in the USA, Canada, Japan, Spain, and Switzerland discovered that approximately 31% of participants avoided vaccinating their children against COVID-19 in 2020.²¹

Following the ever-evolving state of the pandemic, numerous sources of information were available, providing knowledge on COVID-19. In Indonesia alone, people could access information on various media platforms, including social media (*WhatsApp, Instagram, YouTube, Twitter*), television, the government's official website, and short message service (SMS) from the Ministry of Health.²² In the Saudi Arabia study, 41% of participants reported their Ministry of Health as the most important source of COVID-19 information.¹⁷ Despite the many available sources of information, only 30.2% of our participants acquired adequate knowledge, while 46.2% had only moderate level of knowledge. A significant majority (83%) were incorrect about Indonesia's COVID-19 vaccination target scope (**Appendices**). Approximately 48% also held misconceptions about the current availability of an effective drug to cure COVID-19.

Numerous factors, including educational levels and economic considerations, influence knowledge transfer.²⁰ According to our logistic regression analysis of sociodemographic characteristics, level of education was directly proportionate to good knowledge results ($P=0.003$). Our participants were divided almost equally between those with higher vs. lower education (51.5% vs. 48.5%, respectively). Those with higher education were more likely to have good knowledge results than those with lower education (OR=3.22;

95%CI 1.47 to 7.07). In line with our findings, a study in Saudi Arabia discovered that mothers with higher educational levels showed better knowledge of COVID-19.¹⁷ Consequently, our results also showed that income level was significantly associated with good knowledge, in line with the aforementioned theory. Our results showed that participants with higher monthly income were more likely to have good knowledge results (OR 2.23; 95%CI 1.08 to 3.61; P=0.03).

Only 15% of our participants had good attitude scores, whereas most participants (76.3%) had moderate attitude scores towards COVID-19 vaccination in children aged 6-11 years. In the attitude section, most parents believed they should gather as much information as possible to understand the importance of vaccination (88%). Effective crisis communication is pivotal in building the people's trust to follow public policy and guidance.^{18,22} The recipient's trust in the source of information may influence the decision-making process, as is reflected in the attitude and, later, practices. Times of crises, such as the COVID-19 pandemic, indirectly created an ideal opportunity to examine of effective mass communication on public health.²² Additionally, parents or guardians may be more cautious and critical of recommendations or policies related to children's health.²⁵⁻²⁶

A study in England showed that less than half of parents (48.2%) agreed to accept COVID-19 vaccination for children, while 40.9% were hesitant but still leaning towards acceptance.⁸ In contrast, a multicenter study conducted in 2020 across the USA, Canada, Japan, Spain, and Switzerland found that two-thirds of its participants - parents and guardians - fully supported COVID-19 vaccination for children.²² A 2020 Indonesian study found that the main issue regarding the COVID-19 vaccine acceptance was related to its effectiveness.⁷ In this study, 222 participants (85%) strongly agreed on the importance of COVID-19 vaccination in preventing infection. However, out of those 222 participants, 40 (15%) expressed hesitancy about receiving the vaccine.

Despite predominantly moderate knowledge and attitude levels, 62.2% of participants demonstrated good practices. Nearly all participants (98.8%) had already participated in the mandatory national

immunization program by vaccinating their children before the onset of COVID-19. During the study period, participants supported policies on health protocols and obligatory COVID-19 vaccination for children. Nearly 80% of parents/guardians allowed children to be vaccinated, and 95% ensured that they continued to follow the health protocols even after vaccination. Additionally, more than 90% expressed trust in the policymakers and health workers, thus contributing to overall good practices.

Although significant positive correlations were reported between knowledge-practice and attitude-practice, the rate of good practice was higher (62.2%) than that of good knowledge (30.2%) and attitude (15.2%). This finding contradicts the theory that knowledge is hypothesized to be the foundation for attitude and practice. Attitude reflects a tendency to behave or interpret situations. It may differ between people based on their experiences, points of view, and values. Furthermore, to execute a good practice, one must acquire adequate knowledge.²⁷

There was no correlation between knowledge and attitude, whereas a moderate correlation was found between knowledge and practice, as well as attitude and practice. Subsequently, distrust towards the government has been reported in several democratic countries, including Indonesia.²³ Lack of trust can influence perceptions.¹⁸ For this reason, the participants in this study may have exhibited a lower rate of good attitude scores. The presence of independent professional organizations, such as the Indonesian Pediatric Society, and several public initiatives, which provided information in lay language and emphasized public health policies, is believed to help the government garner trust from its people.²² Thus, it can be inferred that the reinforcing good attitudes toward COVID-19 vaccination in children required not only disseminating information to enhance parental knowledge but also enforcing rules or policies for parents.

This study revealed that only a small number of participants had a good understanding of COVID-19. However, they still demonstrated a level of moderate attitude and good practices towards COVID-19 vaccination. We also found that educational level and monthly income were significantly and positively correlated with knowledge. No demographic factors showed significant associations with attitude and

practice results. Little to no correlation between knowledge and attitude is found in this study. Moderate correlation between knowledge and practice, as well as attitude and practice, suggest the need of effective strategies to achieve wider coverage of COVID-19 vaccination among children.

Conflict of interest

None declared.

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References

1. WHO. WHO Coronavirus (COVID-19) dashboard. [cited 2023 Apr 20]. Available from: <https://covid19.who.int/>
2. Forchette L, Sebastian W, Liu T. A comprehensive review of COVID-19 virology, vaccines, variants, and therapeutics. *Curr Med Sci*. 2021;41:1037-51. DOI: <https://doi.org/10.1007/s11596-021-2395-1>
3. WHO. Vaccines and immunization. [cited 2021 Dec 18]. Available from: <https://www.who.int/health-topics/vaccines-and-immunization>
4. Ladhani SN. COVID-19 vaccination for children aged 5-11 years. *Lancet*. 2022;400:74-6. DOI: [https://doi.org/10.1016/S0140-6736\(22\)01245-4](https://doi.org/10.1016/S0140-6736(22)01245-4)
5. Ikatan Dokter Anak Indonesia. Rekomendasi Ikatan Dokter Anak Indonesia Pemberian Vaksin COVID-19 (Coronavac) pada Anak Usia 6-11 Tahun. Jakarta Pusat: Ikatan Dokter Anak Indonesia; 2021. p. 1-2.
6. Nikolopoulou GB, Maltezou HC. COVID-19 in children: where do we stand? *Arch Med Res*. 2022;53:1-8. DOI: <https://doi.org/10.1016/j.arcmed.2021.07.002>
7. Harapan H, Wagner AL, Yufika A, Winardi W, Anwar S, Gan AK, et al. Acceptance of a COVID-19 vaccine in Southeast Asia: a cross-sectional study in Indonesia. *Front Public Health*. 2020;8:381. DOI: <https://doi.org/10.3389/fpubh.2020.00381>
8. Bell S, Clarke R, Mounier-Jack S, Walker JL, Paterson P. Parents' and guardians' views on the acceptability of a future COVID-19 vaccine: a multi-methods study in England. *Vaccine*. 2020;38:7789-98. DOI: <https://doi.org/10.1016/j.vaccine.2020.10.027>
9. Gust DA, Kennedy A, Shui I, Smith PJ, Nowak G, Pickering LK. Parent attitudes toward immunizations and healthcare providers the role of information. *Am J Prev Med*. 2005;29:105-12. DOI: <https://doi.org/10.1016/j.amepre.2005.04.010>
10. Opel DJ, Mangione-Smith R, Taylor JA, Korfiatis C, Wiese C, Catz S, et al. Development of a survey to identify vaccine-hesitant parents: the parent attitudes about childhood vaccines survey. *Hum Vaccin*. 2011;7:419-25. DOI: <https://doi.org/10.4161/hv.7.4.14120>
11. Mahmud S, Mohsin M, Khan IA, Mian AU, Zaman MA. Knowledge, beliefs, attitudes and perceived risk about COVID-19 vaccine and determinants of COVID-19 vaccine acceptance in Bangladesh. *PLoS One*. 2021;16:e0257096. DOI: <https://doi.org/10.1371/journal.pone.0257096>
12. Feleke BT, Wale MZ, Yirsaw MT. Knowledge, attitude and preventive practice towards COVID-19 and associated factors among outpatient service visitors at Debre Markos compressive specialized hospital, north-west Ethiopia, 2020. *PLoS One*. 2021;16:e0251708. DOI: <https://doi.org/10.1371/journal.pone.0251708>
13. Rea ML, Parker RA. Designing and conducting survey research: a comprehensive guide. San Fransisco: Jossey-Bass Publishers; 1992.
14. Kementerian Kesehatan Republik Indonesia. Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/Menkes/4638/2021 tentang petunjuk teknis pelaksanaan vaksinasi dalam rangka penanggulangan pandemi corona virus disease 2019 (COVID-19). [cited 2021 Dec 18]. Available from: <https://peraturan.bpk.go.id/Details/171640/keputusan-menkes-no-hk0107menkes46382021>
15. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi; Kementerian Agama; Kementerian Kesehatan; Kementerian Dalam Negeri Republik Indonesia. Surat Keputusan Bersama Nomor 05/KB/2021, 1347, HK.01.08/MENKES/6678/2021, 443-5847 Tahun 2021 tentang Panduan Penyelenggaraan Pembelajaran di Masa Pandemi Coronavirus Disease 2019 (COVID-19). [cited 2021 Dec 20]. Available from https://jdih.kemdikbud.go.id/sjdih/siperpu/dokumen/salinan/salinan_20220428_145058_SKB%20Mendikbudristek%20Nomor%205%20Tahun%202021.pdf
16. Ikatan Dokter Anak Indonesia. Rekomendasi Ikatan Dokter Anak Indonesia terkait pemberian vaksin COVID-19 pada anak dan remaja. Jakarta Pusat: Badan Penerbit IDAI;2021. p. 1-2.
17. Ashour HA, Alhinti SE, Hawsaoi SA, Alsuwailam AA,

- AlFarhan A, Abdulmajeed I. Knowledge, attitude, and practice (KAP) of COVID-19 vaccine among Saudi mothers. *Cureus*. 2023;15:e36826. DOI: <https://doi.org/10.7759/cureus.36826>
18. Johansson B, Ihlen Ø, Lindholm J, Blach-Ørsten M. Institutional trust and crisis management in high-trust societies. In: Johansson B, Ihlen Ø, Lindholm J, Blach-Ørsten M, editors. *Communicating a pandemic: crisis management and Covid-19 in the Nordic Countries*. Gothenburg; Nordicom University of Gothenburg; 2023. p. 285-98. DOI: <https://doi.org/10.48335/9789188855688-13>
19. Komnas KIPi: Belum ada kasus meninggal yang disebabkan vaksinasi COVID-19. [Internet]. 2022 [cited 2022 Jan 2]. Available from: <https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20220101/1039078/komnas-kipi-belum-ada-kasus-meninggal-yang-disebabkan-vaksinasi-covid-19/>
20. Goldman RD, Yan TD, Seiler M, Cotanda CP, Brown JC, Klein EJ, et al. Caregiver willingness to vaccinate their children against COVID-19: cross sectional survey. *Vaccine*. 2020;38:7668-73. DOI: <https://doi.org/10.1016/j.vaccine.2020.09.084>
21. Kurniasari ND. Communication on Public Health and COVID-19 in Indonesia (Media, Messages and Information about COVID-19). *IOSR J Humanit Soc Sci*. 2021;26:52-7. DOI: <https://doi.org/10.5281/zenodo.4556156>
22. Badran IG. Knowledge, attitude and practice the three pillars of excellence and wisdom: a place in the medical profession. *East Mediterr Health J*. 1995;1:8-14.
23. Putra MA, Bhaskara ILA, Valerisha A. Crisis communication in the time of COVID-19: The significance of grassroot initiative in democratic countries (case of Brazil, Indonesia, and the United States). *JISSH*. 2021;11:1-17. DOI: <https://doi.org/10.14203/jissh.v11i1.210>
24. Boland L, Kryworuchko J, Saarikari A, Lawson ML. Parental decision making involvement and decisional conflict: a descriptive study. *BMC Pediatr*. 2017;17:146. DOI: <http://dx.doi.org/10.1186/s12887-017-0899-4>
25. Nicholson E, McDonnell T, De Brún A, Barrett M, Bury G, Collins C, et al. Factors that influence family and parental preferences and decision making for unscheduled paediatric healthcare - systematic review. *BMC Health Serv Res*. 2020;20:663. DOI: <http://dx.doi.org/10.1186/s12913-020-05527-5>
26. Hubbard R, Greenblum J. Parental decision making: the best interest principle, child autonomy, and reasonableness. *HEC Forum*. 2019;31:233-40. DOI: <http://dx.doi.org/10.1007/s10730-019-09373-9/>
27. Aarthun A, Øymar KA, Akerjordet K. Parental involvement in decision-making about their child's health care at the hospital. *Nurs Open*. 2018;6:50-8. DOI: <https://doi.org/10.1002/nop2.180>

Appendices

Appendix 1. Summary of parental knowledge in detailed questions (N=262)

Statements	Answers	
	Correct	Incorrect
COVID-19 vaccines stimulate the body to develop antibodies against COVID-19*[C], n(%)	254 (96.9)	8 (3.1)
COVID-19 vaccines protect recipients from COVID-19 infection*[C], n(%)	227 (86.6)	35 (13.4)
Vaccine production includes animal studies and three clinical phases requiring thousands of subjects, and would later be evaluated by the responsible authority to ensure its effectivity and safety.*[C], n(%)	227 (86.6)	35 (13.4)
COVID-19 vaccines are given through injection*[C], n(%)	262 (100)	0 (0)
COVID-19 vaccines do not have adverse effects*[F], n(%)	106 (40.5)	156 (59.5)
Everyone, including children, are eligible to receive COVID-19 vaccines*[F], n(%)	217 (82.8)	45 (17.2)
COVID-19 vaccines also protect against influenza*[F], n(%)	145 (55.3)	117 (44.7)
COVID-19 is a disease which could lead to death*[C], n(%)	211 (80.5)	51 (19.5)
COVID-19 does not spread through physical contact (e.g., hand shaking and hugging)*[F], n(%)	72 (27.5)	190 (72.5)
Tropical countries with humid and hot climates like Indonesia are safe from COVID-19* [F], n(%)	63 (24)	199 (76)
COVID-19 is a designed disease that is purposely spread*[F], n(%)	83 (31.7)	179 (68.3)
COVID-19 is produced genetically as a biological weapon*[F], n(%)	95 (36.3)	167 (63.7)
PCR swab is a required method to determine COVID-19 infection*[C], n(%)	253 (96.6)	9 (3.4)
A potent drug to cure COVID-19 has been discovered*[F], n(%)	126 (48.5)	136 (51.5)

Appendix 2. Summary of parental attitude in detailed questions (N=262)

Statements	Answers				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
How convinced are you with the statement that COVID-19 vaccines are safe for Indonesian children?*[+], n(%)	3 (1.1)	16 (6.1)	33 (12.6)	115 (43.9)	95 (36.3)
In your opinion, how important are COVID-19 vaccines to protect children?*[+], n(%)	3 (1.1)	13 (5)	24 (9.2)	94 (35.9)	128 (48.9)
I trust the information about COVID-19 given by healthcare personnel (e.g., doctors, nurses, midwives, etc.)*[+], n(%)	5 (1.9)	8 (3.1)	28 (10.7)	115 (43.9)	106 (40.5)
It is my role as a parent to gain as much information on the importance of COVID-19 vaccination.*[+], n(%)	6 (2.3)	5 (1.9)	20 (7.6)	85 (32.4)	146 (55.7)
Overall, how hesitant are you regarding COVID-19 vaccination for children?*[+], n(%)	20 (7.6)	20 (7.6)	52 (19.8)	84 (32.1)	86 (32.8)
I believe that receiving COVID-19 vaccination may help prevent severe symptoms.*[+], n(%)	5 (1.9)	9 (3.4)	37 (14.1)	95 (36.3)	116 (44.3)
I prefer my child to develop antibodies by getting infected rather than getting vaccinated.*[-], n(%)	112 (42.7)	63 (24.0)	37 (14.1)	30 (11.5)	20 (7.6)
How worried are you about the safety of the COVID-19 vaccine for children?*[+], n(%)	42 (16)	29 (11.1)	65 (24.8)	77 (29.4)	49 (18.7)
How worried are you about the failure of vaccines to prevent COVID-19 infection?*[+], n(%)	46 (17.6)	31 (11.8)	74 (28.2)	64 (24.4)	47 (17.9)

Appendix 3. Summary of parental practice in detailed questions (N=262)

Statements	Answers	
	Yes	No
Do you obey the recommendation from the Ministry of Health to give basic vaccination for your children?*[Yes], n(%)	259 (98.9)	3 (1.1)
Do you postpone COVID-19 vaccination for your children without reasons such as certain comorbidities or allergy?*[No] , n(%)	37 (14.1)	225 (85.9)
The only reason I let my children get injected with COVID-19 vaccine is to ensure they could enter public spaces or school.*[No] , n(%)	195 (74.4)	67 (25.6)
Do you trust the government's policy about COVID-19 vaccination for children*[Yes] , n(%)	243 (92.7)	19 (7.3)
Do you trust non-governmental, independent organizations, such as Ikatan Dokter Anak Indonesia, in policymaking for children's vaccines?*[Yes] , n(%)	253 (96.6)	9 (3.4)
I let my children get a COVID-19 shot in order to enter public facilities and school.*[Yes] , n(%)	216 (82.4)	56 (17.6)
It would be better if people who do not believe in COVID-19 and disagree to get vaccinated are left alone.*[No] , n(%)	70 (26.7)	192 (73.3)
Before your children received the COVID-19 vaccine, did they comply with the recommended health protocols?*[Yes] , n(%)	261 (99.6)	1 (0.4)
After your children received the COVID-19 shot, did they still comply with the recommended health protocols?*[Yes] , n(%)	258 (98.5)	4 (1.5)