The Relationship between Parental Knowledge and Anxiety Levels towards COVID-19 Vaccination in Children

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Abstract

Introduction: *The COVID-19 vaccine is crucial as a preventive measure against infection with the SARS-CoV-2 virus. The Indonesian Pediatric Association (IDAI) has approved the vaccination for children under 12 years, allowing them to receive up to the second dose. However, a lack of knowledge about the vaccine has led to hesitancy among parents, fueled by misinformation and concerns about potential side effects on their children. This study aims to explore the correlation between parental knowledge and their anxiety levels concerning the COVID-19 vaccination for their children.*

Methods: *We conducted a cross-sectional survey with 207 parents of students from SDIT Nurul Fikri in Makassar City. The research instrument was a structured questionnaire. Data were analyzed through univariate analysis, followed by bivariate comparisons using the Chi-square test and multivariate regression.*

Results: *Among the respondents, a majority (58%) exhibited limited knowledge of COVID-19, with 50.2% reporting varying degrees of anxiety about the vaccination for their children. Of the children, 46.3% had received the complete vaccination series. Statistical analysis revealed a significant correlation between parental knowledge and anxiety levels regarding their child's COVID-19 vaccination (α<0.05; p=0.007).*

Conclusion: *There is a significant correlation between knowledge and anxiety concerning children's COVID-19 vaccination, with knowledge being the most significant predictor of anxiety levels.*

Keywords: *Knowledge, Anxiety level, Parents, Covid-19 Vaccination, Children.*

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Hubungan Pengetahuan dan Tingkat Kecemasan Orang Tua terhadap Vaksinasi Covid-19 pada Anak

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Abstrak

Pendahuluan: *Vaksin Covid-19 berperan penting sebagai salah satu tindakan preventif dari infeksi virus SARS-CoV-2. Saat ini IDAI telah menetapkan bahwa anak dibawah usia 12 tahun dapat melakukan vaksinasi Covid-19 hingga dosis kedua. Orang tua sebagai wali yang memberi keputusan diantaranya kurang mengetahui fakta mengenai vaksinasi Covid-19 sehingga sebagian besar memercayai hoaks dan cemas terhadap efek sampingnya terhadap anaknya. Tujuan penelitian ini adalah untuk mengetahui hubungan antara pengetahuan dan tingkat kecemasan orang tua terhadap vaksinasi Covid-19.*

Metode: *Studi potong lintang dilakukan terhadap 207 orang tua dari siswa SDIT Nurul Fikri Kota Makassar menggunakan alat ukur penelitian terdiri atas kuesioner. Analisis data dilakukan secara univariat, kemudian bivariat dengan uji komparatif Chi-square,dan uji multivariat regresi berganda.*

Hasil: *Dari 207 responden, sebagian besar orang tua memiliki pengetahuan kurang (58%) mengenai Covid-19 dan merasa cemas (50,2%) dengan tingkat kecemasan yang bervariasi terhadap cakupan vaksinasi Covid-19 anak di SDIT Nurul Fikri Kota Makassar menerima dosis lengkap (46,3%). Terdapat hubungan signifikan antara pengetahuan dengan tingkat kecemasan orang tua terhadap vaksinasi Covid-19 anaknya ($\alpha<0.05$; $p=0.007$).*

Kesimpulan: *Terdapat hubungan signifikan antara pengetahuan dan tingkat kecemasan orang tua terhadap vaksinasi Covid-19 anak dengan faktor pengetahuan sebagai variabel paling berpengaruh.*

Kata kunci: *Pengetahuan, Tingkat kecemasan, Orang tua, Vaksinasi Covid-19, Anak.*

Introduction

The coronavirus disease 19 (Covid-19) was first detected in the city of Wuhan, China at the end of December 2019 causing a global pandemic that was declared by the World Health Organization (WHO) in 2020.[1] COVID-19 as an acute respiratory syndrome that is currently sweeping the world is caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) with main clinical symptoms of Covid-19 are fever, cough, and runny nose, while other symptoms that can be found are sore throat, burning headache, nausea or vomiting, diarrhea, weakness and shortness of breath.[2,3] The new syndrome that appears after a child is infected with SARS-CoV-2 is called Multisystem Inflammatory Syndrome in Children (MIS-C) (Siobhan Marry, 2021) with manifestations of fever, as well as multiorgan dysfunction such as rashes on the skin. skin, disorders of the heart, and lungs, and even attacks the nervous system.[4,5]

Indonesian children are recorded as one of the highest contributors to the death rate due to Covid-19 according to the Indonesian Pediatrician Association (IDAI) 12.5% (Sandi Husada, 2022).[6] Meanwhile, based on the Ministry of Health's Central Data and Information Center in 2021 the death rate or the case fatality rate (CFR) in the group of children due to Covid-19 is 3-5%.[7,8] Children recorded as having been exposed to Covid-19 reached 700,000 Indonesian children in 2021. Because children's immune systems are quite weak compared to adults, and transmission is fast, they can cause complications of MIS-C in children. This needs to be a concern regard-

ing the transmission of Covid-19 to children who have a greater risk of recurrence and conditions that can worsen suddenly.[9]

Covid-19 vaccination is a preventive measure that can increase the body's immunity to prevent infection with the SARS-CoV-2 virus, whose development continues until it begins to be implemented in society. The principle of the vaccine itself is to include antigens from weakened or killed microorganisms which are processed into toxoids and then provide immunity to the body against a particular disease or infection to prevent-treatting infectious diseases.[10] According to Huang, et al.[11] there is a relationship between Covid-19 vaccination and a reduction in the incidence of Covid-19, especially the death rate in the ICU due to Covid-19, noting that Covid-19 vaccination will be more effective if the Covid-19 vaccination coverage reaches 60% in an area.

Parents who play a role in children's decision making, especially in approving the implementation of the Covid-19 vaccination, include refusing the implementation of the Covid-19 vaccination.[12] There are several concerns or worries as well as a lack of knowledge regarding the Covid-19 vaccination. The effectiveness and benefits of Covid-19 vaccination are one of the factors that can hinder parents from accepting their children to receive Covid-19 vaccination.[13] Doubts that arise due to the amount of information, media, family environment and so on regarding things that are spread in the form of hoaxes give rise to perceptions negative due to lack of knowledge resulting in anxiety for some people.[14] Research by Nur, et al[15] and Nirwan, et al[16] found a relationship between knowledge and action during the Covid-19 war as well as a relationship between anxiety levels and the Covid-19 vaccine program.

Research that discusses the relationship between knowledge and anxiety levels regarding Covid-19 vaccination is still limited, especially discussions regarding parents' willingness if their child stops Covid-19. Considering the importance of Covid-19 vaccination as an effort to prevent SARS-CoV-2 infection, it is important to know the factors that influence parents' decisions to have an abortion, especially for children under 12 years of age. Therefore, based on statements and facts that strengthen the importance of Covid-19 vaccination, the author is interested in research to determine the relationship between knowledge and parents' level of anxiety regarding the Covid-19 vaccination program for children.

Methods

The type of research used was comparative quantitative analysis with a cross-sectional approach for bivariate analysis between knowledge and the level of anxiety of parents about their children's Covid-19 vaccination. For the multivariate test to test the odds ratio with multiple regression tests to measure the relationship between factors and outcomes. The following flow of this research is briefly presented in (Figure 1).

This research was conducted at SDIT Nurul Fikri Makassar City with the target of students in grades 4-6 in 2023 from January to February. This school was selected on the basis that these private institutions are not subject to the government mandates requiring public elementary schools to implement COVID-19 vaccination. Considering children aged under 12 years who are at risk and the latest guidelines from the Indonesian Pediatric Association (IDAI) that permit COVID-19 vaccination for this age group, the minimum sample size was determined using the Slovin formula to be at least 206 participants.

The methodology employed in this study included profiling respondent characteristics such as age, occupation, education, gender, their child's grade level, age, and sex. The Hamilton Anxiety Rating Scale (HARS) was utilized to assess respondents' levels of anxiety. This scale aggregates the values of symptom groups to determine the degree of anxiety as follows: a score of less than 14 indicates no anxiety, 14-20 mild anxiety, 21-27 moderate anxiety, 28-41 severe anxiety, and 42-56 very severe anxiety.[17] The validity and reliability of this questionnaire have been established, with the original questionnaire achieving a validity score of 0.92 (Beck et al., 1988). It has been translated into Indonesian by Ramdan (2018), with a Cronbach's alpha reliability value of 0.756.[18] The knowledge questionnaire was adapted from research by Al-Kafarna, et al.[19] and translated into Indonesian. Its validity and reliability were assessed, yielding a Cronbach's alpha value of 0.76. The validity score (r count) was found to be less than 0.44, and the reliability of the knowledge questionnaire was 0.82. The questionnaire format includes 'true', 'false', and 'don't know' options. Scoring is based on accuracy: respondents receive 1 point for each correct answer, and 0 points for incorrect or 'don't know' responses. The questionnaire was created as a Google Form and disseminated to participants through parent and school groups, personal WhatsApp chats, and by telephone. This approach ensured
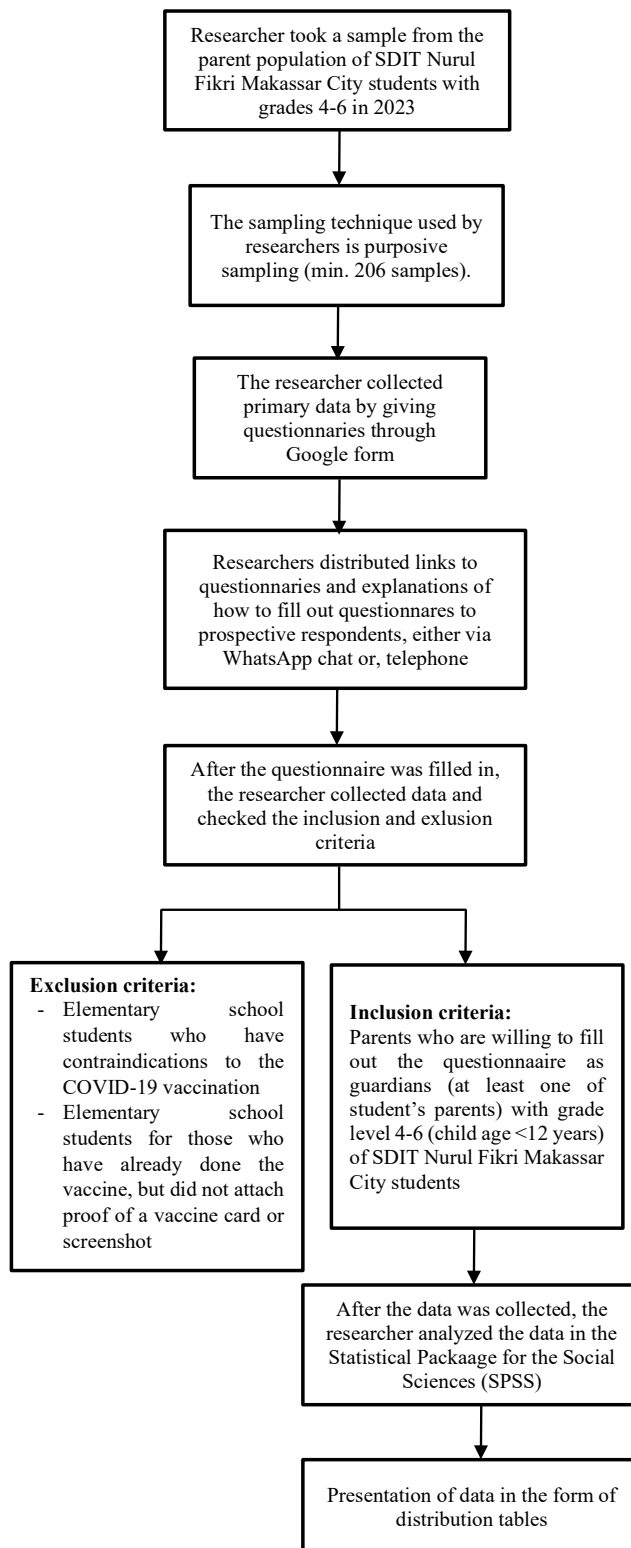
Figure 1. Research Flow

clarity in the filling-out procedure and comprehension of the questionnaire, particularly for parents less familiar with technology, to prevent miscommunication regarding the research objectives and the expected outcomes.

The sampling for this study was conducted using a purposive sampling method, with specific inclusion criteria to minimize bias. These criteria were essential for determining whether a child has contraindications to vaccines, such as allergies, respiratory distress, or a history of anaphylactic shock. Proof of COVID-19 vaccination was required, which could be presented in the form of a vaccination card or verified through 'Peduli Lindungi'—a health management platform

developed during the COVID-19 pandemic. The exclusion criteria included parents' unwillingness to participate and the age of the child being under 12, in order to gather current data on knowledge and anxiety levels about COVID-19 vaccination following recent regulatory updates for children in this age group. Ethical clearance for this study was granted by the Health Research Ethics Committee of Alauddin State Islamic University Makassar, under the number B.359/KEPK/FKIK/XII/2022.

Results

Out of 220 individuals who completed the research questionnaire, 207 samples satisfied the inclusion and exclusion criteria for the study.

Table 1 illustrates the demographic profile of the 207 participating respondents, encompassing the age and sex of the parents, their educational backgrounds, occupations, as well as the sex, age, and class level of the children. The median age of the par-

Table 1. Distribution of Sample Characteristics

Characteristics of Respondents	n	%
Parents Age		
31-39 Years	114	55.1%
≥40 Years	93	44.9%
Gender of Parents		
Man	21	10.1%
Woman	186	89.9%
Parent Education		
SMA/MA/SMK equivalent	10	4.8%
Diploma/Bachelor/Master/Specialist/Doctor	197	95.2%
Parents' job		
Housewife	63	30.4%
Self-employed	55	26.6%
Civil Servant	89	43%
Gender of Child		
Boy	105	50.7%
Girl	102	49.3%
Child Age		
8-9 Years	41	19.8%
10-11 Years	166	80.2%
Child Grade		
4	74	35.7%
5	86	41.5%
6	47	22.7%

ents was 39, with a range from the first (Q1) to the third quartile (Q3) of 37 to 42 years. The majority of the participating parents were female (89.9%) compared to male (10.1%). A significant portion of the parents (95.2%) reported having attained higher education, with qualifications ranging from diplomas to specialist degrees, while a smaller segment of the sample (4.8%) is currently enrolled in high school or vocational studies (SMA/SMK or equivalent). In terms of employment, the most common occupation was civil servants (PNS), representing 43% of the sample, followed by self-employed individuals at 30.4%, and homemakers (IRT) at 26.6%. Analysis of the questionnaire responses indicated a balanced gender distribution among the children attending SDIT Nurul Fikri in Makassar City, with boys making up 50.7% and girls 49.3%, and a median age range of 10 to 11 years. For students in grades 4 through 6, the median grade level was 5, with a range from 4 to 5.

Table 2. Variable Distribution

Characteristics of Respondents	n	%
Knowledge		
Less Knowledge	120	58%
Good Knowledge	87	42%
Anxiety Level		
Not Worried	103	49.8%
Mild Anxiety	68	32.9%
Moderate Anxiety	20	9.7%
Severe Anxiety	14	6.8%
Very Severe Anxiety	2	1%
Children's Covid-19 Vaccination Status		
No Covid-19 vaccine yet	111	53.6%
Covid-19 vaccine dose 1	15	7.2%
Covid-19 Vaccine Doses 1 and 2	81	39.1%

Table 2 presents the distribution of variables from the primary data collection conducted with respondents online via Google Forms. Parental knowledge about COVID-19, serving as an independent variable, yielded a median score of 9 (range 6-13), which falls into the 'lesser knowledge' category. Regarding anxiety levels as measured by the Hamilton Anxiety Rating Scale (HARS), the median score was 14 (range 8-14), indicating a mild level of anxiety among participants. The data further reveals that a majority of the respondents' children have not been vaccinated against COVID-19 (53.8%). These findings underscore the need for government and health services to intensify health promotion

efforts, ensuring widespread and equitable distribution of information about the COVID-19 vaccine, including its benefits, potential side effects, and management strategies.

In (table 3), cross-tabulations and results of the Chi-Square Test were obtained regarding the relationship between parents' anxiety level towards children's Covid-19 vac-

ious and don't worry, regarding the Covid-19 vaccination to those who have already done the Covid-19 vaccination and those who have not done the Covid-19 vaccination. The independent variable with the largest OR value is knowledge (p-value=0.000; OR=13.783; 95% CI%= 8.384 – 33.915).

Table 3. Analysis of the Relationship between Knowledge and Parental Anxiety Levels for Covid-19

Variable	Covid-19 Vaccination Status						Total		p-*value*
	Not Vaccine		Dose 1		Dose 2				
	n	(%)	n	(%)	n	(%)	n	(%)	
Knowledge									<0.001
Less Knowledge	95	45.9	3	1.4	22	10.6	120	58	
Good Knowledge	16	7.7	12	5.8	59	28.5	87	42	
Anxiety Level									
Not Worried	38	18.4	0	4.8	55	26.6	103	49.8	
Mild Anxiety	53	25,6	2	1	13	6.3	68	32.9	<0.001
Moderate Anxiety	12	5.8	3	1.4	5	2.4	20	9.7	
Severe Anxiety	6	2.9	0	0	8	3.9	14	6.8	
Very Severe Anxiety	2	1	0	0	0	0	2	1	

cination at SDIT Nurul Fikri, Makassar City using the HARS questionnaire, most of the respondents who did not have anxiety about choosing their children to vaccinate Covid-19 until second dose (26.6%), than respondents who had mild anxiety mostly chose their children not to vaccinate Covid-19 (25.6%), then to respondents who had moderate anxiety most chose their children not to vaccinate Covid-19 (5,8%). Most of the respondents who had severe anxiety chose their children to vaccinate against Covid-19 up to the second dose (3.9%), while respondents who had very severe anxiety all chose not to vaccinate against Covid-19 (1%). The results of this study showed that the p-value for the anxiety level of parents and children's Covid-19 vaccination was <0.001, which corresponds to a value of α <0.05.

Table 4. Multivariate Test Result

Variable	p-*value*	Odds Ratio	95% Confidence Interval
Knowledge	0.000	13.783	8.384 – 33.915

Multivariate analysis with multiple regression tests shown in (table 4) was carried out on the two independent variables that met the value of p <0.05, namely parents' knowledge and anxiety about Covid-19 vaccination using 2x2 analysis and grouped good and poor knowledge, and anxiety became anx-

Discussions

Knowledge is a pivotal concept that shapes individuals' beliefs, encompassing various stages and dimensions both qualitatively and quantitatively regarding an object or a subject.[19] This study draws on Lawrence Green's behavioral theory, which underscores the significance of knowledge as a predisposing factor that influences a person's behavior or actions within the health sector. For instance, the decision to vaccinate against COVID-19 as a preventative measure is guided by such knowledge.[20] Furthermore, the behavioral theory as delineated by the World Health Organization (WHO) posits that knowledge impacts health behavior.[19,21] In this research, the relationship between parents' knowledge and the vaccination of their children against COVID-19 was examined using the Chi-Square comparative test. The results indicated a significant correlation, with a p-value of less than 0.001 and an alpha level of less than 0.05, confirming the theoretical assertion that knowledge significantly influences health-related behaviors.

The results of this study were supported by Al-Zalfawi, et al[22] using the cross-sectional method with a sample of 2022 and a p-value <0.001 with p= <0.05 it was found that there was a relationship between knowledge related to Covid-19 and acceptance of Covid-19 vaccination, namely the more With high knowledge, parents can easily accept the Covid-19

vaccine action. According to Nur, et al,[15] using the Preferred Reporting Items for Systematic Review (PRISMA) systematic method, it was found that the higher the level of knowledge, the higher the acceptance rate of the Covid-19 vaccine, conversely, the lower the knowledge, the lower the interest of individuals to do the Covid-19 vaccine. According to Nurdin, et al[23] it was revealed that there was also a relationship between the behavior of pregnant women and the level of knowledge of respondents about the transmission of Covid-19 with a p-value of 0.001 <0.05. Concerning parents and children, namely parents who make decisions rather than a child's actions including the Covid-19 vaccination in this study is in line with the literature according to Bono, et al[24] that good parental knowledge about Covid-19 is associated with acceptance of the Covid-19 vaccination with a p-value of 0.001 <0.05.

Metacognitive knowledge is the knowledge that includes all types of knowledge so giving birth to an action itself has several influencing factors, such as education, both formal and non-formal education, which is very important as an intellectual basis for acquiring and understanding knowledge.[20,25] Age also has an influence on an individual in capturing and processing the knowledge as it should. Social, cultural, economic, and environmental as well as information from the media about what often happens today, namely culture and environment or customs adopted by a region can affect an individual's beliefs as well as social and economic advantage over people who have a good economy certainly more have facilities that support their knowledge.[26] Furthermore, in today's digital age, information from mass media, particularly social media, is readily accessible and often disseminated rapidly.[27] However, the veracity of such information frequently remains unverified, leading to public absorption of potentially unsubstantiated facts.[28]

However, this study's findings are inconsistent with and contradictory to the research conducted by Nirwan, et al,[16], which utilized an analytic research method with a cross-sectional approach and concluded that there was no significant relationship between the level of public knowledge and the act of vaccinating against COVID-19, as indicated by a p-value of 0.148, which is greater than the alpha level of 0.05. This suggests that knowledge, despite its complexity and the fact that it is well-understood by individuals (with 75% of respondents possessing good knowledge), does not necessarily translate into acceptance of vaccination. This is because knowledge is multifaceted and cannot be based solely on a single piece of information. Therefore, comprehensive health promotion and clear government directives are required to convey the effectiveness and benefits of COVID-19 vaccination. Some parents harbor concerns that the side effects of the COVID-19 vaccine may be more harmful than the disease itself, leading them to forego vaccination in the hope that their children will develop natural immunity through infection.[29]

Anxiety is a natural feeling as a response to a threatening situation.[30] However, it is important to note that anxiety disorders are characterized by excessive and persistent worry, leading individuals with such disorders to perceive objects or situations as more threatening and dangerous compared to those without anxiety disorders.[31] In this study, through the use of the Chi-Square Comparative Test and bivariate analysis, it was found that there is a significant relationship between parents' knowledge of children's COVID-19 vaccination and their willingness to vaccinate, with a p-value of less than 0.001 and an alpha value of less than 0.05. These results are consistent with the findings of Nilsson, et al,[32] who utilized the Numeric Rating Scale (NRS) questionnaire and found a correlation between an individual's level of anxiety and their willingness to vaccinate against COVID-19; specifically, a higher level of anxiety was associated with an unwillingness to vaccinate, as indicated by a p-value of 0.004, which is less than 0.05. Furthermore, research by Nirwan, et al,[16] employing a cross-sectional method and Fisher's Exact Test analysis, also demonstrated a significant relationship between the level of public anxiety and COVID-19 vaccination, with a p-value of 0.001.[16]

Anxiety is linked to biological theories influenced by autonomic nerves, neurotransmitters, and a genetic theory that discusses the physical changes occurring due to anxiety.[30] Several factors related to anxiety can impede decision-making or facing challenges, including various types of aggravating misinformation such as hoaxes about the Covid-19 vaccine, its dangers, and side effects, as well as an unsupportive environment.[33] Consequently, this can lead to parental hesitation in consenting to and facilitating the Covid-19 vaccination for their children.[34]

However, some studies present inconsistent findings. According to Pramesti, et al[35] using a cross-sectional method and Mann-Whitney analysis, there is no relationship between anxiety levels and whether individuals receive the Covid-19 vaccine, as indicated by a p-value

of 0.497 > 0.05. Gender is another factor that can influence anxiety levels, with hormonal influences making women more susceptible to anxiety than men.[36] Age also plays a role, with younger individuals tending to experience anxiety disorders more readily than older individuals, and the personality and experiences of different individuals can affect one's level of anxiety.[37]

Wijayanti, et al[38] found a relationship between knowledge and anxiety regarding the Covid-19 vaccination, where individuals tend to worry and refuse the vaccine due to inaccurate information. Parents, in particular, harbor significant concerns, especially during a pandemic and with the rapid implementation of the Covid-19 vaccination, leading to a rejection among parents who are more than worried about uncertain side effects for each individual, especially their children, compounded by a lack of knowledge about Covid-19 and the vaccine.[39] Parents play a crucial role in making vaccination decisions for their children, especially those under the age of 12. Burak[39] notes that if parents have significant concerns about Covid-19 and its vaccination during an emergency, including educational obligations, those with high anxiety are likely to be hesitant to vaccinate themselves and their children against Covid-19.

A deficiency in knowledge and excessive worry can result in doubts about accepting the Covid-19 vaccination. In Indonesia, factors contributing to vaccine hesitancy include age, comorbid diseases, inadequate information about Covid-19, uncertainties about the vaccine's halal status – an important consideration in a predominantly Muslim country – as well as skepticism regarding the vaccine's effectiveness in preventing infection, and the individual's level of anxiety.[40] Thus, the role of health services and public figures significant to the health sector is crucial in the process of health promotion about the Covid-19 vaccination to ensure information is evenly distributed and to increase vaccination coverage and herd immunity. In this study, it was found that the null hypothesis (H0) was rejected, indicating that there is no relationship between knowledge and parental anxiety about the Covid-19 vaccination of students at SDIT Nurul Fikri, Makassar City, and the alternative hypothesis (Ha) was accepted, confirming that there is a relationship between knowledge and parental anxiety about the Covid-19 vaccination of students at SDIT Nurul Fikri, Makassar City."

Conclusion

It can be concluded that there is a significant relationship between knowledge and the level of parental anxiety regarding Covid-19 vaccination for students at SDIT Nurul Fikri Makassar City with a value of p=<0.001 with a result of α<0.05. The most influential variable is knowledge with an OR value of 13.783.

Recommendations

In this section, the researcher would like to provide some suggestions based on the results of the research and discussion. first, the importance of the government's role in health promotion to provide accurate information about Covid-19 and its vaccines, especially children's vaccines to parents in a communicative manner and eradicate hoaxes. second, the role of health worker services helps explain the good relationship between doctors and patients regarding the side effects and benefits of the co-19 vaccine. Third, cooperation between the government and schools in supporting COVID-19 vaccination activities so that herd immunity is formed. Lastly, this research is expected to continue to be developed with a variety of samples and populations for future researchers.

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