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# Children's Perception and Belief about Medicines: Effectiveness and Its Autonomy

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## Abstract

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**Keywords:** Perception; Medicine efficacy; Compliance; Autonomy; Children

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**BACKGROUND:** The use of medicines in children is usually always under the supervision of parents. Children are considered not to understand the concept of medicine properly. Children's perceptions of medicine are mostly formed from everyday experience. This can have an impact on children's beliefs about medicines which they are also required to be active and rational medicine users.

**AIM:** This study aims to look at children's perceptions and beliefs about medicines, especially in the perspective of medicine efficacy and children's autonomy in using them.

**METHOD:** The study was conducted with an analytical method with a cross-sectional approach using a questionnaire instrument in grade V elementary school children in Padang City, Indonesia. The total sample size obtained was 503 students.

**RESULTS:** Children still think that medicine efficacy is influenced by taste, colour, size, medicine price, a place to buy medicine and how to get medication. 10.1% of children have stored the medicine at home, and 48.5% of children always depends on waited for their parents when they wanted to take medicine. Regarding children's access to medicines, 11.5% of children have bought their own over-the-counter medicine to a pharmacy or medicine store without the parents' knowledge. 31.4% of children have taken medicine at home without the parents' knowledge.

**CONCLUSION:** The results of this study indicate that children's perceptions of medicine efficacy are still very limited. Even though the child has used the medicine alone in a limited way, the child's autonomy in using the medicine still needs to be monitored by the parent. Therefore, this is the reason for the need for medical education given to children, especially in schools as an integral part of health education.

## Introduction

The use of medicines both for medicinal purposes and for prevention has become a habit for everyone, including children [1], [2], [3]. Unlike adults, the use of medicines in children is usually always under the supervision of parents. In general, parents see that children do not understand the concept of medicine enough that at times, can harm children [4]. Therefore, various preventive measures are taken to protect children from medicines. For example, the message "keep out of reach of children" which is often found on medicine packaging for children.

Conversely, children also tend to look at

medicines very carefully. Some studies have found that children know that medicines can be harmful to the body because they cause harmful effects. Older children are usually more able to understand the risks of these adverse effects than younger children. This is related to the level of cognitive development of children which is in line with their age level [5].

Children get information about medicines generally only from experience using medicines or from observing families using medicines. Experience that is not good at using medicines can affect their behaviour later. A study showed that 79% of children stated that the taste of the medicine was the main factor that made them unwilling to take medication [6]. In this way, all children build confidence and develop

expectations about medicines that will affect their future behaviour in the use of medicines. Therefore, children need basic information about medicines before they use them independently [7]. Some medical information may be obtained by children from various sources such as parents, teachers or professionals such as pharmacists and doctors [8], [9], [10]. Some are also from media such as television, the internet or directly from medicine packaging. But the information they obtain is still very limited and fragmented, so it has not been able to improve children's understanding of medicines.

A study shows that medicine advertisements such as on TV do not have an effect on increasing children's knowledge about medicines [11]. Some studies show that children's knowledge of medicines is still very superficial [5], [10], [11], [12]. This is certainly very worrying because it can have a bad impact on children's attitudes or behaviour about medicines [13]. Medicines can be viewed as something that is not at risk for health, so children are vulnerable to drug abuse or medicine incidents. Some medicine incidents can occur such as medicines that are mistakenly taken, excessive doses, etc. [14], [15]. Or it could be the other way around that medicines are seen as something very dangerous so that children become afraid of taking medication. Children according to their age often perceive medicines based on their physical appearance. As a result, due to the limitations of this knowledge, children often associate the efficacy of the medicine with formulation factors and the way or source to obtain it. Several studies show that children assume that the efficacy of the medicine is related to size, taste, source obtained etc. [16]. This wrong perception if it is not corrected, it can affect the behaviour of children in using medicines, especially when they grow up. Moreover, children who have used their own medicine through self-medication practice. Self-medication practices have begun when children aged 10-14 years and many of them without the knowledge of parents [17].

An international survey conducted in 28 countries stated that children had already practised self-medication especially for medication for headaches [2], [13]. Children are mostly a good reflection of the culture that surrounds them. Behaviour related to medicines and self-care develops in the early stages of their lives. Therefore, studying the knowledge and use of medicines in childhood is very important to increase children's trust in the concept of benefits and risks of medicine [18]. This kind of thing will certainly have a decisive influence on the behaviour and use of medicines later in the adult stage.

This study aims to look at children's perceptions and beliefs about medicines, especially in the perspective of medicine efficacy and children's autonomy in using them.

## Material and Methods

### Study Design

This research was conducted in the city of Padang, West Sumatra Province, Indonesia from June to December 2018 with a cross-sectional survey method. The location of the study was conducted in 10 primary schools spread over 3 sub-districts namely North Padang, South Padang and Bungus Teluk Kabung which represented the different socio-economic status of the community, namely people living in the city centre, middle and suburbs. The sample in this study was elementary school-age children in class V. Sampling uses the stratified random sampling method.

The first stage is the selection of schools using the probability proportional to size (PPS) method, which is based on a database of the number of elementary school students in the sub-district as a size that is used as the basis for opportunities in selecting samples. From selected schools, student samples were selected using the simple random sampling method. The sample size was calculated using the Lemeshow formula to obtain as many as 503 samples.

The inclusion criteria from the sample are domiciled in the city of Padang, fifth-grade elementary school students; children have used medicines because of illness or other reasons and are willing to become respondents. Whereas the exclusion criteria are moving schools or houses outside the city of Padang and difficult to contact

### Instrument

This research is a quantitative study using an instrument in the form of a closed questionnaire to see children's perceptions and beliefs about medicines and their use. This questionnaire was made based on similar research that has been previously modified, which has been adapted to the conditions in Indonesia. The questionnaire was validated at the research location, namely in the city of Padang, Indonesia. This questionnaire consists of 3 parts, namely the first part contains the sociodemographic characteristics of the respondent, the second part contains the perceptual aspects, and the third part contains aspects of trust or behaviour. In the perception, section consists of 2 subsections, namely medicine efficacy related to medicine formulation and medicine efficacy related to the price and source of the medicine obtained. For the belief or behaviour section divided into 3 subsections, each of which is access gets medicine, saves medicine at home and autonomy takes medicine.

Perception is answered with one of 3 choices, namely yes, no and doesn't know. Whereas the part of trust or behaviour consists of answers never, never or

do not know. Specifically, for answers in the perception section, for each correct answer given a score of 1 and the wrong or not knowing given a score of 0. The draft questionnaire that has been prepared, asked for opinions of community pharmacists and clinical pharmacy related to content validation and then validation test 30 elementary school students. Before the research began, the research team who served as enumerators were gathered to be given training on how to collect data on students. Filling out questionnaires by students is done in the classroom with the help of enumerators. Completing this questionnaire takes about 30 minutes.

### Data analysis

The collected data is coded and then sent to the SPSS database for Windows version 21. Univariate analysis (descriptive) includes frequency, percentage, average and standard deviation. Bivariate analysis between dependent variables (perceptions) and independent variables (respondents' sociodemographic characteristics) was determined using the Chi-Square test. If the Chi-Square test does not meet the requirements, the Kolmogorov Smirnov test is used. Data is normally distributed. The level of significance was set at  $p < 0.05$ .

### Ethical considerations

Ethical approval was obtained from the Ethics number: 464/KEP/FK/2018 Committee of the Medical Faculty of Andalas University, Padang. Each parent of the student selected as a sample was also asked for his consent to permit his child to be included in this study. Before starting the research, prior permission was submitted to the Education Office of the City of Padang, West Sumatra. After that, a research implementation letter was submitted to each selected school through the Chair of the Public Health Study Program, Faculty of Medicine, Andalas University.

## Results

Sociodemographic characteristics of respondents are shown in Table 1.

Respondents, in general, were children aged 10-11 years (73.4%), male sex (52.3%) and 43.3% had received 10 (ten) major achievements at school. Respondents also generally reside in the city centre, namely in North Padang and the middle region in South Padang (80.0%). Judging from the income of his family, 48.1% of respondents came from families that had a moderate income. Meanwhile, 32.6% of respondents have family members who work in the health sector. People who are considered the most

accompanying children when they are sick are 85.3%. Also, 24.7% said that they had been hospitalised.

**Table 1: Characteristics of sociodemography of children**

Sociodemography of respondents	Variables	Amount	%
Age	10 – 11	369	73.4
	12 – 14	134	26.6
Gender	Female	240	47.7
	Male	263	52.3
Residence	North Padang	201	40.0
	South Padang	201	40.0
	Bungus Teluk Kabung	101	20.0
Family income	≤ Rp 2.500.000	197	39.2
	Rp 2.500.000 – 5.000.000	242	48.1
	≥Rp 5.000.000	64	12.7
Families as health workers	Yes	164	32.6
	No	339	67.4
Companion during illness	Father	46	9.1
	Mother	429	85.3
	Another Brother/Sister	28	5.6
Sources of information for medicine	Parents	335	66.6
	Friends/another people	14	2.8
	School Teacher	48	9.5
	Medicines advertisement in the newspaper	10	2.0
	Medicines advertisement on TV	67	13.3
	Internet	29	5.8
Achievements	Top 10	218	43.3
	Not included in the top 10	285	56.7
Have been treated at the Hospital	Ever	124	24.7
	Never	379	75.3

For medicine information, children get more from their parents, which is around 66.6%.

The children's perceptions of medicine efficacy can be seen in Table 2. Here, perceptions of medicine efficacy were divided into 2 types, namely children's perceptions of the relationship of efficacy to aspects of medicine formulation and children's perceptions of the relationship of efficacy to aspects of price and source of medicines obtained. The medicine formulation here is in terms of taste, colour and size. From this study, it was found that children's perceptions of medicine efficacy, in general, seemed very superficial. Only 46.1% of children whose perceptions are correct; there is no relationship between the efficacy of the medicine and the taste of the medicine. As many as 39.4% said they did not know what the efficacy relationship with medicine colour was, as well as 36.6% stated that they did not know what the efficacy relationship with tablet size.

**Table 2: Child's perception of medicine efficacy**

Statement	Amount (%)		
	Yes	No	Don't know
Efficacy relationship with medicine formulation			
The taste of the medicine (sweet or bitter) affects the efficacy of the medicine	133 (26.4)	232 (46.1)	138 (27.4)
Medicine color (colored or white) affects medicine drug efficacy	113 (22.5)	192 (38.2)	198 (39.4)
Tablet size (large or small) affects medicine efficacy	142 (28.2)	177 (35.2)	184 (36.6)
Efficacy relationships with prices and sources of medicine drugs are obtained			
Medicine prices (expensive or cheap) affect medicine efficacy	162 (32.2)	218 (43.3)	123 (24.5)
Where to buy medicine (pharmacies or medicine drug stores) affect the efficacy of the medicine	247 (49.1)	144 (28.6)	112 (22.3)
How to get medication (using prescription or without a prescription) affects the efficacy of the medicine	358 (71.2)	80 (15.9)	65 (12.9)

However, only 38.2% of the perceptions were true that there was no correlation between efficacy with medicine colour and 35.2% stated that there was no relationship of efficacy with tablet size. Regarding the medicine efficacy relationship with medicine prices, 43.3% stated that it was not related to the efficacy with medicine prices, and then 49.1% stated

that the place to buy medicines was related to medicine efficacy and almost most children. 71.2% stated that how to get the medicine that is, by prescription or without a doctor's prescription, is associated with medical efficacy.

Comparison of the results of this study with previous studies specifically for taste relationships and medicine size is presented in Table 3. From Table 3, the results are similar to previous studies.

**Table 3: Comparison of several results of studies on the perception of medicine in children in several countries**

Statement	% Statement correct answer from the statement				
	Results of this study	Malaysia (Dawood 2015)	Armenia (Bush 2010)	Nepal (Bush 2010)	USA (Bush 2010)
The taste of the medicine (sweet or bitter) does not affect the efficacy of the medicine	46.1	37.7	30	57	63
Tablet size (large or small) does not affect medicine efficacy	35.2	66.1	35	55	22

\*Age of children in Malaysia 11-12 years. Armenia 10-13 years. Nepal 9-13 years and USA 10-12 years. This study alone in children 10-14 years.

To see the relationship between the sociodemographic characteristics of respondents with perceptions about the efficacy of the medicine above, bivariate analysis was performed using the chi-square test. The results of the analysis are presented in table 4, and the results show that there are only two variables that have a significant relationship ( $P < 0.05$ ) with the child's perception of the efficacy of the medicine, namely the area where the respondent lives and the child companion when sick.

**Table 4: Sociodemographic relationships with respondents' perceptions**

No.	Variables	Mean (SD)	Median (min-max)	P-value
Age	10-11	2.11 (1.58)	2.0 (0-6)	0.444
	12-14	1.96 (1.36)	2.0 (0-6)	
Gender	Female	2.08 (1.43)	2.0 (0-6)	0.752
	Male	2.07 (1.61)	2.0 (0-6)	
Residence	North Padang	2.42 (1.59)	2.0 (0-6)	0.000*
	South Padang	1.86 (1.48)	2.0 (0-6)	
	Bungus Teluk Kabung	1.81 (1.35)	2.0 (0-6)	
Family income	≤ Rp 2.500.000	1.94 (1.46)	2.0 (0-6)	0.132
	Rp 2.500.000 – 5.000.000	2.10 (1.54)	2.0 (0-6)	
	≥ Rp 5.000.000	2.38 (1.65)	2.0 (0-6)	
The family as a health worker	Yes	2.12 (1.60)	2.0 (0-6)	0.535
	None	2.05 (1.52)	2.0 (0-6)	
Companion during illness	Father	2.78 (1.49)	3.0 (0-6)	0.000*
	Mother	1.97 (1.51)	2.0 (0-6)	
	Another Brother/Sister	2.54 (1.48)	2.5 (0-5)	
Information source for medicines	Parents	1.94 (1.48)	2.0 (0-6)	0.068
	Friend/another people	2.71 (1.54)	3.0 (0-6)	
	School teacher	2.19 (1.75)	2.0 (0-6)	
	Medicines advertisements in newspaper	1.90 (1.52)	1.5 (0-4)	
	Medicines advertisements on TV	2.43 (1.63)	2.0 (0-6)	
Achievements	Internet	2.31 (1.20)	2.0 (0-5)	0.725
	Top 10	2.09 (1.49)	2.0 (0-6)	
	Not include top 10	2.06 (1.56)	2.0 (0-6)	
Having been treated in a hospital ever	Ever	2.02 (1.43)	2.0 (0-6)	0.933
	Never	2.09 (1.56)	2.0 (0-6)	

Children living in the downtown area of Padang City showed a higher average perception score of 2.42 (SD 1.59) on a scale of 6 than children living in the suburbs of South Padang and Bungus

Teluk Kabung, respectively 1.86 (1.48) and 1.81 (1.35). Whereas the child accompanied by the father when sick had a higher average perception score of 2.78 (1.49) than if accompanied by mothers and other siblings, namely 1.97 (1.51) and 2.54 respectively (1.48).

The child's behaviour in taking medication can be seen in the results in Table 5. The behavior of children taking medicine in this table are grouped on 3 things, the behaviour of how children access to medicines, store medicines at home and autonomy children using medicines. Almost most of the children, which amounted to 83.9%, said they were obedient in taking medication. Only 10.1% said that they had never obeyed their medication. Whereas related to the autonomy of children in taking medicine. The percentage was almost the same, namely, some children (48.5%) stated that they had to depends on their parents when they wanted to take medicine and others (47.1%) also stated that they did not always depend on their parents when you want taking medication.

**Table 5: Child behaviour in medicine**

Statement	Amount (%)		
	Yes	No	Don't know
Medicine saving behaviour			
Have children ever refused (not obeyed) to take medicine when they were sick?	51 (10.1)	422 (83.9)	30 (6.0)
Autonomy for medicine use			
Do children always depend on parents when taking medication	244 (48.5)	237 (47.1)	22 (4.4)
When sick, children have taken their medication without being accompanied by parents or family	239 (47.5)	233 (46.3)	31 (6.2)
Access to get medicine			
Have children ever bought over-the-counter medicine at a pharmacy or medicine store, without the knowledge of parents?	58 (11.5)	428 (85.1)	17 (3.4)
Have children ever taken the medicines themselves that will be taken from the medicine storage, without being told by parents?	158 (31.4)	316 (62.8)	29 (5.8)

The same pattern of answers is also shown in statements about the experience of children taking their medication without being accompanied by parents or family. As many as 47.5% of children stated that they never took medicine without being accompanied by a parent, but as many as 46.3% said they had taken their medication without being accompanied by a parent. Regarding children's access to medicines, the results showed that 85.1% of children never bought their over-the-counter medicines to pharmacies or medicine stores without the parents' knowledge even though 11.5% of them had instead bought over-the-counter medicines without parental knowledge and 10.1% had kept it at home.

As many as 62.8% of children also stated that they never took their medication at home without the parents' knowledge but instead 31.4% had taken medicines at home without the parents' knowledge.

## Discussion

Medicine perception in children, especially about medicine efficacy, is usually formed when looking at the physical appearance of the medicine itself. Children's perceptions of medicine efficacy can be explained in the following two categories. Namely, children's perceptions of the relationship or relationship of efficacy with formulation factors and medicine sources obtained.

The formulation factor is in the form of physical attributes consisting of taste, colour and size. The taste, colour and size of medicine has no relation to the efficacy or efficacy of the medicine. The percentage of children who attributed the efficacy of the medicine to their taste, colour and size were 26.4%; 22.5% and 28.2%. These results are lower than those found by previous researchers in Spain, namely 61.3% for taste and 53.0% for size [8]. Older children know that medicine efficacy is not influenced by the colour of medicine [8]. The results of other studies also support these findings that many children assume that taste, colour and size are related to medicine efficacy [16].

While the relationship between the efficacy of the medicine and the price and source of the medicine can be explained as follows. A total of 43.3% of children stated that there was no relationship between the price of the medicine and the efficacy of the medicine. In contrast, 32.2% of children stated that prices affected the efficacy of the medicine. Other researchers found the same fact that some children believe that prices influence the efficacy of medicines [16].

However, for the relationship of efficacy with the source of the medicine obtained, the children turned out to be more confident that the official place of medicine such as the pharmacy influenced the efficacy of the medicine which was equal to 49.1%. 37.8% of children in Spain also stated the same [8] and by other researchers [16]. Likewise, getting prescription medication or without a doctor's prescription according to the child. This factor has the greatest effect on medicine efficacy, which is 71.2%. The same results were also shown by previous studies that 60.7% of children stated that prescription medicines were better in efficacy [8]. This shows that the child's trust in the doctor is higher so that the child believes that each medicine given by a doctor is very helpful in healing the disease. If the results of this study are taste and size factors compared to some previous studies [19] can be summarised as in Table 3. From this table, it can be concluded that children's perceptions of each country are different about medicine efficacy. This difference can be caused because of the method of research conducted. However, the results obtained from this study are not very different from the results of previous studies.

From this analysis, two factors significantly influence ( $P < 0.05$ ) on the respondents' average perceptions of medicine efficacy. This factor is the address of the respondent's residence and the child's companion when sick. Children living in the city centre who described a high socio-economic status (SES) in North Padang had a better perception than children living in the suburbs with low SES status, namely in South Padang and Bungus Teluk Kabung. Previous research has shown that SES affects children's level of knowledge about medicines [10], [19].

Child companion when sick has a role in shaping the child's perception of medicine efficacy. Parents are the main source of medical information from children as in Table 1, so it is reasonable that children accompanied by parents when sick have an average score of perception of medicines that is better than other siblings. Overall it can be concluded that children's perceptions of medicine efficacy are still very superficial. This can be seen from the very small average score of perceptions, which is around 2 on a scale of 6. This is thought to be due to the low and limited knowledge of children about medicines. Nearly all studies conducted by other researchers about children's knowledge related to medicine show the fact that children's knowledge of medicines is indeed very limited and fragmented [8], [9], [10], [12], [20], [21], [22]. The low level of children's knowledge can also have an impact on children's beliefs in medicine. In this research, children's trust in medicines is explained by the behaviour of children using medicines and how children can remember the medicines they have used.

Children's behaviour in using medicines here can be categorised into three subsections, namely medication adherence, the autonomy of medicine use and access to obtaining medicines. In Table 5, it can be seen how children's behaviour towards medicines. The percentage of children who answered did not know small enough that was 3.4-6.2%. This certainly illustrates that children can still remember their experiences of using medicines. In general (83.9%) children said they were never stored the medicine at home. Only about 10.1% of children who never store the medicine at home

This shows that children are not afraid of medicines and can realise that medicines can cure if used regularly. This is in line with other studies that show that medicines should be taken when sick and when needed [12], [16], regarding the autonomy of children in using medicines. Some children state that they are dependent on their parents and others do not depend on their parents. The percentage comparison is almost the same between the two. As many as 48.5% of children always depends on parents or their parents when they are taking medicine, and on the other hand, 47.1% of children say they don't always wait for their parents when they are taking medication. As many as 47.5% of children never took their medication without the knowledge of their parents and

as much as 46.3% said they had taken their own medication without the parents' knowledge. Judging from these results it can be concluded that the autonomy of children in using medicines is quite large.

In developed countries like the United States, children are convinced of themselves as active medicine users, and they are reported to have more autonomy in using medicines. Another study said that 44% of children aged 9-16 years always carry their medicine when summer camp activities and 25% of them aged 9-12 years use it themselves without the knowledge of parents [5], for access to medical treatment, almost most of the children. Around 85.1% stated that they had never bought over-the-counter medicines without the parent's knowledge. However, there are around 11.5% of children who have bought over-the-counter medicines themselves. The behaviour of buying medicines on their own if not accompanied by sufficient knowledge is very vulnerable to harming children, especially with risks such as the occurrence of side effects or possibly medicine poisoning.

To access medicine at home, children are generally equal to 62.8%, never taking their own medicine from the place of storage. However, there are around 31.4% of children who have taken their medication without parents' knowledge. This shows that medicine storage at home is not too strict in its supervision and can be accessed by children. The same thing was also shown by other researchers [10], [17], [19].

In line with the results above where children are more dependent on parents when using medicines. The same thing is shown by the child's ability to remember the medication he has used. Children think that the medical problem is entirely a matter of parents so that children feel they do not need to remember or know what medicines they are taking. In contrast, in developed countries like Finland, children are very familiar with medicines [2], [12].

Approximately 13.3% of children get medical information through TV advertisements which are the second-largest source of medicine information after parents as noted in Table 1. While in Finland, children generally receive medicine information from professionals such as pharmacists and doctors and media such as the internet and medicine packaging [10], [12], [20].

Unlike in Greece, children get a lot of medical information from their school teachers [10]. Also, children who have experience using medicines when sick usually know the name of a commonly used medicine [10], [23]. This has to do with the limited knowledge of children about medicines. Previous studies state that children knowledge of benefits, risks and use of medicine are still low and very limited [24].

Based on the results above, it can be

concluded that the child's perception of the efficacy of medicine is still very superficial. Children cannot understand that the taste, colour, size, price, place of purchase and how to get the medicine are not at all related to the efficacy of the medicine. Likewise, the autonomy of children in using medicines cannot be completely removed without the knowledge of parents.

The limitations and fragmentation of children's knowledge about medicines can have an impact on the child's low belief in medicines that can be beneficial on the one hand and on the other, they can be harmful to the body. Therefore, we recommend that it is very important to apply medical education to children, especially in schools. With this medicine education children are expected to be able to obtain sufficient knowledge about medicine so that it can become a provision for children to fulfill the demands of being active and rational medicine addicts. In the end children can also be expected to be agents of change for their families in using rational medicines.

*Limitation of research:* This research is only limited to children who attend elementary school in grade V only so they have not described school children in general.

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