

Improving the use of *Curcuma aeruginosa* Roxb. as anthelmintic for children in Bogor Regency

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Selma Siahaan, Rini Sasanti Handayani, Ni Ketut Aryastami

Research and Development Center for Humanities and Health Management, National Institute of Health Research and Development, Jakarta, Indonesia

Corresponding address: Selma Siahaan
Email: selmasiahaan@yahoo.com

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Abstrak

Latar belakang: Tingkat kecacingan pada anak di Indonesia masih tinggi, untuk itu diperlukan pendekatan intervensi kesehatan masyarakat yang tepat. Tulisan ini bertujuan untuk meningkatkan pengetahuan, sikap dan perilaku (PSP) ibu dalam hal mengobati sendiri penyakit kecacingan dengan menggunakan *Curcuma aeruginosa* Roxb., bahan alam yang mudah ditemukan di Indonesia.

Metode: Studi intervensi yang terdiri dari pengukuran terhadap tingkat PSP ibu (77) yang memiliki anak (80) usia 3 sampai 10 tahun, dimana dilakukan pemeriksaan kecacingan pada tinja anak-anak tersebut. Kemudian pada anak-anak yang terbukti menderita kecacingan diobati dengan minuman *Curcuma* dengan melibatkan ibu. Terhadap ibu juga diberi penyuluhan dan diukur kembali PSP nya terkait kecacingan dan pengobatan kecacingan dengan *Curcuma*. Tempat pengambilan sampel di Posyandu, desa Cibungbulang kabupaten Bogor.

Hasil: PSP ibu meningkat setelah mereka diberikan penyuluhan kecacingan dan pengobatannya a.l pengetahuan bahwa kecacingan adalah penyakit menular (42,90% menjadi 84.40%) dan makanan yang kurang matang dan kotor menjadi jalan masuk bagi cacing kedalam tubuh (67,50% ke 92.20%), dan tanaman obat dapat digunakan untuk mengobati kecacingan (45.50% menjadi 79.20%).

Kesimpulan: Edukasi kesehatan yang langsung melibatkan ibu untuk melakukan pengobatan kecacingan dengan *Curcuma* terbukti efektif untuk meningkatkan PSP sekaligus menyembuhkan kecacingan pada anak. Hasil studi menyarankan bahwa program pengobatan kecacingan pada anak dengan *Curcuma* dapat dilakukan pada program pengentasan kecacingan dan tidak perlu didahului dengan test pengujian kecacingan pada feces karena *Curcuma* terbukti efektif untuk pengobatan kecacingan, aman dan meningkatkan nafsu makan anak. (*Health Science Journal of Indonesia* 2017;8(2):95-101)

Kata kunci: pengentasan kecacingan, *Curcuma aeruginosa* Roxb., anthelmintic, ibu dan anak

Abstract

Backgrounds: Worm infections in Indonesia are still high, it needs an appropriate public health intervention. This study aims to improve the knowledge, attitude and practice (KAP) of mothers about self-medication of worm infections using *Curcuma aeruginosa* Roxb., a natural plant easily found in Indonesia

Methods: Study intervention involving the assessment of knowledge, attitude and practice of mothers (77) whose children (80) were feces tested to find out worm infections on their children. The children who confirmed suffering from worm infection were joined *Curcuma* treatment. Health education related to worm infections and its treatment with *Curcuma* were delivered to mothers. Then PSP of mothers were assessed again using the same questionnaires as before. Samples were collected from two Village Integrated Health Post in Cibungbulang village Bogor Municipality

Results: Before-after intervention showed, the KAP of mothers increased after they got health education & information i.e. mothers knew that worm infections was a contagious disease 42.90% to 84.40%, mothers knew that dirty or poor cooked food is the way of worm get inside into the body 67.50% to 92.20% and mothers knew that medicinal plant is one of kind treatment for worm infections 45.50% to 79.20%.

Conclusions: Health education together with *Curcuma's* treatment improved mother's KAP and it was also cured children from worm infections. It is recommended that deworming program for children with *Curcuma* should be appropriate without examination of stools since *Curcuma* effective, safe and may stimulate children's appetite. (*Health Science Journal of Indonesia* 2017;8(2):95-101)

Keywords: deworming, *Curcuma aeruginosa* Roxb., anthelmintic, mothers and children.

One of the contributors of the malnutrition and high morbidity in Indonesia is worm infections. Based on available data from Ministry of Health, in 2008 the prevalence of worm infections in Indonesia was 33.1% with the wide range from 0 to 60.98%. Several researches showed this figure tend to remain constant until 2012.^{1,2,3,4}

Worms are passed to person through contact with contaminated feces, for instance eating of poorly cooked flesh of animal contaminated with feces. Some worms may cause diarrhea in addition to weakness and progressive anemia. It may creates and worsens malnutrition, and in some cases can lead to heart failure and death.^{3,5,6} To combat worm infections, the appropriate public health program is needed.

Deworming children by medicinal plant is one of the easiest, cheapest and most effective public health interventions. Deworming would lower anemia levels, and support their growth and their ability to be more focus, in studying and playing; the children more protective to get sick and would have much healthier.⁵

Mothers have the important role in preventing child's health. Several researches showed that there is an association between mother's education and children's health state.⁷ If mothers have knowledge about worm infection, purposively they will put a better efforts to prevent their child to free on such infections through a better or healthier life style.² The effective health education should be focused, comprehensive and delivered with communicative languages. It will empower community to solve their health problems by themselves.⁸

People who live in rural areas have poor knowledge on basic health and hygiene practices, poor access to health facilities, as well as clean water and decent accommodation.² Accordingly, some of them may not realize that they are susceptible of worm infections.^{3,5,6} So that the government need to focus on the deworming beneficent target. Unfortunately, the regional/local government has limited resources i.e. budgets, so that the availability of the medicinal plants in their surrounding can be a good and benefitted solution for their worm problems.

Curcuma aeruginosa is a natural plant which is easy to find in Indonesia, in house yard and along the street and its rhizomes are sold in the market with the cheap price (Rp.300,-/100gr). Its local name is *temu ireng*. Traditionally, our great grand parents have used *Curcuma* as an anthelmintic or as an appetite stimulant. Clinical tests to adults and children proved that the rhizome of *Curcuma aeruginosa* is the most effective anthelmintic among other medicinal

plants in Indonesia.^{9,10} The toxicity rate is also very low. In vitro research showed that the rhizome juice suppressed the spontaneous contraction of rabbit's jejunum.¹¹ Other researches state that the *Curcuma's* extract possessed spasmolytic effects in the rat intestine and uterus and they also showed that the immersion of *Ascaris* in *Curcuma* solution, concentrate 60% for 24 hours, killed 68% *Ascaris*.^{9,12} Another research found that extracted *Curcuma* consists of essential oil and active substances. These essential oils have work mechanism similar like acetylcholine antagonize to suppress the contraction of the smooth muscles.¹³

Koesdianto Tantular conducted clinical test of *Curcuma's* rhizome in Surabaya towards 79 students from elementary school, comparing treatment of worm infections using 15 ml (25 gram) *Curcuhita moscata* versus *Quiscalis indica*, *Curcuma heyneana*, *Curcuma aeruginosa*, and Mebendazol 500 mg. The results found that only *Curcuma aeruginosa* showed the equivalent CR (Composite Reliability) as compared to Mebendazol with the least side effects.¹⁴ Other research also found that *Curcuma aeruginosa* was the most effective anthelmintics compared to other medicines in Indonesia.^{6,9,10,11}

However, the use of *Curcuma aeruginosa* as herbal medicines has not yet popularized and well understood. The community have not known that *Curcuma* is has an anthelmintic remedy.

This study aims to improve mothers' knowledge, attitude and practice on child's medication on worm infections using easily available plantation of *Curcuma aeruginosa* Roxb.

METHODS

Type of study was a community intervention taken place in Cibungbulang municipality, Bogor, West Java. Cibungbulang is one of backward areas with poor hygiene and sanitation condition. Based on health district reports in 2005-2006 the prevalence of worm infections was >50%. Before the study began, we did the orientation in order to confirm that the prevalence of worm infections for children in Cibungbulang was about 50%. We tested several children's feces, and the result was 25 of 45 children confirmed suffering from worms infections, in other words, ± 56% of children suffered from worm infections. This area was also chosen as *Curcuma* is easy available and grew in this area. Samples were taken from two Village Integrated Health Posts or

Posyandu during 3 months, of intervention, that was May to July 2009.

The study populations were mothers at Cibungbulang villages in 2009. Samples for this study was mothers with children age 3 to 10 years old by the reason these children were more likely to be exposed by dirty ground area or open environment. The number of samples calculated by using the following Lemeshow formula

$$n = \frac{Z^2 \cdot P(1-P)}{1-\alpha/2} \cdot d^2$$

We used the confidence interval 99% & deviance 10%. The proportion is 0.50. Based on this formula, the sample calculation result is 167, which means the minimal samples should be 167 mothers. In this study, the total sample at the beginning were 189 mothers with the total children of 204. After the feces examination, 91 children confirmed worm infected. The number of eligible mothers became 80 persons. However, only 77 mothers including 80 children continued join the study.

The flow chart of samples number since the beginning until the end can be seen in the figure 1.

Data collection process:

Mothers whose children were participating stool test were asked to participate the KAP interview on worm infections. Before the interview was started, the mother has to signed for the informed consent to confirm their participation. Structured interviewed was conducted involving 16 questions with yes or no type of answers. Mother’s characteristics - were identified such as age, education, job, and monthly household expenditures.

Then we delivered health education and information to these mothers whose children approved suffer from worm infection. The materials of health education about anything related to the worm infections including medicinal plants for worm treatment. Mothers were involved in their child’s treatment using *Curcuma* namely accompanied their children to drink the *Curcuma* at Posyandu in 3 (three) consecutive days. Mothers were also asked to bring their children’s feces to be tested to the primary health care. Researchers presented the result of the stool examinations to the mothers together with delivering health related promotion and information Furthermore, they were asked to fill the same questionnaires as before about the KAP of worm infections.

Curcuma drink preparation: Materials: Rhizomes of *Curcuma aeruginosa* Roxb. were collected from local market in Cibungbulang village. The rhizomes were cleaned, washed and minced with knife. The minced *Curcuma*’s were boiled with enough water and sugar. The concentrate of *Curcuma* drink was 10 ml equal to 10 gram fresh rhizome for children age 3 to 5 year and 25 ml equal to 25 gram fresh rhizome for children above 5 years old. The *Curcuma* drink was given to children one time a day along 3 days.¹⁴ In this study the *Curcuma* drink prepared by researchers together with cadres and mothers.

At the end of the study we gave the mothers the *Curcuma* rhizomes and asking them to plant the rhizomes at their house yards.

Data Analysis: all data were analysed statistically using SPSS ver.12.0. We present descriptive and bivariate using chi-square test.

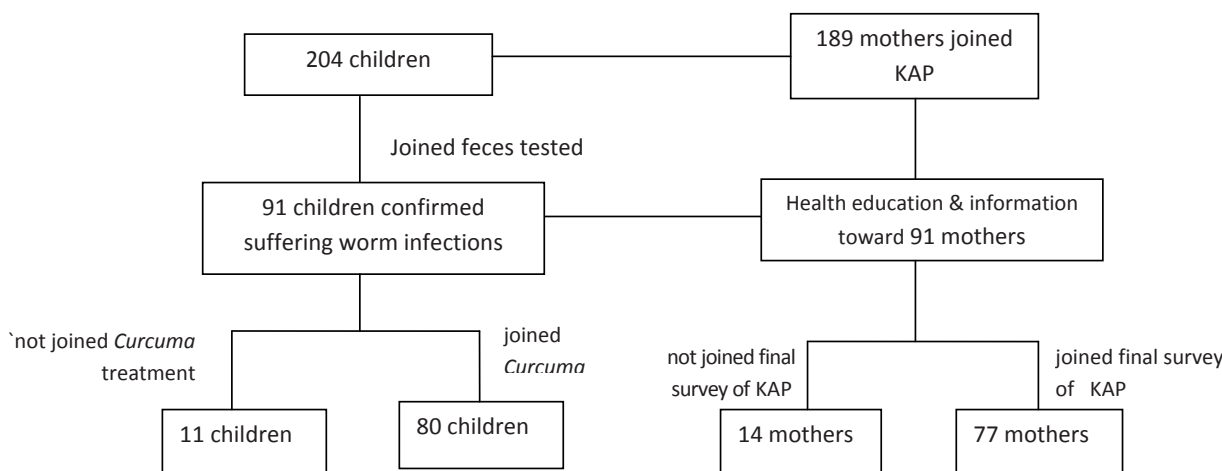


Figure 1. Flow chart of the samples no. and study process

RESULTS

The average age of mothers was range from 19 to 49 years old and their household expenditures range from Rp. 300.000,- to Rp. 2.000.000,- per month. Table 1 shows that most mothers had low education of elementary schools and being a housewife. Majority of them spent Rp. 600.000,- per month for their household expenditures.

Samples number of children who confirmed suffered from worm infections was 91 out of 204 children (44.60%) and 80 of these children joined *Curcuma* treatment and post feces tested. Number of children who recovered from worm infections after taking *Curcuma*

treatment was 76 out of 80 children (95%). Table 2 shows the proportion of characteristic of children.

Generally, the KAP of mothers related to worms infection and how to treat their families to be free from worms infection increased after they got health education and information, for example, formerly only 52% mothers knew that the way of worm get inside into the body can be through dirty/poor cooked meals, then after intervention there were 71% of mothers knew about it. In addition from 14 to be 68% of mothers knew that *Curcuma* can treat their families when suffering from worms infection. The KAP results of the mothers, either pre and post intervention, can be seen in Table 4.

Table 1. Mode of characteristic of mothers (n=77)

Characteristic	Mode (%)
Age	26 & 35 years old (15.6%)
Education	Elementary (62.3%)
Occupation	Household (96.10%)
Household Expenditure (Rupiah)	Rp.600.000,- (26.00%)

Table 2. Proportion distribution of most characteristic of children

	n	Percentage	
		Male	Female
Children suffered worm infections	91	52.7%	47.3%
Joined <i>Curcuma</i> treatment (Post intervention)	80	50.0%	50.0%

Table 3. Mothers proportion of KAP before and after intervention

	Percentage		p-value
	Before	After n=77	
Knowledge			
1. Mothers have been heard about worm infections	84.40	97.40	0.012
2. Mothers know that worm infection is a disease	94.80	98.70	0.321
3. Mothers know that worm infections is a contagious	42.90	84.40	0.000
4. Knowing there is a relationship between cleanness with worm infections	90.90	96.10	0.321
5. The cause of worm infections:			
Dirty food	79.20	93.50	0.011
Poor cooked food	55.80	84.40	0.000
6. The way of worm get inside into the body:			
Via dirty/poor cooked meals	67.50	92.20	0.000
Via dirty/not boiled drink water	64.90	85.70	0.002
7. The symptoms of someone who suffers from worm infections:			
Difficult to concentrate	57.10	83.10	0.000
Easy to get sick	71.40	88.30	0.004
8. The prevention of worm infections:			
wash the hand with soap before eating	88.30	100	0.004
Attitude			
9. Mothers want their children free from worm infections	93.50	100	0.045
10. Mothers want to have a better knowledge about worm infections	92.20	98.70	0.346
Practice			
11. The respondent's children have been/are suffering from worm infections	51.90	96.10	0.514
12. Have given the worm medicines several times to the children	50.60	58.40	0.342
13. Kind of treatment that mothers have been done to the children who suffer from worm infections: giving herbal medicines/medicinal plants	45.50	79.20	0.000
14. Name of worm medicine that mothers have given to the children:			
Pirantel pamoat	28.60	22.10	0.148
Curcuma	18.20	88.30	0.308
Did not remember	35.10	18.20	0.131
15. Place to get the worm medicine:			
Small shop on the street	74.00	83.10	0.060
On the field (garden)	22.10	41.60	0.008
16. Economic situation is the reasons of mothers who did not give the treatment to their children	36.40	39.00	0.164

Note: P-value obtain from chi-square test

DISCUSSION

The intervention on knowledge improvements of mothers was able to increase mothers understanding on the worm infections as a contagious disease. They have become well understood that dirty environment as well as inappropriate food cooking could bring about infection caused by entering the worm's larva into our stomach. Previous study mentioned comprehensive health intervention and education can be a good way to enlarge people's knowledge.^{7,8}

Curcuma, a plantation that easily available, culturally acceptable and hence affordable has become a good type of herbal medicine. This study found, that the number of worm after it has been intervene with the herb has been reducing significantly. Several studies also proved that *Curcuma aeruginosa* is one of the most effective herbs for deworming.^{9,10} With regard to mother attitude and practice, this study found that the mothers can realized that *Curcuma* can help the children against worm infection

The economic reasons would become a good consideration to insist mothers in using *Curcuma* as a remedy to prevent worm's infection. The background characteristic showed that the household expenditures of their family mostly were about Rp.600.000,-/month. This figure was on area of poor people.¹⁵ The fact that mothers were not given the kids a worm medicines by the reason having no money should not be happening again in the future after they have got intervention as an impact of this study. This assumption should be applicable as has been proved by a study that *Curcuma* effective as anthelmintic can remove economic barrier.

The study showed that 91 of 204 children (45%) confirmed suffering from worm infections. In addition 76 of 80 children (95%) who joined *Curcuma* treatment confirmed curing from worm infections. The study supported previous studies state that *Curcuma* is effective as anthelmintic. Its essential oils that works effectively against worms.^{9,10,11}

Majority children who suffered from worm infection were 3 years old. In addition, ±78% of children was not going to the school. Generally, it is assumed that children who have already attended school would have a better knowledge & practice about cleanness & personal health.^{6,11} In addition, the majority education background of the mothers were only elementary school (70%), accordingly the knowledge of the mothers about worm infections, environment & personal health

were limited. However, the existence of posyandu with the dedicated community cadres helped them to improve their KAP related to their health. It is clear that public health intervention is able to change community's behavior on positive direction. This study shows that intervention by giving curcuma and health education can decrease the prevalence of worm infections among children. This can be a good model in Indonesia because it is possible to do, especially with posyandu cadres supports. The local government should maintain the existence of the community cadres who work voluntary for the VIHP. Cadres provide information and help to connect health and social support services, and to engage posyandu members to do improvement activities. Furthermore, the government should support the posyandu with budget and suitable facilities, such as computer, audio visual and mobile vehicle. These community cadres should also be trained with many health programs.¹⁶

Several references studies recommend that health education & information should be conducted comprehensively & intensively to mothers in enhancing their KAP related health.¹⁷ Health education is a tool to increase people's knowledge in addition to motivating community to keep their healthy life style. The improvement of mother's knowledge may stimulate the change of their attitude and practices in a positive way such as preventing disease occurrence.^{16,18} In this study the health education was delivered only with health presentation, discussion and demonstration. It did not involve the interpersonal communication and nice video audio visual such as short movies, symbols. etc. Those may lead to the better improvement of the KAP of mothers and the recorder can be a tool for repeating other same health education programs.

Sustainability of the use of *Curcuma* to prevent or cured worm infections in the community need to be strengthened. To gain sustainability a regular refreshment and or dissemination may needed, so that, the mothers and community get use and keep practicing this traditional herb as well as better sanitation until the incidence of worm infection is declined.⁸ The next programs can be carried out without feces tested as the *Curcuma* drink is safe, similar like ginger and tea.

Program on deworming has been implemented in Indonesia, the program mostly conduct at schools.^{6,19} However, the incidence of worm infection is still be in problem. As found out by this study, it seems

that delivering pills only through the school children may not enough, but changing behaviour from home through mothers' informal education should be considered as well. The study recommends that not only at school, deworming programs in posyandu should be one of its routine programs, because mothers and children under five years visit the posyandu regularly.²⁰

In conclusion, the use of *Curcuma aeruginosa* Roxb is potential remedy to medicate worm infections. This herb is easily available in the yard or market, economically affordable price and can be done without examination of stool. Dissemination information of this herb and its function through informal education to mothers and or community is considered to be an effective way to reduce the disease prevalence. This study showed that mothers knowledge improvement on worm medication using *Curcuma* was able to change their attitude and practice to healthier life style. In addition, the program of deworming children that conducted by government can be conducted by using *Curcuma*.

Ethical approval

Ethical clearance was provided by the National Commission of Ethics, National Institute of Health Research and Development, Ministry of Health-Republic of Indonesia.

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