

*Original article*

# **Quantitative Helmint Assessment (QHA) On Nutritional Status of Children and Stunting Events For Elementary Students in the City Of Makassar**

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## **Abstract**

**Objective:** to analyze the relationship between the Quantitative Helmint Assessment with nutritional status and the incidence of stunting in SD Bangkala III students in Makassar City

**Method :** This type of research is analytic observational using cross sectional design. Location This research was conducted at SD Bangkala III, Bangkala Village, Manggala District, Makassar City. 63 samples were taken using proportional stratified random sampling technique and simple random sampling. Quantitative examination is needed to determine the intensity of infection or severity of disease by knowing the number of eggs per gram of feces (EPG) in each type of worm.

**Results:** based on the measurement results of the helmint assessment for the mild category with the incidence of stunting and not stunting kneeling as many as 8 (38.0%), 13 (62.0%), respectively. In the measurement results, the moderate category with the incidence of stunting and non-stunting was 11 (38%), respectively. 13 (62%), while the results of QHA measurements for the severe category of knee stunting were 1 (25%), and 3 (75%), respectively. based on the measurement results of the helmint assessment for the light category with nutritional status of thin, normal and obese knees as many as 5 (23.8%), 13 (62.0%) and 3 (14.2%).

**Conclusion:** There is a significant relationship between QRA and nutritional status in elementary school students with p value (0.003), there is a significant relationship between QRA and the incidence of stunting with p value (0.022).

**Keywords:** *QHA, Ascaris, Trichuris, Nutritional Status, Stunting.*

## **Introduction**

Soil-borne worm infection in Indonesia is a major health problem in urban and semi-urban areas with poor environmental sanitation, poor hygiene habits and low socioeconomic status. Environmental sanitation, availability of water sources, availability of latrines at home and poor personal hygiene behavior of the community play a major role in the transmission of

worm infection<sup>1,2,3</sup>.

Worms infection that is transmitted through soil develops in the host's body into adult worms and reproduces by laying eggs. The eggs of roundworms and whipworms are excreted along with the feces of the host so that they can contaminate the soil environment. Meanwhile, hookworm eggs will develop into infective filiaform larvae on the ground. Hookworm infection is transmitted to humans by direct contact with soil contaminated by infective filiaform larvae. Meanwhile, ascariasis and trichuriasis infection occurs when the infective worm eggs are ingested by humans<sup>4,5,6</sup>.

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Children are a group of people who suffer from worms the most, especially elementary school children because they often play or come into contact with the soil which is the place where the worms grow and develop. The incidence of worms in elementary school-age children can hinder their growth and physical and cognitive development who are in a very fast and active growth period. At this age children should get a balanced and quality nutritional intake<sup>1,7,8,9</sup>. If left unchecked for a long time, children can suffer from malnutrition, and even become less protein energy (KEP)<sup>6,10</sup>.

According to the 2013 RISKESDA, the national prevalence of short is 37.2%, consisting of 18% very short and 19.2% short. This national figure increased from 2010 (35.6%) and 2007 (36.8%). There are 20 provinces with a prevalence above the national level, one of which is South Sulawesi at 23.5% (2013). The incidence of stunting in the PKM Rappokalling work area shows that there are 10 school-age children 6-12 years who have worms. 24.5%<sup>5,7,11</sup>.

Based on data from the Puskesmas Bangkala, Makassar city, the incidence of stunting among elementary school students 7-12 years is 13.5% (55 children), this is influenced by poor environmental sanitation, for example there is still a lot of garbage scattered, flood-prone areas and community PHBS behavior that is still low. This is indicated by diarrhea disease which is still relatively high, namely 35.5% of school age children. Therefore, the researcher is interested in examining worm infection with the incidence of stunting in elementary school students in Makassar City.

## Materials and Methods

This type of research is analytic observational using cross sectional design. Location This research was conducted at SD Bangkala III, Bangkala Village, Manggala District, Makassar City. Samples were taken as many as 63 with proportional stratified random sampling technique and simple random sampling Pemeriksaan sampel.

Quantitative examination is needed to determine the intensity of infection or severity of disease by knowing the number of eggs per gram of feces (EPG) in each type of worm.

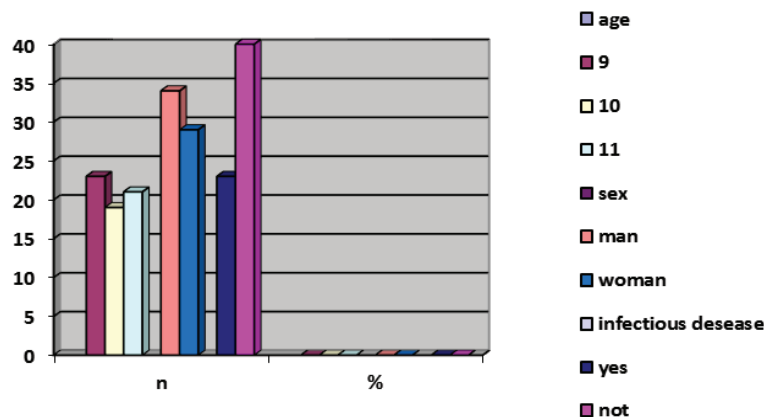
### (1) How to Make Preparations

- a) Filter the stool using a filter wire. Place the cardboard with the hole on the slide and then insert the filtered stool into the hole.
- b) Take the cardboard with a hole and cover the stool with cellophane soaked in Kato solution.
- c) Flatten with a rubber bottle cap until evenly distributed. Let the preparation stand for 20-30 minutes.
- d) Examine it under a microscope and count the number of eggs in the preparation.

### (2) How to Count Eggs

The result of quantitative stool examination is the intensity of infection, namely the number of eggs per gram of feces (Egg Per Gram / EPG) of each type of worm.

## Result



Graph 1 Characteristics of Respondents in SD Bangkala III students

**Table 1: Distribution of Respondents About the Types of Worms Infection in SD Bangkala III Students in Makassar City**

Type of worm	Quantitative Helminth Assessment (QHA)							
	Mild		moderate		Severage		Total	
	n	%	n	%	n	%	N	%
Ascaris	14	82,3	3	17,7	0	0	17	100
Trichuris	3	27,3	8	72,7	0	0	11	100
Ascaris &Trichuris	4	25	8	50	4	25	16	100
Trichuris dan entero	0	0	1	100	0	0	1	100
Total	0	0	20	44.5	4	8,8	45	100

Based on table 1, it shows that the types of worms that infects the most are Ascaris worms, which are included in the mild category as many as 14 (82.3%), and 17.7% moderate. In this type of trichuris worm, the number of mild worm infections (27.3%) was moderate as much as 72.7%.

**Table 2: Distribution Of Respondents About PHBS Behavior Towards Worm Infection At SD Bangkala III Makassar City**

Reseach Variable	Quantitative Helminth Assessment (QHA)						Total	
	Mild		Moderate		Severage			
	n	%	n	%	n	%	N	%
Hand washing								
Routine	4	57,1	2	28,6	1	14,3	7	100
Not routine	17	44,7	18	47,7	3	7,9	38	100
cutting nails								
Routine	2	66,7	0	0	1	33,3	3	100
Not routine	19	45,2	20	47,6	3	7,2	42	100
consume deworming medicine								
Routine	1	50	0	0	1	50	2	100
Not routine	20	46,5	20	46,5	3	7,0	43	100
Wearing footwear								
Routine	17	85,0	2	10,0	1	5,0	20	100
Not routine	4	16,0	18	72,0	3	12,0	25	100

Based on the table 2 shows that the habit of washing hands routinely and in the QHA (mild) category is 4 (57.1%), 17 (44.7%) is not routine, the habit of routine nail cutting is in the QHA (mild) category as many as 2 (66.7%) and 19 (45.2%) who were not routine.

**Table 3: Distribution of Respondents Based on Quantitative Helmint Assessment (QHA) with Nutritional Status of Bangkala III Elementary School Students in Makassar City**

Quantitative helmint Assement	Nutritiona status						Total		p
	skinny		Normal		Fat		N	%	
	n	%	n	%	n	%			
Mild	5	23,8	13	62,0	3	14,2	21	100	0,003
Moderate	7	35	12	60	1	5	20	100	
Severage	1	25	2	50	1	25	4	100	
Total	13	28,9	27	60	5	11,1	45	100	

Based on table 3, The results of the analysis show that there is a significant relationship with the p value (0.003).

**Table 4: Distribution of Respondents Based on Quantitative Helmint Assessment (QHA) with Nutritional Status of Bangkala III Elementary School Students in Makassar City**

Quantitative helmint Assement	incidence stunting				Total		p
	Stunting		Not stunting		N	%	
	n	%	N	%			
Mild	8	38,0	13	62,0	21	100	0,022
Moderate	11	55	9	45	20	100	
Severage	1	25,0	3	75,0	4	100	
Total	20	44,4	25	55,6	45	100	

Based on table 4nThe analysis showed that there was no significant relationship with the p value (0.022).

**Discussion**

In theory, the chances of worm infection are more common in boys because they play more outside the home and interact with soil media and work in the garden. However, in reality, the observations of boys and girls have almost the same playing habits. Although the types of games are different, their activities are mostly carried out on the ground. Boys usually play ball<sup>5,9,12.</sup>

Body Mass Index (BMI) can be used to evaluate the nutritional status of children aged 5 years to adolescence. The distribution of body mass index was obtained by children with a low BMI of 79.5% and children with a normal BMI of 46%. The number of students with a low BMI. 30.3% were infected with worms and 28.3% of normal students were infected. The existence of ascariasis infection causes malnutrition in elementary school students to be higher, which will cause weight loss and inhibit the child’s growth<sup>10,13,14.</sup>

The results of research conducted in Kediri showed that there were 7 students infected with worms and anemia (25%). The results of the bivariate test did not provide significant results between the worm infection variable and the anemia status variable. This is because the respondents who were infected with trichuriasis and hookworm were very few and the intensity of the infection was mild so that it had little effect on reducing Hb levels.<sup>4,7,9,15.</sup>

In this study, the highest number of infections was a single *T. trichiura* infection (79.3% of the total infection) followed by a single *A. lumbricoides* infection (20.7%), so it can be said that in this study the STH infection was dominated by *T. trichiura* and *A. lumbricoides*. Another trigger factor for worm infections is the weather factor. This research was conducted from September to October in Makassar City when it is dry and rainy season which has a temperature of  $\pm 30^\circ\text{C}$  which is the optimum temperature for the development of *T. trichiura* eggs. The soil in this research location looks dry because the location of this research is experiencing a dry season. Because it is in the dry season, worm eggs can fly through the air<sup>5,10,16,17.</sup>

In this study, STH infection was most prevalent in children aged 8 years, amounting to 24.1%. The results of this study are similar to research conducted by Annisa et al. (2017) who stated that the prevalence of STH infection is higher in children aged 6-12 years, and Eryani et al. (2015) which states that the highest prevalence of STH infection is found in children aged 6-8 years.

From 63 samples, it was found that the proportion of malnutrition status was high, namely 43.9%. These results are similar to research conducted on elementary school students in the Riau area, it was found that 58.16% of students had good nutritional status and 41.84% of students were malnourished. This is due to the economic level of the parents in the school including middle and lower levels.

The results of statistical tests using the Chi-square test the relationship between STH infection and nutritional status obtained p value = 0.037 and OR = 2.765 (95% CI: 1.147-6.662). These results indicate that there is a statistically significant relationship between STH infection and nutritional status. The results of this study correlate with several previous studies, including

the results of research conducted by Simarmata et al. (2015) at 3 primary schools in Simpang Empat and Kabanjahe Districts, Karo District, North Sumatra which stated that there was a significant relationship between STH infection and nutritional status (p = 0.001) Similar to the research of which stated that STH infection had a significant relationship with nutritional status with p value = 0.025 and OR = 2.05 (95% CI: 1.08-3.87)<sup>18,19.</sup>

However, this result research which states that there is no significant relationship between STH infection and nutritional status in students of SDN 126 Sematang Borang District, Palembang City with a value of p = 0.065 (p > 0.05) and OR = 2.669 (95% CI: 1,439-15,192), Several studies have been conducted to find an association between nutritional status and STH infection. Relationships are complex and may depend on environmental, social and economic influences. The interplay between malnutrition and infectious disease makes it difficult to identify which of the two conditions came first. Infectious diseases such as worms that attack children can interfere with the child's nutritional condition due to several things, including decreased appetite for children due to discomfort experienced so that the intake of nutrients is reduced, even though children need more nutrients, especially to replace their body tissues. damaged by the disease<sup>5,9,20.</sup>

## Conclusion

There is a significant relationship between QRA and nutritional status in elementary students with p value (0.003), there is a significant relationship between QRA and the incidence of stunting with p value (0.022).

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**Conflict of Interest-** None of the authors has competing interests

**Ethical Clearance-** from committee ethical clearance University Muslim Indonesia.

## References

1. Ratnayaka RMKT, Wang Zhong-Jun. Prevalence and Effect of Personal Hygiene on Transmission of Helminthes Infection Among Primary School Children Living in Slums. *International Journal of Multidisciplinary Research*, 2012; 2 (7): 1-12.

2. Sherkhonova T, Yap P, Mammado S, Sayfuddin K, Martinez P, Amosse WP, Wientzene RL, Steinmanna P. National intestinal helminth survey among school children in Tajikistan: prevalences, risk factors and perceptions. *Acta Tropica*, 2013; 126: 93-8.
3. Nasr NA, Hesham M Al-Mekhlafi HM, Ahmed A, Muhammad Aidil Roslan MA, Bulgiba A. Towards an effective control program of soil transmitted helminth infections among Orang Asli in rural Malaysia. Part 2: Knowledge, attitude, and practices. *Journal of Parasites & Vectors*, 2013; 6: 28-40.
4. Nematian J, Nematian E, Gholamrezannezhad A, Asgari AA. Prevalence of Intestinal Parasitic Infections And Their Relation With Socio Economic Factors And Hygiene Habits In Tehran Primary School Students, *Acta Tropica*, 2004; 92: 179-86.
5. Kundaian F, Umboh JML, and Kepel BJ. The Relationship Between Environmental Sanitation and Worms Infection in Elementary School Students in Teling Village, Tomariri District, Kab. Minahasa. Faculty of Public Health, Samratulagi University, Manado, 2011. 2015;35(2):97-106
6. Midzi N, Mtapuri-Zinyowera S, Mapingure MP, nPaul NH, Sangweme D, Lerema GH, Mutsaka MJ, Tongogara F, Makware G, Chadukura V, Brouwer KC, Mutapi F, Kumar N, Mduluza T. Knowledge Attitudes and Practices of Grade Three Primary School Children in Relation to Schistosomiasis, Soil Transmitted Helminthiasis and Malaria in Zimbabwe. *BMC Infectious Diseases*, 2011; 11: 16. 2015;35(2)82-95
7. Hamad H. The Relationship between Infection and Soil Contamination by Soil-Transmitted Worm Eggs and Behavior of Elementary School Children in Tembung Village, Medan Tembung District. Thesis. North Sumatra University Graduate School, 2009.
8. Steffanus M, Santosa YP. Prevalence of Mine Worm Eggs in Anemia Patients in Sebangki, West Kalimantan. *Indonesian Medical Magazine*, 2010; 60 (3): 114-8.
9. Ahmed A, Al-Mekhlafi HM, Choy SH, Ithoi I, Al-Adhroey A, Abdulsalam AM, Surin J. The nutritional impacts of soil transmitted helminthes infections among indigenous school children in rural Malaysia. *Journal of Parasites and Vectors*, 2012; 5: 119. 2019;35(2):145-151
10. Nedhaam C, Kim HT, Hoa NV, Cong LD, Michael E, Drake L, Hall A, Bundy DAP. Epidemiology of Soil Transmitted Helminths Nematode Infections in Ha Nam Province, Vietnam. *Tropical Medicine and International Health*, 1998; 3 (11): 904-12.
11. Alemu A, Atnafu A, Addis Z, Shiferaw Y, Teklu T, Mathewos B, Birhan W, Gebretsadik S, Gelaw B. Soil Transmitted Helminths and Schistosoma Mansonii Infections among School Children in Zarima Town, Northwest Ethiopia. *BMC Infectious Diseases*, 2011; 11: 189.;35(2):97-106
12. Centers for Disease Control and Prevention. Laboratory Identification of Parasitic Diseases of Public Health Concern [home page on the Internet]. c2016 [updated 2016 May 3; cited 2017 Jun 24]. Available from <https://www.cdc.gov/dpdx/trichuriasis/index.html>.
13. Pohan HT. Soil-borne worms. In: Sudoyo AW, Setiyohadi B, et al, editor. Internal medicine textbook. Edition V. Jakarta: Interna Publishing; 2009. p. 2938-42.
14. Centers for Disease Control and Prevention. Laboratory Identification of Parasitic Diseases of Public Health Concern [home page on the Internet]. c2016 [updated 2016 May 3; cited 2017 Jun 24]. Available from <https://www.cdc.gov/dpdx/hookworm/index.html>.
15. Munirudidin M. The Relationship between Nutritional Status and Learning Outcomes in Class V and VI Students in SD Negeri 2 Cepiring, Kendal Regency, Academic Year Semarang: Semarang State University; 2010. Latham M. A priority for primary health care. Proceedings of a Workshop "Intestinal Parasites: A Priority for Primary Health Care". New York: Cornell University; 1991, 35(2):97-106
16. Cole TJ, KM Flegal D, Nicholls and AA Jackson. Body Mass Index Cut Offs to Define Thinness in Children and Adolescents: International Survey. *BMJ*, 2007; 335: 194. 2015;35(2):101-105
17. Tehnida VHM, Ponka R, Ndzi ES, Madocgne AK, Amedee M, Grace TM, and Moyou RS. Prevalence of Malaria an Soil Transmitted Helminthes Infections and Their Association with Undernutrition in Schoolchildren Residing in Mfou Health District in Kameroon. *Journal of Public Health and Epidemiology*, 2012;4(9):25360.

;35(2)135-125

18. Helminths Control in School-age Children: A guide for managers of control programmes. Second edition. France. WHO Press. 2011.
19. Kabatereine NB, Standly CJ, Sausa-Figueiredo JC, Fleming FM, Stothard JR, Talisuna A, Benwick A. Integrated Prevalence Mapping of Schistosomiasis, Soil Transmitted Helminthiasis and Malaria in Lakeside and Island Communities in Lake Victoria, Uganda. *Journal Parasites and Vectors*, 2011; 4: 232;39(2):158–162
20. Ziegelbauer K, Steinmann P, Zhou H, Du ZunWei, Jiang JY, Fürst T, Jia TW, Zhou XN, Utzinger J. Self-Rated Quality of Life and School Performance in Relation To Helminth Infections: Case Study From Yunnan, People’s Republic of China. *Journal Parasites & Vectors*, 2010;3: 61