

## The Effect of STH Worm Infection on the Nutritional Status of Farmers in the Agronursing Area: Literature Review

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### Abstract:

STH (Soil Transmitted Helminths) worm infection is a disease that often occurs in people who live in agro-industrial areas, especially in people who work as farmers. Someone often underestimates this disease, even though if this disease attacks adults, it can cause it to occur decline in health conditions and work productivity. One way to prevent worms namely by promoting a clean and healthy life. This study aimed to determine whether there was a relationship between infection and the nutritional status of farmers. This study utilized a literature review to examine further the relationship between STH worm infections and nutritional status in an agronursing environment. The method used was a narrative literature review or traditional review. The literature search was conducted through article search engines, including Google Scholar and Research Gate. The results of the 10 articles found that the nutritional status and STH infection were not significantly affected, while some articles revealed that nutritional status based on upper arm circumference had a significant association with infectious disease morbidity.

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## INTRODUCTION

Indonesia is an agricultural country. Around 60 percent of Indonesia's population lives in the countryside, most of which are engaged in agriculture. Most of the Indonesian labor force in rural areas works in the agricultural sector, risking health problems related to farmer-environment interactions. Agronursing is a nursing care management system that focuses on individual, family, and community clients, which is holistic and comprehensive in an agricultural setting (Kurniyawan et al., 2023a). Farmers often experience fatigue from the workload and long working hours, which affects sleep quality and physical and mental health (Kurniyawan et al., 2023b).

Jember is an area where agriculture is a large part of the population and has various types of agricultural businesses. Farmers tend to live in rural areas where they make their living by farming utilizing simple farming tools, so their agricultural production tends to be low (Suparti & Suparman, 2019). The commodities of rice are the leading food commodities because their distribution is more widespread than other food commodities. Pakusari sub-district is one of the large sub-districts with an area of 29.2 km<sup>2</sup>; most of its citizens work in the agricultural sector having the main commodities of rice and corn. The abundance of agricultural products is inversely proportional to the low value of nutritional adequacy in the sub-district, which in turn leads to the status of malnourished children under five in Pakusari Sub-district (Susanto, Rokhani, Yunanto, Rahmawati, & Merina, 2023).

The nutritional status of children under five is influenced by direct factors, namely food and infectious diseases, as well as indirect factors, namely parenting and the reach of quality health services, influenced by education levels, income, and access to information (Trimara, Indriani, & Adawiyah, 2022). Nutritional status is the state of the body as a result of food consumption and the use of nutrients (Hasrul, Hamzah, & Hafid, 2020). Infections occur in farmers and farming families because of their inattention to personal hygiene. Infectious disease is caused by intruding pathogenic microbes into the human body.

STH (Soil-Transmitted Helminth) is a group of intestinal nematodes whose life cycle requires soil during breeding to form infective and can be transmitted to humans. The prevalence of helminthiasis is found in barefoot farmers affected by helminthiasis infection. STH (Soil-Transmitted Helminth) groups that can develop in the human intestine include *Ascaris lumbricoides*, *Trichuris trichiura*, *Necator americanus*, and *Ancylostoma duodenale*. In conjunction with examining helminthiasis in this literature, we can observe the correlation between helminths and nutritional status. The nutritional state occurs due to the utilization or absorption and diet on the body's condition. Nutritional states that satisfactory nutrient status is the preparation of adequate food to nourish the body (Nasution et al., 2022). This study aimed to determine whether there was a relationship between infection and the nutritional status of farmers.

## METHOD

This study utilized a literature review to examine further the relationship between STH worm infections and nutritional status in an agronursing environment. The method used was a narrative literature review or traditional review. The literature search was conducted through article search engines, including Google Scholar and Research Gate. A data search in this literature review study uses the Boolean operator. The keywords used during the search for articles to be reviewed were "STH worm infection on farmers' nutrition." The selection of articles or papers to be considered in the literature study using the PRISMA flow chart, which comprises 4 stages: identity, screen, eligibility, and inclusion.

## RESULT

During this literature review study, 77 articles were obtained using search engines. The articles were obtained from the Google Scholar search engine. 49 articles were obtained, 13 articles were selected from the Research Gate search engine, and 18 articles were searched from the PubMed search engine. Of the total 77 articles obtained, 10 were determined to be suitable for review. An article with a cross-sectional approach was found as many as 10 articles with a population of family farmers. These comprised 10 articles analyzed with publication time from March 2019 to March 2023. Article 8 was published in Bahasa, while 2 were published in English. A total of 3 articles consisted of topics 2 articles consisted of topics that described the nutritional status of farming families, 5 articles reviewed infectious diseases and STH worm infections in farming families, and 2 articles discussed topics on the relation between nutrition and infectious diseases in farming families. The results of the 10 articles found that the nutritional status and STH infection were not significantly affected. In contrast, some articles revealed that nutritional status based on upper arm circumference significantly associated with infectious disease morbidity.

Table 1. Results of the Selected Literature

Author(s)	Title	Purpose	Sample	Research Method	Results
Author: Parweni, N. K. A., Getas, I. W., & Zaetun, S  Journal identity: Journal of Analyst Medika Bio Sains/2018/ Vol.5 (2): 68~72	Soil- transmitted helminth infection of intestinal nematode worms in green sai vegetable farmers in Bug-Bug Village, Lingsar District, West Lombok Regency	Seeing the picture of nematode worm infection intestinal transmission through the soil (Soil Transmitted Helminth) on green mustard vegetable farmers in the village of Bug- bug Lingsar District, West Lombok Regency.	The population and samples were taken from 28 samples of mustard green farmers	This research uses descriptive observation method. Sampling in this study with purposive sampling method where sampling is based on certain considerations made by the researchers themselves and the sample according to the criteria studied	Overview of intestinal nematode helminthic infection transmitted through the soil (Soil Transmitted Helminth) to green mustard vegetable farmers in Bug-bug Village Lingsar District, West Lombok Regency, with a total sample of 28 respondents, it was concluded that the result examination of feces on green mustard vegetable farmers in Bug-Bug Village, Lingsar District, Lombok Regency West is <i>Trichuris trichiura</i> worm eggs. Green mustard vegetable farmers who are positively infected with <i>Trichuris trichiura</i> worms is 7.14%.
Author: Doutel, E. J., Picauly, I., & Salmun, J. A  Journal identity: Journal of Community Health/2019/ Vol.1(3) 103-110	Determinants of the nutritional status of toddlers in farming families in the working area of the Halilulik Health Center, Belu Regency in 2019	Analyzing the determinants of toddler nutritional status in farming families in the working area of the Halilulik Health Center, Belu Regency in 2019.	The sample in this study were 94 toddlers who were in the working area of the Halilulik Health Center	This study used an analytic survey method with a cross sectional study approach	The determining factor for undernutrition in toddlers is the level of energy and protein adequacy. The level of mother's knowledge about nutrition and disease history has a relationship with the nutritional status of children under five as a factor that plays a role in influencing nutritional intake of children under five. Food processing habits and dietary restrictions have no relationship with toddler nutritional status.

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Author(s)	Title	Purpose	Sample	Research Method	Results
Author: Fatimah, N., & Nindya, T. S  Journal identity: Media Nutrition Indonesia/20 19/4(2) : 177-185	The relationship between the adequacy level of energy and macronutrient s with the food security of elementary school students from farming families	Analyze level relationships adequacy of energy and macronutrients (protein, fat and carbohydrates) with food security of elementary school students from a farming family.	The research sample was 60 elementary school students grades 1 to 6 at SDN Jobatan 1, Jomban 2 Public Elementary School, and Jombatan 3 Elementary School, Jombatan Village, Kesamben District, Jombang Regency, whose parents His parents worked as rice farmers.	This study uses a cross sectional research design with sampling techniques simple random sampling.	Income parents of students will effect on the quantity of food consumed by family members. Level of energy adequacy of school students The foundation of the peasant family is related significantly with family food security, where almost all elementary school students with energy adequacy level is not enough, comes from food insecure families.
Author: YURIKO, A., & MURLINA, N.  Journal identity: Journal of Scientific Cohesion Vol. 7. No. January 1, 2023	Relationship between Education Level and Knowledge of Soil Transmitted Helminths Infection At the Aisiyyah Branch Recital Mother, Medan Denai District	Conduct analysis tests regarding the relationship between the last level of education and the level of knowledge about Soil Transmitted Helminths infection	Population The study consisted of 30 mothers who came from the Aisiyyah branch of the Medan Denai sub- district	This study used a descriptive analytic research method with a cross sectional approach. Population at This research is the mother of the Aisiyyah branch of recitation, amounting to 30 people. The sample in this study uses total sampling technique, where the entire total population becomes the research sample	There is a relationship between education level and knowledge about STH infection in the Aisiyyah branch recitation mothers. Where this can be proven by the results of the respondents. Which is in accordance with the research of Ded et al., which is according to the theory that has been described as one of the influencing factors the level of one's knowledge of worm infection is the education level of the respondent.

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Author(s)	Title	Purpose	Sample	Research Method	Results
Author: Pratiwi, I. A. I. L., Swastika, I. K., & Sudarmaja, I. M.  Journal identity: UDAYANA MEDIKA E- JOURNAL, VOL. 7 NO. 4, APRIL, 2018 : 148 – 154	The effect of soil- transmitted helminth (STH) infection on memory and visual-motor coordination in cognitive function of children at SD 1 Sulangai, Badung Regency, and SDN 1 Blandingan, Bangli Regency, Bali	Conducting research related to the effect of soil-transmitted helminth (STH) infection on memory and visual-motor coordination, by collecting stool on the specified day.	Population The study consisted of all students from grades 1 to 6 (273) at SDN 1 Sulangai, Badung and SDN 1 Blandingan, Bangli that met the inclusion criteria and those that did not included in the exclusion criteria	The method used in this research is a quantitative study with a cross-sectional design. Data collection is done for Stool examination using the Kato technique Katz; cognitive function examination with Wechsler Intelligence Scale for Children III (WISC III) which consists of Forward Span Digits, Backward Span Digits and Coding; and requests for informed consent regarding the consent of the respondent's parents	There is a prevalence of SDN 1 Sulangai children, Badung and SDN 1 Blandingan, Bangli which are positive helminthiasis and cognitive function tests And there is a matching method for confounding factors in both case and control groups. There is no significant difference between memory and visual-motor coordination for Pre-test and Post- test.
Author: Ramadhani, R., Sawitri, H., & Maulina, N  Journal identity: Malikussaleh Journal of Medicine and Student Health Vol.1 No.4 November 2022	Relationship between Soil Transmitted Helminths (STH) Infection and Nutritional Status in Pusong Lama 8 State Elementary School (SDN) students Banda Sakti District, Lhokseumawe City in 2022	Conducting research related to nutritional status determined by BMI/U and microscopic stool analysis which is considered to be an indicator of STH infection	The population and samples were taken from 75 (F=35, L=40) students of SDN 8 Pusong Lama Banda Sakti District, Lhokseuma we City.	The method used in this research is a quantitative study with a cross-sectional design. Data collection through BMI/U measurement and microscopic stool analysis.	In this study it was revealed that the state of the nutritional status of students at SDN 8 Pusong Most of the time were in a normal/good nutritional state and were not infected with STH, as well there was no significant relationship between STH infection and the nutritional status of students SDN 8 Pusong Lama.

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Author(s)	Title	Purpose	Sample	Research Method	Results
Author: Purwaningtyas, D. R., & Marliyati, S. A.  Journal identity: ARKESMAS /2018/Vol.3(2):105-111	Nutritional Behavior, Nutritional Status, and Infectious Diseases Morbidity of Female Farmers and Farmworkers in Pemalang	To examine nutritional behavior, nutritional status, and morbidity of infectious diseases among female farmers and farm workers in Taman Subdistrict, Pemalang Regency, Central Java to see the relationship between nutritional behavior and nutritional status and the relationship between nutritional status and infectious disease morbidity among female farmers and farm workers.	The population and samples were taken from 97 women farmers and farm laborers in Taman District, Pemalang Regency, Central Java	The method used in this research is a quantitative study with a cross-sectional design. Collecting data through anthropometric measurements and interviews using a questionnaire. The statistical test used is Chi-Square	Most of the respondents had poor nutritional knowledge, positive nutritional attitudes and inappropriate nutritional practices. There are significant differences between the nutrition practices of farmers and farm labourers. The majority of respondents have normal nutritional status based on BMI and ALL, as well as a low morbidity rate of infectious diseases. However, there are significant differences in the morbidity of infectious diseases. The morbidity of farm workers is higher than that of farmers. There is a significant relationship between nutritional knowledge and nutritional status based on BMI. Nutritional status based on ALL has a significant relationship with infectious disease morbidity
Author: Nasution, A. N., Girsang, E., Marpaung, E., & Sinaga, C. S.  Journal identity: Journal of Education and Counseling/ 2022/Vol.4(5):5645–5651	Correlation between Soil Transmitted Helminths (STH) Infection with Anemia and Nutritional Status of Farmers in Parhitean Village, Pintu Pohan Meranti District, Toba Regency	Seeing the relationship between worms and anemia and nutritional status by assessing diet, nutritional status, and the amount of hemoglobin in the blood	The population and samples were taken from 28 farmers in Parhitean Village, Pintu Pohan Meranti District, Toba Samosir Regency	The method used in this research is cross-sectional with data collection using purposive sampling. The statistical test used is Chi-Square.	There were 5 people who were infected with STH worms (soil transmitted helminths) which could be caused by lack of hygiene and not taking regular deworming medication. The positive rate of anemia is 3.6%. Fourth, the positive rate of thin nutritional status is 25%. The nutritional status in Parhitean village, Pintu Pohan Meranti sub-district, Tobasa district is still high due to sufficient nutrients entering the body of the community so that there is no relationship between STH (soil transmitted helminths) and nutritional status, because the value of $p = 0.574$ . In addition, there is no relationship between STH (soil transmitted helminths) and Anemia, because the value of $p=1,000$ .

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Author(s)	Title	Purpose	Sample	Research Method	Results
Author: Moutos, A., Doxani, C., Stefanidis, I., Zintzaras, E., & Rachiotis, G.  Journal identity: European Journal of Investigation in Health, Psychology and Education/2 022/12(3):26 9-280	Knowledge, Attitude and Practices (KAP) of Ruminant Livestock Farmers Related to Zoonotic Diseases in Elassona Municipality, Greece	Assess knowledge of zoonoses with high potential risks for ruminant keepers and identify trends in attitudes and practices related to transmission of zoonotic diseases in rural areas of Greece.	The population and samples were taken from 204 ruminant farmers from 33 settlements in an area with intense agrarian activity.	This research was conducted as a cross sectional study, using a questionnaire.	It was recorded that 11.3% consumed unpasteurized milk. Education level is associated with better knowledge and practice. The results demonstrate the need for continued educational awareness and action. Close contact with veterinarians can be utilized as a key tool both with current brucellosis vaccination programs and in designing awareness campaigns about zoonoses in collaboration with other public health officials.
Author: Lopes, S. O., Ribeiro, S. A. V., Morais, D. D. C., Miguel, E. D. S., Gusmão, L. S., Franceschini , S. D. C. C., & Priore, S. E	Factors Associated with Anemia among Adults and the Elderly Family Farmers	Contribute in the form of knowledge needed to develop public action, especially related to rural populations regarding anemia.	The population and samples were taken from 297 in 124 families.	This study used a cross- sectional study method. Spearman's correlation test was applied to assess the correlation between hemoglobin levels and other numerical variables.	The prevalence of anemia is 41.1%, higher in women (55.7%). In addition, poverty touched a prevalence of 39.7%. A positive correlation between hemoglobin level and per capita income was found. Individuals who experience food insecurity, the elderly, and those who do not own property, are more likely to experience anemia. Farmers with per capita income above 1/2 the minimum wage are less likely to suffer from anemia. The prevalence of anemia in the group studied was higher than in previous studies. This disease is associated with factors that also predispose to food insecurity.

## DISCUSSION

Based on the results of 10 journals, infectious diseases in farmers that affect nutritional status are influenced by several factors, namely nutritional intake, disease history, food processing habits, knowledge, food security, personal hygiene, and nutritional practices. Research (Lopes et al., 2022) found that there are factors that affect the nutritional status of toddlers in rural Indonesia by examining the relationship between maternal knowledge, adequacy of energy and protein intake, history of infectious diseases, family food processing habits, and family food restrictions with the nutritional status of toddlers. There is a similarity of discussion between the journal and research (Nasution et al., 2022) which states that there is a relationship between the level of adequacy of energy and macronutrients (protein, fat, and carbohydrates) with the food security of elementary school students from farming families. Family food security is related to the quantity of family food consumption. Increasing family food security can increase income from the non-agricultural sector. Based on the two journals, food or nutrient intake will affect nutritional status. Knowledge, food security, and food processing habits influence the nutritional status level.

In the study (Doutel et al., 2019) contains research on the description of soil-transmitted helminth infection in mustard green vegetable farmers in Bugbug Village, Lingsar District, West Lombok Regency. Work is one of the factors that can increase the frequency of helminthiasis infection, especially work related to the soil, one of the work professions is farmers. While cleaning pest plants, green mustard vegetable farmers do not use personal protective equipment such as gloves or footwear. A day of direct contact with soil can lead to helminthiasis infection by soil-borne intestinal nematodes. In addition, the water used for irrigation of mustard greens farming land comes from the river which is also used for people to carry out daily activities such as bathing, washing and defecation. Other studies have similarities with increasing education to increase awareness of infectious diseases, namely in research (Pratiwi et al., 2018) which discusses the evaluation of knowledge, attitudes, and practices of ruminant farmers regarding zoonoses. Education level was positively associated with better knowledge and practices, while strict veterinary supervision of farms was associated with better practices related to zoonosis prevention. The study (Rizqa et al., 2022) also discusses the relationship between education level and knowledge about Soil Transmitted Helminths (STH) in Aisiyah mothers. In the journal, a study was conducted with the results of the level of education and knowledge of mothers having a significant impact on the prevalence of intestinal worm infections in children so that it is necessary to increase knowledge, awareness about STH infections, and change behavior towards STH infections. In research (Fatimah, 2019) discusses the relationship between Soil Transmitted Helminth (STH) infection with anemia and nutritional status in farmers in Parhitean village with solutions to increase the importance of hygiene and worm eradication programs for farmers in the area. In another study (Yoriko & Murlina, 2023) said that the relationship between the nutritional status of students of SDN 8 Pusong and STH infectious diseases was influenced by several factors, including maintaining a good child's diet, monitoring children's PHBS, and maintaining environmental cleanliness at home. both have similarities regarding the discussion of research related to what factors affect nutritional status and are associated with infectious diseases such as STH. In research (Parweni et al., 2019) that supports the previous journal also discusses STH infections can cause a decrease in cognitive development, namely memory and visual-motor, thus preventing children from reaching their potential. in this study it was found that Soil Transmitted Helminth (STH) infection or helminthiasis indirectly affects cognitive function in sufferers, namely children who have a higher vulnerability compared to other age groups. Lack of food intake, digestive disorders, malabsorption, and poor growth rates are often found in children with



ascariasis and trichuriasis. In addition, the study (Moutos et al., 2022) said that the development of agricultural human resource quality is closely related to nutritional status and morbidity of infectious diseases related to nutritional behavior. The journal study examined nutritional behavior, nutritional status, and morbidity of infectious diseases in female farmers and farm laborers in Taman District, Pemalang Regency, Central Java. The results showed that most respondents needed better nutritional knowledge, positive attitudes, and inappropriate nutritional practices. There was a significant difference between the nutritional practices of farmers and farm laborers. Therefore, intervention or prevention is needed to overcome this. The study (Purwaningtyas & Marliyati, 2018) proposed public health interventions to overcome anemia and improve food security and nutrition in rural areas in Minas Gerais, Brazil. From this journal, appropriate solutions and interventions related to nutritional status and helminthiasis infection can be obtained. The interventions are in the form of policies and easy access to public services. The shortcomings of several journals that have been reviewed are that most of them use analytical survey methods with a cross-sectional study approach, which may need to provide a complete picture of the factors that affect nutritional status. In addition, most of the studies were conducted in a region or region so that the results or solutions cannot be generalized in other areas.

## CONCLUSION

Many factors, including nutritional intake, disease history, food processing habits, knowledge, food security, personal hygiene, and nutritional practices, can cause the level of nutritional status and nutrition in farming families. Meanwhile, helminthiasis infections that occur in farming families, such as STH infections, are mostly caused by poor personal hygiene in farming families even though they often meet the soil. The level of nutritional status and nutrition in farming families can also be indirectly affected by helminthiasis incidence because it decreases appetite and susceptibility to disease due to decreased body resistance. Therefore, it needs to be balanced with adequate nutrition and nutrition intake to maximize nutritional and nutrition needs.

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