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Child behavioral factors contributing to worm infestation among children under 5 years of age attending OPD services in Katikamu HCIII, Luwero District. A cross-sectional study.

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ABSTRACT

Background:

The study aimed to determine the child behavioral factors contributing to worm infestation among children under 5 years of age attending OPD services in Katikamu HCIII, Luwero District.

Methodology:

This quantitative descriptive cross-sectional study was conducted at Katikamu Health Centre III in Luwero District, Central Uganda. Parents of children under five attending the outpatient department formed the study population. Using Slovin's formula, a sample of 40 respondents was obtained from a population of 45 and selected through convenience sampling over five days. Data were collected once using structured and semi-structured questionnaires. Data were checked, coded, and analyzed using SPSS to generate frequencies and percentages. Validity, reliability, and ethical standards were ensured throughout the study, and procedures followed approved institutional guidelines.

Results:

Catholics formed the largest religious group at 18 (45%), followed by Muslims 12 (30%) and Protestants 10 (25%). Business persons dominated occupations at 29 (72.5%), with peasants 7 (17.5%) and government workers 4 (10%). Regarding children, females were 23(57.5%) and males 17 (42.5%). Most children were fed twice daily (23, 57.5%). Walking barefoot was reported by 27 (67.5%). Half were aged 2-3 years (20, 50%). Eating raw food was the least reported (2, 5%), while improper handwashing affected 8 (20%) children overall, and nail trimming was uncommon (3, 7.5%).

Conclusion:

Child-related worm infestation risks included female children, frequent barefoot walking, contaminated play areas, and high activity ages two to three.

Recommendation:

Promote child hygiene through handwashing, shoe wearing, avoiding contamination, and implement routine six-monthly deworming for children.

Keywords: *Child behaviors, worm infestation, barefoot, handwashing.*
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BACKGROUND OF THE STUDY

Intestinal parasitic infections among children remain a significant public health concern in many low- and middle-income countries, largely influenced by child-related behavioral and environmental factors. Studies from different settings highlight age, hygiene practices, feeding behaviors, and environmental exposure as key determinants of worm infestation. In Nigeria, Amisu et al. (2023) reported that children aged 4–5 years had a lower risk of worm infection compared to younger children, who are more likely to play in contaminated environments and place unwashed hands or objects in their mouths, increasing exposure to worm eggs and larvae.

Similarly, research conducted in South Sudan identified poor handwashing practices and frequent barefoot walking as major predisposing factors for intestinal parasitic infections among children (Vilwanathan et al., 2017). Walking barefoot increases contact with contaminated soil, facilitating skin penetration by larvae such as hookworms. Evidence from Ethiopia further emphasizes the role of hygiene and diet. Gadisa et al. (2019) found that under-five children who consumed raw or uncooked foods were more likely to acquire parasitic infections compared to those fed cooked foods and boiled milk. Duguma et al. (2023) also identified a lack of handwashing before meals and untrimmed fingernails as significant risk factors.

In Uganda, Noordin et al. (2022) reported a hookworm prevalence of 10.3% among children below 14 years, with male children showing higher infection rates. Additionally, a Somali study revealed that children aged 13–36 months and those fed once daily were more vulnerable to intestinal worm infections (Osman et al., 2024). Collectively, these findings demonstrate that age, hygiene practices, feeding patterns, and environmental exposure substantially contribute to worm infestation among children. The study aimed to determine the child behavioral factors contributing to worm infestation among children under 5 years of age attending OPD services in Katikamu HCIII, Luwero District.

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METHODOLOGY

Study Design and Rationale

This study adopted a descriptive cross-sectional design and quantitative techniques for data collection and analysis.

A cross-sectional study design was preferred because the research was a snapshot, as it involved data collection only once, given the time allocated for research.

Quantitative study design was adopted because the study involved the application of mathematical and statistical methods to numerical data to understand the meaning and patterns of the data.

Study Setting and Rationale.

The study was conducted at Katikamu Health Centre III, a government-run healthcare facility located in Katikamu Subcounty, Luwero District, Central Uganda. The facility was situated along Lira-Gulu Road, approximately 0.73 N latitude and 32.53°E longitude, and it was about 70 km from Kampala.

It serves as a primary health care provider for the local population, offering outpatient services, maternal and child health care, and emergency medical care to a population of approximately 5,000 patients being served by 3 Clinical officers, 4 Nurses, 3 Midwives, and 2 laboratory assistants. The study area was chosen because it served a large catchment area for mothers of children with helminthic infections, hence providing a sizable population for the sample.

Study Population

The population of interest consisted of parents of children aged below 5 years attending Outpatient Department services at Katikamu HC III.

Sample Size Determination

The population size of interest was 45. The sample size was calculated using Slovin's formula to get sample size.

$$\mathbf{n=N/(1+Ne^2)}$$

where n=sample size

and N=population of interest = 45 (Parents of Children aged below 5 years)

e=level of precision (maximum allowed error at 95% confidence interval in estimating the population size) =5%=0.05

Substituting the formula

$n=45/(1+45 \times 0.05^2)$

n=40

Therefore, the sample size was 40 respondents attending services in the Outpatient Department at Katikamu HC III. The sample size was selected because it was adequate to generate the information needed for the study and was relatively affordable and manageable in terms of time and finances.

Sampling Procedure

A convenient sampling method was used to select 40 respondents, with 8 mothers sampled on each of the 5 days. This approach allowed us to reach the required sample size efficiently by selecting available and willing participants within the set data collection period.

Inclusion criteria

The study included mothers of children aged below 5 years who consented, were literate, Ugandan, and present during the data collection period.

Exclusion criteria

The study excluded mothers who did not consent to participate or were absent during the data collection period.

Independent Variable.

These were causal factors contributing to worm infestation, including mothers' demographic data (age, level of education), children's behaviors (playing with soil, eating soil, walking barefoot, eating uncooked food)

Dependent Variable.

This was a worm infestation among children under 5 years.

Research Instruments

These were tools used to collect data. Structured and semi-structured questionnaires with both open- and closed-ended questions were developed to identify factors contributing to worm infestation among children under 5 years at Katikamu HC III. The questionnaire began with a confidentiality statement.

Data Collection Procedure

A letter of introduction was obtained from the research committee of Mildmay Uganda School of Nursing and Midwifery and presented to the in-charge of Katikamu HC III to seek permission to conduct the study.

The purpose of the study was explained to the staff and participants, and reassured of confidentiality. Questionnaires were used to capture data from consenting respondents. Data were collected over 5 working days. Questionnaires were filled out anonymously, kept under key and lock, and access to data was restricted with a password-protected file.

Data Management and analysis.

Completed questionnaires were checked for completeness, accuracy, and logical flow of responses. Missing responses were addressed through revisits. Data were sorted, classified, summarized, and tabulated, then computed in frequencies and percentages using SPSS. Data were further presented in pie charts, tables, and bar graphs. Data analysis was also conducted manually using a calculator, simple

algebra, and tally sheets, and explained using Microsoft Excel.

Validity

Validity referred to the ability of the instrument to measure what it was intended to measure. The supervisor cross-checked the instrument to ensure content validity and appropriate adjustments were made.

Reliability

The questionnaires were pretested at Bukalasa Health Centre among 10 caregivers of children under 5 years and retested among 5 respondents to make final adjustments before the main study.

Ethical Considerations

Ethical considerations observed included:
Obtaining an introductory letter from the school before entering the study area.
Seeking permission at the site of data collection.
Obtaining informed consent from participants by explaining the objectives, significance, benefits, and voluntary participation.
Allowing participants to freely withdraw if unwilling to participate.
Ensuring confidentiality, privacy, and respect by allowing respondents to withhold their names and use codes instead.

RESULTS

Socio-demographic data of the respondents

Table 1 shows the distribution of respondents according to respondents soci0-demographic characteristics (n=40)

Varaible	Responses	Frequency (f)	Percenatge (%)
How old are you?	18-25 years 26-35 years 36-45 years	4 30 6	10 75 15
What is your marital status	Married Single parent	26 14	65 35
What is your educational level?	Primary Secondary Tertiary institution	11 22 7	27.5 55 17.5
What is your religious affiliation?	Catholic Protestant Muslim	18 10 12	45 25 30
What is your occupation?	Government worker Peasant Business person	4 7 29	10 17.5 72.5
Total		**40**	**100**

Source field findings (2025)

Table 1 shows that most respondents 30 (75%) of the respondents were aged 26–35 years, while the least 4 (10%) were aged 18–25 years.
The table further shows that the majority, 26 (65%) of the respondents were married, while the minority, 14 (35%) were single parents.
With regard to education, most respondents 22 (55%) of the respondent had attained secondary education, while the fewest 7 (17.5%) had tertiary education.
In terms of religion, the majority, 18 (45%) of the respondents were Catholics, while the minority, 10 (25%) were Protestants.
Regarding occupation, most respondents, 29 (72.5%), of the respondents were business persons, while the least were 4 (10%) were government workers.

Child behavioral factors contributing to worm infestation among children under 5 years.

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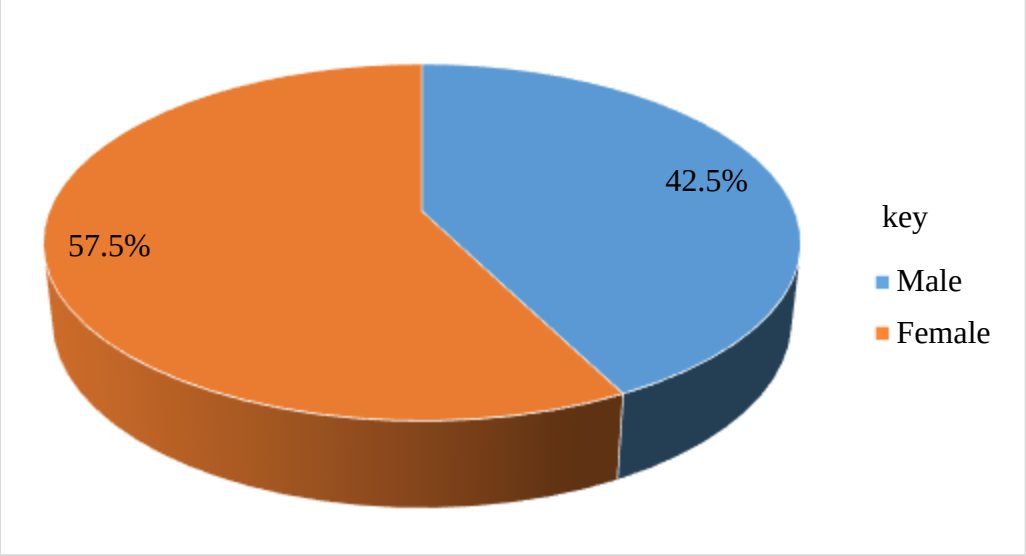
Figure 1 shows the distribution of respondents according to their child's gender (n=40)



Source field findings (2025)

Figure 1 shows that the majority, 23 (57.5%) of the respondents stated that their child's gender was female, while 17 (42.5%) stated that their child's gender was male.

Table 2 shows the distribution of respondents according to their other child behavioral factors contributing to worm infestation among children under 5 years (n=40)

Variable	Responses	Frequency (f)	Percentage (%)
How often do you feed your child	Once a day Twice a day Thrice a day	2 23 15	5 57.5 37.5
Which of the following are the practices of your child	Eating raw food Walking barefooted Improper hand washing Not trimming nails	2 27 8 3	5 67.5 20 7.5
What is your child's age	1-2 years 2-3 years 3-4 years	13 20 7	32.5 50 17.5
Total		**40**	**100**

Source field findings (2025)

Table 2 shows that the majority, 23 (57.5%) of the respondents stated that they fed their children twice a day, while the minority, 2 (5%), fed their children once a day.
Regarding children's practices, the majority, 27 (67.5%) of the respondents mentioned that their child walked barefoot most times, while the minority, 2 (5%), stated that their child eats raw food.
A half 20 (50%) of the respondents stated that their child's age was 2-3 years, while the least 7 (17.5%) stated that their child was aged 3-4 years.

DISCUSSION

The study found that the majority (57.5%) of the respondents had female children who were more likely to be infected with worms, possibly because female children under 5 years in the study area often spend more time at home playing near contaminated areas, increasing their exposure to soil and unhygienic environments where helminthic eggs are present. These study findings are not in line with a study conducted in Uganda by Noordin et al. (2022), who reported that male children were more likely to be infected with STH.
The study revealed that the majority (67.5%) of the respondents mentioned that their child walked barefoot most times, which increased their chances of being infected with worms. The study findings are consistent with a study conducted in Sudan by Vilwanathan et al. (2017), which

found that walking bare foot were associated with intestinal parasitic infections.

The study further found that 50% of the respondents, whose child's age was 2–3 years, noted more worm infestation, probably because children in this age group are more active, frequently play outdoors, and often put their hands or objects in their mouths, increasing their exposure to contaminated soil and unhygienic environments where helminth eggs are present. The study findings concur with a study conducted by Amisu et al. (2023), which reported that having a child in the higher age group of 4-5 years reduced the risk of infection with worms compared to having children in lower age groups. The findings of the study showed that the above child behavioural factors contributed to worm infestation among children under 5 years.

Study limitation

The study involved only 40 respondents, which limited the generalizability of the findings to all parents of children under five in Katikamu Subcounty; to address this limitation, future studies could increase the sample size to include participants from multiple health facilities or villages, thereby improving the representativeness of the findings.

The use of a convenient sampling method may have introduced selection bias, as only readily available and willing participants were included; future research could adopt systematic or stratified random sampling to ensure that all eligible participants have an equal chance of being selected.

The cross-sectional nature of the study limited the ability to establish causal relationships between parental, child, and socio-economic factors and worm infestation; this could be addressed in future studies by conducting longitudinal research to track participants over time and establish temporal and causal links.

Data were collected using self-reported questionnaires, which may have been affected by recall bias or social desirability bias, as respondents could have provided answers they thought were acceptable; combining questionnaires with direct observation or health records review in future studies could improve data accuracy.

CONCLUSION

Child-related risks for worm infestation included female children spending more time in contaminated play areas, frequent barefoot walking, and the high-activity age group of 2–3 years, all increasing exposure to helminth eggs.

RECOMMENDATION

Promote proper child hygiene by encouraging regular handwashing with soap, wearing shoes, and ensuring children avoid playing in contaminated areas.

Adopt routine deworming practices every six months as recommended, rather than waiting for children to develop symptoms.

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LIST OF ABBREVIATIONS

MDA: Mass drug administration
MOH: Ministry of Health
NGOs: Non- government organization
SDG: Sustainable Development Goal
STH: Soil-transmitted helminths
OPD: Outpatient Department
WHO: World Health Organization
HC III: Health Centre Three
SPSS: Statistical Package for Social Scientists

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The study had no funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY

Data is available upon request from the author.

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AUTHOR CONTRIBUTIONS

AA: collected the data.
HM: supervised the study.
JFN: supervised the study.
HN: supervised the study.
IPN: supervised the study.
FS: **:** supervised the study

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