



## Magnitude and Factors Associated with Scabies among Primary School Children in Goro Gutu Woreda, East Hararghe Zone, Ethiopia

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### ABSTRACT

**Introduction:** Scabies affects more than 300 million people, causing significant morbidity, particularly in nations with few resources. In Ethiopia, guidelines for handling outbreaks have been developed by the federal ministry of health. However, an investigation remains limited to some regions, and health extension workers who can miss cases do diagnosis. **Objective:** To determine the magnitude and factors associated with scabies among primary school children in Goro Gutu woreda, east Hararghe zone, Oromia region, Ethiopia, from October 20 to November 20, 2022. **Method:** An institutional-based cross-sectional study was conducted among 460 primary school children in the Goro Gutu woreda from October 20 to November 20, 2022. Data were collected using a pre-tested, structured questionnaire and a physical examination. Data were analyzed using Stata version 15. Bivariable and multivariable analyses were employed to identify factors associated with scabies. Finally, the statistical significance level was declared at a *p* value less than 0.05. **Result:** The overall magnitude of scabies was 11.4% [(95% CI: 8, 14)]. Lower grade level of (1-4 grade) (AOR=3.09, 95% CI (1.32, 7.25)), family of illiterate father (AOR=2.68, 95% CI (1.32, 5.44)] and not taking bath with water and soap [AOR=3.22, 95% CI (1.07, 9.66)] were factors significantly associated with scabies. **Conclusion:** Schoolchildren in the Goro Gutu district of eastern Ethiopia had high scabies rates based on the 2015 Ethiopian guideline for control of scabies outbreaks, which strongly correlated with children's grade level, fathers' educational status, and the frequency of taking a bath with soap and water. Improving the hygienic behavior of students in institutions and communities is recommended.

**Keywords:** Magnitude, Scabies, Goro gutu, Ethiopia

## INTRODUCTION

Scabies is a common, communicable infection of the skin caused by a mite (*Sarcoptes scabiei*). It is sometimes known as the human itch due to the intense itching caused when the pregnant female mite burrows into the top layer of skin and lays eggs [1]. The most common symptom of a scabies infestation is pruritus. When the skin's protective barrier function is compromised, secondary bacterial infections are encouraged, which can result in further, potentially fatal problems. It is a neglected tropical disease that affects people of all ages, ethnicities, genders, and social classes worldwide [2]. According to studies, children who slept on the floor with other child developed more infections that are serious and were re-infected more frequently. This makes it easier for scabies mites to move from infected to healthy youngsters through skin-to-skin contact [3].

Scabies contributes to significant economic costs for national health services in the developed world due to outbreaks in health institutions and vulnerable communities. However, in resource-poor countries, the burden of scabies infestations as well as their complications contributes to a major cost to health-care systems [4]. Evidence from the literature shows that the prevalence of scabies in African countries is persistently high, being noticeable among individuals and in some specific groups and communities [5]. In Ethiopia, scabies is also common, especially during natural or manmade disasters such as flooding, drought, civil war and conflict, poor water supply and sanitation, and overcrowding living conditions [6]. A study conducted on scabies among schoolchildren in Northern Ethiopia and southern Ethiopia found prevalence of 22.5% and 5.5%, respectively [7].

Poverty and poor hygiene are factors in the spread of scabies, as they are nearly always associated with overcrowding, sharing of beds, poor hygiene, lack of access to health care, inadequate treatment, primarily mediated by close and extended contact with scabies-infested persons, and malnutrition [8]. Overcrowding, poor hygiene, poor nutritional status, immigration, homelessness, and sexual contact are the common predisposing factors for the infestation [9]. These complications may include local skin infections, abscesses, kidney disease, and heart disease [10]. Scabies can be treated with several different topical medications, but community-wide control is difficult to achieve. Ivermectin is an oral medication that is increasingly utilized for mass therapy since it kills numerous additional parasites [11].

### Statement of the Problem

Globally, the prevalence of scabies ranges from 0.3% to 71%. Scabies also accounts for 0.21% of Disability-Adjusted Life Years (DALYs) [12]. There is a high prevalence of scabies in low and middle-income countries [13]. Its prevalence in Sub-Saharan Africa varied up to 33.7% [14]. As different epidemiological studies conducted in some parts of Africa indicate, the prevalence of scabies, such as in Gambia (15.9%), Cameroon (17.8%), and Nigeria, is about 4.7% up to 65% [15]. Scabies affects all social classes; however, some groups of people, such as immune-compromised individuals, the elderly, residents of care facilities, children, and populations with low socioeconomic conditions, are at higher risk of infection [16]. Scabies is a common problem among schoolchildren, and the infestation spreads rapidly due to close physical contact between classmates and overcrowding conditions in the schools [16].

Ethiopia has developed a guideline to help control and prevent scabies outbreaks. The recommended interventions include Health, Water, Sanitation, and Hygiene (WASH), and communication for development. Considering scabies as a water-washed disease, the key intervention is the provision of access to sufficient safe water for personal hygiene. washing of clothing, washing of the body using soaps, especially the affected areas, appropriate hand washing at critical times, and clothing or bedding that were used by an infested individual during and before effective treatment should be sundried to allow time for mites and eggs to die [17].

Scabies is one of the public health concerns among communicable diseases in Ethiopia, especially among disadvantaged people like the streets, migrants, and poorer [18]. The magnitude of scabies infestation in Ethiopia was varied, ranging from 2.5% to 78%, and inconsistent [19]. In Ethiopia, drought expansion and the increased number of water-scarce districts with limited Water, Sanitation, and Hygiene (WASH) intervention further worsen

the disease expansion and severity among the vulnerable. The total number of highly affected Districts in Amhara, Tigray, and Oromia reached 32 districts; 24 districts in Amhara, 5 in Tigray, and 3 in Oromia regions were highly affected, with limited surveillance for scabies, for a total of more than 250,000 affected, with a prevalence of more than 15% in some districts [20].

Scabies has become a major public health problem, especially in low-resource settings. Especially in Ethiopia, scabies focused on adults; however, it was not well investigated in children under 15 years' of age. So, there was limited study done regarding scabies prevalence and associated risk factors among primary school children in the study area. Therefore, the aim of this study was to assess the magnitude and factors associated with scabies among primary schools in Goro Gutu woreda.

### **Significance of the Study**

The result of this study would provide the magnitude of scabies and risk factors for scabies among primary school children attending class during the study period. The findings of this study would be of paramount importance for the Goro Gutu Woreda Health Office and Education Office to inform the burden of disease and apply Mass drug Administration (MDA). It is used as a baseline to prevent and control scabies and its associated factors. It is used to reduce scabies prevalence and its health consequences in primary school children. It is used as the baseline data for other studies that will be conducted in the area.

### **Objectives**

**General objective:** To assess the magnitude and factors associated with scabies among primary school children in Goro Gutu woreda from October 20 to November 20, 2022.

#### **Specific objectives:**

- To determine the magnitude of scabies among primary school children.
- To identify factors associated with scabies among primary school children.

## **METHODS AND MATERIALS**

### **Study Area and Period**

The study was conducted at Goro Gutu-woreda from October 20 to November 20, 2022. Goro Gutu woreda is found in eastern Oromia, Ethiopia. Goro Gutu is bordered to the south by Deder woreda, to the west by the Hararghe zone, to the north by the Somali region, and to the east by Meta woreda. About 416 kilometers from the capital, Addis Ababa, and 104 km from the zonal capital, Harar There is two urban and 28 rural kebeles. Six health centers, 28 health posts, and 84 primary schools (excluding kindergarten) are in the woreda (woreda administrative office report, 2014).

### **Study Design**

Institutional-based cross-sectional study was conducted.

### **Population**

**Source population:** The source population includes all primary school children with their parents or guardians in Goro Gutu woreda.

**Study population:** All primary school children who were attending schooling in selected sections of selected schools with their parent or guardian during the data collection period in Goro Gutu woreda.

### **Eligibility Criteria**

**Inclusion criteria:** All primary school children in the selected sections of selected school with their parent/guardian were included in the study.

**Exclusion criteria:** Primary school children who were absent from school for two consecutive days during data collection were excluded from the study.

**Sample Size Determination**

**For objective 1:** The sample size was calculated by using a single population proportion formula:

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

Considering 23.8% from the previous study [21]. With assumptions of confidence level at 95%=1.96, a margin of error (d)=5, design effect=1.5, and adding 10% for non-response rate as follows:

$$n = \frac{(z_{\alpha/2})^2 p(1-P)}{d^2} = \frac{(1.96)^2 \times 0.238(1-0.238)}{(0.05)^2} = 279$$

Non-response rate=10% × 279=28

So, n=(279+28) × 1.5=460, Where, n=the minimum sample size,  $z_{\alpha/2}$  =the desired level of confidence interval 95% (1.96). P=23.8% magnitude of scabies, d=margin of error 5% (0.05).

**For objective 2:** The sample size for the second specific objective of this study was determined by considering factors that are significantly associated with the outcome variable: a two-sided confidence level of 95%, a margin of error of 5%, a power of 80%, and the ratio of exposed to unexposed at 1:1 using EPI-Info software. Considering 10% for the non-response rate, the final sample size for the second objective was determined as follows (Table 1).

**Table 1 Sample size determination for the objective two factors associated with scabies [22-24]**

Factors	Scabies		AOR	Sample size considering 1.5 design effects and 10% non-response rate
	% of Exposed	% of Unexposed		
Frequency of bathing	7.70%	25%	3.51	(164+16.4)×1.5=271
Family size	60.9%	39.06%	0.77	(180+18)×1.5=297
Sharing clothes	41.40%	58.60%	5.61	(274+27.4)×1.5=452

The largest sample size was taken from the first objective; 460 participants were selected from the study population.

**Sampling Procedure/Technique**

A multi-stage sampling technique was used to select a representative sample of the participating primary schools for the study units. The first six kebeles were selected from Goro Gutu District by simple random sampling. Second, from the selected kebeles, nine schools were selected by simple random sampling. The final sample size was allocated proportionally based on the total number of students in the selected school. Then, the sample size in the selected school was proportionally allocated to each grade based on the number of students in each section. Finally, students were selected by systematic random sampling from their class rosters. The sampling width was determined by the proportion formula: the total number of students in the sections divided by the total sample size, which is 2301/460=5 and then every fifth student on the roster were included in the study (Figure 1).

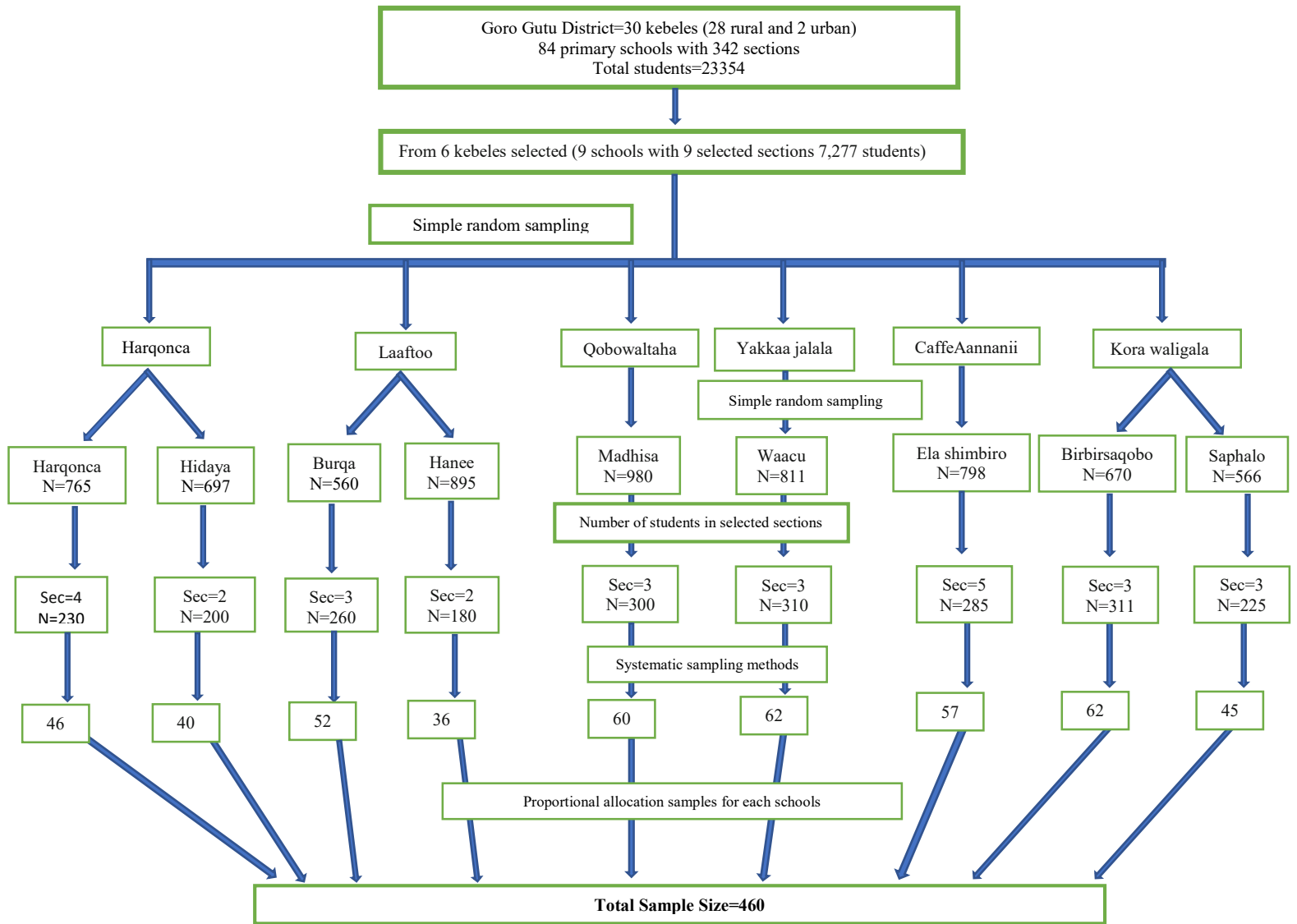


Figure 1 Schematic diagram of sampling frame on the magnitude and factors associated with scabies among primary school children of Goro Gutu district, Oromia, Ethiopia, 2023

**Data Collection Methods**

**Data collection tools:** The data was collected by face-to-face interviewing using a pre-tested Afaan Oromo version structured questionnaire from the parents and students. The questionnaire was developed by reviewing different literature [23,25,26]. The questionnaire has three sections, namely: Socio-demographic factors, personal hygiene factors, and living condition factors.

**Data collectors:** Ten field workers, nine B.Sc. nurses’ data collectors, and one health officer supervisor were assigned.

**Data collection procedures:** The data were collected using clinical investigation (observation) and structured interviewer-administered questionnaires. Data collectors were trained by a dermatologist on how to diagnose

scabies, and training was given on how to obtain informed consent or assent from parents or the study participants to ensure ethical procedures, including practical sessions.

The 2020 IACS Criteria were used by the data collectors to identify scabies presentations. During the interview, parents or guardians of the child were asked about the child's experiences with itching and history of contact with someone with scabies. Then, a clinical examination of the child was carried out to look for burrows, solid lesions (papules), and vesicles. Clinical signs of characteristic skin lesions on the hands, inter digital spaces, wrists, arms, elbows, armpits, legs, or feet, as well as a history of itching that was worse at night, are used to diagnose scabies. Clinical evaluation is necessary for the diagnosis of clinical scabies (level B) or suspected scabies (level C), which includes aspects of the patient's history and a skin inspection. Ample lighting should be used when examining patients. Due to issues of cultural and personal modesty, we could not inspect sensitive parts like the breasts and external genitalia.

Therefore, subcategory B2 would not be included in our diagnostic evaluation (male genital lesions). It could be classified as subcategories B3 or C1 (typical features), with far fewer classified as B1 (burrows) or C2 (atypical features). The presence or absence of a scabies infection served as the study's outcome variable [27].

### **Variables**

**Dependent variable:** Magnitude of scabies.

**Independent variables:**

- Socio-demographic factors: Age, sex, family size, and educational status.
- Personal hygiene factors: Use of soap in the bath, trimming of finger nails, washing the body, and cloth.
- Living conditions factors: Include living with an infected person, sharing a bed, and sharing clothes.

### **Operational Definitions**

**Scabies:** Scabies is characterized by common skin lesions on the hands, inter digital spaces, wrists, arms, elbows, armpits, legs, or feet, as well as a history of night time itching [27].

**Contact with scabies infested person:** participant who live together with infected person by scabies, share a bed (including romantic partners), attend the same school, or spend a lot of time together [23,25,26].

### **Data Quality Assurance**

The questionnaire was first prepared in English, and then translated into the local language (Afaan Oromo) and then back to English by different language experts to check its consistency. In addition, data was collected by observation or physical examination of students by trained nurses. A pre-test was conducted at 5% of the sample size in Haramaya district two weeks before the actual data collection period to test for clarity and completeness of the data collection tool, and corrections were made accordingly. Training was given to data collectors and supervisors by a dermatologist for 3 days on how to diagnose scabies and how to take informed consent from parents or guardians, assent from students, approach participants, and ensure ethical procedures, including practical sessions at Chelenko Primary Hospital. On each day of the data collection, there was close supervision by the supervisors and principal researcher to support and monitor the data collection process by the data collectors. Principal investigators and supervisors were checked for daily activity, consistency, and completeness of the questionnaires and to give appropriate support during the data collection process. After data collection, each questionnaire was checked for completeness to commence the data entry process on a daily basis [27].

### **Data Analysis**

After data collection, the data was coded, cleaned, and entered into Epi Data version 3.1 and analyzed using Stata version 15. Descriptive statistics were performed to compute summary statistics, and the results were presented in tables and in text as frequencies, percent, and standard deviation. A bi-variable analysis was performed to select candidate variables with  $p < 0.25$ . Based on this, candidate variables were included in the final model of multivariable analysis to control all possible confounders. Variables that were also significant in previous studies and from the

context point of view of the study area were included in the final model of multivariable analysis even if the above criteria were not met. The model's goodness of fit was tested by the Hosmer and Lemeshow statistic test; the model was considered a good fit since it was found to be non-significant for Hosmer and Lemeshow (Pearson chi=1.80, p-value=0.6152). Multi-collinearity was checked by using VIF to see correlation between independent variables, and the result showed that no variables with VIF>10 were observed. Finally, variables with a p-value less than 0.05 in the multivariable analysis were considered, as there is a significant association with scabies.

### **Ethical Considerations**

Ethical clearance was obtained from the Institutional Health Research Ethics Review Committee (IHRERC) of the College of Health and Medical Sciences, Haramaya University. In addition, an official letter of support was written from the School of Medical Laboratory Sciences to the Zonal Health Department and the Goro Gutu Waida Education Office. The purpose and significance of the study were explained to the head of the selected school and the parents or guardians of the child, and they were assured that they had the right to withdraw from the study at any stage. Informed, voluntary, written, and signed consents from parents and children and assent from the children were obtained before the data collection. Then, parents and their respective children were invited by the teachers to come to the school where their child was learning. Detailed information about the child was obtained from his or her parents. Identified scabies cases were linked to health extension workers and the district Health Office for treatment purposes. In addition to this, students were sensitized to adhere to proper sanitation and hygiene practices on a daily basis. Similarly, school directors and teachers were informed to monitor their students' hygiene. The confidentiality of the study participants was maintained throughout the study.

### **Information Dissemination**

The results will be submitted to Haramaya University, the School of Public Health, the Zonal Health Department, and the Goro Gutu District Health Office, which will present them at the different workshops. Moreover, efforts will be made to publish the findings of the study in a peer-reviewed journal.

## **RESULTS**

### **Socio-demographic Characteristics**

In this study, 447 study participants were included, with a response rate of 97%. However, 13 students whose parents or guardians were not willing to respond were excluded from the study. The median age of the children participating in this study was 12 (IQR: 9-15). One hundred sixty-four (36.7%) of the study participants were in the age group of 6 years to 10 years. More than half of the study participants were male children (57.5%); having 1-5, families (78.5%), Muslims in religion (92.6%), have a literate mother (59.3%), and have literate father (64.7%) and farmers in occupational status (90.6%) (Table 2).

**Table 2 Socio-demographic characteristics of study participants (students and their parents) at Goro Gutu primary schools, Eastern Ethiopia, 2022 (n=447)**

Variables	Categories	Frequency	Percentage
Age of children (years)	6-10	164	36.7
	11-14	151	33.8
	15+	132	29.5
Sex of the child	Male	257	57.5
	Female	190	42.5
Children's grade level	1-4	281	62.9
	5-8	166	37.1
Family size	1-5	351	78.5
	>5	96	21.5

Mother's educational status	Not read and write	182	40.7
	Literate	265	59.3
Father's educational status	Not read and write	158	35.3
	Literate	289	64.7
Occupational status of the head housewife	Farmer	405	90.6
	Government employee	6	1.3
	House wife	11	2.5
	Merchant	25	5.6

### Personal Hygiene and Contact Information for Students about Scabies

The majority of the study participants took a bath last week (79.4%), washed their clothes with soap and water (73.1%), shortened their nails last week (64%), and had no contact with someone having scabies (87.2%) (Table 3).

**Table 3 Personal hygiene and contact information for students and parents about scabies at Goro Gutu primary schools, Eastern Ethiopia, 2022**

Variables	Categories	Frequency	Percentage (%)
Child took a bath last week.	Yes	355	79.4
	No	92	20.6
The child took a bath with water and soap.	Yes	324	72.5
	No	123	27.5
The child took a bath with water only.	Yes	137	30.6
	No	310	69.4
Child washed clothes last week.	Yes	342	76.5
	No	105	23.5
Child: wash clothes with water and soap.	Yes	327	73.2
	No	120	26.8
Child: Wash clothes with water only.	Yes	125	28
	No	322	72
Child trimming nails last week	Yes	286	64
	No	161	36
Child contact with an individual diagnosed with scabies	Yes	58	13
	No	389	87
The child shared a bed with another individual.	Yes	52	11.6
	No	395	88.4

### Magnitude of Scabies

**History:** A positive contact history was reported in 58 (13% of study participants). Sharing a bed with others was reported by 52 (11.6) individuals. Have a friend or classmate with a rash was reported in 49 (10.96) students. Itch was reported in 46 (10.29%) of the study participants. typical lesions were observed in 51 (11.41%) of the study participants.

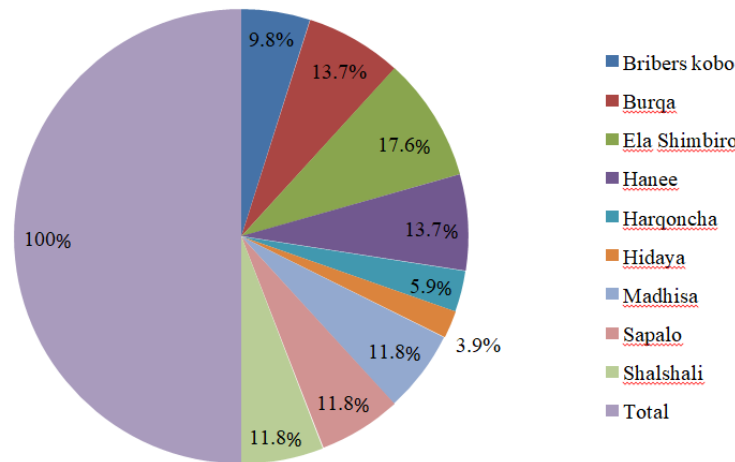
**The IACS Criteria:** The overall magnitude of scabies among primary school children was 11.4% (51/447) (95% CI: 8, 14). Of total scabies cases, 49 (10.96%) were observed in those with positive contact histories, and 46 (10.29%) were observed in individuals who have an itch. Finally, 46 (10.29%) cases were classified as clinical scabies (level B with typical lesions in a typical distribution and two history features), and 5 (1.12%) were classified



as suspected scabies (level C1 with typical lesions in a typical distribution and one history feature) according to the IACS Criteria.

**Magnitude of Scabies in Relation to School Names:** The overall magnitude of scabies among primary school children was 11.4% (51/447) (95%CI: 8, 14). From the total scabies cases, the highest percent were found in Ela shimbiro primary school (17.6%) and lowest in Hiday primary school (3.9%) as shown in figure 2.

**Magnitude of Scabies by School Name**



**Figure 2 Prevalence of scabies by school name in Goro Gutu woreda, eastern Ethiopia, 2022**

**Factors Associated with Scabies**

Bi-variable and multivariable logistic regression analysis was used to identify factors associated with scabies. The high frequency of scabies in relation to Socio-demographic characteristics, personal hygiene, contact information, and high-risk groups were candidates for bi-variable analysis.

Bivariate analysis shows that Students of Age 6 years to 10 years, Students from families with a family size >5, students from grades 1-4, Students from illiterate Mothers, Students from illiterate Fathers, Students have not taken a bath last week; Students have not taken a bath with water and soap; Students have not washed cloths with water and soap. In addition, Students who did not Cut their nails last week were more likely to be infested by scabies, and they were significantly associated with scabies, as confirmed by the odds ratio of PV<0.25% with 95% (Table 4).

**Table 4 Results of bi-variable analysis for factors associated with scabies among primary schools in Goro Gutu Woreda, 2023**

Variables	Category	Scabies		COR (95% CI)	p-value
		Yes	No		
Age of children (years)	6-10	31 (18.8%)	133 (81.1%)	4.89 (1.97,12.12)	0.001
	11-15	18 (9.2%)	178 (90.8%)	2.14 (0.80, 5.75)	0.129
	15+	2 (2.3%)	85 (97.7%)	1	
Family size	1-5	30 (8.5%)	321 (91.5 %)	1	
	>5	21 (21.9%)	75 (78.1%)	2.99 (1.62, 5.52)	0.0001
Child grade level	1-4	43 (15.3%)	238 (84.7%)	3.56 (1.63,7.79)	0.001
	5-8	8 (4.8%)	158 (95.2%)	1	
Mother's educational status	Unable to read and write	33 (18.1%)	149 (81.9%)	3.04 (1.65,5.58)	0.0001
	Literate	18 (6.8%)	247 (93.2%)	1	
Father's educational status	Unable to read and write	32 (20.3%)	126 (79.7%)	3.60 (1.96, 6.61)	0.0001

	Literate	19 (6.6%)	270 (93.4%)	1	
Taking a bath last week	Yes	31 (8.7%)	324 (91.3%)	1	
	No	20 (21.7%)	72 (78.3%)	2.90 (1.56, 5.38)	0.001
Taking a bath with water and soap	Yes	23 (7.1%)	301 (92.9%)	1	
	No	28 (22.7%)	95 (77.2%)	3.04 (1.67, 5.52)	0.001
wash cloth last week	Yes	33 (9.65%)	309 (90.4%)	1	
	No	18 (17.1%)	87 (82.9%)	1.93 (1.040,3.60)	0.037
Wash cloths with water and soap	Yes	26 (8%)	301 (92.0%)	1	
	No	25 (20.8%)	95 (79.2%)	3.04 (1.67, 5.52)	0.0001
I cut my nails last week.	Yes	23 (8.0%)	263 (92%)	1	
	No	28 (17.4%)	133 (82.6%)	2.40 (1.33,4.34)	0.003

Multivariable analysis shows that students from the grade level of 1-4 were 3.09 times more likely to be infested by scabies than students from the grade level of 5-8 (AOR=3.09, 95% CI 1.32, 7.25), similarly, students from the family of an illiterate father were 2.68 times more likely to be infested by scabies than the students from the family of a literate father (AOR=2.68, 95% CI 1.32, 5.44). In addition, students who had not washed their bodies with water and soap were 3.22 times more likely to develop scabies than their counterparts were [AOR=3.22, 95% CI (1.07, 9.66)]. Therefore, scabies was significantly associated with children’s grade level, father's educational status, and not taking a body bath with water and soap at P 0.05 (Table 5).

**Table 5 Results of multivariable analysis for factors associated with scabies among primary schools in Goro Gutu Woreda, 2023**

Variables	Categories	Scabies		COR (95% CI)	AOR (95% CI)
		Yes%	No%		
Age of children (years)	6-10	31 (18.8%)	133 (81.1%)	4.89 (1.97,12.12)	1.71 (0.35,8.38)
	11-15	18 (9.2%)	178 (90.8%)	2.14 (0.80,5.75)	1.49 (0.35,6.21)
	15+	2 (2.3%)	85 (97.7%)	1	1
Family size	1-5	18 (9.2%)	178 (90.8%)	1	1
	>5	2 (2.3%)	85 (97.7%)	2.14 (0.80,5.75)	2.13 (1.01,4.49)*
Children's grade level	1-4	43 (18.1%)	238 (84.7%)	3.56 (1.63,7.79)	3.09 (1.32,7.25)**
	5-8	8 (4.8%)	158 (95.2%)	1	1
Father's education status	Unable to read and write	32 (20.2%)	126 (79.7%)	3.60 (1.96,6.61)	2.68 (1.32,5.44)**
	Literate	19 (6.6%)	270 (93.4%)	1	1
Mother's educational status	Unable to read and write	33 (18.1%)	149 (81.9%)	3.0 (1.65,5.58)	0.74 (0.21,2.55)
	Literate	18 (6.8%)	247 (93.2%)	1	1
Taking a bath with water and soap	Yes	23 (7.1%)	301 (92.9%)	1	1
	No	28 (22.7%)	95 (77.2%)	3.85 (2.12,7.01)	3.22 (1.07,9.66)*
Taking a bath last week	Yes	31 (8.7%)	324 (91.3%)	1	1
	No	20 (21.7%)	72 (78.3%)	2.90 (1.56,5.38)	0.50 (0.16,1.60)
wash cloth last week	Yes	33 (9.65%)	309 (90.4%)	1	1
	No	18 (17.1%)	87 (82.9%)	1.93 (1.04 ,3.60)	0.18 (0.05,0.64)
Wash cloths with water and soap	Yes	26 (8%)	301 (92.0%)	1	1
	No	25 (20.8%)	95 (79.2%)	3.0 (1.679,5.52)	2.73 (0.85,8.77)
Trimming nails last week	Yes	23 (8.0%)	263 (92%)	1	1

	No	28 (17.4%)	133 (82.6%)	2.40 (1.33,4.34)	1.26 (0.54,2.91)
<b>NOTE:</b> *Indicate significant with $p<0.05$ , **Indicate significant with $p<0.001$ , CI=Confidence Interval, COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio.					

## DISCUSSION

This study was conducted to assess the magnitude of scabies and its contributing factors among primary school children. Scabies has an impact on children's lives, e.g., by causing extreme itching that causes them to miss more school. Patients with scabies also had to deal with secondary bacterial problems. Children's grade level, father's educational status, and the absence of taking body baths with water and soap were factors significantly associated with scabies. The overall magnitude of scabies among primary school children was 11.4% [(95% CI: 8, 14)], which was almost consistent with the studies conducted in Ethiopia: Amhara region, Bahir Dar (14.5% 95% CI: 1.5, 27.6%) [28], in Central Armachiho district, Northwest Ethiopia (10.82% 95% CI: 8.7-12.9) [25], Dabat, northern Ethiopia (9.3% 95% CI: 5.66%, 12.94%) [22], and out of Ethiopia, Liberia (9.3% 95% CI: 6.5%-13.2%) [29], Nigeria (13.3% 95% CI: 11.8-16.8) [30]. However, it was lower than studies conducted in Cameroon (17.8%, 95% CI: 14.7-22.9) [31], in Tigray Region, Northern Ethiopia (12.93% 95% CI: 17.5-21.0) [23], Solomon Island (19.2% 95% CI: 17.5-21.0) [32], and Fiji (18.5%, 95% CI: 14.7-22.9) [33]. On the other hand, the current magnitude is higher than a study done in Egypt (4.4% 95% CI: 1.4%-1.8%) [34]. This difference in magnitude might be due to variation in the sociodemographic characteristics of the study population, level of awareness, and health-seeking behavior across these populations.

This study revealed that students who did not wash their bodies with water and soap were more likely to be infested with scabies than their counterparts. This finding is consistent with the study conducted in Nigeria [35]. Scabies can be prevented and managed through good personal hygiene habits. By washing the body with soap, scabies mites are destroyed because soap has a chemical property that eliminates the mites from the body and reduces the likelihood of transmission. Lack of proper water access across the nation could put people at risk of contracting infectious diseases. The responders may also not have been aware of the significance of maintaining good personal cleanliness, which could be a risk factor for the spread of scabies mites.

This study revealed that students in the lower grades were more affected by scabies than higher-grade students. This was in line with a study conducted in Cameroon [31]. The higher-grade students might have more awareness about transmission and prevention, or this might be because students at first-cycle primary schools have less control over their personal hygiene and environmental sanitation. They also have a higher chance of contact as they spend much of their time playing with their friends [22]. The spread of human scabies is linked to poor personal hygiene. Therefore, it is possible that the younger students, who are of a lower educational level than their counterparts, are less aware of personal hygiene rules to adopt, especially when living with others, and are therefore more likely to be infested.

The other factor identified in the current study was the father's educational level. Those students who did not learn to read and write were more likely to be infested with scabies. This finding is also similarly reported by other studies conducted in Iran [36], in Egypt [37], and in Indian [38], suggested that parents with higher levels of education are more capable of applying healthcare and prevention measures for their children. The possible reason might be that parental education seems to have a major role in the prevention of contagious diseases [37]. There was one report from Egypt found that Parents with higher levels of education are more capable to apply healthcare and prevention measures for their children.

### Strength and Limitation

**Strength:** The diagnosis was made based on a simplified, modified version of the 2020 IACS criteria. Skilled primary healthcare personnel perform a brief skin examination of exposed parts of the limbs for the presence of typical scabies lesions. It is used to offer more accurate regional estimates of prevalence, to argue for enough funding for control, and to track prevalence over time, including evaluating the effectiveness of control programs.

**Limitation:** As this is an across-sectional study, the temporal relation between the insufficient knowledge about Scabies, the variable demographic factors, and the high prevalence of Scabies among the targeted population cannot

be determined. Some limitations of our study include the absence of dermcopy and/or skin scrapings or microscopy, although they are operator-dependent and have relatively low sensitivities.

### CONCLUSION

Scabies prevalence in Goro Gutu woreda primary school was high, according to the 2015 Ethiopian guidelines for the control of scabies outbreaks. The prevalence was assessed in connection to socio-demographic traits, personal cleanliness, and contact history. Scabies was found to be substantially correlated with children's grade level, fathers' educational status, and not cleaning one's body with soap and water.

Based on the findings of this study, the following recommendations are proposed:

**For Woreda Health and Administration Offices:** Improving the hygienic behavior of students by creating awareness regarding scabies mode of transmission and control mechanisms.

**For School's Teachers:** Create awareness regarding scabies mode of transmission and prevention mechanisms.

**To Researcher:** Prevalence surveys are recommended to provide more detailed regional estimates of prevalence, advocate for appropriate resources for control, and monitor prevalence over time, including to assess the impact of control interventions.

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### DECLARATIONS

#### Conflict of Interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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