

Scabies outbreak investigation in Addet town, West Gojjam Zone, Amhara region, Northwest Ethiopia, 2017

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Abstract

Background Globally scabies was among the 50 most common infectious diseases, with a point prevalence 0.3%-46% and in terms of morbidity, at 1.5 million disability-adjusted life years. This study investigate and asses risk factors of scabies in Addet Medhanit Alem yekolo temarie in Yilmana Densa district Amhara, Ethiopia, 2017 Methods Unmatched Case-control study was employed. Fifety five cases from line lists reviewed as per the WHO case definition. Cases were epidemiological linked to previously epidemiological confirmed cases and 118 controls were interviewed with structured questionnaires. Data was entered EPI info version 7 and analyzed by SPSS version 23. Adjusted Odds Ratios and with corresponding 95% confidence intervals were calculated to measure strength of association in multi-variable logistic regression Results The prevalence of scabies was 35%. The mean (SD) age of respondents was 16.4(2.785). Out of respondents 110 (63.6%) used river water for daily basis, 36(20.8%) changed their cloth frequently, 105(60.7%) washed their body frequently, 106(61.3%) had at least one scabies infected person in their house. The odds of scabies infection were 2.3 (AOR = 0.436, 95% CI: 0.205-0.929) times lower among frequent changing of cloth, And washing of body with soap and water were 2.17(AOR = 0.461% CI: 0.214-0.993) times lower having scabies infection. Share cloth was 3(AOR = 3.313, 95% CI: 1.536-7.149) times higher having scabies infection. Presence of scabies infected individuals in the family was 6 (AOR = 6.029, 95% CI: 2.071-14.275) times higher to develop scabies infection. Conclusions There prevalence of scabies infection was high, less than 15 years age group were most affected. Frequent changing of cloth, frequent use of soap for body wash, sharing of cloth and presence of scabies infected individuals in the family were factors affecting scabies infection. Personal, house hygiene should be strength and avail soap for students should be considered.

Background

Human scabies is a contagious an external parasite skin infestation caused by *Sarcoptes scabiei* var *hominis*. The mite, only visible to the naked eye, burrows into the epidermis and lays eggs, induced a host immune response that leads to sever itching in response to just a few mites (1). The scabies mite is almost always transferred by direct, prolonged, skin-to-skin contact with a person who is already infected by scabies. An infected person can transfer scabies even if he or she has no symptoms. Scabies can be passed from an infected person to his or her household members and sexual partners. Scabies can communicate easily under crowded conditions where close body and skin contact is common. Areas such as nursing homes, extended-care facilities, and prisons are often sites of scabies outbreaks. Humans are the only reservoir (2, 3).

World Health Organization's currently incorporated scabies to the list of neglected tropical diseases (NTDs) (4). According to Global Burden of Disease (GBD) study, scabies was among the 50 most common infectious diseases worldwide, with a point prevalence of around 0.3%-46% (5, 6). In terms of morbidity, it is estimated at 1.5 million disability-adjusted life years (7).

In addition scabies outbreak reported in three consecutive years globally in 2008 in Nepal about 14.7%, in 2009 in Malaysia, Brazil Fiji, 8.1%, 9.8% cases were reported respectively and in 2010 Malaysia was reported 31% cases (8).

Scabies outbreak becomes common in Ethiopia. Since 2016, about 373,000 scabies cases were reported in 76 Woredas in Amhara region Ethiopia(9). It may be due to its nature of transmissibility, poor water access, the occurrence of the El Nino and insufficient supply of medicines to treat those who fell ill(10). Scratching, secondary to itching can lead to introduction of the skin with bacteria, leading to the development of impetigo (skin sores), especially in the tropics. Impetigo can end up with complication of, abscesses, sepsis in infants, acute post-streptococcal glomerulonephritis and possibly rheumatic heart disease. Studies shows that renal damage can be found in up to 10% of children with infected scabies in resource-poor settings and, in many, this persists for years following infection contributing to permanent kidney damage (6, 11, 12). Scabies can be treated by anti-scabies drugs. Treatment of individuals with scabies and their contacts is unlikely to achieve this goal, and so there is increasing interest in implementing a mass drug administration (MDA) strategy.(3, 6, 13)

This study conducted to investigate the outbreak and assess risk factors of scabies, among Yekolo temaries in Yilmana Densa District, Amhara Region, Ethiopia

Methods

Study area and population

The outbreak investigation was conducted in in a close religious community within in orthodox religion of Yilamana Densa district in Amhara, Ethiopia.

The district has 155 Orthodox Church, five Mosques, one protestant church and many orthodox religious students.

In Ethiopia, religious students who learn Ethiopian Ge'ez language (the classical liturgical language) are called Yekolo Temari. Ethiopian community called the students by different names such as Yekes temehirt, Ye'abinet timihirt, and yebetekihinet temehirt. However their importance is their living condition, hygienic behavior, and housing condition. These groups of people, "Yekolo-temari" are treated as a special group of children because of different social, cultural, religious/traditional and educational factors which makes them different from another group of people in Ethiopia. They have their own living lifestyle, livelihood strategy, social life and religious commitment which might not be practiced in the majority of other same age people in the country. Moreover majority of students comes from far area from their parents' Permanent residency. Because of this they need help from the nearby community in all aspects, including food, cloth and materials for personal hygiene. However may not get adequate support from the community due to scarcely resource. They lived with a range three to seven students in a single narrow room, the room in majority of cases made of grass and mud with narrow surface area, and it serves as residential for students and as a classroom. As a result of this the students should obligate to

share bed and room. Students wear special cloth while giving spiritual service, however during routine duty time they don't wear special cloth. Moreover the students don't have any regular income to buy additional clothes unless supported by religious members. Then they enforced to wear one cloths for a long period of time without changing. One of the schools in Ethiopia is found in Yilmana Densa district, North West Ethiopia, among which is a school located in the courtyard of Orthodox church. During the time of outbreak investigation, there were 194 Yekolo Temaris in the church [11-13].

Study Design and Study period: - Institution based unmatched case-control study was conducted from November 12- 19, 2017.

Target population: - All Yekolo Temaris in the district

Study population: All Yekolo Temaris in the district one Orthodox Church

Study unit: Yekolo Temaries in Orthodox Church who recruited as cases or controls.

Inclusion criteria: All yekolo temaries living in Orthodox Church Yekolo temehert bet

Exclusion criteria: Yekolo temaries in Orthodox Church who does not present during the study period.

Explanatory variables: Age, educational status, contact with scabies infected persons, sharing of cloth, hygiene and sanitation practices, number of people living together

Standard Case Definitions

- Suspected case: A person with signs and symptoms consistent with scabies
- Confirmed case: A person who has a skin scraping in which mites, mite eggs or mite feces have been identified by a trained healthcare professional
- Contact: A person without signs and symptoms consistent with scabies who has had direct contact (particularly prolonged, direct, skin-to-skin contact) with a suspected or confirmed case in the two months preceding the onset of scabies signs and symptoms in the case
- Epidemiologically linked case: Is a suspected case, which has contacts with a laboratory-confirmed case or another epidemiologically confirmed case.
- Index case:-Suspected or confirmed scabies case (case that met the criteria for standard scabies case definition) that initiates the public health attention (may or may not visit health facility) and of course, the first case who possibly the source of infection for the other cases emerging

Operational definition

- Infrequent bathing: taking of shower once within a period of more than a week
- Frequent bathing: Bathing one or more times per week
- Frequent changing of cloths: Changing of cloth more than once per a week

- Infrequent changing clothes: Changing clothes once within a period of more than a week
- Frequent use of soap for body wash: Use of soap for body washing at least two times from three consecutive body wash
- Infrequent use of soap for body wash: Use of soap for body wash once or none at all from three consecutive body wash
- Share cloth: Sharing of any cloth at least for half hour

Outcome measures: having scabies infection

Sample size calculation

Sample size determination: The sample size was determined by using EPI info 7.2 formulas for unmatched case-control based on the following assumption; 95% confidence level, Power = 80%, Ratio of case to control= 1: 2, Proportion of controls with exposure = 36.3 %, Least odds ratio = 2.63, Proportion of case with exposure = 60%(14). Therefore, the sample size was 173 samples 58cases and 115 controls were selected.

Statistical analysis

Data cleaned, coded and entered into EPI-INFO version 7.2 statistical software packages. Further cleaning and statistical analysis was done using SPSS version 23. Descriptive statistics including tables and charts were used to display the result. To identify factors associated with scabies infection multivariable logistic regressions analysis was done. Variables having a p-value <0.2 in the bivariable analyses was entered into the multivariable logistic regression model. Adjusted odds ratio with 95% CI was used to determine the presence and strength of association.

Ethical considerations

The study approved by Amhara Public Health institute ethical committee, and letter of support was obtained from West Gojjam zone health department and Yilmana densa District health office. Then the district Orthodox Church religious leader and Yekolo temaries teacher was informed about the investigation and written consent was obtained. For those less than 18 years students, consent was taken from their teacher, because the students living in far distance (other districts) from their family and consent to obtain from the family was not feasible. Willingness of each study participant was asked after they understand the main purposes of the study. Participants were informed that they can decline to participate at the very beginning or at any stage during the interview.

The information collected from respondents is kept confidential and Privacy of respondents was kept during interview and screening.

Results

Descriptive Epidemiology

All cases were male, 34(62%) of them were age between 15-25 years and the mean old (standard deviation) was 15.3(\pm 2.2). Among cases, 35(63.6%) were sleeping with their friend, 38 (69%) had previous history of scabies infection, around 34(62%) wash body at least once per week and 29(53%) of them used soap to wash their body and 12(22%) of cases were learning both religious and formal education. Controls all of them were male, 91(77%) of them age lay between 15-25years with the mean (SD) age of 16.9(\pm 2.1) year, 103(87.2) of them learned only religious education, the remaining follow both secular and religious education. On the other side from non-cases, 42(35.6%) of them were sleeping alone, 63(53.3%) of them were sleeping with scabies infected individuals, and 73(61.9%) of them were infected by scabies in the earlier time and 73(61.9%) of them used river water for daily basis (Table 1)

Skin Examination: - one case had 12 skin lesion and 40(72.7%) of cases were counted 1-5 skin lesion in their body (Figure1)

The index patient was from Addet Beata "Yekolo Tamari" [religious students] on 17-05-2017(10-10-2009 E.C), 13 years old male who came from scabies epidemic area Qurit district "Chegodie Hana" Yekolo Timhert bet (Religious school). Latter the number of cases become increased and reported to the district health office by Addet 02 kebele Health extension workers and by Addet health center on 06-02-2010. And the district report for West Gojjam Zone Health department on November 7/2010. (Figure 2)

Analytical Epidemiology

In binary logistic regression analysis, Frequent changing of cloth, wash body by soap, sleep with scabies affected person, previous history of scabies, share cloth, and presence of scabies infected person in the family were factors associated with safe scabies infection (Table 2).

In multivariable logistic regression analysis place of residence, wealth index, mother's education, number of under five years old children, child age and improved latrine were significantly associated with safe child feces disposal practices.

The odds of scabies infection were 2.29 (AOR = 0.436, 95 % CI: 0.205-0.929) times lower among frequent changing of cloth as compared to those changing of cloth infrequently. And washing of body with soap and water were 2.17 (AOR = 0.461 % CI: 0.214-0.993) times lower having scabies infection when compared to washing their body water alone. Share cloth was 3.3 (AOR = 3.313, 95 % CI: 1.536-7.149) times higher having scabies infection when compared to people don't share cloth. Presence of scabies infected individuals in the family was 6 (AOR = 6.029, 95 % CI: 2.071-14.275) times higher in developed scabies infection compared to a family with no scabies infected family.

Public health actions and responses

Treatment of cases including close contacts with permethrin 5% dermal cream was given in order to prevent the spread of scabies and re-infestation. Drugs were supplied from Yilmana Densa District health

office. Risk factors were identified and successfully addressed to control the outbreak through church community involvement, health information dissemination. Besides, personal hygiene week was declared and performed during outbreak investigation period. Finally, the number of cases decline after the treatment. The other interventions were taken awareness creation on all Yekolo temarie contacts should be treated at the same time even if asymptomatic and reapply the topical scabicide to the hands if they are washed during the treatment period (in 8 hours after application of the medication). Clothing, bedding, and linens used by an infested individual during the seven days prior to and during treatment should be washed or cleaned and dried sun or putting clothes in a plastic bag for two days and above is also effective in letting the mite die. Routine cleaning of the house and health education on prevention is important to avoid reinfection.

Discussion

Hundred percent's of respondents were male, which is similar to a study conducted Scabies Outbreak Investigation among "Yekolo Temaris" in Gondar Town, North West Ethiopia, different from a case-control study conducted in Enarji Enawuga District, East Gojjam zone, North West Ethiopia and a case-control study conducted Doga-Temben District, Tigray, Ethiopia (14-17). This could be due to the fact that in Orthodox religion doctrine only males are giving spiritual services. Therefore males only engaged in yekolo timhert bets to learn how the service is given.

The prevalence of scabies was 35%; it is higher than the study conducted in Northern Ethiopia among 'Yekolo temeri' reported 22.5% and a study among school children in Fiji where the overall prevalence of scabies infection was 23.6% (15, 18). This may due to yekolo temaries living in overcrowded and unsanitary conditions and numbers of cloth having to change may be lower than other communities, this may concise with the fact Scabies mites can only live about 72 hours without human contact (19). And the finding is lower than a study conducted Sindh, Pakistan 47.6%(20). This could be the difference in study subjects.

The age-specific attack rate was 31% between 15-18 years. This finding is in line with a study conducted in the west of Iran 30.6% (21) and lower than a study conducted in East Badewacho District, Southern Ethiopia, which is 75% (22) and higher than. This may be due to difference in a study population, meaning in our study most of the students engaged in the school were youth, however other studies were conducted in the whole community

Frequent changing of cloth was associated with scabies infection. The odds of having scabies were lower by 53% among those yekolo temaries changing their cloth frequently(15). This finding is lower than the study conducted Doga-temben, Tigray Ethiopia and Enarj Enawuga, Amhara, Ethiopia(14, 16). The possible justification could be the difference in study participants, reagents used washing of cloth, length of stay between uncloth and clothing and number of cloth having. Frequent uses of soap for wash body were associated with scabies infection. The probability of getting scabies infection was decreased by 54% among those used soap frequently to wash their body. This finding is lower than the study

conducted Doga-temben, Tigray Ethiopia and was not significantly affected in a study conducted in Gondar Town, North Western Ethiopia, and Enarj Enawuga district, Amhara, Ethiopia(14-16). The reason may be the difference in sample size, type of soap they used and the difference in the study area.

Share cloth were 3.313 times increase the odds of having scabies infection when compared to people don't share cloth. This result is in line with in a study conducted in Gondar Town, North Western Ethiopia with odds of 2.76 and lower than a study conducted in Enarj Enawuga, Amhara, Ethiopia odds of 8.5. The reason may be difference in study area, sample size.

Presence of scabies infected individuals in the family was (AOR = 6.029, 95 % CI: 2.071-14.275) times higher in developed scabies infection. This finding is lower than a study conducted in Doga-temben, Tigray Ethiopia adjusted odds ratio 98.78. This may be difference in sample size.

Study limitations

We employed case control study the role of recall bias could not be ruled out and some the study population comes from outside the region then it is difficult to draw spot map

Conclusions

There was scabies outbreak in Yilmana Densa Yekolo timhert bets. The prevalence of scabies infection was high in Yilmana densa district in "Yekolo Temaries". Age groups 15-18 years were most affected age group and factors like frequent changing of cloth and frequent use of soap for body wash protect scabies infections. However, sharing of cloth and presence of scabies infected individuals in the family were risk factors for scabies infection. Early detection and treatment of cases and not sharing of clothes should be considered

Abbreviations

AOR: Adjusted odds ratio; CI: Confidence interval; EPI info Epidemiological information; GBD: Global burden of disease; MDA: Mass drug administration; NTDs: Neglected tropical disease; OR: Odds ratio; SPSS: Statistical package for social science students

Declarations

Ethics approval and consent to participation

This outbreak investigation was approved by Amhara public health Institutional, West Gojjam zone health department and Yilmana densa District health office. We obtained informed consent in a written form from the district Orthodox Church religious leader and Yekolo temaries teacher about the investigation and behalf of children under the age of 18 because the students living in far distance (other districts) from their family and consent to obtain from the family was not feasible. Particularly, special

notifications on the respondents' rights to refuse to answer questions were notified to the participants. Participants were informed that they can decline to participate at the very beginning or at any stage during the interview.

The information collected from respondents is kept confidential and Privacy of respondents was kept during interview and screening.

Consent for publication

Not applicable

Availability of data and materials

The data and materials are available upon request in the principal investigator by this email address robelhbtamu@yahoo.com and cell phone +251918706762

Competing interests

The authors declare that they have no competing interest

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The authors declare that there is no financial support for this study

Authors' contributions

Principal investigator conceived and designed the study, performed analysis, interpretation of data and drafted the manuscript. Co- authors, advise from title modification and assist during design the study, analysis, and interpretation.

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Not applicable

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Tables

Due to technical limitations, Table 1 is only available as a download in the supplemental files section.

[Table 2 Bivariable and multivariable in scabies outbreak in Addet Medhanitale Church Yekolo temaries, November 12-19, 2017](#)

Factors		Case	Control	Odds ratio (Crude)	95% confidence interval		Odds ratio(95%CI) Adjusted
					Lower	Upper	
Frequent changing of cloth	Yes	18	69	0.345	0.1765	0.6764	0.43(0.205-0.928)
	No	37	49	1			
Frequent wash body	Yes	34	71	1.072	0.556	2.068	
	No	21	47	1			
BY what wash body	Soap & water	29	34	2.965	1.527	5.757	0.461(0.214-0.993)
	Water alone	26	84	1			
Number of family	<3	32	68	1.023	0.535	1.956	
	≥3	23	50	1			
Contact scabies affected person	Yes	50	90	3.11	1.13	8.563	
	No	5	28	1			
Sleep with scabies affected family	Yes	40	63	2.328	1.162	4.644	2.171(0.949-4.946)
	No	15	55	1			
Travel history to scabies affected area	Yes	38	73	1.378	0.697	2.725	
	No	17	45	1			
Previous history of scabies infection	Yes	28	45	1.682	0.882	3.21	
	No	27	73	1			
Share cloth with scabies affected person	Yes	31	36	2.942	1.518	5.70	3.313(1.536-7.149)
	No	24	82	1			
Source of water for body and cloth wash	Pipe	2	6	0.658	0.126	3.419	

	Spring	13	32	0.802	0.376	1.708	
	Well	3	7	0.846	0.207	3.46	
	River	37	73	1			
Knowing about scabies mode of transmission	Yes	17	29	1.373	0.676	2.79	
	No	38	89	1			
Presence of scabies affected family	Yes	36	46	2.965	1.521	5.782	6(2.071-14.275)
	No	19	72	1			

Figures

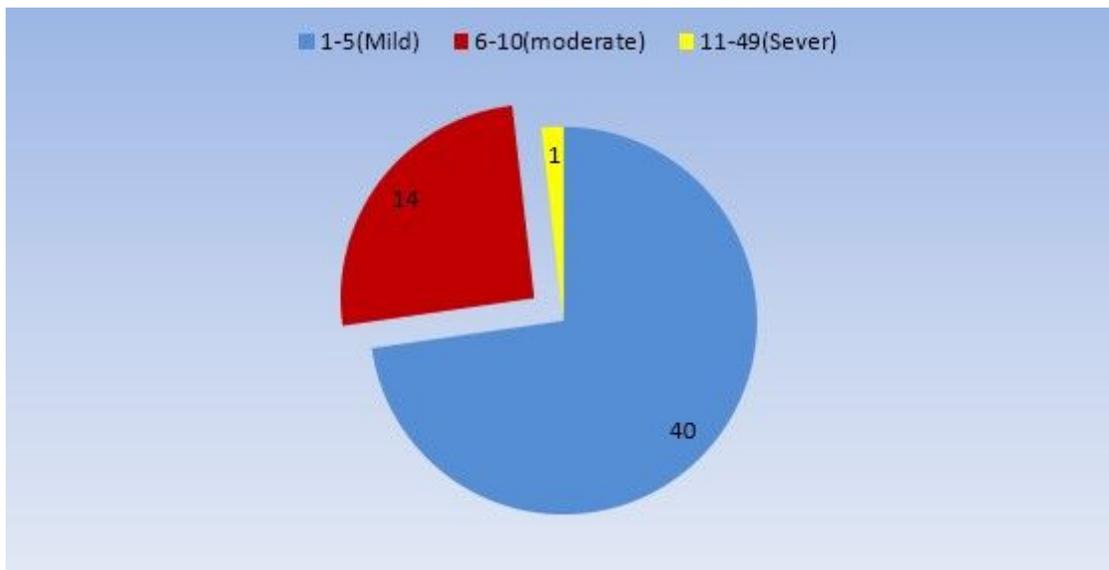


Figure 1

Number of cases respective of skin lesion in Addet Medhanit Alem Church yekolo temaries, Yilmana Densa District, 2017

