OUTBREAK INVESTIGATION OF SCABIES, DEMBIYA DISTRICT, NORTH GONDAR ZONE, AMHARA REGION, 2017

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Abstract - Scabies affects people of all countries. In developing countries, children in particular are most susceptible, with an average prevalence of 5–10%. It is very common in Ethiopia, especially during natural or manmade disasters, flooding, drought, civil war and conflict, poor water supply/ sanitation, and overcrowding.
We conducted 1:2 unmatched case-control study from August 28-November 2, 2017 in Dembiya District. Odds Ratio, 95% CI and P-value were used to measure the significance of association in bivariate and multivariate analysis. Variables with p value of equal to or less than 0.05 were reported to be significantly associated with dependent variable. We identified 141 Scabies cases with overall attack rate of 2% and Zero case fatality rate.
Poor hygiene, sharing of clothing, and sleeping proximity with infected persons were associated with higher frequency of scabies disease. Therefore, increasing awareness creation about the transmission, prevention and control methods of scabies disease was recommended.

Key words - Scabies, case-control, Dembiya, Ethiopia, 2017

I. INTRODUCTION

SCABIES is a neglected parasitic disease that is a major public health problem worldwide, particularly in resource-poor regions. Human scabies is caused by an infestation of the skin by the human itch mite (Sarcoptes scabiei var.hominis). It is confirmed by the demonstration of mites, eggs, or (black or brown football-shaped masses of scabies feces) on microscopic examination (1). The most commonly affected areas are the hands, feet, the inner part of the wrists and the folds under arms. In the developed world, outbreaks in health institutions and vulnerable Communities contribute to significant economic cost in national health Services. However, in resource-poor tropical settings, the sheer burden of scabies infestation, as well as their complications, impose a major cost on health-care systems. In 2010, it was estimated that the direct effects of scabies infestation on the skin alone led to more than 1.5.million YLDS (years lived with disability), and the indirect effects of complications on renal and cardiovascular function are far greater. Scabies affects people of all countries. Children in developing countries are most susceptible, with an average prevalence rate of 5–10% (6). Scabies causes intense itch, severely affecting sleep and quality of life.
In Ethiopia, scabies is common, especially during natural or man-made disasters, such as flooding, drought, civil war and conflict, poor water supply and sanitation, and overcrowded living conditions. For example, according to public health emergency measures surveillance report, scabies is becoming a public health concern, affecting wider geographic areas and population groups, especially in drought affected nutrition hotspot woredas(8). As global disease burden, Health grove reported in 2013 that the annual years of healthy life lost per 100,000 people from scabies has decreased by 30.1% since 1990, an average of 1.3 percent a year(9).

II. STATEMENT OF THE PROBLEM

Currently, Ethiopia is experiencing scabies outbreak in drought affected areas where there is shortage of safe water for drinking and personal hygiene caused by El Nino(16), (17). In this regard, the Federal Ministry of Health (FMoH), in collaboration with partners, is planning to respond and aims to rapidly stop community level transmission of scabies outbreak using multi-sectoral intervention approach. Key focus is on affected and high risk districts, based on nutrition and scabies outbreak risk criteria (6). Some immunocompromised, elderly, disabled, or debilitated persons are at risk of a severe form of scabies known as crusted, or Norwegian, scabies. Persons with crusted scabies have thick crusts of skin that contain large numbers of scabies mites and eggs.
Multiple factors like poverty, low socioeconomic conditions, poor hygiene, illiteracy, lack of access to health care, frequent population movements, inadequate treatment, malnutrition, social attitudes, overcrowding, poor public health education , sleeping habits, overcrowded sleeping space, sharing of clothes and sharing of towels have frequently been cited as risk factors for scabies throughout the world (12). Scabies is endemic in many tropical and subtropical areas, such as Africa, Central and South America, Northern and Central Australia, the Caribbean Islands, India, and Southeast Asia. The International Alliance for the Control of Scabies (IACS) recently formed groups from across the globe to advance the agenda of scabies control (14).
Previous studies reported that the prevalence of scabies in tropical countries was high. For example, in Fiji, the prevalence of scabies in school children

was 18.5% (7). A study in northern Ethiopia, Gondar Town among 'Yekolo Temari' revealed 22.5% scabies prevalence. However, another study conducted in southern Ethiopia revealed a prevalence of 5.5% among school children. As study done in SNNPR East Badowacho District in 2016, age-group less than fifteen years, family size > greater 5 members, and sleeping with scabies cases were found to be significantly associated with scabies infestation (17). The odds of developing Scabies Infestation was 2.6 284 among family members with size >= 5 persons compared to those whose family size <= 5 members 285 with [AOR (95%) =2.63 (1.10-6.27)] (17).

III. OBJECTIVES

3.1 General Objective

To investigate the outbreak of scabies and identify the risk factors for the occurrence of the outbreak in order
to provide appropriate control and prevention measures of the disease.

3.2 Specific objectives

- To confirm the existence of outbreak
- To determine the magnitude of the outbreak
- To describe the outbreak by time, place and person
- To analyze risk factors and measure the attack rate of the outbreak
- To guide appropriate prevention and control measures to stop further spread of the disease

IV. METHODS AND MATERIALS

4.1 Study Area and Population

The outbreak investigation was conducted in one kebele, Atikilit-Telemit of Dembiya District, North Gondar Zone, and Amhara Regional State. Atikilit-Telemit kebele is one of 57 kebeles of Dembiya district. The District is located 784 kms south of the capital Addis Ababa, and 215 km from the Regional City Bahir Dar. The District shares boundaries to East, Gondar Town and Gondar Zuriya district to the West, Chilga & Takusa district to the North Lay Armachiho District and to the South Lake Tana. The total population of the District was 334,216 males, accounting for 168,779 (50.5%) of the population. The District has 49 Health posts, 9 health centers and 1 District Hospital. The physical health service coverage of the District was 100%. The District water coverage was 48% and latrine coverage of 51%.

4.2 Study period:

The investigation was conducted from August 28-November 2, 2017.

4.3 Study Design:

Unmatched case-control study was used.

4.4 Study Population:

All population was in Dembiya District, where cases and controls were selected.

4.5 Target Population:

Population living in Atikilit-Telemit Kebele.

4.6 Sample Size:

Sample size was calculated by Epi-info 7 stat calc for unmatched case-control study Two sided confidence level (1-α) =95%. Power (% chance of detecting) = 80%, Ratio of controls to case= 1: 2. From previous study result we took variables with high sample size: Proportion of controls with exposure = 16.2 %. Proportion of case with exposure = 42 % From among the series of hypothesized variables used to calculate the sample sizes which were adopted from different studies, the variables with larger sample size was used. Therefore, the total sample size used in our study was 120 (40 cases and 80 controls).

V. SAMPLING TECHNIQUES AND PROCEDURES

We had conducted simple random sampling techniques because of we wanted to draw a sample of a scabies outbreak who were already identified and put on line list of cases by cluster health center personnel,

Table 1: Sample size Calculation assumptions for each hypothesized risky factor from previous study
(Fleiss with continuity correction method)

Sr.No	Variables	Assumptions from previous study results		Sample size at 95% CIL, 80% power and 1:2 case Control Ratio		Total
		% Case Exposed	% control Exposed	# of Case Calculated	# of Control	
1	Hand washing without Soap [a]	42%	16.2%	40	80	120
2	Change Clothes at least weekly [b]	20.8%	79.2%	10	20	30
3	Contact History With Scabies case [b]	90.7%	9.3%	5	10	15
4	In frequent washing Clothes [a]	95%	50%	15	29	44
5	In frequent taking shower [a]	45%	16.2%	33	66	99
6	Wearing others Clothes [a]	52.5	22%	33	66	99

provided they had onset of itching in the last 6 week. Procedures of selected sample units as follows:

1) Sample size was calculated Epi-info 7 statCalc function for unmatched case-control study used different assumption, then we had calculated total sample size (n) is 120 (40 cases and 80 controls).
2) Sampling frame was created, which means for cases from the collected line list names of all scabies cases who were identified in the last 6 weeks and for controls from neighbors of selected cases who did not develop scabies during the period of the study.

3) A number was assigned to each of the names of scabies cases in the sampling frame (line list of the cases). This was done using a Microsoft excel sheet.
4) We randomly selected 40 cases by using Microsoft excel plus 2016 on data analysis.
5) Selected cases were divided based on the number of data collectors given to them. Then data collectors with one community member went to the selected Kebeles house-to-house searching, and they recruited people into the study. Controls were neighbors of cases who did not develop scabies during the period of the study.

5.1 Inclusion Criteria & Exclusion Criteria

5.1.1 Inclusion Criteria:
Cases selected by simple random from the line lists of Atikilit-Telemit kebele and Dembiya district who had signs and symptoms of scabies infection, and who agreed to participate in the study were included.

5.1.2 Exclusion criteria:
Cases that did not fulfill the signs and symptoms of scabies based on WHO case definition were excluded from cases. Unaccompanied children/with no family were excluded.

5.2 Case Definitions:
We used the WHO standard case definition, stated below:

5.3 Suspected Case:
Any person with generalized itching which often becomes worse at night, and abnormal skin lesions which are papules, pustules, nodules or urticarial.

5.4 Confirmed Case:
A person who has a skin scraping in which mites, mite eggs or mite feces have been identified by a trained health care professional.

5.5 Contact:
A person without signs and symptoms consistent with scabies who had direct contact with a suspected or confirmed case in the two months preceding the onset of scabies signs and symptoms in the case.

5.6 Variables

5.6.1 Dependent Variable: Scabies cases

5.6.2 Independent Variables: Age, Sex, Contact of respondents, Hygiene practices/Habits, Size of family member

VI. DATA COLLECTION METHODS

The investigation was conducted through house-to-house searching for scabies cases in selected kebeles. We used semi-structured questionnaires which were adopted and modified from previously used and interviewed cases and controls, and collected data. Data was collected by principal investigator, 1 district PHEM officer, and 2 health center workers. Orientation was given for data collectors on the questionnaire. The collected data was checked and when entering the data into the computer, the missing variables and consistency of filling of questionnaires and completeness of data checked out carefully.

6.1 Data Entry and Analysis
Data was checked, entered and analyzed on computer using Epi info7, IBM SPSS statistics 20, and Arc Map 10.2.2. We used Arc GIS for mapping of study area and spot map analysis, Epi info for data checking and entry and SPSS for statistical data analysis in our study. Descriptive and advanced statically analyses were undertaken. Logistic regression analysis was conducted to find association of diseases with risk factors and exposure outcomes were measured and tested using OR, 95% Confidence Interval and P-value.

VII. RESULTS

7.1 Descriptive Epidemiology
We identified a total of 141 scabies cases from 18th August to 2 October, 2017 with overall attack rate of 2% and Zero case fatality rate. The median age of affected groups was 16 years (IQR=19). Of affected age groups, 5-14 year old children were more affected, 45(32%), than other age groups, and less than five children were less affected in our study area.

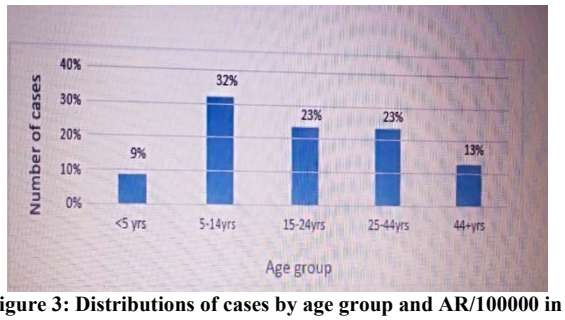


Figure 3: Distributions of cases by age group and AR/100000 in Dembiya District, Amhara, Ethiopia, 2017

Of total cases, 64 (45%)were females and 77 (55%) were males. By the sex specific attack rate in the study area, males were more affected than females, having AR of 1.9% and 1.6% respectively. Mostly affected body Parts of the cases by skin sores were 12 (30%) with skin sores on finger web, 7(17.5%) had skin sores on wrist, 6 (15%) had Skin sores on Elbow and Anterior axillaries line.



Photo A &B: : Picture of scabies patients in Dembiya district, North Gondar, Ethiopia, 2017

7.2 Analytical Study

We conducted unmatched case control study. 40 cases and 80 controls were selected. In a ratio of 1:2, Case of scabies was defined as any person with generalized itching which often becomes worse at night, and abnormal skin lesions which are papules, pustules, nodules or urticarial. Controls were defined as any person who had similar characteristics as that of cases except absence of the disease. Among the study participants, 25(62%) of cases and 35(44%) of controls were female.

The participants' median age was 36 years, with interquartile range of 22 years and age group of 15-24 years were more affected. Most of the participants were farmers, 28(70%) of cases and 76(98%) controls.

Table 2: Distribution of respondents according to their Age group, sex, Family size & occupation, Dembiya District, North Gondar zone, Amhara region, 2017

Variables		Case (n=40)		Control (n=80)	
		Count	%	Count	%
Age group	5-14yr	11	27%	0	0
	15-44	19	48%	50	62%
	44 +	10	25%	30	38%
Sex	Female	25	62%	35	44%
	Male	15	38%	45	56%
Occupation	Farmer	28	70%	76	95%
	Civil servant	1	3%	0	0
	Student	9	22%	3	4%
	House wife	2	5%	1	1.25%
Family size	< 4	5	13%	18	22%
	4-10	35	87%	58	73%
	>10	0	0	4	5%

The statistical significance in bivariate analysis was observed among variables such as Contact history (COR= 10.9, 95% CI = 9.7-24, P value= 0.0000); putting on clothes of someone with the diseases in the previous six weeks (COR= 4.1, 95% CI =1.7-10, P value=0.0009) was found to be potential risk factors of an outbreak of scabies diseases.

Table 3: Bivariate analysis of Scabies outbreak in Dembiya District, Amhara Region, 2017

Variables		Case(n=40)	Control(n=80)	Crude OR, 95% CIL	P Value
Sex	**Female**	25 (63%)	35 (44%)	**2.1(0.9,4.6)**	0.052*
	Male	15 (37%)	45 (56%)	**Reference**	
Age group	**5-14**	11(28%)	0	Undefined	0.0000*
	15-44	19(47%)	51(64%)	1.1(0.4,2.6)	0.86**
	>44	10(25%)	29(36%)	Reference	
Occupation	Farmer	30 (75%)	76 (95%)	0.4 (0.02,6.5)	0.5**
	Student	9 (22.5%)	3 (3.8%)	3 (0.1, 64)	0.46**
	House Wife	1 (2.5%)	1(1.2%)	Reference	
Family Size	<4	5(13%)	18(23%)	**0.5(0.2,1.4)**	**0.18***
	4-10	35(88%)	61(76%)	**Reference**	
	>10	0	1(1%)	**0(0,1E12)**	**0.97****
Hand wash with soap	Yes	32(80%)	65(81%)	0.9(0.4,2.4)	0.123*
	No	8(20%)	15(19%)	**Reference**	
Frequency of body bath	Every 2-3 days	11 (28%)	19 (24%)	**Reference**	
	Weekly	19(47%)	46 (58%)	**0.7(0.3,1.8)**	**0.123***
	More than week	10(25%)	15(18%)	**1.2(0.4,3.4)**	**0.131***
Frequency of washing cloths	**weekly**	33(83%)	66(83%)	**1(0.4,2.7)**	**0.142***
	More than a week	7(17%)	14(17%)	**Reference**	
Not Changing clothes daily	Yes	31(78%)	68(85%)	**1.6(0.6,4.3)**	**0.3****
	No	9(22%)	12(15%)	**Reference**	
Put on clothes of someone else with the diseases in the previous six weeks	Yes	17(43%)	12(15%)	**4.1(1.7,10)**	**0.0009***
	No	23(57%)	68(85%)	**Reference**	
Contact History	Yes	39 (97%)	21 (26%)	**10.9(9.7,24)**	**0.0000***
	No	1(3%)	59 (74%)		
Water shortage	Yes	6(15%)	7(9%)	**1.8 (0.6,5.9)**	**0.199***
	No	34(85%)	73(91%)	**Reference**	
Awareness About Scabies	Yes	33(82%)	68(85%)	**0.8 (0.3,2.3)**	**0.72****
	No	7(18%)	12(15%)	**Reference**	

Key: * Variables those run in multivariate ** Variables those excluded in Multivariate analysis because of P value >0.2

Potential risk factors that remained statistically significantly associated with the disease in multivariate logistic regression analysis were body bath more than week (AOR= 1.5, 95% CI = 1.2-4.1); Contact history AOR 17, 95% CI 13.4-20); Water shortage AOR 3.3, 95% CI 2.4-4.5).
On the other hand, protective factors that remained statistically significantly associated with the diseases on multivariate logistic regression analysis were Sex Female (AOR = 0.4, 95% CI= 0.1-0.7), Hand washing with soap (AOR 0.6, 95% CI (0.1-0.9).

DISCUSSION

In our study, we found that Males were more affected than Females, which was supported by a study done in north western Ethiopia in 2016 [18] and Amhara Region South Wollo, Bati District in 2016 [19]. In our study area Females were 60% less likely to be infected compared to Male populations.

The possible assumption was that Females had more access to water everyday than Males and were able to relatively maintain their personal hygiene. People who washed their hands/body with soap were found to be 40% less likely to acquire scabies (AOR= 0.6, 95% CI 0.1-0.9),
which aligned with the study done in Enarj Enawuga Woreda, East Gojjam Zone, Amhara region, 2015. It reported those who were not using soap for body bath/hand wash

Table 4 Multivariate analysis of Scabies outbreak in Dembiya District, Amhara Region, 2017

Variables		Case(n=40)	Control (n=80)	Crude OR, 95% CIL	AOR
Sex	Female	25 (63%)	35 (44%)	**2.1(0.9,4.6)**	0.4(0.1,0.7)
	Male	15 (37%)	45 (56%)	**Reference**	
Family Size	<4	5(13%)	18(23%)	**0.5 (0.2,1.4)**	1.2(0.9,4.3)
	4-10	35(88%)	61(76%)	**Reference**	
	>10	0	1(1%)	**0(0,1E12)**	0.0000
Hand wash with soap	Yes	32(80%)	65(81%)	0.92(0.35,2.4)	0.6(0.1,0.9)
	No	8(20%)	15(19%)	**Reference**	
Frequency of body bath	Every 2-3 days	11 (28%)	19 (24%)	**Reference**	
	weekly	19(47%)	46 (58%)	**0.7(0.3,1.8)**	1.3(0.8.5)
	More than week	10(25%)	15(18%)	**1.2(0.4,3.4)**	1.5(1.2,4.1)
Frequency of washing cloths	weekly	33(83%)	66(83%)	**1(0.4,2.7)**	0.9(0.18,5.0)
	More than a week	7(17%)	14(17%)	**Reference**	
Cloth exchange with infected person	Yes	17(43%)	12(15%)	**4.1(1.7,10)**	3.1(2,4)
	No	23(57%)	68(85%)	**Reference**	
Contact History	Yes	39 (97%)	21 (26%)	**20.5(14.1,30.2)**	17.0(13.4,20.0)
	No	1(3%)	59 (74%)	**Reference**	
Water shortage	Yes	6(15%)	7(9%)	**1.8 (0.6,5.9)**	3.3(2.4,4.5)
	No	34(85%)	73(91%)	**Reference**	

were 4.5 more affected than their counterpart (AOR 4.5, 95% CI (1.8, 11.4) [20]. The study conducted in North Gondar among "Yekolo Temari" revealed that body bath above a week was 3.1 times risk for scabies infection (AOR = 3.2, 95% CI 1.2-8.5) than those taking body bath frequently less than a week [14]. Our study results also agreed with this study (AOR=1.5, 95% CI 1.2-4.1). On the other hand, individuals who put on infected person's clothes were 4.1 times more infected than those who did not, which was a similar finding with the study done in North Gondar among "Yekolo Temari" in 2015 (AOR =2.76 95% CI 1.04,7.41). Age groups, family size and frequency of cloth washing were not significantly associated with the occurrence of scabies outbreak in our study area, which is different from the study done in Bedwecho district, Hadiya Zone in 2016.

LIMITATION

There were limited studies or researches in scabies, especially in Africa in general and particularly in Ethiopia.

CONCLUSIONS

The existence of Scabies was confirmed in the district; in Dembiya district the AR of Scabies were higher in Males than in Females; poor personal

hygiene was significantly associated with the occurrence of Scabies in Atikilit-Telemit, Dembiya district. Contact history with infected person, cloth exchange with infected person, infrequent body bath and infrequent cloth washing were found to be risk factors significantly associated with Scabies while washing hands/body with soap was found to be a preventive factor.

RECOMMENDATIONS

Active Surveillance:
The district health office and cluster center health workers have to increase their active surveillance to assess cases home-to-home, since scabies diseases affect more people because of late detection and response to outbreak.

Promotion of Hygiene:
The district health office and health center have to promote hygiene and sanitation of the community.

Community Sensitization:
Increasing awareness in the community on the modes of transmission of scabies to avoid or minimize contact with cases.

Emergency Public Health Policy Development:
The Zonal Health department should establish a mechanism to include scabies under the public health emergency management reporting system.

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