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Scabies Outbreak Investigation among "Yekolo Temaris" in Gondar Town, North Western Ethiopia, November 2015

Zeyneba Jemal Yassin[1,2], Abel Fekadu Dadi[1,2], Habtamu Yimer Nega[1,3], Behailu Tariku Derseh[4,*], Wondesen Asegidew[4]

1 Department of Ethiopian Field Epidemiology and Laboratory Training, University of Gondar, Ethiopia;

2 Department of Biostatistics and Epidemiology, School of Public Health, University of Gondar, Ethiopia;

3 Department of Public Health Emergency Management, South Wollo zone, Ethiopia;

4 Debre Berhan University, College of Health Sciences, Department of Public Health, Ethiopia.

*Corresponding author. Tel: +251911071777; E-mail: minastariku@gmail.com

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Research Article

Abstract

Introduction: Scabies is an ecto-parasitic, highly contagious skin disease caused by infestation of the skin by the human itch mite, *Sarcoptes scabiei var. hominis.* Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year. In Ethiopia, according to national survey conducted in 2008, there are 6.2% of schoolchildren and 5.6% of orphan school children affected with scabies. On November 10, 2015 scabies outbreak were reported to Gondar town health office from St. Lideta Lemaryam church. Therefore, the purpose of this study was to investigate scabies outbreak, identify factors associated with scabies transmission and to take public health action among affected group of people.

Materials and method: Unmatched case control study with case control ratio of 1:2 was conducted from November 13 to 20, 2015 in St. Lideta church in Gondar town. Data was collected by face to face interview of cases and controls through structured questionnaires. Data analysis was done using Epi-Info and SPSS 20. Odds ratio with its confidence interval was used as measure of association and to assure statistically significance.

Results: 96 respondents were included; 32 cases and 64 controls. The analysis of the study shown that people who share close from ill person were 2.76 (95% CI=1.04-7.41) times more likely to develop scabies; and individuals who had close contact with ill person were 5.37 (95% CI=1.84-17.6) times more likely to develop disease scabies, also individuals who had travelling history to scabies epidemic area were 4.7 (95% CI=1.64-14) times more likely develop the disease. Besides, individuals who wash their body in more than a week interval were 3.22 (95% CI=1.22-8.5) times more likely develop scabies.

Conclusion: In this study, scabies was a public health problem among "Yekolo Temari" in St. Lideta Lemaryam church of Gondar town. Sharing cloths, student to student contact, travelling history to scabies epidemic area and poor personal hygiene was risk factors identified during investigation of the outbreak.

Keywords: Investigation; Outbreak; Scabies; Yekolo Temari.

2. Introduction

Scabies is an ecto-parasitic, highly contagious skin disease caused by infestation of the skin by the human itch mite, *Sarcoptes scabiei* var. *hominis* [1-6]. The fertilized female mite burrows into the skin, depositing eggs in the tunnel behind her [5]. It is a common parasitic infection. Infestations occur when the "itch" mite, *S. scabiei*, burrows into the skin and consumes host epidermis [1,3,6]. *Sarcoptes scabiei*, commonly known as scabies, is a parasitic mite that causes intense itching, rashes and lesions [1,2,4]. Although infestation is not life threatening, scabies is a nuisance disease that is commonly found in health care facilities and can result in crisis, fear and panic. Scabies outbreaks can be costly to control and may easily reoccur if not properly contained and treated [3].

Scabies is an important disease of children, but it occurs in both sexes, at all ages, in all ethnic groups, and at all socioeconomic levels and personal hygiene is an important preventive measure and access to adequate water supply is important in control [5,6]. Scabies is a skin disease known to humans for at least 2,500 years [7,8]. Dermatologists estimate that more than 300 million cases of scabies occur worldwide every year [8,9]. Scabies is transmitted by skin-to-skin contact, as demonstrated in classical studies by Mellanby, who showed that direct person-

to-person body contact was generally necessary for transmission of scabies. Thus, it is a disease of overcrowding and poverty rather than a reflection of poor hygiene [7,8].

Scabies is a major global health problem in many indigenous and third world communities [6]. It has been added to WHO's list of Neglected Tropical Diseases (NTDs), in recognition of the very large burden of disease unlike many other NTDs, scabies can also occur in temperate regions where it similarly has a predilection for vulnerable communities in which overcrowding and poverty co-exist [1].

Scabies affects people from every country and is one of the commonest dermatological conditions in the world. It affects more than 130 million people worldwide at any one time, with the highest rates occurring in countries with hot, tropical climates, where infestation is endemic [1].

The prevalence and complications of scabies make it a significant public health problem in the developing world, with a disproportionate burden in children living in poor, overcrowded tropical areas [7,9].

The primary contributing factors in contracting scabies seem to be poverty and overcrowded living conditions [6,9]. Studies from Mali, India, Brazil and northern Australia all show an association with overcrowding, especially sleeping quarters [9]. As indicated in study conducted by Annie and Wesley there are a number of studies from Mali, Malawi, Tanzania and Sierra Leone also point to scabies as one of the common skin problems in Africa. This report explores Scabies, one of the highly contagious skin infections commonly seen in Africa, to understand the disease and ways of prevention and treatment [8]. Closed communities and institutional environments experience high endemic rates and epidemic outbreaks in tropical and developing countries. For example, 86% of children in a Sierra Leone displacement camp, 31% of children in a Malaysian welfare home and 87% of children in a Thai orphanage had scabies [9].

In Ethiopia, according to national survey, there was 6.2% of school children with scabies on their arms and 5.6% of orphan school affected by this neglected tropical disease [10].

Thus, the objectives of this outbreak investigation were:

1. To assess the range and extent of the outbreak in terms of person, time and place.
2. To identify possible risk factors for scabies among Yekolo Temari (Spiritual students) in St. Lideta Lemaryam Church in Gonder.
3. To reduce the number of cases associated with the outbreak among Yekolo Temari.
4. To prevent future occurrences by identifying and eliminating the source of the problem.
5. To assess the efficacy of currently employed prevention strategies.
6. To address responsibility concerns to stakeholders.
7. To provide good public relations and educate the community.

2. Materials and Methods

2.1 Study area and period

The investigation was conducted in St. Lideta Lemaryam church on "Yekolo Tamari" [religious students], Gondar town, Northern Gondar zone, Amhara region. The study was conducted from 13 to 20 November 2015 (Figure 1).

2.2 Study design

Unmatched case-control study design was employed to identify potential risk factors for scabies.

Cases were individuals who had skin scraping with identified mites, mite eggs or mite feces in St. Lideta Lemaryam church from 13 to 20 November 2015.

Controls were individuals who are living within St. Lideta Lemaryam church and who had no skin scraping with identified mites, mite eggs or mite feces on their skin in the same specified period.

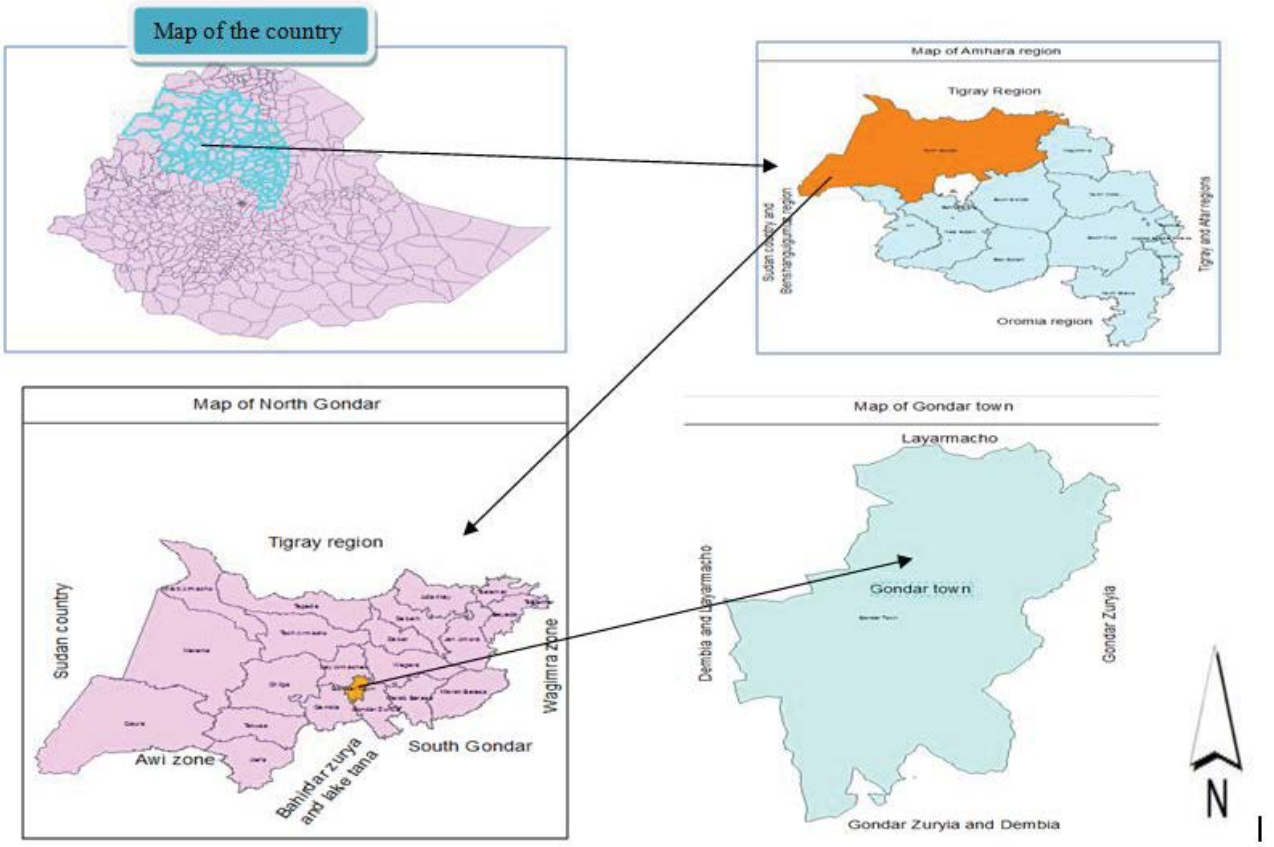
2.3 Study population

In Ethiopia religious students who study Ethiopian Ge'ez language (the classical liturgical language) are called Yekolo Temari. In the local terms, the school has different names such as Yekes temehirt, Ye'abinet timihirt, and yebetekihinet temehirt. Great importance is attached to the school which performs an important role on the one hand in the teaching of the geez language (The classical liturgical language) and on the other of the Orthodox identity of the younger generations. Many prominent priests from different parts of the country were instructed there, today active in the field of commentary and the study of the Bible. These groups of people, "Yek'olo-temari" are treated as a special group of children because of different social, cultural, religious/traditional and educational factors which makes them different from other group of people in Ethiopia. They have their own life style, livelihood strategy, social life and religious commitment which might not be observed in the majority of other same age people in the country. One of the famous such school in Ethiopia is found in Gondar town, North West Ethiopia, among which is a school located inside the courtyard of St. Lideta Lemaryam Church. During the time of outbreak investigation there were 142 Yekolo Temaris in the church [11-13].

2.4 Standard case definition

Suspected scabies

"Yekolo Temari" with signs and symptoms consistent with scabies [14,15].



Source: Ethiopia shape file

Figure 1. Map of Amhara region, Northern Gondar and Gondar town, 2015.

Confirmed scabies

Is "Yekolo Temari" who has skin scraping with identified mites, mite eggs or mite feces have been identified by a trained health care professional. Skin infection characterized by rash or lesions and intense itching especially at night. Lesions prominent around finger webs, wrists, elbows, axillaries, beltlines, thighs, external genitalia, nipples, abdomen, lower portion of buttocks, head, neck, palm and soles of infants may be involved [14,15].

2.5 Sample size

A total of 96 study participants were enrolled; 32 cases and 64 controls who were living in church and got involved in the study.

3. Data Collection

Document review on available data from outpatient registration book, line list records, weekly surveillance data and related documents were done in Gondar town health office and Ginbot 20 health center. In addition to document review, to look for factors associated with scabies, a neglected tropical disease, face to face interview was applied among cases and controls by using structured questionnaires.

3.1 Data processing and analysis

Data was entered and cleaned in Epi_Info for windows version 3.5.1 and exported to statistical product for service solution (SPSS version 20) statistical software for analysis. Descriptive and analytical statistical methods were used to describe and infer the findings. The chi square test of independence was conducted to test whether factor variables were related to outcome variable. During chi square test we used observed and expected values in each cell to compute a cell value, which showed us the linear relationships dependent and exposure variables. Then bivariate logistic regression analysis was computed to examine the association between scabies and different risk factors. To determine the strength of association among "Yekolo Temari" who were infected with scabies and explanatory variables, crude odds ratio was computed. During regression analysis, crude odds ratio greater than one (COR>1) was considered to have a positive association, that is cases had higher probability to develop scabies than controls when they are exposed to a specific factor. In the contrary, COR<1, indicates negative association and COR=1 indicates there is no association between scabies and explanatory variables. Statistical significance was declared when p value was less than 0.05.

4. Results

4.1 Descriptive epidemiology

Descriptive epidemiology by person

Out of 96 respondents; 32 were cases and 64 were

controls (1:2); all were male in sex and orthodox in their religion. The minimum and the maximum age for the respondents were 13 and 20 years, respectively on both case and controls. From the respondents 68 (70.8%) of their age was found between 15-18 years. Seventy seven (80.2%) of the respondents were Amhara in their ethnicity. Among 96 respondents 85 (88.5%) of them had learnt only religious education, as a result they are called "Yekolo Temari" (Religious student) and the rest 11 (11.5%) had been learning both secular and religious education (Table 1).

Out of all cases in the church, age specific attack rate was estimated to be 162 per 1000 children for students less than 15 years and the overall attack rate of scabies in St. Lideta Lemaryam church students was estimated to be 225 per 1000 population. During investigation death was not reported (Table 2).

Descriptive epidemiology by time

The index case of the outbreak was observed on September 21, 2015 and the outbreak is reported to the district health department on November 9, 2015. The index case was 20 years old male who came from scabies epidemic area (Tigre region- as reported by affected student). The burdens of cases has been increased then after and reached its peak on November 10, 2015 (Figure 2).

4.2 Risk assessment

Out of 96 respondents; 21 (21.8%) reported had they had pipe water and 55 (57.3%) of them had pipe water and other water source for their water use. Among 96 respondents 28 (29.2%) and 6 (6.2%) of students wash their body in every two weeks and monthly basis, respectively. Out of the total respondents 55 (57.33%) of them wash their cloths in every two weeks (Table 3).

4.3 Clinical presentations

Among 32 cases 19 (59.3%) reported that they had skin rashes in the beginning of symptom and 9 (28%) had red bumps and blister on their finger webs. Regarding the severity of skin rash, 5 (26.3%) of whom had severe pain and 12 (63%) of respondents with skin rash reported to have moderate pain (Table 4).

Table 1. Sociodemographic characteristics of the respondents, St. Lideta Lemaryam church, Gondar town, November 2015 (N=96).

No.	Variables	Categories	Frequency			Percent (%)
			Cases	Control	Total	
1	Sex	Male	32	64	96	100
2	Age	Less than 15 years	5	16	21	21.8
		15-18 years	22	46	68	70.8
		Greater than 18 years	5	2	7	7.4
3	Answering the questionnaire	Guardian of respondents	02	04	6	6.25
		Respondents	30	60	90	93.75
4	Ethnicity	Tigre	8	11	19	19.8
		Amhara	24	53	77	80.2
5	Religion	Orthodox	32	64	96	100
6	Educational status	Religious	30	55	85	88.5
		Secular and religious	2	9	11	11.5
7	Marital status	Not eligible	19	48	67	70
		Single	13	16	29	30
8.	Fathers Occupation	Farmer	28	52	80	83.3
		Merchant	2	6	8	8.3
		Unemployed	1	2	3	3
		Government	1	4	5	5.4
9.	Mothers Occupation	Farmer	20	38	58	60.4
		Merchant	3	6	9	9.3
		House wife	9	20	29	30.3
10	Living together	Less than or equal 5	10 (31%)	20	30	31
		Greater than 5	22 (69%)	44	66	69

Table 2. Attack rate distribution by students age group, St. Lideta Lemaryam church, Gondar town, November 2015 (N=96).

Age Group	Number of Cases (%)	Total Students	ASAR/1000 Population
Less than 15 years	5 (16.5%)	31	162/1000
15-18 years	22 (68.7)	85	259/1000
Greater than 18 years	5 (16.5%)	26	193/1000
Over all	32	142	225/1000

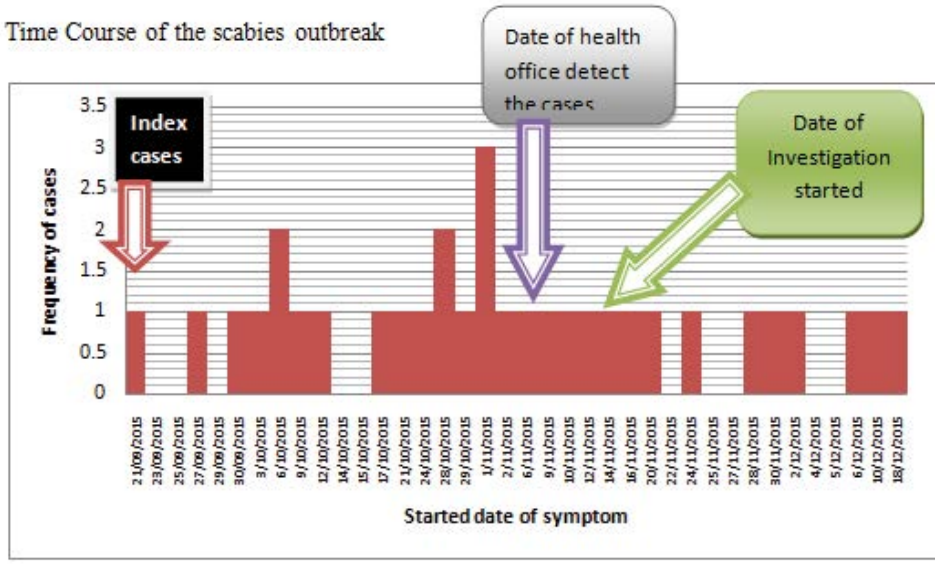


Figure 2. The time course of scabies outbreak in St. Lideta Lemaryam church, Gondar town, November 2015 (N=96).

Table 3. Frequency distribution of personal hygiene practice among "Yekolo Temari", in St. Lideta Lemaryam church, Gonder town, Ethiopia, November 2015 (N=96).

No.	Variables	Categories	Frequency			Percent (%)
			Cases	Control	Total	
1	Frequency of body wash	Every other day	1	0	1	1
		Weekly	21	40	61	63.6
		Every 2 week	5	23	28	29.2
		Monthly	5	1	6	6.2
2	Frequency of washing cloths	Weekly	6	10	16	16.67
		Every 2 week	16	39	55	57.33
		Monthly	9	15	24	25
		Every two months	1	0	1	1

Table 4. Frequency distributions of clinical presentations of scabies among "Yekolo Temari" in St. Lideta Lemaryam church, Gondar town, Ethiopia November 2015.

No.	Variables	Categories	Frequency	Percent (%)
1	Symptoms (n=32)	Skin rash	19	59.3
		Red bumps and blister	9	28
		Tiny red burrows	5	15.6
		Persistent itching	11	34.3
2	Number of lesions(n=19)	Mild pain	2	10.5
		Moderate pain	12	63
		Severe pain	5	26.3
3	Body part affected by the lesion (n=19)	Finger webs	10	52
		Ulnar border of the hand	12	63
		Elbow	4	21
		Anterior axillaries area	3	14.2
4	Develop Complication	Yes No	8 22	25 75

4.4 Analytical epidemiology

A test of the significance of linear association shown in contingency (Table 5), indicated that factors such as shared cloth with Pearson chi square=5.195 (df=1), p=0.022; close contact among infected and non-infected students with X^2=12.191 (df=1), p<0.001; students travelled to scabies epidemic area with X^2=10.817 (df=1), p=0.001 and students who wash their body within more than a weekly basis with X^2=6.996 (df=1), p=0.008 had statistically significant association with scabies. Moreover, regression analysis showed that "Yekolo Temari" who shared cloth from infected students were 2.76 times more likely to develop scabies (COR=2.76, 95% CI= 1.04-7.41); and "Yekolo Temari" who experienced close

Table 5. Chi square and logistic regression of selected risk factors for scabies in St. Lideta Lemaryam church, Gondar town, Ethiopia November 2015.

Variable	Status	Cases	Controls	COR (95% CI)	Chi-Square Value	P-Value
Had shared cloth with ill person	Yes	16	17	2.76 (1.04-7.41)	5.195	0.022
	No	16	47			
Had close contact with ill person	Yes	26	28	5.37 (1.84-17.6)	12.191	<0.001
	No	6	36			
Traveled to scabies epidemic area	Yes	15	10	4.7 (1.64-14)	10.817	0.001
	No	17	54			
Wash a body above a week	Yes	19	20	3.22 (1.22-8.5)	6.996	0.008
	No	13	44			

contact with ill students, were 5.37 times more likely to develop scabies than who did not experienced close contact (COR=5.37, CI= 1.84-17.6). Similarly, those "Yekolo Temari" who come from epidemic area were 4.7 times more likely develop the disease than who did not visited epidemic area (COR=4.7, 95% CI=1.64-14) (Table 5).

4.5 Public health actions and responses

Treatment of cases including close contacts with benzyl benzoate lotion was done in order to prevent spread of scabies and re-infestation. Drugs were supplied from Gondar town health office and "Ginbot 20" health center. Risk factors was identified and successfully addressed to control the outbreak through church community involvement, health information dissemination, close follow-up of cases and re-screening, and prompt treatment of new cases. Besides, personal hygiene week was declared and performed during outbreak investigation period. Finally, the number of cases decline after the investigation.

5. Discussion

This study revealed that all case were male in sex these might be most of the time "Yekolo Temari" were male and the age ranges from 13 to 20 years; study conducted by Shelley et al showed that scabies is an important disease of children, but it occurs in both sexes, at all ages, in all ethnic groups, and at all socioeconomic levels [6].

28 (29.2%) and 6 (6.2%) wash their body in every two weeks and monthly, respectively. Regarding the hygiene of their cloth, 24 (25%) washes their cloth on a monthly basis and more. These might be due to shortage of water nearest to them. 21 (21.8%) of students gets water form pipe for their activities and 34 (35.4%) get water from other source. This might because of in the church water pipe was opened for an hour to the students one times a day.

This study showed that the proportion of students "Yekolo temari" who share a single room was more than five among 66 (69%) of students. This crowdedness may create conducive environment for the transmission of scabies. Similarly cross sectional study was done and show that scabies was more common in more than 5 family size as compared to family size less than 5 (18.70%) [14]. These might be lack of room for those students; the prevalence and complications of scabies make it a significant public health problem in the developing world, with a disproportionate burden in children living in poor, overcrowded tropical areas [7,9].

Bivariable analysis indicated that individual who shared cloth with ill person were 2.76 times more likely to develop scabies (COR=2.76, 95% CI=1.04-7.41) than who did not shared cloths. This finding is consistent with study conducted by Rathore and Saxena that clearly showed the association between sharing of cloth and development of scabies with p value less than 0.001 [16]. Likewise, individual who had close contact with ill person were 5.37 times more likely to develop scabies (COR=5.37, 95% CI=1.84-17.6). This result is similar with study done in Rohilkhand Medical College, which showed that close contact with scabies ill person was statistically associated with odds ratio of 16.7, p<0.0001 [16]. Regarding travelling history, individuals who had travelling history to scabies epidemic area were 4.7 times more likely develop the disease (COR=4.7, 95% CI=1.64-14). This finding was demonstrated by study conducted by Mellanby that showed that direct person-to-person body contact was generally necessary for transmission of scabies [7,8].

Personal hygiene is an important preventive measure and access to adequate water supply is important in the control of disease [5]. In this study individual who wash their body in more than a week basis were 3.22 times more likely develop scabies than who wash their body regularly (COR=3.22, 95% CI=1.22-8.5).

6. Conclusion

In this study, scabies was a public health problem among "Yekolo Temari" in St. Lideta Lemaryam church of Gondar town. Sharing cloths, student to student contact, travelling history to scabies epidemic area and poor personal hygiene was risk factors identified during investigation of the outbreak.

7. Recommendation

For the prevention and control of such neglected tropical diseases, public health emergency management team of Gondar town health office should regularly perform institutional health inspection. Such strong and regular

inspection eases a floor for early detection and prompt treatment of health related problems. Moreover, regular health information dissemination activities should be provided for those venerable groups by health professionals on personal hygiene, early reporting of any health problems when they occur and the levels of disease prevention and control.

8. Acknowledgment

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Availability of data and material: All data was available in result section.

10. Authors' contribution

Inauguration and design of this investigation, analysis and interpretation of data were done by ZJ, AF and HY. Drafting manuscript, revising it critically for intellectual content, and final approval of the version to be published was done by ZJ, AF, HY, BTD and WA. Lastly, before submitting for publication, all authors read and approved the final manuscript.

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