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Assessment of Household Knowledge, Attitudes and Practices about the Most Health Problems at al-Matammah, West Nile River State, Sudan

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Abstract: ***Knowledge survey, attitude and practices are essential elements to prevent and control the health problems and diseases in developing countries. These elements have a great concern by government and different community sectors nowadays. This study was aimed to assess the level of the knowledge, attitudes and practices of women in Sudanese community at al-Matammah West River Nile State. A descriptive systematic study was used. A questionnaire for 94 households was used to investigate the preliminary information of the socio-demographic status, hygienic and safety practices of respondents. Data obtained was analyzed by computer using SPSS, version 20. Results revealed that 92.4 of the respondents receiving low or middle level of education or illiterate. There was a significant association between male education, family size, house conditions and distance of WC from water sources at home. Most of the respondents exhibited a high percentage (77.66%) of large family size living inmedium sanitary conditions(57.5%).The study showed a poor knowledge and practices about drinking water and improper transfer of wastes. The most popular diseases were malaria (69.014%), diarrhea (18.31%), typhoid (5.63%) and 7.04% for the others. The majority of the participants (92.55%) claimed that they could treat patients at health centers and 68.82% of them recorded that there is no health education lectures held for health awareness. The role of the locality was very weak in presenting lectures which reported 21% by the respondents. Education and health education as a part of control programs are important and essential to improve the health awareness among the households.People behavior, culture, knowledge, attitude, practices and lack of capability or inability of controlling programs may increase diseases percent, therefore it is recommended to establish different programs to achieve sustainable and effective control.***

Keywords: al-Matammah, Health Problems, Health Education, Household, Knowledge, Attitude and practices, Nile State, Sudan.

1. Introduction

In Sudan, health is a top national priority after security [1]. Generally, it is provided through three levels: teaching, general and specialty hospitals; rural hospitals (at least one in each locality); and primary health care (PHC) centers, dispensaries and dressing stations [2]. In the last decade, the health status indicators in Sudan have revealed a stagnation or deterioration of health care. Children under five years of age are suffered from malnutrition and stunting. As recorded by [3], the rate of under-five mortality in Sudan increased from 104 per 1000 live births in 1999 to 112 per 1000 live births, and then decreased to around 78 per 1000 live births in 2010. Similarly maternal mortality ratio increased from 537 per 100,000 in 1990 to 1107 per 100,000 live births in 2006, and then it significantly dropped to 216 per 100,000 in 2010. Different communicable diseases are dominated in Sudan, with a new outbreak every 2 to 5 years. The most common infectious diseases are food or waterborne diseases, malaria and HIV. Efforts have been expanded locally and internationally to enhance the health delivery in Sudan. Different organization as UNICEF, WHO and UNDP are developing programs to increases the availability of PHC centers and PHC services [2].

The survey by [4] reported that the prevalence of diarrhea and gastroenteritis diseases are considered as one of the most 10 diseases leading to hospital admission either in Khartoum State or other different states in Sudan. Khartoum State represents high prevalence compared with other states representing 39/1000 population (outpatients) for the year 2010. The prevalence rate per 1000 population is 18, while for children age (0-4) is 10.6%. The percent of death by diarrhea and gastroenteritis between children age 0-4 is 5% of total deaths. Total cases of patients for typhoid, dysentery, diarrhea and gastroenteritis diseases were 10221, 8059, 73396 respectively. The rate death for typhoid was 64, 196 for dysentery, and 591 for diarrhea and gastroenteritis.

Malaria is an endemic disease in Africa. Globally, half of the world population is at risk of malaria. Estimating 80% of cases and 90% of death were occurred especially among children and pregnant women [5]. In Sudan, over 90% of cases are caused by infection with Plasmodium falciparum. In northern Sudan, 16% of hospital deaths are attributed to the disease. The rates are significantly higher in rural compared to urban populations. Malaria causes considerable mortality in Sudan, especially among young children and pregnant women. In Northern Sudan, 16% of hospital death contributed to the diseases. Studies revealed that the case fatality rate was ranged between 5 and 12% among children under 3 years of age four times more likely to die than the other [6]. Sudan is subjected to another epidemic diseases such as meningococcal meningitis, viral haemorrhagic fevers, cholera etc, resulting from poor reporting, environmental factors and inadequate health services. There is rapidly increasing burden of non-communicable diseases popular in Sudan. Diabetes mellitus, cardiovascular diseases and cancer have been among the top ten causes of hospital admission and deaths in Sudan since 1998 [6].

Many human infectious diseases are transmitted through contact with animals (zoonoses), including household pets. There is limit knowledge about the public pets, contact practices and awareness of zoonotic diseases risk from pets. Households consider that domestic animals as an important part of family and believed that their benefits were greater than pets associated health risk [7].

It is essential to provide a community with safe water. As recorded by WHO, 2.6 billion (40%) of the world population live without adequate, safe water and good sanitation practices of water [8]. Water sources can be contaminated at the source, at home or during the journey in between. Inadequate water sanitation plays an important role in the increasing of communicable diseases in developing countries. About 2.5 billion people were lacking improved sanitation facilities and nearly 1 in 4 people in developing countries were practicing open defecation [9]. Usually during emergencies, households use different methods for water treatment to improve its quality. These methods are disinfection (including chemical, boiling and sunlight), sedimentation and filtration [10].

Households waste mainly consists of solid and liquid rubbish which are considered as environmental health problem all over the world. Some are reusable and others are non-reusable. If this rubbish are not properly managed or disposed many problems will be introduced into the environment [11]. Awareness program for waste management is greatly required to avoid all hazards and diseases outbreak.

Awareness is an important element for decision-makers to plan and deliver an effective control of different diseases and solving health problems especially in developing countries. Human behavior, knowledge, attitudes, practices and beliefs are usually related to the culture and can enhance the effectiveness of controlling and preventing methods of many diseases as malaria [12]. The local knowledge and practices related to malaria is important for the implementation of culturally appropriate, sustainable, and effective interventions [13]. The knowledge attitude and practices of a community lead to the inability of the programs to achieve a continuous control [14]. Knowledge gaps and attitude create people unable to practice different hygienic bases. Socio-economic status of persons, ethnic tradition or beliefs and other cultures play important roles in diseases spreading [15]. Generally, there is a need for education on hygiene which will ensure the correct and proper use of the services for a long time after the technical consultant have been left [16, 17].

The objectives of this research are to assess the household's knowledge, attitude and practicesabout the most health problems as a health base data important for health authorities and to help decision-maker.

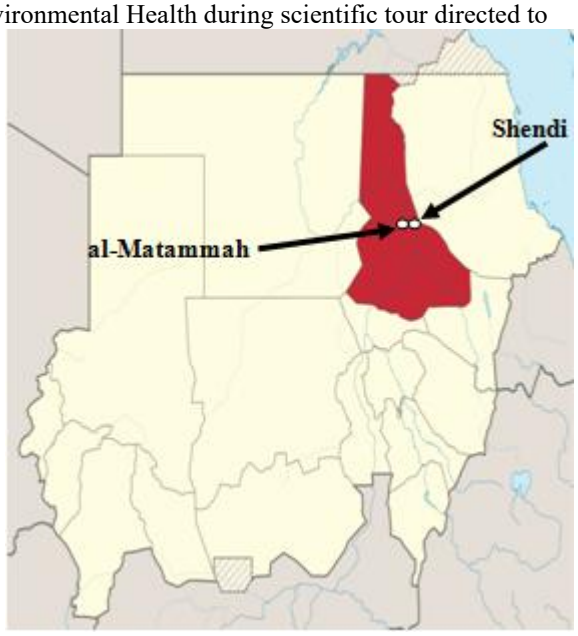
2. Materials and methods

2.1 Study area

The study was conducted in Al Nil Neighborhood at al-Matammah city in the Nile State. The Nile State is one of the Sudanese states located north Khartoum at altitudes 16°-22° North and longitudes 30-32° West, with a total area of 124 Km^2. al-Matammah is one of the seven localities of the state which located west Shendi with total population of 8861. The main activities of the citizens in the area are the agriculture and trade. This locality has 4Neighborhoods, 4 higher schools, 5 primary schools, one hospital and center care, one popular market and 2 cars for wastes discharge. The sources of water are the ground water (5 wells) which is directly pumped to the houses without treatment. The area lacks for water treatment unit, water and food laboratory analysis. There is only one apparatus for the biological and chemical analysis of water shared between the two cities al-Matammah and Shendi.

2.2 Study design and data collection

A descriptive systematic method was used to collect the data. In September 2015, 94 households in Alneel Neighborhood at al-Matammahwas selected using a systematic descriptive technique. A structured questionnaire was used to collect information about the socio-demographic status, house condition, animal rearing, water sources, hygienic practices of drinking water, the most common diseases in the area, knowledge of waste discharge, availability of health survives and lectures introduced for the health problem awareness.The interview was conductedby Bahri UniversityStudents College of Public and Environmental Health during scientific tour directed to



Nile River State among Sudanese states (in red color)

That area using a dialogue-bases format. Only the head of the household was interviewed. In case of their absence a responsible adult was interviewed. The data was analyzed by descriptive statistics and chi-test using SPSS version 20. p value less than 0.05 is considered as significant.

3. Results and Discussion

Table 1 shows gender, age group, education level for female and male, family size and monthly income. The majority of the studied participants were female comprising 75% and their aged between 20 and 40 years. This due to the gender

role, where women stay at home, men selection for women to be interviewed and men go to the work [18]. The family size of the most households ranged between 5 and 8 persons. Also results revealed that most of the respondents had low education level. Generally, 74.71% of male and 68.14% of female received low to medium education level. The illiteracy level among females was higher (23%) than male (9%). [2]found that most of the participants (80%) of the Sudanese communities received low to medium level of education. Low education levels among women in this study reflected the cultural concept in which women stay or work at home rather than to complete their high education[19]. However, 57% of the houses exhibited medium hygienic conditions, 27% good, 10% bad and 5% were excellent (Table.2). There was a significant association between male education and house condition where the p value (0.014) < 0.05 and the family size where p value (0.008) < 0.05 (Table 3 and 4).

Table 1: Socio-demographic information

Gender		
Sex	**Frequency**	**Percentage**
Male	22	24.44
Female	68	75.56
Total		100
Age group		
> 20	1	1.10
20-40	54	59.34
<41	36	39.56
Total		100
Education level of female		
Illiteracy	21	23.86
Khalwa	8	9.10
Primary	28	31.82
Secondary	24	27.22
University graduate	7	7.96
Total		100
Education level of male		
Illiteracy	8	9.20
Khalwa	13	14.94
Primary	27	31.03
Secondary	25	28.74
University graduate	14	16.09
Total		100
Family size		
2-4	21	33.34
5-8	60	63.83
> 9	13	13.83
Total		100
Monthly income		
< 1000	45	54.88
1000-1500	22	26.83
> 1500	15	18.29
Total		100

Additionally, 96% of the houses had latrines and 4% had not. There was a significant association between the male education level and the latrine distance from the water sources at home where the p value (0.009) < 0.05 (Table 5). Both two these groups were considered as the main sources of water contamination at home and ground water located downhill from the latrines pit [20, 21]. Improve or unimproved pit latrines in low-income countries are usually used by households [22, 23]. The use of pit latrines in low-income countries may cause human and ecological health problems concerning the microbiological and chemical contaminants. These latrines lack of many physical barriers such as concrete between stored excreta and soil and/or groundwater [24] which leads to soil, environment and water sources contamination.

Nearly, half of the respondents (47.78%) were reared animal at home (Table 2). The presence of animals will contaminate the water sources, environment at home, surrounding environment and they could be a source of infection with different diseases as hookworm which that can be transmitted through foot [25]. Usually, most of thechildren in developing countries as in Sudan play inside and outside barefoot (personal observation) which may lead to the infection with parasites as hookworms. Several studies revealed that zoonotic diseases could be transmitted through domestic animals [26, 27]. The direct contact with animals will make a high risk to human to be infected with zoonotic diseases transmitted from domestic animals, therefore rearing of animals away from home, fencing animals and education concerning the diseases that transmitted via domestic animals is are very essential to prevent any infection.

Results showed that water obtained from different sources including protected well, not protected well, donky, hafaier, karoo, water net, river and others. As recorded in Table 6, water brought to house on foot (20.3%), by animals (4.7%), by bicycle (1.6%), by cars (14.1%) and by others (59.4%). However, 56% of the respondents brought water in plastic containers, 20.55% used iron barrel, 1.37% used Safiha and 21.92% used others. Most of the participants (97.59%) covered water sources. Additionally, 88.31% of the household cleaned their equipment, 71.2% of them cleaned once after each use and 79.452% cleaned water equipment with water and soap. Protected well source represented the highest percent (39.4%) followed by the general water net.

The results claimed that there was a medium hygienic practice of water at home. However, water look clean, the water quality and safety especially microbial contamination was unknown and this was a problem health concern among inhabitants there. Untreated water, unwashed hands, uncovered water, bringing of water by different methods (Table 6) and open defecation or contamination with sewage discharges or faecal waste of domestic and wild animals [28] all these factors will enhance contamination of water and be a source of waterborne diseases, thus the improving of water sanitation will prevents diarrhea and different waterborne illness. Plastic containers used for water storage are commonly available in different forms in the local markets. These containers can be considered as a good alternative choice for cement or ceramic water tanks if they are resist to the heat and Ultraviolet rays especially during long summer months. In Sudan, most of the people in urban and rural areas store water (used for different purposes including drinking water) in plastic containers under the sun in the yards. If these containers are not manufactured from non-toxic materials they will be hazards for human health. Plastic containers are mostly made of Polyethylene (PE), Polypropylene (PP), Bisphenol (BPA), High Density Polyethylene (HDPE), Polyethylene Terephthalate (PET) and cross-linked Polyethylene (PEX), or Thermoplastic

Polymer, which have very well-known health risks for end users. These chemicals released and start mixing with water when used for a long time and when these reservoirs are washed with detergents and also leach antimony and bisphenol A (BPA), when exposed to the UV and heat. These compounds are potentially hazards and cause many diseases as cancer, asthma, cardiac problems and reproductive system irregularities in women. As reported by [29] plastic material has adverse effect on animal and human health. Plastic product are directly toxic as in the case of lead, cadmium, and mercury, carcinogenic as in the case of diethylhexyl phthalate (DEHP)and endocrine disruption, which can lead to cancers, birth defects, immune system suppression and developmental problems in children [30].

As it can be seen from the results the majority of the households (82.98%) transferred their solid wastes and most of them (81.319%) transferred it weekly (Table 7). More than half of the households (52.784%) use other ways to discharge their wastes rather than burning or burying. Those respondents may dispose their wastes at communal collection containers, in water bodies, in open spaces and into surface drain. As revealed by [31]the majority of the households in Ghana storedthe solid wastes at home with only 22.6% of household store their wastes outside home. Also

Table 2: Description of house conditions and animals at home

House condition		
Condition	**Frequency**	**Percentage**
Bad	8	10.0
Medium	46	57.5
Good	22	27.5
Excellent	4	5.0
Total		100
WC presences		
Yes	85	96
No	4	4
Total		100
Distance between water sources and WC at home		
< 10	42	48.276
10-20	37	42.539
> 20	8	9.1959
Total		100
Animal rearing at home		
Yes	43	47.78
No	47	52.22
Total		100
Kinds of animals at home		
Cows	6	12.5
Sheep	30	62.5
Donkey	1	2.08
Others	11	22.92
Total		100

Table 3. Significant association between education level of male and house condition.

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.109[a]	12	.014
Likelihood Ratio	22.487	12	.032
Linear-by-Linear Association	.933	1	.334
N of Valid Cases	74		

a. 15 cells (75.0%) have expected count less than 5. The minimum expected count is .27.

Table 4. Significant association between education level of male and family size.

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.659[a]	8	.008
Likelihood Ratio	17.824	8	.023
Linear-by-Linear Association	.642	1	.423
N of Valid Cases	87		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is 1.01.

Table 5. Significant association between education level of male and WC distance from water sources at home.

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.615[a]	4	.009
Likelihood Ratio	11.991	4	.017
Linear-by-Linear Association	6.694	1	.010
N of Valid Cases	83		

a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is .39.

they reported that the waste burning is high among household store in plastic bags. In this study participants had a poor knowledge and practices about how to discharge their wastes although there is two cars for wastes dispose. Improper dispose of wastes leads to the growth of microorganisms, mosquitoes and flies [2] and thus lead to the diseases outbreaks. Home collection of solid wastes is limited to household responsibilities. In Ghana in urban Accra, there was a general perception that children should be responsible for transporting waste from the households to dumping sites [32].

Household solid waste includes both nonhazardous and hazardous contents which are collected together and disposed in open area or in water bodies or buried or burned in developing countries. Organic matter of wastes may contaminate underground water due to leachate from organic matter in open dumping and pose major environmental health threats[33]. Indiscriminatedisposal, burning and burying of solid wastes play an important role in environment pollution and may be health threats.Wastes burning contribute to the air pollution problems smoke [34]and destroy ozone layer and its protective properties and therefore increasing the health risk. Solid waste burning is associated with high incidence of respiratory system infection, cancer, birth defects and reproductive disorders and other chronic diseases [35, 36]. Dumping and accumulation of wastes may create a good environment for

rodents, rats, flies, microorganisms, other vectors of diseases and produce a bad odor due to the decomposition of organic materials of these wastes. Odors emitted from waste accumulation and dumping considered as an environmental nuisance [37]. Domestic wastewater consists of blackwater which effluent from toilet and greywater (GW) which is the remaining water of washing, bathing and kitchen effluent. Domestic wastewater consistsof blackwater which effluentfrom toilet and greywater(GW) which isthe remaining water of washing, bathingand kitchen effluent.In this study more than halfof the respondents (64.9%) spread GW directly to the street or in the yardat home, 27.66% by other methods and 7.447% ofthem collected in basins. [2] found that most of the Sudanesecommunity (70%) disposed wastewater directly to the street and reported that the most common problems related to the improper water disposal are the growth of the flies and rodents. Most people around the world thought that graywater was relatively good and healthier than wastewater.Due to this most of people in developing countries use it for irrigation, cooling the weather and fixing dusty area at

Table 6: Hygienic practices of drinking water

Methods of bringing water		
Method	**Frequency**	**Percentage**
On foot	13	20.3
By animal	3	4.7
By bicycle	1	1.6
By cars	9	14.1
Others	38	59.4
Total		100
Equipment used for water transportation		
Plastic containers	41	56.16
Iron barrel	15	20.55
Safiha	1	1.370
Others	16	21.92
Total		100
Covering of water equipment until usage		
Yeas	81	97.59
No	3	2.41
Total		100
clean water equipment		
Yeas	68	88.31
No	9	11.69
Total		100
times to clean water equipment		
Once after each use	47	71.21
More than once	18	27.27
Not washed	1	1.52
Total		100
Methods of equipment washing		
By water only	13	17.808
Water + soap	58	79.452
Water + disinfectant	1	1.3699
Combination of three	1	1.3699
Total		100
Water treatment before using		
Yes	38	42.22
No	52	57.78
Total		100
Methods of water treatment		
Boiling	12	33.33
Filtration	1	2.78
Disinfection by chemicals	16	44.44
Sedimentation	1	2.78
Others	6	16.67
Total		100

Table 7: Knowledge of wastes disposal

Waste transfer		
Waste transfer	**Frequency**	**Percentage**
Yes	78	82.98
No	16	17.02
Total		100
Days of waste transfer		
Daily	2	2.1978
Weekly	74	81.319
Monthly	8	8.7912
Not transported	6	6.5934
Others	1	1.0989
Total		100
Disposal of solid wastes		
Bury	4	4.5977
Burning	37	42.529
Others	46	52.874
Total		100
Disposal of greywater		
Collected in basins	7	7.447
Spreading	61	64.9
Others	26	27.66
Total		100

home. Generally, the use of GW poses hazards and threats for human and environment health. The use of GW for landscape irrigation particularly for household gardening introduces different hazards into the environment, these hazards include elevation of salinity level, boron and surfactants that can alter the soil properties, damage plants and contaminate ground water [38, 39]. Also [40] claimed that the use of GW enhances the microorganisms spreading. As recorded by [41],feacal coliforms did not survive in the soil. Treating greywater before using for irrigation or for other purpose is recommended, even in the places where this is not essential.

Fig.1. shows the most popular diseases in the investigated area. These diseases were malaria (69.0423%), diarrhea (18.31%), others (7.0423%) and typhoid (5.633%). Nearly to the third of the participants (29.80%) referred the cause of these diseases to contaminated water, 20.22% to pools, 13.82% to mosquitoes, 9.58% to ignorance, 5.32% to wastes and water, 3.19 to water + pesticides and water + mosquitoes, 2.12% to mosquitoes + water +foods, flies, air and 1.6% to vegetables, foods, mosquitoes + trees + water, mosquitoes+ wastes, mosquitoes+ wastes +flies, water + food, environment pollution and wastes. Malaria is an endemic disease in Africa [5]. The percent of people die by diarrheal diseases and malaria was 7.67% and 2.13% respectively in Sudan [42]. Inadequate hygienic conditions and poor hygiene practices play major roles in increasing communicable diseases in the developing countries. Contaminated water is the main cause of diarrheal diseases world-wide and kills about 2.2 million people globally each year, mostly children in the developing countries [43]. People behavior, culture, knowledge, attitude, practices and lack or inability of controlling programs may increase these diseases, therefore it is recommended to establish different programs to achieve sustainable and effective control.

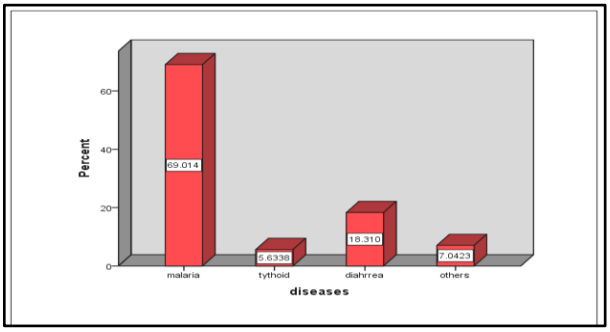


Figure 1: The most popular diseases at al-Matammah city

The study revealed that the majority of the households (92.55%) went to the health centers to cure diseases, 5.319% treated with traditional medicines (as mint, garlic, spider net and mimosa) and 2.128% used classical treatment (Fig.2). It is quietly recognized that the community was fully aware about the treatment at health centers rather than to the treatment with traditional or classical treatment. Similar results recorded by [2]. It claimed that most of the people live in different states of the Sudan were fully aware about diseases treatment at primary health centers. Treatment with traditional medicine may be acquired from family since childhood and from those (old women and men) people who believed and experienced in treatment with traditional medicine. The use of traditional medicine may not cure the diseases well, enhances diseases transmission among people and increases the risk [44]. They also recorded that most of them agreed that the services of these centers were not available. The majority of the households (94.57%) answered that health services were existed at the area, 55.576% of them went to the health centers, 57% stated that the services were available and 81.72 mentioned that it was easy to reach these centers (Table 8).The community in different states of the Sudan was fully aware about the health care modalities and there was generalized agreement among most inhabitants in different states that the primary health care is not available at almost all governmental primary health care units [2].

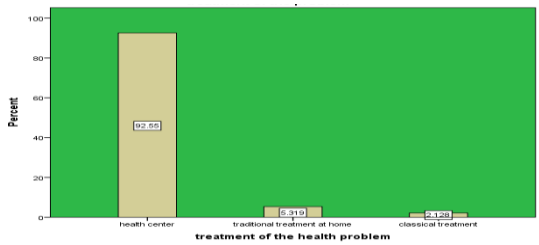


Figure 2: Practices used for Diseases treatment

Table 8: Health services information

Health services existence		
Existence	**Frequency**	**Percentage**
Yes	87	94.57
No	5	5.43
Total		100
Types of Health services		
Hospital	39	43.333
Health center	50	55.576
Others	1	1.1111
Total		100
Availability of all services		
Yes	35	38.043
No	57	61.967
Total		100
Easy to access		
Yes	76	81.72
No	17	18.28
Total		100

Generally, 68.871 of the participants answered that there was no lectures, symposium, forums or seminars presented about thehealth problems awareness and hygienic practices at this area, 53.571% of the household claimed that the duration of these programs was held before more than two months and 53.571 of them answered that the university students were reasonable about these programs (Table 9). The rule of locality responsibilities towards inhabitants was very weak concerning the health precautions, lectures, symposiums, forums and seminars. Presentation of these programs is recommended to raise knowledge, awareness about the health care, hygienic practices, transmission of diseases, how to prevent and control these diseases. Most of the respondents in this study received low or middle level of education or illiterate, had a poor knowledge about the hygienic practices of drinking water and improper methods to discharge their wastes. Due to all these, health education as a part of control programs is important and essential to improve the health awareness among the households at al-Matammah.

Table 9: Lectures for health problems awareness and hygienic practices

Lectures conduction		
Conduction	**Frequency**	**Percentage**
Yes	29	31.183
No	64	68.817
Total		100
Duration of lectures		
Before month	4	14.286
More than two month	15	53.571
Before year	5	17.857
Others	4	14.286
Total		100
Who is introducing the lectures		
Locality	6	21.429
University students	15	53.571
Others	7	25
Total		100

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