ANALYSIS OF ENVIRONMENTAL SANITATION CONDITION OF OMONADA TOWN, OMONADA WOREDA, SOUTH WEST ETHIOPIA.

BY

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A RESEARCH PAPER SUBMITTED TO THE DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES AND TECHNOLOGY, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES, JIMMA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF SCIENCE IN ENVIRONMENTAL HEALTH.

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Abstract

Environmental sanitation problem is one of the important health problems in the world and Ethiopia too. Therefore, a across sectional study was used to assess the environmental sanitation condition of Nada town, South West Ethiopia. From a total of 1320 households, 240 households were determined statically and questioners, interview and observational data collection instrument were used. The result of the study indicate that, 121(50.42%) respondents were illiterate, 90(37.5%) were merchant and the majority of the income of households 102(42.5%) had got less than 200 birr per month, 150(62.5%) house were privately owned, walling and floor materials were respectively, 224(93.33%) from wood with mud, and 220(91.67%) were earth. Also poor housing condition was seen. Almost 225(93.75%) households use natural ventilation system. More than 75% of householders got water from pipe water in which 52.08% were accounted to public stand pipe and 5.42% from unprotected spring. Consumption rate of water per households per day were, 142(59.17%) householder use between 20-40 liters, 66(27.5%) between 41-60 liters and the rest 11(4.58%) and 21(8.75%) use between 61-80 and >80 liter of water for both personal hygiene and consumption purpose respectively and as a result the consumption rate of the householders were low. 204(95.32%) householders were use simple traditional pit latrine in unsanitary condition and also unsafe disposal methods of refuse was seen with 165(68.75%) open field, 23(9.58%) burning in the street and 22(9.17%) burning in the yard or compound. Only 30(12.5%) of households use refuse pit. Latrine availability was statically not associated with both monthly income and educational status of householders with p-value >0.1. Generally as the result indicates, most households use simple pit traditional latrine with unsanitary condition, practice unsafe waste disposal methods at all and mostly they got water from protected source with low consumption rate. To solve this problem, the health sector, sanitarian and town administration should collaborate with each other and with other sectors to alleviate the problems.

Acknowledgements

Acronyms

WHO-   World Health Organization

PHC-   Primarily Health Care

VIPL-   Ventilated Improved Pit Latrine

UNICEF-   United Nation International Children Found

CIS-   Corrugated Iron Sheet

USSR-   Union Nation of Soviet Socialist Republic

GC-   Gregorian Calendar

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Operational Definition

➔ **Adequate water supply:** is one that provides safe water in quantities sufficient for drinking and forculinary domestic, and other household purposed so as to make possible the personal hygiene of members of the household.(20)

➔ **Environment:** a collection term used to describe all the living and nonliving things that making our surroundings.(11)

➔ **Household:** a group of two or more person who joining occupy the whole or part of a housing unit and who have common provision for food and other essentials of living.(6)

➔ **Primary Health Care:** is essential health care. The first level of contact of individuals, the family and community with the health system, bring health care as close as possible to whole people live and work.(3)

➔ **Sanitation:** is the means of collecting and disposing of waster material (solid, liquid and human waste water) and community water in hygienic way so as not to endanger human health.(11)

➔ **Safe Water:** a water that does contain harmful chemical or micro-organisms in concentration that could not cause illness or desirable for sight, taste and smell to drink.(20)

➔ **Refuse:**- solid waste that thrown out that is not putrceble (decomposed) includes can, metal, paper etc.(11)

CHAPTER ONE

1. Introduction

1.1. Background information

Environmental sanitation is a field of public health, which is interested on the relations between people and physical, social and cultural environment. It involves varies effects to control the environment, to control and prevent disease. It includes personal cleanliness, which helps to protect against disease (16).

> Environmental sanitation is necessary to overcome the effect of human activities in his environments. The increases in population and movement of people to urban and metropolitan areas have intensified environmental control difficulties in those areas. The provision of save water, the collection and disposal of human and domestic and industrial wastes, the prevention of atmosphere pollution and control of ionization radiation are becoming more difficult before (10).

The link between sanitation and public health has been more recognized by doctors, planners and engineers that improvement in sanitation is vital for improvement in public health. Thus, the recognition of the role of good sanitation and water supplies on human health, and the poor status of water supplies and sanitation service to the majority of population of the world, led to designation of the 1980's as "international drinking water supply and sanitation decade" at the United Nations water conferences at Plata (1977). The general aims of the decade were to increase coverage of water supply and sanitation of all sectors of the population employ appropriate technologies and promote community participation in all stages of the process (5).

Today environmental sanitation covers all aspect of our interrelationship with our environment water supply, housing condition and availability, food safety, vector control, waste management, safe excreta disposal, and noise pollution control are the main concern of environmental sanitation (10).

1.2. Statement of the Problem

The most precious resource of any nation is healthy population. Health however is impossible to achieve without adequate water supply, proper human excreta and refuse disposal, the control satiety of the food from disease causing microorganisms or their poisonous products and control of flies, lice and mosquitoes (12, 20).

One of the most important benefits of water and sanitation are is by providing barriers to transmission of disease from environment to the human body of diarrheal disease, which is responsible for an estimated of 21% of fatalities of under five children in developing countries or 2.5 million deaths per year. In order to improve quality of life around the world it is important to focus in intervention that result improvement of water, sanitation and hygiene (20).

However according to WHO and UNICEF joint monitoring programme to water supply and sanitation estimated that 1.1 billion people live without improved water supply while over half of developing world population (representing 2.6 billion people) lacks access to improved sanitation (20).

In Ethiopia the provision of safe and adequate water supply for population has far reaching effects on health, productivities and quality of life as well as the socio-economic development. Lack of clean/potable water supply and sanitation service in the country has been series problem and statistics shows that more than 60% of health related death are caused by water borne disease (Government of Ethiopia 2007:35).

Much of the housing both in rural and urban areas of developing countries lacks the most basic requirement to health. More than 2000 million people live in life threatening and health threatening housing is overcrowded: space is nearly always at premium, and many families live in one room shelters or single rooms in tenements. Such overcrowding encourages the spread of acute respiratory infections; tuberculosis, meningitis and intestinal parasites. Four or more persons to a room make it almost impossible to protect hazardous holds substance. In urban

areas a higher proportion of housing is illegal settlements and built flammable materials. Many dwelling are built on land prone to flooding, on steep hillside or otherwise dangerous site. (19)

Inherent to all towns of Ethiopia, environmental sanitation problem is one of the important health problems. The majority of the urban poor live in low quality over crowed, self made forms of shelter that are marginally served by the public utilities taken for granted by better of group. Poor people often lack adequate resource for removal of disposal excreta and other wastes so that it is common to see rotting garbage's, human feces and associated insects and rodent's infestation.

Generally, improper waste management, unsafe excreta disposal, poor housing condition, inadequate and unsafe provision and using of water supply are the major problems of many nations of the world and main factors for communicable diseases.

1.3. Significance of the Study

The international conference in Alma-Ata, UssR (1978) indentified PHC as the key to achieve health for all- 2000 goal. PHC has placed emphasis on eight key elements among which "supply of safe water and basic sanitation" (3). Also lack or inadequacy of sanitary human waste disposal pollution on environment, water source and the final is the human ill or disease. It is important to use latrine and sanitary facility for prevention of gastrointestinal disease (9). To alleviate this situation of poor sanitations, the primary health care approach has to be effectively implemented. In line with this the transitional government of Ethiopia has set policies with special emphasis on promotive health service, safe water supply and environmental health and hygiene (15). Therefore, this study was conducted to solve the existing problems, create public awareness about sanitation and related disease with poor sanitation. Finally it helps for further study and comment for the responsible bodies.

CHAPTER TWO

2. Literature Review

The WHO expert committee on environmental sanitation in 1950 define environmental sanitation as "the control of all those factors in man's physical environment which exercise or may exercise deleterious effects on his physical environment, health and survival. In particular it refers to the control of community water supply, excreta and waste water and solid waste disposal refuse, vector of disease, housing condition, food supplies, handling of atmospheric condition and the safety of the working environment (20).

Environmental problem have since growing in a complexity, especially with advent of radiation and chemical hazards. Mean while the world's need for essential sanitation service (i.e drinking water supply, excreta, waste water and solid waste disposal) have greatly increased as a result of rapid population growth and higher population expectation. This lead to the United Nation designation to international drinking water supply and sanitation decade (11).

Water supply and sanitation in Ethiopia is inadequate. Most of the population of urban and rular a like, do not have acces to safe and adequate water supplies and sanitation facilities. Few households show sufficient understanding of environmental sanitation or hygienic practice regarding solid and liquid waste disposal and personal hygiene. As a result three fourth of the health problem in Ethiopia are due to communicable diseases attributable to unsafe/un sanitary waste management particularly excreta. Diarrheal disease caused by improper management of water and sanitation is among the major or cause of infant and child morbidity (19).

Local studies which were conducted in different areas of the country shows low acces to basic sanitation and water supply. Study conducted in Jimma rular area by W/Tensaz F. and Mengistu A. shows that the majority of the households get water for domestic purposes from unprotected springs, rivers, well and ponds and only 22.5% obtain water from protected springs. Colifom bacteria were isolated from over 50% of the weaning foods. The study pointed out that the study

community was ingesting contaminated food. High contamination of weaning food was significantly associated with unsafe water supply (22).

In many parts of Ethiopia, where ground water is not exploited and surface water is scarce and faraway from dwellings, house wife spends most of their times carrying a few liters of water from water holes, streams and springs. In some localities, these water holes, which are usually contaminated, are from two or four hours walking distance away from homes. The amount of water obtained under such conditions is strictly rationed for drinking, and almost no provision is made for personal cleanliness or house hold hygiene which important role in the prevention of disease transmission. (14).

A study conducted in Jangua marriam, North western Ethiopia, to determine the prevalence of risk factors of trachoma the result shows that from 414 households 59.2% had trachomes, the water source of household was far. 68.8% of them had travel more than one hour to fetch water. The water consumption, the greater majority of household (93%) consumed <12 liter perday while only 7% of the total households were able to use 12 and above liters of water for all water consumption activities of the household. The two main water sources were river (92.5%) and unprotected spring water (75%). (1)

Generally, in urban and rular developing countries including Ethiopia, water is often remote and unsafe. In areas were conventional treatment plants available, all of the community may not be capable of utilizing the system. For example, study done by wondimagegn showed that the majority (76.5%) of people in Jimma town, in which water treatment plant is available, use un protected source. (17)

Study done in Keffa-Sheka zone, in 1997 showed that the prevalence of diarrhea was significantly higher in children coming from storage containers by dipping (18%) than the those where water is obtained by pouring (12%).(13)

Using latrine is one of the methods of excretal disposal in many parts of the worlds. But in the unplanned and uncontrolled settlements, human waste were seen in open fields and on streets. As a results it serves breeding site of flies and rodents. Then flies feed on human feces and directly contact with human food and transmite the dieses to human. (14)

Another study, which was conducted in Ghana's Volta region 217 households, only 9% had access to latrines. The rest were defecating anywhere in vicinity of villages. Refuse collection bins or boxes were available to 29% of the interviewers and 28% had access to bathroom with soak away. There were no proper waste storage facilities and no designated refusal disposal sites. Instead, waste was deposited indiscriminately behind houses, providing breeding site for mosquitoes. The people were unaware of health hazards associated with this practice. (2)

A local study conducted in Easter Tigray, shows that using open pit latrine was significantly associated with increased incidence of overall under 5 morbidity and chronic respiratory illness. This can be explained on the basis of advantage of open pit latrines as permanent breeding site for flies and source of bad odor. Children living in rural areas less experienced frequent diarrheal disease than those living in semi urban areas. This might be due to relatively increased use of open pit latrines in semi urban areas from which flies transmit enteric pathogens. (7)

Generally, if the living house is not safe, clean, well ventilated and lighted, free from vectors and rodents, then the inhabitants will become ill as well as an overcrowding house cause accident hazards, increase the risk of spread of communicable disease and cause mental stress. Unfortunately, many people in the developing countries of the world do not have decent place to live and these affects public health. (11)

Housing also intimately related to health. The structure, location facilities, environment and uses of human's shelter have strong impact on the state of mental, physical and social well being. In developing countries households are small, crowded and poorly ventilated. The cooking fire often is set in a single stove without chimney to carry the emitted products of combustion to outdoors. (6)

Infant and child mortality have long been used as indicator of level of socio-economic development of a nation. Most developed countries registered low level infant and child mortality rates. In developing countries, particularly in Sub-Saharan Africa, although significant achievements have been made, infant and child mortality still stand at high levels. In Ethiopia, infant and child mortality in 1993 were 110/1000 and 161/1000 respectively. This high level of mortality may be associated with demographic, socioeconomic and environmental factor such as

ethnicity, housing condition, overcrowding, availability of save and adequate water supply and latrines. (8,18)

In properly handling, storing and disposing of wastes such as solid waste, liquid waste and human waste (excreta) have great major impacts on human health and environment. They leads to contamination of ground water and source of drinking water supply and also results nuisance and odor problems, breading site of flies and mosquitoes. In addition they create poor vision of environment. (11,18)

A high incidence of disease associated with poor sanitation is characteristics of disease picture in many developing countries. About 80% of all human illness are associated with poor environmental sanitation and polluted water. In developing countries 13 million of fatalities occur annually among children under five years of ages as consequence of infectious diseases (12, 20).

Generally, unsafe and adequate water supply, poorly constructed house and unstandardized house, in properly handling, storing and disposing of wastes (human, solid, liquid), lack of sanitary facilities such as latrines, safe and adequate water are the main concerns to take environmental sanitation under consideration. They are the main cause to environmental deterioration, human health and well being of societies.

CHAPTER THREE

3. Objective

3.1. General objective

The general objectives of this study was to assess the environmental sanitation condition of Omo Nada Town

3.2. Specific objective

- ➢ To determine the community accessibility and utilization to safe and adequate water supply, and means of transport, collection and storage at home.
- ➢ To determine means of the sanitary excreta disposal methods.
- ➢ To determine the general, housing structure and condition to support health of household.
- ➢ To determine the communities practice of collecting, storage and disposal methods of solid waste.

CHAPTER FOUR

4. Methods and Materials

4.1 Study Area

The study was conducted in Omo Nada Town, Southern of Ethiopia which is located in Oromia region south west of Jimma zone at distance of about 298 km away from Addis Ababa and at 78 km from Jimma Town. According to the 2005 central statics of agency of Ethiopia, the town had 6345 total population and 1320 total households (from town's data statics).

4.2. Study Design and Periods

Cross-sectional study was conducted from March 3-25/2013 GC.

4.3. Source Population

Total households found in Nada Town= 1320.

4.4. Study Ppopulation

Was each house that had got the chance of being included in the sample.

4.5. Sample Population and Sample Size determination

Sample size was calculated as the following formula

$$n = \frac{N_z{}^2pq}{d^2(N-1)+z^2pq} = \frac{1320 \times (1.96)^2 \times 0.5 \times 0.5}{(0.05)^2(1320-1)+(1.96)^2 0.5 \times 0.5} = \underline{295}$$

N= Total household=1320

P= Water and sanitary facility coverage is not studied 50%=0.5

Z=Total standard normal deviation corresponding to confidence level is 95%=1.96

Q= 1-p=0.5

d= Degree of accuracy desired: 0.05

Nf= corrective factors

Since calculated sample sizes less than 10,000, correction formula was used ie. nf.

nf= $\underline{n}$ = 297 = **240** Sample size determined
   $1+\underline{n}$ $1+\underline{297}$
     N   1322

4.5.1. Sampling Techniques

Systematic random sampling data collection was conducted to select household that will be got the chance of to be included in the study population. That means after first house questioned the next house was determined by N/nf house i.e. the 5th household.

4.6. Study Variables

4.6.1. Dependent Variables
- Condition of the housing
- Solid waste storage, collection and disposal practice
- Availability and utilization of sanitary facilities
- Availability of water

4.6.2. Independent Variables
- Educational status of households
- Religions
- Occupational status of households
- Population group
- Economic status
- Distance of water source
- N^o of class room

4.7. Data Collection Techniques

Data was collected by using well structured and pretested questionnaires and observational check list by the principle investigator and trained data collectors. The person interviewed were mainly housewife but husband, elder boy and girl were also responded if housewife absent at home.

4.8. Pretest

The pre test of the questionnaire and observational check list was done on 5-10% of study area on out before the actual data collection and also the process of interviewing was done randomly to improve questionnaires according to the pre test.

4.9. Data Analysis and Interpretation

Data was processed manually by using scientific calculator. Then it was organized and analysed based on the sets variables. The result was presented expressed in rates, table and graphs. At the end it was interpreted and compared using standards and other similar studies or findings.

4.10. Ethical Consideration

Approved license (written) letter was taken from university (JU), department of environmental health. The purpose of the study was explained clearly to the target population to get consent from study subjects. The norms, belief and values of them were respected.

CHAPTER FIVE

RESULTS

1. Demographic and Socioeconomic characteristics

As table one below shows concerning socioeconomic characteristic households of Nada town, 214(89.17%) houles were headed by male, 26(10.83%) house were headed by female. But during data collection, 78(32.5%) respondent were male and the rest 162(67.5%) were female.

Regarding to the educational and religious status of households, 13(5.4%) were Orthodox, 217(90.4%) were Muslim, 6(2.5%) were protestant, and the rest 4(1.7%) were other such as waqefata. Among assessed households, 12(50.4%) were illiterate, 20(8.33%) were read and write, 26(10.83%) were 1-4 grades, 47(19.58%) and 26(10.33%) were 5-8 grades and 10^+ respectively. As the result indicates the majority of the interviewed respondent were illiterate.

Table 1. Demographic and Socio-economic characteristic of Nadada Town

	Variable	N$^{\underline{o}}$	%
Sex of the head of household	Male	214	89.17
	Female	26	10.83
	Total	**240**	**100**
Religion	Muslim	217	90.4
	Orthodox	13	5.4
	Protestant	6	2.5
	Other	4	17
	Total	**240**	**100**
Educational Status	Illiterate	121	50.42
	Read and Write	20	8.33
	1-4 grades	26	10.83
	5-10 grades	47	19.58
	$\geq 10^+$	26	10.83
	Total	**240**	**100**

As indicated on table tow below concerning occupational average monthly income and family size of Nada town households, 22(9.16%) were government employees 90(37.5%) were merchant, 27(11.25%) were Tea/tella seller, 66(27.5%) were farmer, 10(4.17%) were house wife, 6(2.5%) were students and the rest 4(1.67%) were other/unspecified such as over age family.

The majority of households family size were greater than or equal to five which accountable to 153(63.75%) and 87(36.25%) were less than five.

Table 2. Socio-demographic characteristics of Nada town household Omo Nada woreda on occupational, average monthly income and family size

	Variable	N⁰	%
	Government employee	22	9.16
	Merchant	90	37.5
	Tella/Tea seller	27	11.25
	Farmer	66	27.5
Occupational Status	House wife	10	4.17
	student	6	2.5
	Daily laborier	15	6.25
	Other	4	1.67
	Total	**240**	**100**
	<200 birr	102	42.5
	200-400 birr	71	29.58
	500-700 birr	33	13.75
Average Monthly income	800-1000	22	9.17
	≥1000 birr	12	5
	Total	**240**	**100**
	<5 person	87	36.25
Family Size Per household	≥5 person	153	63.75
	Total	**240**	**100**

2. Water

Concerning the water source of Nada town households, 26(10.83%) were use tap inside the compound, 125(52.08%) were public stand pipe, 30(12.5%) were sharing with neighborhood, 22(9.17%) were protected spring, 13(5.42%) were unprotected spring and 24(10%) households were use public protected well.

Table 3. Water supply status, distance and time taken to fetch

Source of Water Supply	Variable	N⁰	%
Pipe water	Tap inside the compound	26	10.83
	Neighborhoods	30	12.5
	Stand pipe	125	52.08
Spring water	Protected	22	9.17
	Unprotected	13	5.42
Well	Protected	24	10
	Total	**240**	**100**

Regarding to water utilization, 142(59.17%) households were use between 20-24 liters, 66(27.5%) were use between 41-60 liters, 11(4.58%) were use between 61-80 liters, and the rest 21(8.75%) households were use above 80 liters of water per households. Concerning water utilization, most of the households those who had Tap inside their compound use water greater than 80 liters per households due to accessibility and afford ability (i.e those who had tap inside their compounds) of water to householders.

Table 4. Distance, time and frequency of water utilization in Nada town households

	Variable	N⁰	%
Distance of water source	<100 meter	86	35.9
	100-200 meter	122	50.8
	>200 meter	32	13.3
	Total	**240**	**100**
Time taken to fetch	<20′	94	44.1
	20-40′	106	39.2
	40-1hr	40	16.7
	Total	**240**	**100**
Daily per capital water consumption /in liters	20-40 liters	172	71.67
	41-60 liters	40	16.66
	61-80 liters	15	6.25
	>80 liters	13	5.42
	Total	**240**	**100**

On water storage process, the majority of households were use plastic jerry cans 222(92.5%), 5(2.08%) were barrel, 9(3.75%) were clay pot and 4(5.67%) were use bucket as storage materials.

Table 5. Water storage materials and methods of withdrawal

	Variable	$N^\underline{o}$	%
	Jerry cans	222	92.5
	Barrel	5	2.08
Storage materials	Bucket	4	1.67
	Clay pot	9	3.75
	Total	**240**	**100**
	Yes	228	95
Presence of Cover	No	12	5
	Total	**240**	**100**
	Dipping	18	7.5
Withdrawal Practice	Pouring	222	92.5
	Total	240	100

Regarding to presence of cover and withdrawal practice, the majority of water storage materials had covers i.e 228(95%) and 12(5%) had no covers. Water withdrawal practice of most households were pouring system 222(92.5%) due to the narrower of water storage materials and the rest 18(7.5%) were practice dipping system.

3. Housing Condition

Concerning the housing condition of Nada town households, 150(62.5%) were private house, 90(37.5%) were rested house from private owners and municipality. The majority of the roofs of the house i.e 230(95.84%) were constructed from CIS and the rest 10(4.16%) were constructed from thatched roof. The walling and flooring materials of house respectively were, 224(93.33%) were wood with mud and 16(6.67%) were brick/block, 220(91.67%) were earth, 15(6.25%) were conceret/tile and the rest 5(2.08%) were lumber.

Table 6. Structural and condition of housing of Nada town including owners and rented, types of floor, roof and walling.

	Variable	Nº	%
House owner ship	Private	150	62.5
	Rented	90	37.5
	Total	**240**	**100**
Types of roof	CIS	230	95.84
	Tatched	10	4.16
	Total	**240**	**100**
Types of walling	Wood with mud	224	93.33
	Brick/block	16	6.67
	Total	**240**	**100**
Floor materials	Earth	220	91.67
	Concrete/tile	15	6.25
	Lumber	5	2.08
	Total	**240**	**100**

As table seven below indicates, the majority of the house had two windows 96(40%),and the rest 18(7.5%), 78(32.5%) and 10(4.2%) had now separation room, had three classes, had greater than four classes respectively and 48(15.8%) had four classes.
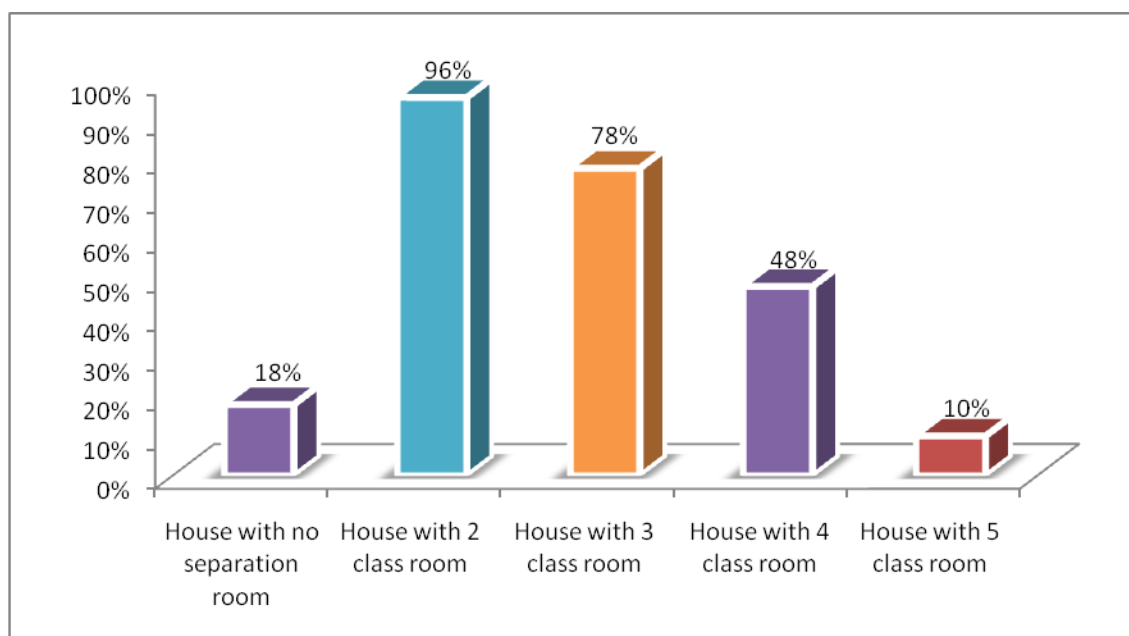
Figure 1. Number of clasroom of households of Nada town

With regarding to ventilation system, the majority of the houses have good natural ventilation system with two or above windows which accounted to 225(93.75%) and the rest 15(6.25%) had no ventilation system.
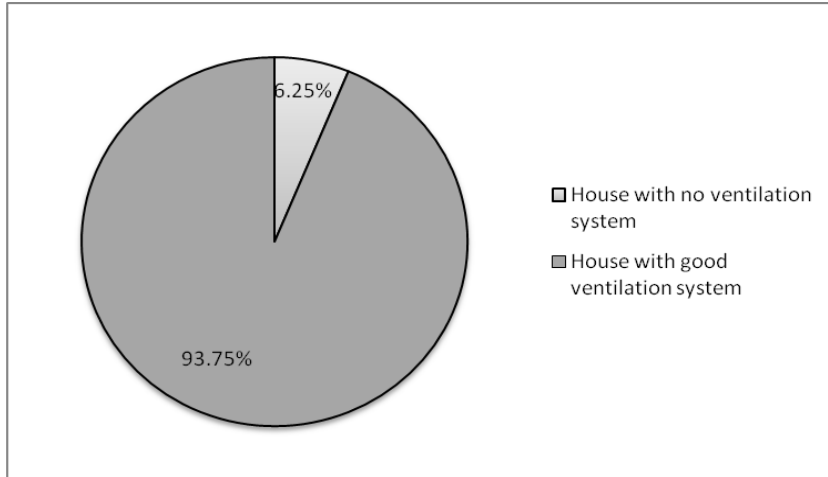
Figure 2. Availability of ventilation system of houses of households of Nada town

Table 7. Structure and condition of housing of Nada town including number of class room, ventilation and illumination of households.

Characteristic	Variables	N⁰	%
Number of class room	No separation	18	7.5
	2	96	40
	3	78	32.5
	4	48	15.8
	>4	10	4.2
	Total	**240**	**100**
Ventilation system	Yes	225	93.75
	No	15	6.25
	Total	**240**	**100**
Number of windows	No	15	6.25
	2	101	42.08
	≥3	124	51.67
	Total	**240**	**100**
Source of illumination	Natural	221	92.08
	Electric	12	5
	Other	17	2.92
	Total	**240**	**100**

4. Availability of latrine and refuse container

As the result table eight below shows, the majority of the households use simple traditional pit latrines which is 204995.32%) and the rest 4(1.87%) and 6(2.8%) household were use VIPL and pit like dutchlatrines respectively. The rest 26(10.83%) of households do not have latrines so that they used other means of excreta disposal such as open defection, shared with neigh boyhood and communal pit. Among latrine availability, 191(89.26%) were functional, 23(10.74%) were non functional due to odor problems 7(30.43%), 4(17.39) due to filled and 12(52.18%) due to structural damage.

Table 8. Availability and types of latrine of Nada town households

Characteristic	Variables	N<u>o</u>	%
Latrine availability	Yes	214	89.17
	No	26	10.83
	Total	**240**	**100**
Types of available latrines	Simple Pit latrine	204	95.32
	VIPL	4	1.87
	Other	6	2.81
	Total	**214**	**100**
Option for families haven't latrines	Open defecation	13	50
	Neighbor hood	6	23.07
	Communal	7	26.93
	Total	**26(10.83)**	**100**

Table 9. Functionality of latrine present in nada town households

Characteristic	Variables	N<u>o</u>	%
Current status of latrines	Functional	191	89.25
	Non-functional	23	10.75
	Total	**240**	**100**
Reason if not functional	Odor	7	30.42
	Filled	4	17.39
	Structural damage	12	52.18
	Total	**23(10.75)**	**100**

Latrine facility was not statistically associated with both monthly per capital income and educational status of households with p value > 0.1.

Table 10. Latrine availability with economical status of Nada town households

	Latrine availability		Total	P. Value
	Yes	No		
<200	86(90.5)	16(11.05)	102	
200-400	66(63.31)	5(7.69)	71	(df=4)
500-700	30(29.42)	3(3.57)	33	x^2cal=4.63
800-1000	21(9.62)	1(2.4)	22	P>0.1
>1000	11(10.7)	1(1.3)	12	
Total	214	26	24	

Table 11. Availability of latrine with educational status of Nada town households

	Availability of Latrine		Total	P. Value
	Yes	No		
Illiterate	109(107.89)	12(13.12)	121	(df=1)
Literate	105(106.12)	14(12.89)	119	x^2cal=0.06
Total	214	26	240	P>0.1

Table 12. Solid waste storage facility for Nada town households

	Variables	Nº	%
Presence of containers for on site storage	Present	115	42.92
	Not present	125	52.08
	Total	**240**	**100**
Kinds of container used for storage	Sack	90	78.27
	Cartoon	14	12.17
	Basket	6	5.22
	Other	5	4.34
	Total	**115**	**100**

As figure three below indicates out of households practice onsite storage of solid waste, majority of them 90(78.28%) were uses sack. The rest 14(12.17%), 6(5.22%) and 5(4.34%) were uses cartoon, busket and other such as plastic and metallic bin respectively as storage materials.
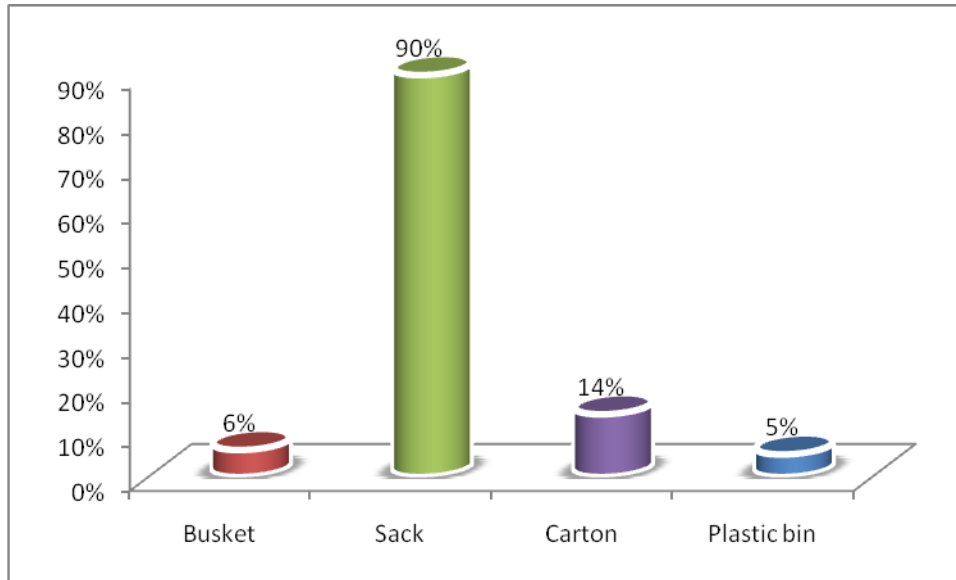
Figure 3. Solid wastestorage facility for households of Nada town

Regarding to solid waste disposal methods of household, majority of households practice unsafe waste disposal methods such as open dumping (open filed) 165(68.75%), 23(9.58%) burning in the street and 22(9.17%) burning in the com pound. Out of assessed households, only 30(12.5%) households use pit as safe disposal methods solid of wastes. Generally no vehicle facility for transportation of solid waste.

Table 13. Refusal disposing facilities of Nada town households

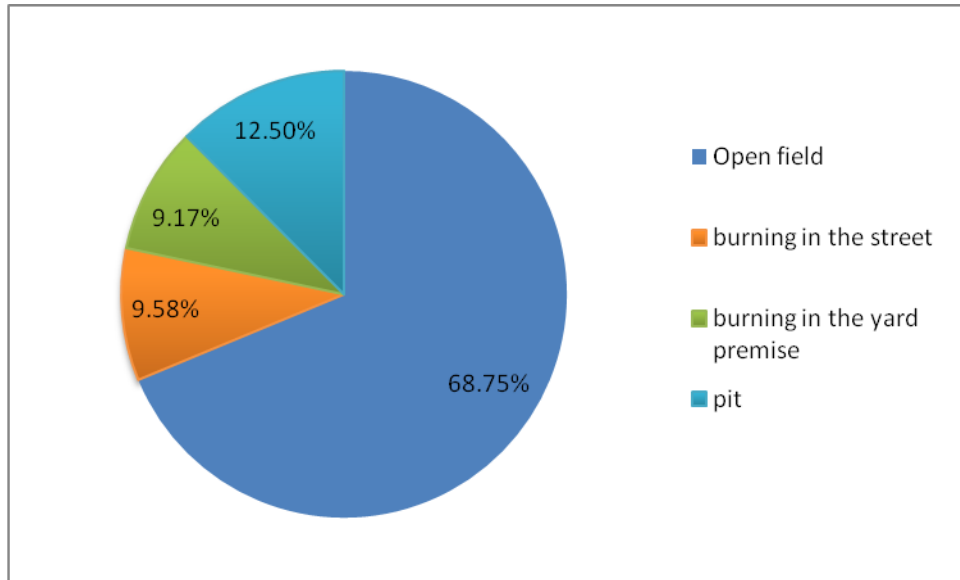|	**Variables**	**N°**	**%**
	Present	-	-
Availability of vehicle that transport to disposal site	Not present	240	100
	Total	**240**	**100**
	Open field	165	68.75
	Burning in the street	23	9.58
Types of refuse disposal facilities used	Burning in compound	22	9.17
	Pit	30	12.5
	Total	**240**	**100**

Figure 4. Solid waste disposal practice among households of Nada town

CHAPTER SIX

DISCUSSION

Socio-economic and demographic characteristics

Infant and child mortality have long been used as indicator of level of socio-economic development of a nation. In developing countries particularly in Sub-Sahara an Africa, infant and child mortality stillest and at high level. This situation is similar in Ethiopia that may associated with demographic, socio economic and environmental factors such as overcrowding. (8,18).

In these assessment from a total of 240 study population, 121(50.42%) were illiterate, 20(8.33%) were read and write and the rest 99(41.24%) were learn formal education. So as the result indicates, the majority (more than half) of households were illiterate. The average monthly income of most of the households were less than 200 birr. The family size per household is greater than 5, the average family size of the household in Ethiopia.

A similar study that were conducted by Faris etal in the inhabitant of Jimma town shows that those who get less income and low educational status tend to live in crowded area and have poor sanitation facility.

Water

One of the most important benefits of water and sanitation are is by providing barriers to transmission of disease from environment to the human body of diarrheal disease (20). In this study, 26(10.83%) were got water from tap inside the compound, 30(12.5%) were from neighborhoods and 125(52.08%) were from public stand pipe. 22(9.17%), 13(5.42%) and 24(10%) house were got water form protected spring, unprotected spring and protected well respectively. According to the result indicates more than 70% of assessed households got their water from protected pipe water.

In contrast to study done by Wondimagegn, the majority (76.5%) of people in Jimma town, in which water treatment plant is available, use unprotected source. Even though the water they obtained were from protected source, the quantity they need and got is not enough because the

fear of payment at institution, limited time of supply, lack of enough water source available in the town and in accessibility to exist water source due to walking distance to fetch.

On water consumption rate, the majority of households 172(71.67%) were used between 20-24 liters of water per households. The rest 40(16.66%) were use between 41-60 liters, 15(6.25%) were between 61-80 liters and 13(5.42%) households were use >81 liters of water per households for both personal and food preparation purpose. Generally the water consumption rate of households were low when compared with family size of households and did not met WHO recommended guide line which is the average daily requirement of water for both personal hygiene and consumption of water is 20 liter per person per day.

Regarding to water withdrawal practice, majority of households 222(92.5%) were practiced pouring due to the narrower of the storage materials of water. This is particularly important for the prevention of diarrheal disease. The rest 18(7.5%) households were practiced dipping system.

This is similar study with that done in Keffa Sheka zone, in 1997 showed that the prevalence of diarrhea was significantly higher in children coming from storage containers by dipping (18%) than those were water is obtained by pouring (12%). (13)

Housing Condition

Housing also intimately related to health. The structure location, facilities, environment and uses of human's shelter have strong impact on the state of mental, physical, and social well being. In developing countries households are small, crowded and poorly ventilated. (6)

The result of these assessment pointed out that 150(62.5%) were private house, 90(37.5%) were rented house. The flooring materials, 220(91.67%) were earth, 15(6.25%) were concrete and 5(2.08%) were tile. Roof and walling materials were respectively, 230(95.84%) were CIS 10(4.16%) were thatched roof and 224(93.33%) were wood with mud and the rest 16(6.67%) were brick/block. But from observed results, there is a good ventilation system house with two or greater than windows 225(93.75%). This is because since the majority of the household greater than or equal to two class room, they had ≥2 windows due to the fearing of darkness and

suffocation. 15(6.25%) houses had no ventilation system and 18(7.5%) houses had no separation room (i.e., the sleeping, the dinning and the sitting rooms are the same).

Latrine and solid waste containers availability

In adequate and insanitary human waste disposal pollute an environment, water source and the final is the human ill or disease. It is important to use latrine and sanitary facility for prevention of gastro intestinal disease. (9)

Regarding to extretal disposal, the results showed that 214(89.17%) houses had latrine facility and 26(10.83%) houses had no latrine facilities. Out of latrine available, 204(95.32%) were simple traditional pit latrine, 4(1.87%) were VIPL and the rest 6(2.8%) were pit without slap (i.e use hole in the ground for excretal collection) and ditch or bush. Other means of excretal disposal for family haven't latrines were open defecation 13(50%), sharing with neighborhood 6(23.07%) and communal latrine 7(26.92%). The reason for family haven't latrine were financial problem, due to house rented and lack of space to construct.

Concerning the functionality of latrine, 19(89.25%) were functioning and the rest 23(10.75%) were not functioning due to odor 7(30.43%), structural damage 12(52.8%) and due to filled 4(17.39%).

In similar way the results shows the hygienic of latrine was not well kept that means the surrounding is dirty, fecal matter around pit, odor problems files infestation around pit etc.

This is similar study done incidence Tigray, that shows using open pit latrine was significantly associated with increased in cadence of overall under 5 morbidity were related to the advantages of open pit latrine as permanent breeding site for flies and source of bad odor.

Another study, which was conducted in Ghana's Volta region on 217 households, only 9% had access to latrines. The rest were defecating anywhere in vicinity of villages (2).

Concerning solid waste disposal method, the results showed that majority of households 210(87.5%) practice unsafe waste disposal methods such as dumping open field, burning in the street and in compound. Only 30(12.5%) households practice save disposal method of solid waste such as refusal pit. No vehicle collection facility at all.

A similar study done in Ghana's Volta region on 217 households indicates that refuse collection bins or boxes were available to 29% of the interviewers. There were no proper waste storage facility and no designed refusal disposal sites. (2)

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATION

Generally as a result obtained from observation indicates, the majority of assessed households were illiterate, the monthly per capital income of households were low, the ventilation system of the house were good and almost water source for households were from protected source. But the utilization of water for both personal hygiene and consumption purpose were low when compared to family size. Solid waste disposal methods were almost unsanitary/unsafe methods such as dumping in open field and burning in the street and in compounds. Based on the findings of this study, the following recommendations were forwarded.

1. The health sector of Omo Nada town, the municipality of town, sanitarian and the administrators should give special attention to the distribution of water and sanitary facilities.

2. Intersectional collaboration with other sectors like NGOs to improve sanitary condition of town and water supply.

3. Education about sanitation and water should be given for the community to create awareness how to handle the waste and water properly.

4. There should Involvement of community in planning, implementing, monitoring and evaluation of water and sanitation projects

Limitation

The assessment was cross sectional study, resource and time limitation forced the detail integration since availability and utilization of water and sanitary facility in sanitation condition needs to be conducted for long period of time.

ANNEXES-I-

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ANNEXES-II-

1.2. Questionnaire

Part One: Socio-Demographic Data

Region _____Woreda_____Kebele_____Hous N$^{\underline{o}}$

Name of the head of house hold _____

Sex_____   Age_____

1. Religion

      1. Orthodox☐   2. Muslim ☐

      3. Catholic ☐   4. Protestant☐   5. Other _____

2. Educational Status

      1. Read and write☐   2. Illiterate☐

      3. 1-4 grades☐   4. 5-10 grades☐   5. 10^{+}☐

3. Occupational status of household

      1. Government employ ☐   2. Merchant☐

      3. Un employed/ daily laborer☐   4. Tella Seller ☐

      5. Carpenter☐   6. Black smith☐   7. Farmer☐   8.Other _____

4. Family size_____

5. Monthly per capital income of household members _____

Part Two- Structure and condition of house:

Housing ownership   Private _____ Rented_____

1. Material constructed

      1. Thatched roof ☐   2. CIS☐   3. Other/ Specify _____

2. Types of walling

       1. Wood, mud with plastic☐ 2. Brick/blocks/Stone☐   3. Other/Specify_____

3. Floor materials constructed

     A. Earth☐   B. Lumber

     C. Concret/tile, brock   D. Other/Specify

4. Number of classroom

     A. 1☐   B.2☐   C.3☐   D.4☐   5.>4☐

5. Ventilation system N^o of windows

     A. Cross ventilation☐   B. though ventilation☐

     C. One way ventilation☐   D. No window☐

6. Source illumination

     A. Electric☐   B. Spirit lamp/kurat☐

     C. Wood☐   D. Natural☐   E. Others/specify--------

7. Kitchen

     Is there kitchen?   A. Yes☐   B. No☐

     If yes sight of kitchen

     A. Detached from house☐   B. Attached to house/within the house☐

8. If no, where does the family prepared food?

     A. Inside the house☐   B. Open space☐   3. Other/Specify_____

9. General Condition of the house

     A. Good☐   B. Fair☐   C. Bad☐

Part Three: Water supply source distance and time taken to fetch the water

Source of water supply

1. Pipe water

   A. Tap inside the house☐   B. Neighborhood ☐ C. Stand pipe☐

2. Well   A. Protected☐   B. Unprotected ☐

3. Spring   A. Protected☐   B. Un protected☐

4. River/Stream   A. Zoned☐   B. Unzoned ☐

❖ Distance of water source

❖ Time taken to fetch

❖ Daily percaptial the consumption in liter

❖ Water storage materials

     A. Clay pot☐   B. Bucket☐   C. Jaricans☐ D. Barrel☐   E. Other/specify

❖ Have cover storage materials?   A. Yes☐   B. No☐

❖ Methods of water withdrawal

     A. Dipping☐   B. Pouring☐

Part Four: Availability and types of latrine

(Observe the sanitary status of latrine)

1. Do you have latrine?   A. Yes☐   B. No☐

       If yes what kinds of latrine available?

       A. Pitlatrine☐   B. VIPL☐

       C. Water Carriage☐   D. San plant☐   E. Other/Specify___

2. If latrine not available, were do use?

       A. Opedefecation   B. Communal

       C. Neighbors   D. Other/Specify_____

❖ Is there space available for construction? A. Yes☐   B. No☐

❖ Is it affordable for the family   A. Yes☐   B. No

3. Utilization of available latrine (filling Q(s) is yes)

    ❖ Do the family use latrine always?   A. Yes☐   B. No☐

    ❖ If no, the reason   A. it is filled☐   B. Odor☐

C. No Privacy☐   D. Lack of water

E. Structural damage   F. Other/Specify____

4. What do you thing about the benefit of using sanitary facility

A. Protect people from diarrheal and other disease ☐

B. Reduce nuisance and bad odors☐

C. Prevents chickens and animal spreading human feces☐

D. Save times☐

E. Other/specify _____

Part Five: Solid waste storage, collection and disposal practice

1. Do you use materials for onsite storage?   A. Yes☐   B. No☐

If yes what kinds of container (for storage)

A. Sack☐   B. Buskets☐

C. Cartoon☐   D. Metall☐   E. Other/Specify------

2. What types of refuse disposal facilities do family use?

A. Open field☐   B. Brining in street ☐

C. Pit☐   D. Municipal Collection☐   E. Other /specify_____