

VULNERABILITY TO HEALTH AND HEALTH RELATED PROBLEMS: PLACES AND PEOPLE IN URBAN SETTING OF ETHIOPIA

January 2018



USAID
FROM THE AMERICAN PEOPLE



Disclaimer:

This document is made possible by the generous support of the American people through the United States Agency for International Development (USAID) through John Snow, Inc. (JSI) implemented Strengthening Ethiopian Urban Health Program under cooperative agreement number AID-663-A-13-00002. The contents are the responsibility of JSI and not necessarily reflect the views of USAID or the United States Government.

EXECUTIVE SUMMARY

Background

Less than a decade ago, majority of humankind used to live in rural settings, which has fast changed in recent times. To date majority of the global population resides in urban centers. United Nations projection shows that by 2050, 6.3 billion people would live in urban centers. The pace of urbanization in Africa and Asia in particular is unprecedented.

Improvements in socioeconomic and health exemplified by better literacy and education, life expectancy, better housing and sanitation, access to services, living conditions, food security and better health indicators, and urban settings are becoming the optimal choice for living attracted people to live in urban centers. Yet, such narrative appears to mask the realities of disadvantaged urban quarters with vivid destitution and compromised health.

The poor in urban quarters face multitude of social and economic challenges and are subjected to compromised socio-economic indicators and facilities as compared to the rich in the same urban setting. To date, a third of urban residents in Africa and Asia reside in slum settings and this proportion is increasing at an alarming rate. Residents of such quarters of urban settings are vulnerable to infectious diseases such diarrhea, HIV and TB.

Ethiopia is one of the most populous countries in Sub-Saharan Africa with increasing population size although the proportion of its urban residents is relatively low as compared to the rest of Africa. Currently, 19% of the population resides in the urban areas. With the current pace of urbanization, 42% of Ethiopians are estimated to live in urban settings by 2050.

Even with the limited level of urbanization, state of urbanization in Ethiopia is characterized by widespread unemployment, poor housing, and overcrowding in some sections of urban setting. Recent World Bank estimates indicate that 70-80% of urban population in Ethiopia lives in settings characterized as slum.

This particular study aims to assess and define the profile of vulnerable quarters of selected urban centers; identify perceived health needs of selected vulnerable sections of the towns, define barriers to health services use and challenges of health facility in providing services to vulnerable section of the population in vulnerable settings.

Methods of the study

Mixed study design was employed to respond to the specific objectives of the study. Survey was used to develop profile of vulnerable quarters of urban settings, characterize vulnerable groups in the study settings, and identify felt health problems. Qualitative method was employed to explain barriers and explore challenges of health service provision at health facility level.

The study was carried out in JSI SEUHP supported urban centers of five regions (Amhara, Oromia, Tigray, SNNP and Harari) and two city administrations (Addis Ababa and DireDawa). The study particularly targets 115 vulnerable sections of urban centers in selected operational towns.

Initially rapid assessment was carried out to determine vulnerable sections of urban settings of the study centers based on whether residents are believed to have increasing exposure to hazards and have limited coping capacity.

Residents in quarters identified as vulnerable were randomly selected and interviewed to generate data on household, socio-economic, health related variables such as diarrhea, PNC, and delivery characteristics. Representatives of local government administrations, regional city administrations, representatives of NGOs working in the area, associations/societies in the study areas and health extension workers were engaged to generate evidence on barriers to service use and challenges to health service provision. Household heads with mental health problems, household heads below 15 years of age, and those who resided in the area for less than six months were excluded from the study.

Selection of participants followed EAs with roughly 200 HHs in each selected sites such that the vulnerable sections would have one or more EAs. From each EA, 20 HHs were chosen following CSAs procedure. If the size of the vulnerable section is less than the size of EA, a smaller number of HHs were selected. The definition of HHs in vulnerable sections was adjusted to contexts where more than one HH may live under one roof (in which case they are more than one HH), some may live on permanent location on street, some under temporary shelter, etc., and sampling took all these into account. Accordingly, from a sample of 20 HH per vulnerable section, 1220 respondents participated in the study.

Survey data was summarized using descriptive statistic and associations between felt needs, service provision, perception among residents etc. were determined using a chi-square test. Qualitative data was analyzed using open code software. Themes and sub-themes were developed in line with the objectives of the study. Findings from different sources were triangulated and interpreted in responding to the objectives of the study.

Different steps followed for quality assurance of this assessment. Data collection tool for the survey was developed following the objectives of the study that was further refined following training of data collectors and pre-test of the tools in one of the Woredas in Oromia that was not included in the study. Similarly, a qualitative checklist that was developed following the objectives of the study was shared with colleagues along with the objectives to verify consistency of the tools. During data collection, close supervision and spot checks were carried out by co-investigators. During data analysis, data was screened for completeness, cleaned for outliers, unexpected values, and errors ensuring quality and consistency.

Ethical clearance was obtained from the research ethics committee of the Department of Preventive Medicine, School of Public Health, at Addis Ababa University. Official letter was taken from the University to the respective towns to obtain permission and respondents were informed of the objectives of the study, benefits, and confidentiality measures. All participants agreed to participate and provided information.

Findings

a) Characteristics of the vulnerable sections of study settings:

i. Places

Respondents categorized their habitat as slum, semi-slum or non-slum based on such criterion as overcrowding, limited private water point, widespread solid waste and lack of liquid waste disposal, more in migrants and main means of livelihood is not regular job. Nearly, 55% of the respondents agreed that their residential area fit in the category of a slum while 34% felt their settings were semi-slum. Of the respondents however, 11% felt that their living quarter was not a slum.

Vulnerable quarters of urban centers were found to be relatively small in terms of both land and population size. Population size was roughly estimated at a range 240 to 17,000. This shows that the vulnerable quarters within urban center ranges from a small village in some towns to the whole kebele in others. However, the location of such vulnerable quarter was found to be haphazard with no uniformity of location found anywhere in urban setting but with common features as slums.

Housing conditions in vulnerable quarters of study setting were found to have roofs from iron sheets (97%), and thatched roofs (2%). The latter were exclusively from the Amhara and Oromia regions. Plastic roofs were not common where 1% of the HHs reported plastic roof from Harar city and Dire Dawa.

Majority of the houses in vulnerable quarters (58%) were found to have mud or sand floor, while concrete floor accounted for 39%. While mud or sand floors were relatively common in Dire and Harar, concrete floors were found common in Addis (69%) and Oromia (70%). Findings show that wall of the houses in vulnerable quarters of the study settings were mainly from mud (92.6%), from mud brick (14%) and wattle covered with mud (78.5%), handmade brick. Iron sheets and masonry were found to be used as walls in 3.5% and 3.9% of the houses respectively and ordinary stones were common in Tigray and at times in Dire Dawa.

Due to lack of separate cooking spaces, 21% of the respondents were found to cook within the same house they live in. This is particularly common in Harar (64%), Addis Ababa (30%), and Tigray 25%).

Findings on infrastructure revealed that 5% of the households in vulnerable quarter do not have electric power, 52% do not have proper roads, 89% of respondents reported to use tap water while 9% of these use water from communal water points. Health facilities are available in all study settings with an average distance 18 minutes from the household although residents in Amhara, SNNPR and Dire Dawa are relatively at a distant from facilities.

Sixty eight percent of the respondents do not have functioning sewerage system. Finding on availability of latrine in vulnerable quarter of urban centers was found encouraging with 91% of the HHs reported to have latrine. Relative limitation of latrine was reported to be the case in Dire Dawa where 74% of residents; Adgrat, Hawassa, and Woldiya with slightly more than 50% of HHs with no functioning

latrines. The most common types of latrine reported were unimproved latrine (71%) and traditional improved latrine (23%).

Disposal of liquid and solid waste was found challenging in all vulnerable quarter of the study settings. Findings shows that 54% of respondents reported spillage in open fields, spill to dug pit (19%) and discharge to sewerage pipe (15%). Six solid waste disposal methods were found to be commonly practiced among respondents in the study setting; on-site storage and collection by municipality for disposal, disposal in open field, and burning in order of priority were reported by 84% of the respondents.

ii. Characteristics of residents

Two third of the respondents were found to be migrants who were born and raised in other places and came to their current residential quarter. Forty five percent of the migrants were in the age group of 25-44 years while 7% were found to be young people aged 15-24. There was major difference in proportion of migrant's sex.

Basic necessities of life such as clothing, food, and health care were found to be common problems of residents. The main source of livelihood was found to be petty trade (44%), salary from long-term employment (22%) and daily labor (16%).

Finding shows that 86% of residents in vulnerable quarter of the study settings do not treat water after collection and before use it for drinking purpose regardless of its source. However, marked difference was found between study settings. Fourty eight percent of participants from Batu, 38% from Mekelle, 33% from Adama, 25% from Addis Ababa, and 20% from Dire Dawa were found to treat water before using in order of their weighted average. Finding on hand washing after visiting toilet and before eating was found to be as low as 27% and 34% respectively.

b) Felt health needs

Findings on perceived prevalence of diseases among adults in the vulnerable quarter of the study settings show prevalence of non-communicable diseases such as kidney, hypertension, and heart problem; infections and other communicable diseases was found to be 29.2%, 27.6% and 20.5% respectively. History of adult mortality was found to be 8.4% during the last two years. These were attributed to kidney, hypertension, and heart problems. There were variations between regions in terms of perceived prevalence of of disease and cause of death.

One month prior to the survey, 32.6% of the household members encountered illness episode. Respondents from SNNPR encountered highest episode of illness (47.5%), while the lowest is in the Tigray region (17.3%). Overall, among those who encountered illness episode during the last one month, 44.5% visited health center followed by hospitals (36%). Visits to health centers range from 65.2 % in Harar to 26.5% in Tigray and visit to Hospital ranges from 59.3% in Tigray to 18.5% in Dire Dawa. About 10% of the participants reported to have visited traditional healer.

Regarding child health, acute respiratory infection (30%), diarrhea (29%) and fever (20%) were invariably perceived as prevailing health problems. Two weeks preceding the study, 7.6 % of children in vulnerable quarters reported to encounter diarrheal disease. Subsequent actions taken shows that 58% were given the same or less amount of drinks while 26.5 % were given more drinks and 4.8% remained the same. Food provision shows that 13.3 % eat much less and 70% eat the same while the remaining proportion were given more than usual to eat during the incident of diarrhea.

Access to health education for members of the community was found to be widespread. However, there were differences across regions where 71% of respondents from Addis Ababa 73.7% from Tigray and 54% from Amhara reported to benefit from health education, while in the remaining regions less than 50% benefitted from health education.

Study participants expressed satisfaction with physical availability of health facility within their residential vicinity. However, there is common dissatisfaction with availability of treatment (drugs) and medical equipment. Respondents pointed out that 19.5% obtain medicines from the facility while 78.8% are instructed to buy drugs from pharmacies..

It was reported that 68.6% of births are attended by skilled birth attendants in health facility, majority being in a public facility (hospital and health centers) and 3% in private facilities. The overall proportion of delivery assisted by skilled birth attendants in health facility ranges from 47% in Harar to 85.6% in Addis Ababa. Finding revealed that 31.4% of women delivered their recent child at home. Home delivery is as high as 52.8% in Harar, 38% in DireDawa and SNNP and about 30% in Amhara, Tigray, and Oromia regions.

Findings on postnatal care reveals that 32 % of babies received the first checkup within an hour of delivery, 19% in about 2 days and 24% within a week after delivery.

c. Barriers and challenges in use and delivery of health services

Qualitative evidence revealed that barriers to meet felt health needs were unanimously reported at individual and institution levels. At individual level such barriers as lack of awareness about health problems and poverty as explained in terms of non-sustainable livelihood were major barriers to use of available services. Limited access to safe water and lack of toilets at household levels were also found to be barriers to service use.

Institutional level barriers were documented to include lack of supplies and equipment at facility levels, lack of free medical services, long waiting time at facility level and unfriendly health service provider. These barriers were found to be common in all the study settings. Although those who cannot pay get letter from their kebele, this was not readily acceptable to warrant services to the clients at facility level. Physical setting related barriers were identified to include over crowdedness, lack of access roads to the main road, left over construction materials that block roads for ambulances, liquid and solid waste disposal, and lack of public latrines or lack of sanitation for communal latrine were identified to affect healthy living of residents in vulnerable quarters of urban settings.

Characteristically, those who live in vulnerable quarters are mobile and do not have evidence of permanent residence such as identification card. As a result, they are neither well integrated with the local community nor benefit from availability of facilities. They often visit or are escorted to health

facilities when the problem get complicated. Besides, the level of awareness about health is so limited and awareness building efforts did not fruit for the fact that they do not attend the sessions due to competing priorities related to livelihood.

Institutionlevel challenges to provide services were related to limitations of human resources, inconsistency in availability of supplies and failure from clients to appreciate the burden of health staff. Participants at health structure in study settings consistently reported limitation in the number and mix of health professionals to meet growing health demands of clients. Although requests are presented to higher authorities, respondents complained that, there has never been satisfactory response to improve number and mix of human resources as well as supplies and equipment.

Interpretation of results

Findings from this study offered useful insights on vulnerability of places within urban settings and its residents. It was clear that risk of exposure to illness causing factors is widespread in the study settings and residnets characteristics facilitate vulnerability. Study finding helped to characterize vulnerable quarter of urban settings and its residents. Vulnerable quarters of urban settings and its residents were found to share common characteristics. It was found that places in vulnerable quarter are characterized by overcrowding, poor housing explained in terms of floor, wall and ceiling materials, poor sanitation, lack of clean water and toilets and lack of access road to the main road. Use of single room as a living room and for kitchen, and the fact that residents are mainly immigrants from other places are also challenges identified. These factors exposed and facilitated vulnerability to health problems and subjected adults and children to different health problems.

Non-communicable diseases such as kidney, hypertension, and cardiac problems are common among adults while acute respiratory infections and fever were common among children. Lack of limitaiton of necessary resources subjected residents to the consequences of prevailing health problems.

Health services are accessible in vulnerable quarters of the study settings while inconsistent supplies and equipment as well limited number and mix of health professionals are major challenges at facility level. Use of such services as ANC and PNC is not encouraging. Still about a third of women deliver at home in urban settings where awareness is believed to be better and service is accessible.

Conclusions

This study reveals that vulnerable quarters and residents are haphazardly distributed in urban settings. There is no uniform distribution and placement of such quarters. Yet, vulnerable quarters and residents in all urban settings share common characteristics.

Exposure to prevailing health problems and being subjected to the problem is common in all study settings. Common factors facilitating exposure to subjecting residnets to the problem includes poor housing, poor sanitation, hygiene, poor avialbility of clean water, toilet, compromised job opportunity, social segregation, weak coping mechanisims, and road access. Majority of residents in such quarters migrated to respective urban settings from other places. They are poorly integrated with community, often without identification card and without sustainable livelihood. Catering for such residents with

prevailing non-communicable diseases and communicable infections remains challenging. Despite accessibility, health facilities lack persistent supplies and medical equipment as well as type and mix of health professionals commensurate to demands. Existing professionals at times are not respectful of clients, discouraging from using the services.

Recommendations

Finding clearly depicts that vulnerable quarter of the study settings are evident with prevailing non-communicable diseases (kidney, hypertension, and heart problem); infections and other communicable diseases. Such vulnerability has to do with type of housing, access to amenities such as water, waste disposal system, lack of improved pit-latrines, quality of housing, descent living and cooking space, sustainable livelihood, and access roads. Addressing such problems require concerted effort by different sectors for prevailing problems are beyond the mandate of health sector. Coordination and clarification of roles of such stakeholders as housing, water and sewerage and road authority may improve the current state in vulnerable sections of urban settings.

Distribution of vulnerable quarters within urban center is haphazard. Similarly, residents are mobile due to lack of sustainable livelihood option. In view of this, interventions may miss important quarters and its residents. Thus, future intervention may contribute to healthy urban living if specific vulnerable quarters distributed in different part of urban settings and its residents are targeted.

In view of the prevailing health problems in vulnerable quarters and growing demand, health facilities are expected to be prepared with supplies and equipment as well as type and mix of human resources.

Finally, the research team realized dearth of literature on urban health. There are not many studies and documentation on urban health. This is a major limitation to draw feasible plans as well as to identify gaps in existing interventions. Thus, government as well as donors should give attention to collect, collate and share evidence on urban settings for policy and strategic focus on vulnerable sections.

ABBREVIATIONS /ACRONYM

AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal Care
EDHS	Ethiopian Demographic Health Survey
FGDs	Focus Group Discussions
GIS	Geographic Information System
HEP	Health Extension Program
HIV	Human immunodeficiency virus
JSI	John Snow Incorporated
NCDs	Non Communicable Diseases
SDH	Social Determinants of Health
SSA	Sub Saharan Africa
STDs	Sexually Transmitted Diseases
TB	Tuberculosis
UHEP	Urban Health Extension Program

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
Background.....	ii
Methods of the study	ii
Findings.....	iv
Interpretation of results	vii
Conclusions	vii
Recommendations	viii
1. BACKGROUND.....	1
1.1. Introduction.....	1
1.2. The Context in Ethiopia	3
1.3 Rational for the study.....	5
2. OBJECTIVE	7
2.1 General objective	7
2.2 Specific objectives.....	7
2.3 Expected Outcomes (Annex IV)	7
3. METHODOLOGY.....	8
3.1 Study setting	8
3.2 Study design	8
3.3 Study population.....	8
3.4 Exclusion Criteria.....	8
3.5. Study variables.....	9
3.5.1 Dependent variable	9
3.6 Method of data collection and analysis	10
3.6.1 Qualitative Approach	10
3.6.2 Quantitative Approach.....	11
3.7 Data Analysis	14
3.7.1 Quantitative	14
3.7.2 Qualitative approach.....	14
3.8 Quality assurance	14
3.9 Ethical considerations.....	15
4. RESULTS.....	16
4.1 Profile of vulnerable sections	16

4.1.1 Socio-demographic characteristics of respondents.....	16
4.1.2 Profile of Places.....	18
4.1.3 Characteristics of respondes.....	19
4.1.4 Infrastructure.....	23
4.2 Livelihood characteristics.....	28
4.2.1 Migration.....	28
4.2.3 Occupation of respondents and household income.....	32
4.2.3.1 Cooking Fuel.....	34
4.4 Felt problems and health concerns.....	34
4.4.1 Felt health problems.....	34
4.4.2 Health related concerns at urban vulnerable sections.....	36
4.5 Prevailing health problems.....	36
4.5.1 Common prevailing health problems at household.....	36
4.6 Morbidity and Mortality at urban vulnerable quarters.....	39
4.6.1 Common childhood problems at households.....	42
4.7 Availability and use of health service.....	45
4.7.1 Maternal health service.....	47
4.7.2. Health education service to Household.....	50
4.8 Satisfaction with health service.....	51
4.9 Support expected at urban vulnerable sections.....	52
4.10. Perceived barriers to health service provision among residents of the vulnerable section of urban center.....	53
4.11 Challenges in providing health service to selected vulnerable sections of the towns.....	56
5. DISCUSSION.....	60
6. CONCLUSION.....	67
7. RECOMMENDATIONS.....	71
8. REFERENCES.....	74
ANNEXES.....	77
Annex I: Selected Cities and vulnerable sections.....	77
Annex II: Routes for data collection.....	79
Annex III: Qualitative data collection plan.....	80
Annex IV: Outcome, data source and approach by objective.....	81
Annex V: Map of study area.....	82

Annex VI: Work Schedule.....	83
Annex VII: Participant’s information sheet.....	84
Annex VIII: Consent form	85
Annex VIII: Vulnerability Assessment tool	86

Tables and Figures

Table 1 Age of respondents by sex	16
Table 2: Education of respondent by marital status.....	17
Table 3: Socio demographic characteristics of the participants.....	18
Table 4: Respondents defining their residence.....	19
Table 5: Characteristics of respondents by age	19
Table 6: Main materials used to construct roof, wall and floor of the house by region.....	20
Table 7: Location of Kitchen or cooking place for the household.....	22
Table 8: Respondents hand washing experience during home activities	24
Table 9: Presence of sewerage in vulnerable quarters	25
Table 10: Access to road by type of road and region.....	28
Table 11: Residents length of stay in the village by migration condition of residents	29
Table 12: Reasons for migrating to the current location by sex.....	30
Table 13: Items that are most difficult to fulfill	30
Table 14: Items that are most difficult to fulfill by occupation (%)	31
Table 15: Percentage of respondents owning household items	32
Table 16: Occupation of respondent by sex.....	32
Table 17: Main economic sources of respondents by sex and descriptive statistics of monthly income of HH ..	33
Table 18: The most felt health problems at urban vulnerable health sections in Ethiopia, 2017.....	35
Table 19: Prevailing concerns related to health at vulnerable quarters in Ethiopia, 2017.....	36
Table 20: Prevailing health problems mentioned at urban vulnerable sections of Ethiopia, 2017.....	38
Table 21: Tuberculosis case and treatment at urban vulnerable section households in Ethiopia	42
Table 22: Diarrheal problem and its management among children’s at vulnerable sections in Ethiopia	45
Table 23: Presence of Health facility in the vulnerable quarters by region	46
Table 24: Place of delivery among urban vulnerable sections in Ethiopia, 2017.....	47
Table 25: Maternal delivery experience and postnatal checkup at urban vulnerable sections in Ethiopia, 2017	50
Table 26: Child health checkup practice after delivery at the urban vulnerable sections of Ethiopia, 2017	50
Table 27: Satisfaction to health service and access to medical drugs at the urban vulnerable sections in Ethiopia, 2017	52
Table 28: List of towns by level of shelter deprivation.....	64

Figure 1: Conceptual Frame work.....	5
Figure 2: View of houses where the poor live within a city. Several people live in the same room.....	22
Figure 3: Waste at market place and open ditch filled with water and dirt in one of the study setting in Addis Ababa	26
Figure 4: Morbidity among adults in the urban vulnerable section households.....	39
Figure 5: Death among household members at urban vulnerable sections in the last three (2014/2015 to 2016/2017) years.	39
Figure 6: Perceived causes of death during the three-year at vulnerable quarters of urban settings in Ethiopia.....	41
Figure 7: Common child hood illness at vulnerable quarters of urbanc ented in Ethiopia, 2017.....	42
Figure 8: Type of treatment options used for diarrhea at urban vulnerable sections in Ethiopia, 2017	45
Figure 9: Reasons for not to deliver at health facility among urban vulnerable section of Ethiopia, 2017.	48
Figure 10: Access to health education at household level in the urban vulnerable sections, 2017.....	51

I. BACKGROUND

I.1. Introduction

Globally an estimated 54% of the population resides in urban areas in 2014(1). This proportion of urban population is projected to reach 66% by 2050(1). The world is witnessing unprecedented urbanization especially in developing countries with its far-reaching implications(1). For the first time in history, more people are now living in urban settings than in rural areas. By the year 2030, an estimated six out of every ten people will be living in towns, with the most explosive growth expected in Asia and Africa(2).The population in urban areas of Africa and Asia in particular is expected to grow from 1.9 billion in 2000 to 3.9 billion in 2030 (2). The number of slum dwellers in developing countries increased from 689 million in 1990 to 880 million in 2014, according to the United Nations World Towns Report 2016.

This fast expanding urbanization has brought improvements to local economies with improved prosperity of urban areas as compared to rural setups due to economy of scale, concentration of talents, and availability of options for social services and technologies. Improved living conditions with improved income, housing, transportation facilities, education, health services, and social support mechanisms play important role to improved urban health indicators(2).

As such, urban life becomes rich and fulfilling, more diverse, stimulating source of new ideas and new opportunities. Urbanites can for example foster enlightened, congenial, and multicultural living (3). As a hub of economic and social transformations with better literacy and education, life expectancy, improved housing and sanitation, access to services, participation in public affairs, better living conditions, better food security and better health indicators, urban settings are places of choice for living(3). Specific evidence reveals that urban inhabitants enjoy better health on average than their rural counterparts due to evident decline in fertility and infant mortality rates which is linked to various determinants such as improved sanitation and nutrition, and easier access to contraception and health care (4). Throughout the last centuries, marked improvements were recorded in health indicators in urban settings.

Nonetheless, such narrative appears to mask the realities of disadvantaged urban settings and its residents. While urban living has become attractive with improved social and economic indicators, as pointed out above, yet there are still urban settings that are disadvantaged in several fronts and its residents have become increasingly destitute with compromised health. In most African, Asian and South American urban settings inequities are far more as compared with some rural settings(1). It is documented that the few rich reap benefits from urbanization. The poor who do not share the same level of joy regarding access to opportunities remain poorer (4, 5). Urban residents especially those in slum settings are facing multitude of social and economic and are subjected to sub-standard living (5). Available evidence show – a third of urban residents in Africa and Asia reside in slum settings(6, 7). In Africa, the urban population is estimated to grow from 300 million in 2000 to 740 million in 2030(3). Slum settlements in urban settings are the reality of the day particularly in Africa, Asia and South America. This is because urban governance failed to provide affordable housing for the poor and provide social amenities and infrastructures.

Many believed that urbanization is associated with the changing status of an urban area, modernization of rural area, as well as increase in town size. In relation to the impact of urbanization on disease pattern, many associated it with the increment of lifestyle-related diseases and emergencies of new diseases.

In as much as health challenges of urbanization are alarmingly multifaceted, residents in urban slums and their neighbors are characterized by limited social services and facilities including unsafe water supply and sanitation, poor housing structures, crowding and compromised job opportunities(8). This is against claims that urban settings commonly exhibit better health indicators. Relatively old data on child health outcomes from 47 developing countries has shown that the risk of stunting and mortality was 1.4 times higher for urban residents as compared to rural(1). That would challenge the whole endeavor to ensure equity, inclusiveness and accountability to meet universal health care and thereby SDGs(8, 9). Commitments to Universal Health Coverage and SDGs are about improving the living conditions of urban residents. Such global commitments were not rolled out to benefit all urban residents equitably.

Safe water supply and adequate sanitation to protect health are among the basic human rights. Ensuring their availability would contribute immeasurably to the health and productivity of development. More than 700 million people still do not have access to clean and safe water for a healthy life. The 2016 United Nations World Water Development Report estimates that some 2 billion people require access to improved sanitation, with girls and women especially disadvantaged.

To date, urban residents in slum settings remain vulnerable to wide range of health problems. With the shift in the burden of illness, urban settings generally face triple threats: infectious diseases like HIV/AIDS, TB, pneumonia, diarrheal diseases; non-communicable diseases like asthma, heart disease, cancer and diabetes; and violence and injuries, including road traffic accidents (4).

The WHO has long recognized the challenges of urbanization to both global and national development agenda. As part of its Social Determinants of Health initiative, the WHO has given attention to urbanization as it may positively or negatively affect places where people grow, live, and work as it creates opportunities for inequities in services including health(8). One of the major concerns in tracking urban settings and determinants of health is the lack of disaggregated evidence. Evidence concerning urban health is not often specific about averages. This is believed to shadow the actual reality of urban health especially for the poor(10, 11).

In order to address such challenges, a global network of researchers for Urban Health Knowledge Network on Urban Settings (KNUS) was formed to synthesize evidence on broad policy and program interventions for healthy urbanization(10). Given urban health is much broader than the mandate of a particular sector, all stakeholders are expected to collect and collate evidence that should be triangulated to provide benchmark for urban planning and intervention. KNUS is designed to engage all those that are operating in urban settings to carry out equity assessments and response tool on a regular basis to monitor and act on health inequity in programming and interventions(7). The assessment draws on the Social Determinants of Health framework that was introduced in 2010(11). It guides the process of local and national stakeholders to identify, prioritize, and track inequities in health in urban settings following selected indicators such as infant mortality, tuberculosis, diabetes, road traffic injuries, safe water, improved sanitation, primary education, full immunization, skilled birth attendance, smoking,

unemployment, and government expenditure on health. Such initiatives were the results from concerns on a lack of evidence to plan and implement urban health equity and inclusiveness.

Such problems are more pronounced when rapid urban expansion is not accompanied with necessary infrastructure and relevant policies to better organize urban governance for healthy urban centers(7) which opens opportunities for expanding slum settings and compromised health status of its residents.

1.2. The Context in Ethiopia

Ethiopia is one of the most populous countries in Sub-Saharan Africa with its fastest urban growth rates in the world (12–14). Despite a low level of urbanization in Ethiopia as compared to the rest of Africa, the pace at which Ethiopia is urbanizing is exceptionally high(14). This is attributed to a relatively high fertility as compared to other African towns and rural-to-urban migration where rural outmigration generates 6% urban population growth rate(14). Currently, 19% of the population resides in the urban areas, which make the country one of the least urbanized countries in the world. However, with its current pace, by 2050, 42% of Ethiopians are estimated to live in urban settings (14).

Rural-to-urban migration is becoming key feature of Ethiopia's development and a contributor to the population growth of urban settings. Migrants constituted almost half of the urban population for the past twenty years and the majority of them came directly from rural areas despite an increase in the urban-to-urban migration. Available reports indicate that such migration in search of opportunities is becoming more of the case than an exception(1, 15). And yet, with such seemingly widespread opportunities, urbanization fails to meet demands of in-migrants as well as that of its residents. Recent reports on the state of towns in Ethiopia reveal that services employ over 60% of employment seekers. This depicts that most jobs in Addis Ababa are in the informal sector and are not commensurate with the steady rural-to-urban migration(16). Access to formal jobs are constrained where 24%of the residents in the city of Addis are unemployed(16).

Such vivid realities are believed to contribute to urban poverty in Ethiopia which is characterized by poor access to social services, insecurity, crime, social segregation and alienation which are typical within slum settings(9).

Housing quality in Ethiopia is considered poor as compared to neighboring countries. It is estimated that 70-80% of the urban population in Ethiopia lives in settings that are believed to be slums(9, 16). Although there are not, yet well-structured studies on the implications of the expanding housing schemes, there are anecdotes that show the housing scheme has posed its own challenges among others to human social connectedness. Unlike their usual place of residence where dwellers take collective actions to jointly counter social challenges, in housing quarters such as condominiums, decisions are made centrally following rules, which were argued to affect the social relations. One of the beneficiaries of such housing schemes reflected his frustrations to an international media as follows -"I miss my friends, my social life, my work," he says. "I have a nice house but no income" (17).

Inequalities in accessing health services and structural issues such as urban poverty, poor sanitary conditions, overstretched infrastructure, overcrowding, and social exclusion creates marked vulnerabilities in residents which result in a wide range of health problems(5). Like the other

counterpart of the developing nations, Ethiopian urban areas are not immune from the major public health challenges leading to numerous health risks. This is believed to be the case even in the new housing schemes.

As part of a series of analytical studies by the Urban, Rural, and Social Development Global Practice at the World Bank, Ethiopia's urban health review has generated useful evidence on the state of urbanization in Ethiopia. Findings show that infrastructure and service delivery jobs remain undermined while formal labor markets are failing to keep up with the demands for employment.

More specific evidence reveals that despite claims that Ethiopia is on track to meet the sanitation targets of MDG, Ethiopia was reported to be one of the countries in Sub-Saharan Africa that not on track to meet the MDG sanitation target(5, 8). Studies that are more recent have reported that only 11% of the population in Addis Ababa's slums and 41.2% of the city's total population had access to improved sanitation. Most people in the urban slums (80.4%) used unimproved sanitation facilities and that 8.2% practiced open defecation(18). The Ethiopian DHS survey of 2016 estimated that 84% of the urban population had no access to improved and private sanitation that 7% were found to practice open defecation(12).

Health hazards such as poor housing conditions and lack of access to safe water and sanitation results in a range of health problems in urban settings. Previous studies have shown that there are people and specific places that are more vulnerable to wide range of health problems(13). However, still there is a paucity of data on urban health profile in Ethiopia and there is limitation in recognizing key obstacles and working on such obstacles. The obstacles including lack of data on urban health are not as much technical or even financial as are related to governance and the organization of civil society (4). In Ethiopia, the urban settings are under municipal structure that often finds it difficult to coordinate the various public sectors that has stake in the urbanization process. Review by World Bank Group recommended that "Policymakers must weigh the long-term costs and benefits when making decisions, as the policies, institutions, and investments put in place now will influence urban systems for years to come"(16, 19).

This study intends to generate evidence on vulnerabilities of specific quarters of selected urban settings and its residents to defined health and health related problems. The rationale for this particular study lies in recognition of the fact that:

1. Urban settings in Ethiopia are not uniform in terms of distribution of services, resource and infrastructure making some quarter and its residents vulnerable to specific health problems in connection to increasing exposure to various hazards
2. Residents in some quarters of urban centers lack proper information and are relatively destitute, are characterized by female-headed households, migrants, street dwellers and petty traders with weak coping capacity against prevailing health problems,
3. Rapid population growth has placed a great strain on basic services and the development of critical infrastructure, which fails to keep pace with the rapidly growing needs of the urban population. This is more important when coordination between different actors is at best poor.
4. With limitation of evidence about urban settings and its residents makes evidence based urban health planning difficult

Hence, this study is expected to map the vulnerability of specific quarters of urban settings in JSI's SEUHP operational towns of Ethiopia, and provide a detailed profile of residents of the vulnerable sections and characterize the vulnerable section in terms of health and other related services. This exercise would provide adequate information on which sections of operational towns are vulnerable and characterize households of study area with key health outcomes. Vulnerability is assessed in terms of risk of exposure, lack of necessary resources to cope and being subjected to the consequences of exposure as specified in the conceptual model below. Moreover, this may help not only programmers but also policy makers to understand the urban settings and dwellers to make evidence based planning and decision-making.

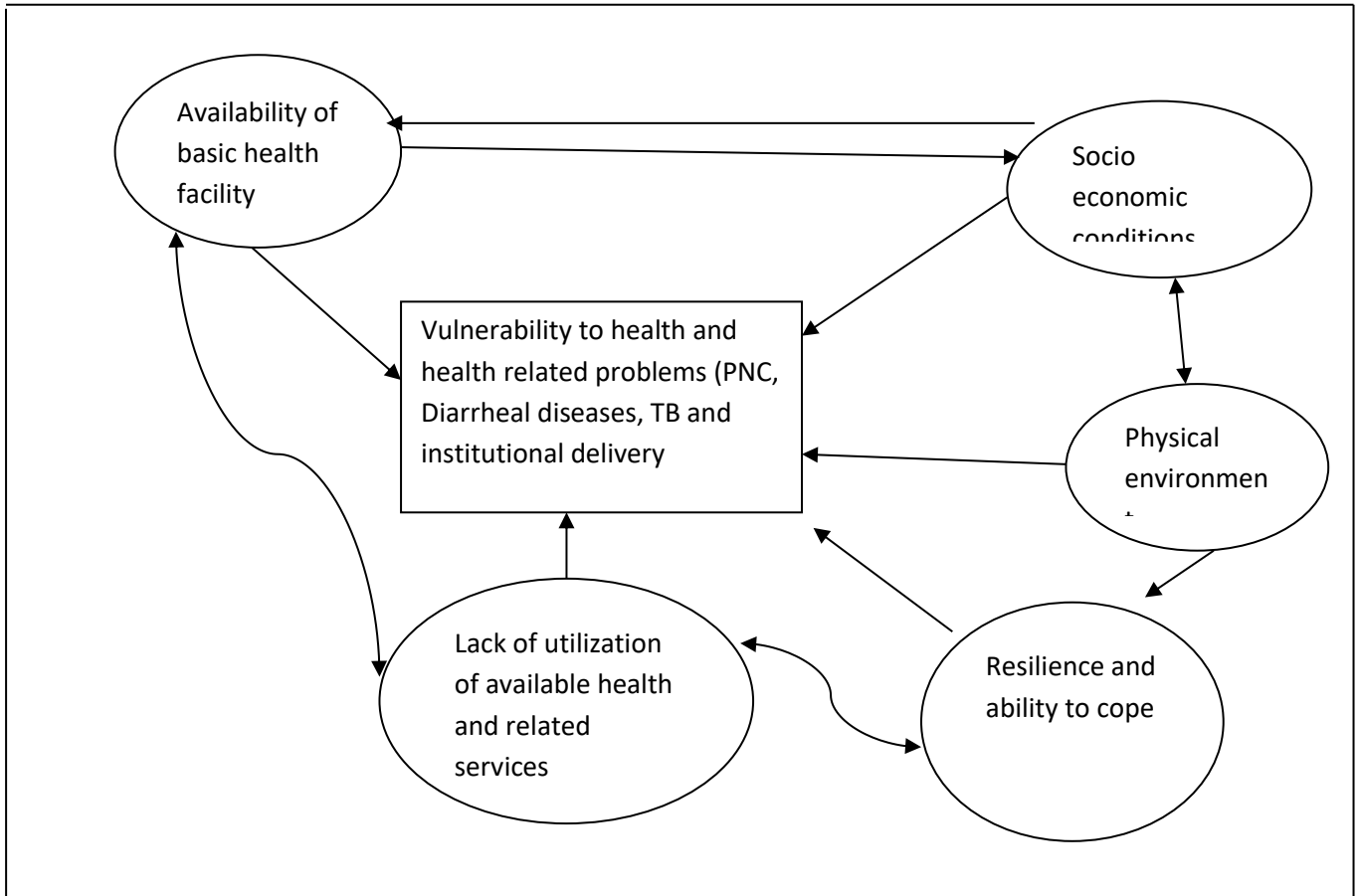


Figure 1: Conceptual Frame work

1.3 Rational for the study

Rapid urban population growth and the socio-economic disparities placed major strain on provision of basic health service, Development of infrastructure and services are anonymously reported to have failed to keep up with the pace of urbanization and its growing population. This study was particularly carried out to pay closer attention to the realities of the health of urban residents. There are three main rationales to this study:

1. Urban residents in developing countries including Ethiopia are more vulnerable to the triple burden of health problems (communicable-infectious, non-communicable and accidents-injuries) understanding who is more vulnerable and why would improve policy, strategic and programmatic interventions
2. Despite the expansion of slums and increasing number of residents in such settings in Ethiopia, there is a limited understanding of the interconnections between those who reside in slums and their health situation and why they reside in such settings. Thus study would shade light on the health state of those who reside in slums
3. To date there is limited information on the health status of the different sub-population groups in urban settings, including the urban poor, female-headed household's migrants and street dwellers. Due to a lack of such evidence, planning to cater for this section of the population remains weak. This study would pave the way for differential interventions informed by evidence

Hence, this study is expected to map vulnerable and risk specific sections of urban population in JSI's SEUHP operational towns in Ethiopia, and provide detailed profile of residents of the vulnerable sections and characterize their health and related services. This exercise would generate useful information on vulnerable people, vulnerable places, their characteristics, and key health outcomes. The outcome of this study would help not only programmers but also policy makers to help them understand the urban settings and its dwellers for evidence based planning and decision-making.

2. OBJECTIVE

2.1 General objective

Characterize vulnerable sections and their residents of selected towns along with factors of vulnerability in Ethiopia

2.2 Specific objectives

1. Characterize and develop profile of vulnerable sections of selected urban centers
2. Identify felt health needs of selected vulnerable section of the towns
3. Identify barriers facing residents of vulnerable urban center to health services
4. Assess challenges faced by health offices and providers in service provision for selected vulnerable section of the towns

2.3 Expected Outcomes (Annex IV)

- Prevalence of Diarrhea, TB,PNC, Skilled Delivery assistance
- List of felt needs of residents and associated factors
- Challenges of acquiring services identified and listed.
- Challenges of providing services to residents and managing them identified and listed.

3. METHODOLOGY

3.1 Study setting

JSI works in 49 urban centers in five regions (Amhara, Oromia, Tigray, SNNP, and Harari) and two city administrations (Addis Ababa and DireDawa). About 115 vulnerable sections of urban centers were identified in the 22 selected towns. The towns were selected to represent the regions.

3.2 Study design

A Mixed design (quantitative and qualitative) was used to explore vulnerable settings and determine factors of vulnerability. Cross-sectional approach was used for quantitative study while in depth interview and Focus Group Discussion (FGD) was implemented for qualitative approach.

3.3 Study population

There are four sets of study population, each presented as follows:

- Based on a previous study (JSI-AAU report, 2015, and JSI-AAU report, 2016), there are section(s) of urban centers that host populations which are vulnerable to HIV and other infections and who tend to use available maternal health service relatively less as compared to the rest; and who are deprived of infrastructure and other social services. This study will focus on urban sections that are vulnerable to health problems;
 - a. where relatively more migrants reside, a majority of people live in rented houses,
 - b. where access to health services is limited,
 - c. where services such as water, electricity, latrine, etc. are limited or not available,
 - d. where the poor and destitute reside and
 - e. Where relatively more drinking establishments and nightlife prevails.

The above study population was used for the first objective.

- Households in settings identified under 'a' above and termed vulnerable group of people constitute the second study population was used for the third and fourth objectives.
- Representatives of local government administration, regional city administration, representatives of NGOs working in the area, associations/societies in the study areas and health extension offices was the third study population to serve the fifth objective.
- Vulnerable sections of urban centers identified earlier (JSI-AAU report 2016) in all 46 urban centers and nearest HF, water points and public toilets constitute the fourth study population for the second objective.

3.4 Exclusion Criteria

Household Heads (HHs) with mental health problem, household heads below 15 years of age and HHs residing in the area for less than six months were excluded from the study.

3.5. Study variables

The following groups of variables were used in the study. Details about individual variables are included in the tools and were retrieved for analysis. Blueprints that guided the study is also highlighted in the conceptual framework

- Household characteristics
- Socio economic variables
- Selected health related variables such as Diarrhea, PNC, Delivery, etc...

3.5.1 Dependent variable

A number of dependent variables were obtained from the tools, but the following two may stand as most important ones.

- Vulnerability to health outcome
- Vulnerability to health related services
- Access to Health related services
- Proportion of under-five children with diarrhea in the last two weeks
- Proportion of mothers who received skilled delivery assistance for the last childbirth

These variables were developed from health and health related variables that were collected using tools.

Operational Definition

- **Vulnerability:** Insecurity in the well-being of individuals, households and communities due to exposures to health problems explained by prevailing health problems, absence or lack of resources to cope with the problem and being subjected to consequences
- **Slum:** A state of perceived livelihood of residents related to physical infrastructure of their housing condition and surroundings and availability and/or access for basic needs.
- **Service Availability-**The availability to a health related services according to respondents verbal information on impression of the availability, distance, time spent to reach the nearest services location and the money spent on transport.
- **Post Natal Care:** The care provided by health institution to the mother immediately after delivery and the first 42 days
- **Institutional delivery:** Proportion of women who gave their last birth assisted by skilled personnel in health facilities
- **Diarrheal diseases:-**refers to a child with loose or watery stool for three or more times during a 24-hour's period in the household within two weeks period prior to the survey, as reported by the mother of the child.

3.6 Method of data collection and analysis

3.6.1 Qualitative Approach

According to previous study in selected urban settings urban quarters with the following characteristics were defined as vulnerable:

- When quarter of the setting host relatively more migrants
- Residents of vulnerable quarters live in rented houses, sustain precarious livelihood, poor social network and more concerned about their daily survival.
- Access to health services is limited
- Such services as water, electricity, latrine, etc. are limited;
- Drinking establishments are often common

The qualitative approach of this study helped to address the specific objective, 'assess challenges faced by health offices and providers in service provision for selected vulnerable section of the selected study settings', and was used as an input for other objectives (Annex III)..

Besides, data from this source helped to at least explain barriers to felt health services among vulnerable groups.

Research participants

Based on the assumption that population size determines service provision, study towns were divided into three categories. Accordingly, towns were categorized as regional, zonal and woreda towns, since towns in same category have similarities in population size, town development, dominant religion, and possibly other characteristics. Three towns each representing the three levels were chosen for the study in each region. However, woreda level towns could not be obtained for all regions. In each selected town, specific settings that are identified as vulnerable based on previous mapping exercise were considered for data collection. Community opinion leaders, Health Extension Professionals (HRPs), and urban health focal persons in those sites were purposely selected to participate in the study. Details of research participants in the respective region are provided in the table below:

Number and type of qualitative study participants by region

Region	Number of towns/sub-towns	Community opinion leaders	HEWs	Urban health office (UHEP Coordinators/Supervisors)
Oromia	3	6	6	3
SNNP	2	4	4	2
Amhara	2	4	4	2
Tigray	2	4	4	2
AA	2	4	4	2
DD	1	2	2	1
Harari	1	2	2	1
Total (13)	13	26	26	13

3.6.2 Quantitative Approach

3.6.2.1 Sampling Method

Following the identification of specific sections of urban settings as vulnerable to health and other social problems, it was important to study detailed characteristics, risks, access to services and challenges faced by residents in the vulnerable sections of selected towns. To answer the specific objectives, structured survey was carried out in the selected towns. Pre-tested survey tool helped generate household level data on socio-economic, health and health related, sanitation and related information. The quantitative approach was used to respond to specific objectives 1, 2, and 3 (partially).

Sources of such data were pulled from the sampled population in those sections of the town defined as vulnerable based on prior qualitative study.

Structured sample survey design was followed based on information from vulnerable sections of the towns. To identify factors contributing to vulnerability of residents from different vulnerable quarters of different towns, representative sample households were selected from each of the vulnerable quarters of towns using two-stage stratified random sampling technique. In the first stage representative urban centers (first level strata), among 46 covered by JSI, were selected (see annex for the list). The towns were selected in such a way that they are fairly distributed over the region such that different culture and ecology, which is believed to influence settlement pattern and way of life in urban centers, is well represented. The selected towns were stratified into vulnerable quarters of the towns. In the second stage, vulnerable quarters among those identified in the towns, were selected. Households were assumed to be homogenous within strata (vulnerable quarter of a town) and simple random sampling used to select households (see annex for details).

Since in some of the vulnerable sections of towns formal settlement with defined household may not exist, the sampling strategy for selecting respondents should be flexible to suit existing problem and protect against bias.

A structured questionnaire was developed and pretested on a pilot town, not included in the study, involving all investigators. Survey data collectors were recruited based on evidence of such previous experience. They were trained and deployed to the study sites.

3.6.2.2 Sample size and data collection procedures

From Phase I study (13) it was possible to obtain information on the number of vulnerable quarters of the towns under study and the approximate size of these quarters. A maximum of five (for Arbaminch and Sodo) and a minimum of one (BatuZiway) vulnerable quarters of towns were identified. However, it was not possible to take all these vulnerable quarters of the towns for the second phase of the study for logistic reasons and for the fact that precision increased by using them all in the study compared to cost incurred is not that useful. Samples of vulnerable quarters proportional to the total number of quarters identified in urban centers were taken. Apart from Arbaminch and Sodo (3), and Asela and Batu (1), two quarters were tentatively selected from the remaining towns. Location is used as a criterion for selection of vulnerable quarters. That is two vulnerable quarters, which are distant apart within a city were selected for the reason of representation. This helped to select vulnerable quarters that show different characteristics. After drawing the list of vulnerable quarters to be visited, site supervisors

ensured that the selected vulnerable quarters in a city are far apart as much as possible and differ in terms of their vulnerability situation.

For sampling, towns were grouped according to their status: Regional, Zonal and Woreda level towns. Addis Ababa, being large city, is represented by Woreda's as being equivalent to regional Woreda towns. The main reason for adopting the hierarchy is that the towns differ in terms of their size, which has implications on sample size. It is assumed that, as the size of the town gets larger, the vulnerable quarters of the towns gets larger as well. This was therefore used as a basis to determine number of respondents from each section in each urban center.

A vulnerable section of a town could not be delineated accurately as no physical boundary exists. They are only identified by their local names or kebeles and have different sizes. Thus, there is no precise sampling frame for sampling HHs from vulnerable sections of towns. Therefore, reference was made to sampling strategy used by CSA. CSA mapped the whole country into several Enumeration Areas (EAs) for the purpose Population Census. Each EA holds on average about 200 households. Thus, all national level surveys use the EAs for designing sampling techniques. Two alternative sampling strategies were initially planned but since EAs map could not be used (CSA was working on census cartography and EAs were being updated), data collectors with the help of supervisors sketch the area and developed working map of the vulnerable section. The size of vulnerable sections of towns is mostly reported as being less than the size of Kebeles and in few cases, the whole kebele turn out to be vulnerable. Thus, the vulnerable sections were sub-divided into EAs with roughly 200 HHs each, such that the vulnerable sections have one, two, or three EAs as appropriate. Very often CSA samples on average about 20 to 30 HHs per EAs in national surveys. If the size of vulnerable section is less than the size of EA, which might be the cases in some Woreda towns, then less number of HHs (20) were selected. Definition of HHs may slightly differ in vulnerable quarters. For example, more than one HH may live under one roof (in which case they are more than one HH), some may live on permanent location on street, some under temporary shelter, etc., and sampling should consider all these.

In general, a single vulnerable quarters in regional towns could be split into one or more EAs. Therefore, a sample of 20 or more HHs per vulnerable quarters was required. Thus, it was estimated that a minimum of 60 HHs per city is required for regions as a compromise. Zonal and Woreda towns are assumed to have vulnerable quarters, which are equivalent to EA, and 20 HHs per vulnerable quarters is allocated to them.

There were 1220 respondents for this study. This required a total of 180 person-days of data collectors with five on-site supervisors, which is divided into towns according to their size, but two data collectors worked together to ensure data quality. A total of nine routes were identified (see annex 2) to facilitate travel and data collection activities (Annex V).

Data collectors roughly estimated the area using their steps. They did not exactly measure distances, rather used their steps by walking through the village from north to south and east to west, counted steps, and converted to meter. Multiplying length and width of the village, an approximate area of the vulnerable sections were obtained. While walking through the village data collectors roughly counted houses/shelters and multiplied the number of houses by average number of people per household. This information was also estimated from the survey they conducting, because by the time they finish the

survey they already have rough estimate of average number of people per household. Detailed information on vulnerable quarters of towns, number of respondents, number of enumerators required and list of selected vulnerable sections are provided in Annex I. Similarly, roots for data collection in given in Annex II.

3.6.2.3 Mapping vulnerable sections of towns to health risks

The main aim of the mapping exercise is to identify and locate hotspots in each of the study towns that signify areas where society is residing in vulnerable quarters to health risk. Identifying and locating such vulnerable sections of towns require defining why an area is termed ‘vulnerable’. In the context of the present assessment, we used the term ‘hotspot’ to represent societies who are vulnerable to health risks. Therefore, in our assumption, we associate health risks to vulnerable sections, and thus we referred hotspots as vulnerable sections of the study towns. Thus, vulnerable quarters are corners of a town, areas, or collection of houses in a town, which are characterized by poor quality housing construction with poor infrastructure, haphazard road networks, a lack of health service centers, and poor utility and services. In view of the socio-economic condition of the dwellers, it is part of the town where very poor people are residing. Therefore, to identify vulnerable quarters of the study towns, two major distinguishing criteria were used; socio-economic and physical criteria, which are in line with the given definition.

Characterization of the vulnerable sections was done based on field and/or physical observations.

To characterize the identified vulnerable quarters in the field, checklists were prepared so that the degree of vulnerable quarters according to the importance of the defined criteria can easily be described. The checklist comprised, but not limited to, the following important characterizing factors (Annex VI).

Criteria used for selecting the vulnerable sections

SN	Criteria	Description
1	The number of health facility	Availability of health centers in the vicinity
2	Presence of drainage ditches and their condition	The availability and quality of drainage systems (open and full of liquid waste or closed) and how the society use them
3	Housing condition	The quality of houses and spatial arrangements. That is materials used for roofing, floor and walls.
4	Infrastructure network (main road and connecting roads)	The road network between blocks and houses, how close they are? Are they paved? Etc.
5	Public toilet	The availability of public or communal toilet and its quality in terms of feasibility for current use

Respondents were also asked to self-categorize their habitat as either slum; semi-slum or non-slum based on features such as overcrowding, limited private water point, widespread solid waste, and lack of liquid waste disposal, more in migrants and main means of livelihood is not regular job. Participant information, consent form, and tolls are provided in Annex 7 to Annex 9.

3.7 Data Analysis

3.7.1 Quantitative

Descriptive statistics were used to describe characteristics of vulnerable quarters and profile of residents. Associations between felt needs, service provision, perception among residents and other similar variables were judged using chi-square test. Previous similar studies showed that substantial variability between vulnerable quarters within urban and suburban is expected. High variability may be expected within urban centre with respect to socio-demographic characteristics of residents, the level of social-economic factors, and various health problems among neighbors. Similarly, variability may be expected among urban centers in terms of their vulnerable quarters and their residents. It is therefore important i) to develop profile of residents so that comparison among towns is possible; ii) categorize the towns based on determinant factors of vulnerability; iii) categorize vulnerable quarters of towns regardless of towns they come from; iii) study patterns of relationship among factors contributing to vulnerability. Therefore, appropriate statistical methods were used to evaluate different aspects of the urban vulnerability situations.

3.7.2 Qualitative approach

Tape recorded data was transcribed by data collectors and samples were read and compared for consistency. The transcribed materials were entered into open code 4.02 and themes and sub themes were developed in line with the objectives of the study. Thematic analysis was used to triangulate findings from different sources. In presenting the findings, an attempt was made not to influence the original meaning of the finding.

3.8 Quality assurance

Data collection tools were developed following the objectives of the study. In order to ensure the tool helps to generate desired evidence, it was pre-tested in one woreda in Addis Ababa not included in the study and another in Sebeta town as part of training of data collectors. Qualitative checklist guiding questions was shared with colleagues along with the objectives who are not involved in the study to judge if the checklist and probes could help to answer the objectives. In addition to training research assistants/data collectors, close supervision was provided during data collection to ensure completeness of data and proper recording. Survey questionnaires were edited by supervisors either on the spot or in the regional centers while enumeration is ongoing and problems rectified before data collectors leave. During data analysis, data was screened for completeness and cleaned for outliers, unexpected values, and errors ensuring quality and consistency.

3.9 Ethical considerations

Ethical clearance was obtained from the Research Ethics Committee of the Department of Preventive Medicine, at the School of Public Health, Addis Ababa University. The official letter was taken from the University to the respective towns to obtain permission. The respondents were informed of the objectives of the study, benefits and requested for informed consent. The data was collected in a way to ensure confidentiality of the respondent. To ensure the confidentiality of the respondent's individual identifiers were not collected.

4. RESULTS

4.1 Profile of vulnerable sections

4.1.1 Socio-demographic characteristics of respondents

4.1.1.1 Quantitative research participants

Majorities of residents (75%) in the vulnerable sections of the urban centers interviewed were female, with variations from town to town (Table 1); this is not because all of them are household heads, but because women are at home or around while their husbands are at work. Respondents in vulnerable sections of BahirDar and Hawassa towns are roughly in similar proportion of both sexes; while other towns depicted different proportion, where number of female respondents exceeded that of male. Jimma is the only city where male respondents were the majority (72%).

The average age of respondents was 45.6 (SD=14.4) and 42.3 (SD=14.8) years for males and females respectively. The overall mean age was 43.2 (SD=14.8) years (Table 1). Thus vulnerable people seem to pick mate of similar age to to face life. In terms of distribution, 7%, 50%, 32% and 11% of respondents were in the age ranges of 15-24, 25–44, 45-64 and 65+ years respectively..

Age	Sex		Total
	Male	Female	
15 - 24	17.2%	82.8%	87
25 - 34	21.4%	78.6%	299
35 - 44	22.2%	77.8%	306
45 - 54	35.7%	64.3%	213
55 - 64	23.9%	76.1%	180
65+	30.4%	69.6%	135

Table 1 Age of respondents by sex

Sixty percent of respondents are married, while 17% are widowed. While, there is a tendency to face life as couple in vulnerable quarter of urban centers, and on the other hand, high death rate of spouse perhaps partly due to vulnerability because of those lost their life, 90% died of diseases (Table 2). There is significant association between education level and marital status ($p < 0.01$); residents of vulnerable sections tend to be married as their educational level increases. Residents of vulnerable quarters attained higher education in all towns in comparable proportion across study settings. In small towns like Batu, 60% of residents attained high school or higher eluding to the fact that relatively educated individuals resides in considerable proportion in vulnerable quarters of towns.

Sixty seven percent of respondents were married for 15-24 age group compared to 39% for 65+ years. On the other hand, proportion of separated, divorced, and widowed increased by age from 3.5% for 15-24 age group to 61.2% for 65+ age group. Widows constitute considerable proportion of respondents - 25% for 45-64 years of age and 49% for those over 65 years of age.

Marital status	What is the highest level of school you completed? (%)					Total (%)	Total
	No Education	Primary	Secondary	Technical/Vocational	Higher		
Married	30.94	34.81	23.62	4.70	5.94	100	724
Living together	16.67	50.00	16.67	16.67	0.00	100	6
Divorced	42.96	42.96	13.33	0.00	0.74	100	135
Separated	38.89	38.89	20.37	0.00	1.85	100	54
Widowed	68.78	22.44	8.29	0.49	0.00	100	205
Never married but engaged	0.00	14.29	57.14	0.00	28.57	100	7
Never married but not engaged	12.05	22.89	39.76	10.84	14.46	100	83
Total	37.48	32.95	21.00	3.71	4.86	100	1214

Table 2: Education of respondent by marital status

4.1.1.2 Qualitative Research Participants

The research participants were drawn from community members, health extension workers, and city health office representatives. For the purpose of this study, we categorized study participants into 'community opinion leaders' and 'health care providers'. Community opinion leaders were comprised of women association members, elders and chairs of the community police. There were 55 in-depth and key informant interviews. Of this, 55% of the participants were female; 20% were 31–35 years old. Three-quarters of the participants have completed diploma or higher level training, and 60% were married and 11% unemployed (Table 3).

Variable name	Frequency	Percentage
Sex		
Male	25	45.5
Female	30	54.5
Age		
20-25	6	11
26-30	8	14.5
31-35	11	20
36-40	4	7.3
41-45	1	2
46-50	2	3.6
>=51	6	11
Not recorded	17	31

Educational status		
Illiterate	3	5.5
Primary	6	11
Secondary	4	7.3
Diploma and Higher	42	76.4
Marital status		
Single	13	23.6
Married	33	60
Widowed	3	2
Divorced	1	5.5
Separated	1	2
Not recorded	4	7.3
Occupation		
Unemployed	6	11
Daily laborer	2	3.6
HEW	16	29
HEW supervisor	6	11
Woreda health office representative	6	11
Others	7	12.7
Not recorded	12	22
Total	55	

Table 3: Socio demographic characteristics of the participants

4.1.2 Profile of Places

Vulnerable quarters of urban centers were explained by participants in terms of recognition of exposure to health problems that were latter specified and factors that facilitate vulnerability. Besides, whether there are resources to cope with such problems were assessed. Accordingly, places that are considered as vulnerable were found to be relatively small in size in terms of land area coverage and population size. The location of vulnerable quarters are haphazard in urban settings although such places exhibit common characteristics.

Rough estimate of vulnerable quarters in study settings ranges from 4000 to 4 million square meters (with average of 597900.5 m²). Similarly, estimated population size in vulnerable section ranges from 240 to 17000 persons, with mean population of 3379 persons per vulnerable quarters.

Respondents were asked to categorize their habitats as slum, semi-slum or non-slum after the concepts of each was explained to them. Finding shows that 55% indicated their residential area as slum, and 33.6% indicated their residence as semi-slum (Table 4). Thus eighty nine percent pointed out their residential is different in terms overcrowding, type of houses, infrastructural development and characteristics of residents (Figure 1). It was found that 11.2% indicated their residential area as non-slum, and most of these were from Oromia and Amhara regions. The specific study settings were Kemisie, Shashemene, Ambo, Nekemt and Mychew. Residents from big towns such as Addis Ababa, Bahir Dar, Adama, Mekelle and Hawassa endorsed that their residential setting are 'slum' or 'semi-slum'.

Region	Do you consider your residential area as (%):			Total
	Slum	Semi-Slum	Not Slum	
A.A	55.42	41.25	3.33	240
Amhara	41.82	42.73	15.45	220
SNNP	57.00	39.00	4.00	200
Dire Dawa	66.67	31.67	1.67	60
Harar	83.33	11.67	5.00	60
Oromia	52.84	23.08	24.08	299
Tigray	60.71	31.43	7.86	140
Total	55.13	33.63	11.24	1219

Table 4: Respondents defining their residence

The small villages are at times annexed to market places (for example one vulnerable section in Dire Dawa) while it is still a residential area.

4.1.3 Characteristics of respondes

Majority (84%) of respondents in vulnerable quarter of the study settings are found to be Christians. Amhara (43%), Oromo (25%), and Tigry (14%) constitute the major ethnic groups in the study settings. Majority (>80%) of those aged 25-64 live with their children and wife although 35% of the respondents, among 913 who have children, raise them in absence of spouse (Table 5). Often regular residents as compared to migrants live with mothers. Number of residents in a house ranges from 1 to 20 with mean of 4.5 persons (sd =.2.2 persons). Addis Ababa was found to have large family size ranging upto 15, followed by Hawassa while Batu and Harar have few family size.

Age category	With whom are you living?					Total
	Wife	Mother	Father	Children	Brothers or sisters	
15 to 24 years	71.62	24.32	6.76	58.11	21.62	74
25 to 44 years	65.38	16.17	4.57	80.32	16.34	569
45 to 64 years	57.26	18.63	4.11	88.77	6.85	365
65 years and above	43.97	29.31	9.48	77.59	3.45	116
Total	60.94	18.86	5.07	81.32	12.28	1124
Are you migrated from other place?						
Yes	61.81	12.09	4.12	83.79	10.58	728
No	59.64	31.47	6.85	76.65	15.23	394
Total	61.05	18.89	5.08	81.28	12.21	1122

Table 5: Characteristics of respondents by age

4.1.3.1 Housing Condition

Housing and house ownership is basic need for human being. Housing condition of residents in vulnerable quarters of urban setting was assessed based on materials used for roof, floor, and wall construction, whether residents have separate place for living and cooking, and ownership of house. Ninety-seven percent of houses in vulnerable quarter have iron sheets while 1.6% have thatched roofs. While majority of those with thached roofs are from Amhara and Oromia regions two of the houses were from Addis Ababa. Plastic roof are not common. Close to 1% of the HHs reported plastic roof. Such houses with plastic roof were common in Harar city (6.7%, higher than the national average) and Dire Dawa (with 1.9% higher than national average). Tiles are relatively common in Adigrat, Sekota, and Shashemene (Table 6).

Region	Main material of the Roof (%)					Main material of the floor of the main house (%)					The main material of the wall of the main house					
	thatch	Iron sheet	tiles	plastic	Total (N)	dirt/mud/sand	wood	Conc rete	asbestos	Total (N)	concrete/brick	mud/mud brick	mud/wattle	iron sheet	mas onry	
A.A	0.9	98.7	0.0	0.4	236	25.0	5.6	69.4	0.0	232	2.1	16.3	75.4	6.3	0.0	240
Amhara	2.8	93.5	3.2	0.5	216	85.9	3.6	10.5	0.0	220	2.7	3.2	94.1	0.0	0.0	220
SNNP	0.5	99.58	0.0	0.0	192	74.8	3.0	22.2	0.0	198	1.0	0.0	98.5	0.5	0.0	199
Dire D	0.0	98.2	0.0	1.78	56	61.7	0.0	38.3	0.0	60	13.6	15.3	18.6	45.8	6.8	59
Harar	1.67	91.5	0.0	6.8	59	93.2	1.7	5.1	0.0	59	3.3	48.3	48.3	0.0	0.0	60
Oromia	3.0	95.3	1.45	0.3	296	43.4	1.7	54.6	0.3	297	10.7	20.7	68.5	0.0	0.0	299
Tigray	0.0	99.36	0.7	0.0	135	62.7	0.0	37.3	0.0	134	20.7	8.6	39.3	0.0	31.4	140
Total	1.6	96.7	1.0	0.7	1190	58.3	2.8	38.8	0.1	1220	6.9	13.0	72.6	3.5	3.9	1217

Table 6: Main materials used to construct roof, wall and floor of the house by region

Majority of the houses in vulnerable section of study setting (58%) have mud or sand floor (mainly for Dire Dawa and Harar residents), while concrete floor accounted for 39% (Table 6). Concrete floor were common in Addis Ababa (69%) and Oromia (70%) with study settings in Amhara region exhibit the least use of concrete floor (10.4%). About 2.8% of all houses in vulnerable quarters have wooden floors, majority being in Addis, Amhara and SNNP.

Finding shows that mud wall is common (92.6%) feature of houses in vulnerable quarters of study setting. The mud wall is made either from mud brick (14%) or Wattle covered with mud (78.5%). Wattle is a well known lightweight construction material made by weaving thin and 'young' branches of vegetations, like tree, timber, etc. (either whole, or more usually split) or slats between upright stakes to form a woven lattice. It commonly used to make fences and hurdles for enclosing ground or handling livestock. The wattle in this case is commonly used to build houses in the rural areas, but rarely used in modern towns unless for vulnerable quarters of urban areas. Wattle may be used alone or covered with mud,. In vulnerable quaters of towns, however, wattle is often used as it is and rarely covered with mud.

Mud brick is relatively more commonly in Harar, Oromia, and Addis Ababa are explained to defective leftovers. Types of wall include iron sheet and masonry accounting for 3.5% and 3.9% respectively. Two towns (Dire Dawa and Addis) are reported to use iron sheet for wall. About 7% of houses in vulnerable quarter reported to use concrete or fired brick for wall. Finding shows that most of masonry constructions (3%) are found in Mekelle, followed by Adigrat (0.3%) and Dire Dawa (0.3%) (Table 6).

Finding from qualitative data shows that poor housing is common feature of vulnerable quarters of study settings.

"Poor housing condition prevail in this area. Since people do not have money to construct standard houses, cheap materials are used to construct private houses. Walls made from mud and iron sheet is common in our neighbourhood, floors made from iron sheet is not an exception " (Mekele, opinion leader). Another respondent from Harar noted that, people in vulnerable quarter of this town live in plastic houses and sand floor. This is common in the neighbourhood of vulnerable quarters. Moving few blocks away, you will find standard houses" (Dire Dawa, HEW).

Finding reveals that cooking and living place is inconvenient for 25% of the respondents, since they cook in the same room where they live (Table 7). Thirty percent of respondents do not have separate room for sleeping. Fifty-seven percent have one bed room regardless of family size (Table 7).

Qualitative study however revealed that the HHs do not even have space to keep their cooking utensils. They keep these utensils under bed after cooking. One of the respondents emphasized that, "this is the house I and three other family members live in. We rented this house and it is only one room. So, we cook, eat and sleep in this same room. We keep our utensils under bed and that is how we live" (AA, resident).

Those who own houses construct them below standard for renting as a means of livelihood. "Families with large size rent such small rooms relatively cheap. Due to this reason, the area is called Jelba Sefer....(laughed)."(Adigrat, Head of District Health office).

Region	Where is the Kitchen / where do you do the cooking (%)?							Total
	In the house (observed)	In the house (not observed)	Total in the house	In separate building (observed)	In separate building (not observed)	Total in Separate building	Outdoors (observed)	
A.A	29.65	4.87	34.52	47.35	3.10	50.45	15.04	226
Amhara	17.73	0.91	18.64	53.18	3.18	56.36	25.00	220
SNNP	10.74	7.38	18.12	49.66	9.40	59.06	22.82	149
Dire D	6.90	0.00	6.9	24.14	0.00	24.14	68.97	58
Harar	64.41	10.17	74.58	5.08	0.00	5.08	20.34	59
Oromia	13.73	4.58	18.31	60.56	9.15	69.71	11.97	284
Tigray	25.38	0.00	25.38	66.92	0.00	66.92	7.69	130
Total	20.96	3.82	24.78	50.98	4.80	55.78	19.45	1126

Table 7: Location of Kitchen or cooking place for the household

Finding shows that 62% of the respondents in those vulnerable quarters live in rented house while 34% own and 3.5% live in neither own nor rented house suggesting to live in abandoned, demolished, or plastic houses for which they pay no money.

Disaggregating housing information by city, there is significant association between towns and ownership of houses ($p < 0.01$). Living in rented house is common in Addis and regional towns, while ownership of residential quarter is common mainly in zonal towns. Residents in such towns as Addis (82%), Adama (83%), Asela (88%), Harar (71%), Hawassa (88%), Woldiya (78%) and Wolkittie (75%) live in rented houses. Most of the rented houses were found to belong to town administrations while those who rent from individuals rent rooms.



Figure 2: View of houses where the poor live within a city. Several people live in the same room.

4.1.4 Infrastructure

Vulnerable quarters of urban centers were found lacking basic infrastructure as elaborated below.

4.1.4.1 Availability and use of water

About 89% of respondents reported use of tap water (improved water by the standard of UN-HABITAT). Yet, qualitative finding shows that very few of them have pipe water connected to their homes. Most of them get water from neighbors' tap and often do not complain much about access to water. There are limitations on access as expressed in terms of amount of water available per day at HH level and if one can fetch when desired. Finding from qualitative data shows that fetching water from neighbour depends on per agreement with tap owners and access to water point is limited to owner being at home. Getting water in excess for drinking and cooking is not assured in vulnerable quarter of the study setting. Respondents expressed dissatisfaction with this although access to tap water is there.

Of the study settings, river/stream was cited as source of water in SNNP while 9% use communal tap developed by government, NGO, or community members. This is common in Dire Dawa, Mekelle, Sekota and Woldiya towns. Significant disparity was noted between towns in terms of sources of water ($p < 0.001$). All respondents in vulnerable quarters of Hawassa city are using community based water sources; while respondents in vulnerable quarters of Sekota and Woldiya towns reported to have community water source in addition to other sources. Only six HHs (0.5%) in all regions have reported to use well and river/stream as source of water, very few compared to expectations in slum areas; showing that there is an overall improvement in the provision of quality water over time.

Because many of the respondents fetch water from tap, average access to water in terms of time taken to water point is relatively short. Average minutes taken to fetch water from different sources is not that variable; on average it took respondents 6.2, 8.0, 17.2, 30.7, 11.0 minutes to collect water from tap, well, community point, river/stream and standing water respectively. In general, average time to water point regardless of source of water ranges from 19.5 minutes for Sodo (SD=16.9 minutes) to 1.2 minutes for Ambo towns (SD = 0.88).

Majority of HHs (86%) do not treat water for use regardless of its source. Residents in few study settings reported to treat water before use. Such settings as Batu (48%), Mekelle (38%), Adama (33%), Addis Ababa (25%), and Dire Dawa (20%) reported to treat water before using. Sedimentation, filtration using cloth, boiling and use of bleach/chlorine were common method to treat water. Majority of those who treat (70%) reported use of bleaching or chlorine, while few (1.8%) use straining or boiling.

4.1.4.2 Hygiene

Respondents were asked whether they wash their hands before specific activity. Although 72% of all respondents wash their hand before preparing food, majority in Sekota, Jimma, Arbaminch and Wolkittie towns and considerable proportion in Kemisie, Nekemt and Bahir Dar do not wash their hands before food preparation (Table 8). Thirty four percent of the respondents admitted that they do not wash their hands before feeding children and 27% after attending to defecating child.

Even if two-third of the respondents reported to wash their hands before and after certain activities, use of soap was reported by only 77% of respondents. Use of soap is found relatively high for Addis, Ambo, Kemissie, Adigrat (about 92% each), Hawassa (98%), Mychew (88%) and Mekele (85%) while low for Bahir Dar (32%), Sekota (0%), and Shashemene.(22%). Wolkitie and Woldiya towns recorded even the least (each about 7.5%).

Washing hand	Response	
	Number	Percentage
Before food preparation	883	72.4
Before feeding children	456	37.4
After defecation	850	69.7
After attending to defecated child	337	27.6
Before eating food	1145	93.9
After eating foods	1104	90.6
Soap or detergent or any cleansing agent for hand washing	837	77%
Does the household have latrine?	994	91.4%

Table 8: Respondents hand washing experience during home activities

Respondents identified ‘inside or near toilet’, ‘inside or near kitchen’, ‘elsewhere in the yard’, ‘outside yard’ and no ‘specific place for hand washing. Majority (72%) of residents wash their hands ‘elsewhere in the yard’, and the second largest proportion (16%) do not have specific place for hand washing. All respondents in Dire Dawa and majority in Debre Markos (82%) wash their hands anywhere with no specific place.

Qualitative evidence attributes non-use of water before and after HH activities and non-use of soap to lack of water. One of the participants argued that, "We do not have water consistently and hand washing at times becomes luxury (Sekota, resident). Another one pointed out that, "health extension workers teach about hand washing using soap which is not in line with the reality we live in. We do not have water as much as we need and buying soap for this purpose is not feasible" (Batu, resident). An opinion leader has emphasized that. "Keeping hygiene requires water. If I am going to keep my hygiene, I should wash my face, hand and leg; I should wash the child.". To do all these, access to water is very mandatory. However, access to water is not good."(Mekele, Opinion leader).

4.1.4.3 Sewerage System

Sewerage system is critical concern in vulnerable quarters of urban settings in Ethiopia. Thirteen percent of respondents argued that sewerage system is constructed as per standard of the respective municipalities (Table 9). It was found that 13% of residents in vulnerable quarters reported to organize themselves to develop sewerage system although the quality and functionality of such ditches were

doubted. Large proportion of respondents (68%) did not have functioning sewerage system with its evident consequences. In Addis Abeba, sewerages were filled and blocked by dry and liquid waste.

There is a significant association between region/town on whether sewerage is available or not ($P < 0.0001$). Study participants in Harar (70%), Addis Ababa (88%), Shashemene (100%), and Mychew (30%) reporting availability and functioning of sewerage system, while those in Dire Dawa, Batu, Adgrat, Arbaminch, Mekelle, and Ambo reported none functional sewerage (Figure2).

Is Ditch present?	Number	Percent
yes, properly done	161	13.2
yes, informally done by community	153	12.5
yes, me and my neighbors	64	5.2
None	835	68.4
None response	7	.6
Total	1220	100.0

Table 9: Presence of sewerage in vulnerable quarters

Disposal of liquid waste is challenging in almost all vulnerable quarters of urban centers. Majority of respondents reported to use spill to open field (54%), spill to dug pit (19%) and discharge to sewerage pipe (15%). Discharge to open ditch, discharge to water body or river, and spill to toilet is not popular among respondents in general. But towns are significantly associated ($p < 0.01$) with type of liquid waste disposal methods. Discharge to sewerage pipe, for example, is dominantly used in Addis and very rarely used in other towns possibly due to unavailability of sewerage pipe elsewhere. Majority in Mekelle and few in Addis spill liquid waste to toilet, while this is not known in most other towns because it requires ownership of toilet in the first place. Majority of respondents (ranging from 53% to 67%) in Dire Dawa, Hawassa, Mychew and D/Markos spill liquid waste to dug pit. The most common liquid waste disposal was found to be spilling into open field.

Six solid waste disposal methods are practiced among respondents in the study setting. On-site storage and collection by municipality for disposal, disposal in open field, and burning in order of priority were reported by 84% of the respondents. Solid waste disposal methods are significantly associated with study settings ($P < 0.02$). Solid waste disposal in the regional towns (Addis, Adama, B/Dar and Mekelle) is reported to be collected and disposed by municipality. Majority of respondents in Harari and Wolkittie reported to store solid waste on site and dispose at temporary locations. Open field disposal is highly practiced in Dire Dawa, Hawassa, Kemisie and Sekota while burning is commonly practiced at Ambo, Arbaminch, Batu, Shashemene and Sodo, and disposal in dug pit is rarely practiced by all study settings except Adgrat town.

Qualitative study participant from different towns commented along the same line justifying quantitative findings. One the participant pointed out that, "There is no drainage system in our village. Solid and liquid waste management is very poor in this area." (Adigrat, Head of District Health office).

Another respondent emphasized that “Our village is so congested since it is highly populated. If you see here it is full of fecal matter and if you go there it is the same. This place as you can see is so dirty and stinking” (Bahrdar, Community leader). Another participant from same town added that, “Liquid waste is a major problem. There is no space for preparing private pit and we used to preparer common soak pit. Then it became full again and again and most households discharge waste in the open field.” (Bahrdar, HEW)



Figure 3: Waste at market place and open ditch filled with water and dirt in one of the study setting in Addis Ababa

4.1.4.4 Latrine

Availability of latrine in the vulnerable quarter of urban centers is encouraging where 91% of the HHs reported to have latrine. However, there is variation between vulnerable quarters in terms of reported availability of latrine. Lack of latrine prevails in Dire Dawa accounting for 74%, in Adgrat, Hawassa and Woldiya slightly more than 50% of HHs reported non-availability of latrine.

Five types of latrine were reported. Majority (95%) of residents use either unimproved latrine (71%) or traditional improved latrine (24%). Improved latrine with super structure scored 2.2%, while ‘Non-flush latrine connected to septic’ and ‘Flush latrine connected to septic tank’ registered 1.8% and 0.3% respectively. The former is very popular. Majority of residents from Addis Ababa and Adama use improved latrine while, non-flush latrine connected to septic tank is used solely in Mekelle town. Public latrine is rarely used in Nekemt, Shashemene and Hawassa; flush latrine connected to Septic tank is not generally available in the vulnerable quarters under study.

4.1.4.5 Access to Roads

Road network is an important infrastructure in any community for any emergency encounters. There were several cases of disasters where fire fighters could not save property and human life due to lack of access to the area, and ambulances could not access villages at time of emergencies (Merkato fire

fighting on-site TV interview). Families, communities, and even authorities were forced to watch when life is spared and property destroyed in vulnerable quarters. This is particularly the case in Addis Ababa.

Following existing Ethiopian towns road standard, four types of roads were identified in this study. These were: Asphalt, Coble Stone, Gravel and non-proper road (unclassified, informal walkway). The distribution of road types among villages show that 4.4% of residents in the vulnerable quarter of the study settings reported to access asphalt road, 29% respondents access Coble Stone and 27% access gravel road. Majority of respondents (53%) reported to access informal walk-ways (Table 10).

Qualitative findings indicate that coble stone roads in vulnerable quarters remain useful more as walk ways than for vehicles because it is narrow. There is significant association between region and road type ($p=0.001$), for example, gravel road is common in Oromia while 'none proper road' is common in Dire Dawa and Amhara regions. None proper road was observed in the two vulnerable quarters studied in Dire Dawa. Therefore, in case of emergencies vehicles cannot access the area. During the last flooding occurred in Dire eDawa, one of the vulnerable quarters was the victim of this incidence. There is significant disparity in terms of access to proper road among the towns ($p < 0.0001$).

4.1.4.6 Electricity

Regarding availability of electricity in the vulnerable sections of towns, there is no serious inequality among vulnerable sections across regions, except for SNNP and Dire Dawa where about 8.5% of HHs each reported to have no access to electric power (Table 7). Respondents in the other major regions: Amhara, Oromia, and Tigray have approximately similar response, where about 5% claim to have no electric power. This means that most residents in the vulnerable quarters of urban centers have access to electric power although it does not necessarily mean that they own electric meter at their homes. From qualitative results, it is evident that most of them access electric power through rental agreement with neighbors for power grid or allowed to use by sympathizing neighbors. When the data disaggregated by town, it is evident that only residents in vulnerable sections in three towns, Ambo (3%), Hawassa (2.7%) and BahirDar (1.8%), have no access to electric power and are highly affected. Despite low electricity coverage in the country, most zonal and even woreda level towns are not affected by lack of access to electric power. In general, only 4.7% of HHs in all vulnerable sections of all towns have difficulty in accessing electric power.

Region	Do you Have electricity? (%)		Total	Type of road available in your village						Main source of drinking water for household (%)					
	yes	No		Asphalt	Coble Stone	gravel	No proper road	stone (other than coble)	Total (N)	Tap	Well	Community	River/stream	Standing water	Total (N)
A.A	99.6	0.4	240	5.8	22.5	37.8	16.3	18.3	240	99.2	0.4	0.4	0.0	0.0	239
Amhara	95.0	5.0	220	7.7	3.6	16.8	72.3	0.0	220	79.1	0.0	20.9	0.0	0.0	220
SNNP	91.5	8.5	199	6.5	36.8	21.1	35.7	0.0	199	76.3	0.0	21.7	2.0	0.0	198
Dire D	91.7	8.3	60	0.0	0.0	0.0	100.0	0.0	60	75.0	0.0	6.7	0.0	18.3	60
Harar	96.7	3.3	60	1.7	33.3	1.7	63.3	0.0	60	95.0	0.0	5.0	0.0	0.0	60
Oromia	95.3	4.7	299	0.7	32.3	44.7	22.3	0.0	300	99.3	0.4	0.4	0.0	0.0	297
Tigray	95.0	5.0	140	5.7	40.0	17.1	52.0	0.0	140	86.2	0.0	9.4	0.0	4.4	138
Total	95.3	4.7	1218	4.4	25.7	26.8	53.0	3.6	1219	88.9	0.1	9.2	0.3	1.4	1212

Table 10: Access to road by type of road and region

4.2 Livelihood characteristics

4.2.1 Migration

Majority of respondents (66%) in the selected vulnerable quarters were migrants who were born and raised in another place and came to their current residence due to a number of reasons

The 34% who reported as regular residents were not born and raised in the same location. Majority of this later group came either from other corner of the study setting or from surrounding rural community (rural kebele), which may not be termed 'migration' in the definition of UN, but shows movement from other parts of the city to the slum corner.

Both male and female migrate at comparable rate with no significant difference ($P=0.36$). Majority of in-migrants (81%) are 25-64 years of age, while considerable proportion (45%) constitutes most productive age group (25-44) (Table 11). Seven percent of the respondents are either teenagers or young persons (15-24) who are heading HH and are responsible for dependents.

Residents have stayed longer in their current residence after migration; 72% of them lived in the villages for at least 40 years (Table 11). Therefore, these migrants might have lived under vulnerability for long.

Length of stay in the village	Are you migrated from other place?		Total
	Yes	No	
Less than one year	100.00	0.00	19
1 to 4 years	96.97	3.03	99
5 to 9 years	95.56	4.44	90
10 to 14 years	96.26	3.74	107
15 to 19 years	92.31	7.69	78
20 to 39 years	58.80	41.20	483
40 to 59 years	45.25	54.75	263
60 and above	13.64	86.36	44
Don't remember	67.86	32.14	28
Total	66.39	33.61	1211

Table 11: Residents length of stay in the village by migration condition of residents

Migrant distribution varies from one vulnerable quarter to the other. Vulnerable quarters in Hawassa and Asela towns are dominated by migrants (90%) followed by Arbaminch, Batu and Dire Dawa (80-83%). Except in Jimma, Kemisie, and Sekota, where relatively few migrants were reported (10 – 30%), migrants accounted for more than 50% of the residents in all vulnerable quarters of the study settings.

In terms of proportion of migrants across regions, vulnerable sections of Addis Ababa are not as much crowded by migrants as some regions (70%). In terms of regional distribution, except in Amhara region where number of migrants is less than regular residents (44%), migrant population is higher than regular residents in all vulnerable sections of other regions. Finding clearly depicted that (80%) in Dir Dawa, (76%) in SNNP, (73%) in Tigray, (71%) in Oromia and (70%) in Harari were found to have migrated to the specific settings during the last 10 years.

Of those who migrated to towns and residing in vulnerable quarters, 51% migrated in search of job, 22% migrated for family related reasons and 19% due to marriage (Table 12). Other reasons such as safety and security, access to better health services were not considerable. Of all male migrants, nearly 41% migrated in search of job; while of all migrants, 85% of those migrated due to family problem and 61% of those migrated in search of job were female.(Table 12)

Qualitative result shows that although residents in vulnerable quarter complained of overcrowding of places where they live, overcrowding was attributed to migration. One participant highlighted that; “Resident here are very poor and live in a crowded condition. Most of the residence here exit and enter to the area with narrow walk ways and dirt contributing to crowding”(Woldia,HEW). Another participant pointed out that, “There are specific places in this town that are too crowded and extremely congested. Many people live in one single room. For this reason the area has challenging health issues for its residents” (Shashamane, local opinion leader).

When this is disaggregated by towns, significant association exists between towns and reasons for migration ($p < 0.001$). In Addis Ababa, for example, migrants predominantly migrated in search of work,

for family or for marriage (to join family, family dislocation). A major reason in Dire Dawa and Ambo is family dislocation, while it is family reunion (marriage) in Asela. In the rest of the settings search for employment remains a major reason for migration. On the other hand, only 1.5% of migrated due to health related problems.

Why have you left your previous residence place?	Sex of the respondent		Total
	Male	Female	
Job related	39.25	60.75	400
Family problem	14.86	85.14	175
Safety and security	20.83	79.17	24
Marriage	2.72	97.28	147
Health related	25.00	75.00	12
To visit relatives	13.33	86.67	15
Change of residence	8.33	91.67	12
Total	25.22	74.78	785

Chi-square = 94, $p < 0.001$,

Table 12: Reasons for migrating to the current location by sex

4.2.2. Ownership of basic household items

Respondents in vulnerable quarter were asked to mention four items that they wanted but find it difficult to own. As such it was found that clothing, food, and health care were frequently mentioned items of interest. About one quarter of respondents reported school fees and house rent as difficult to meet while 19% mentioned lack of resource to buy TV or radio as an obstacle (Table 13).

Hard to fulfill the following items	Responses		Percent of Cases(out of total response for each) *	Sex	
	N	Percent (out of sum, 2429)		Male	Female
Clothing	607	25.0%	60.3%	23.23	76.77
Food	595	24.5%	59.1%	22.02	77.98
Health care	530	21.8%	52.7%	27.36	72.64
School fee	244	10.0%	24.3%	31.15	68.85
Rent	264	10.9%	26.2%	31.44	68.56
TV or Radio	189	7.8%	18.8%	20.11	79.89
Total	2429	100.0%	241.5%	25.35	74.65

This is obtained by (n/N) , where n =positive response, and N = total responded; for clothing, 60.3% is obtained by $607/1006$.

Table 13: Items that are most difficult to fulfill

Fifty six percent of male and 51% females reported that it is difficult for them to meet health care needs while 62% and 61% of females and 55% and 51% of males were concerned about fulfilling clothing and food needs (Table 13).

Petty traders and daily laborers are slightly more concerned about fulfilling their food requirements, while house wives are relatively more concerned fulfilling their clothing needs. Similarly, NGO employees, small business owners and those without occupation seem to be slightly more concerned about fulfilling their health care needs (Table 14). Government employees showed concern about their clothing, food, health care, house rent and school fee.

What is your occupational status?	Useful items found difficult to fulfill						Total
	Clothing	Food	Health care	School fee	Rent	Purchase of TV or Radio	
Farmer	76.92	57.69	53.85	19.23	15.38	42.31	26
Government employee	46.03	42.86	50.79	39.68	31.75	7.94	63
NGO employee	60.98	51.22	58.54	29.27	19.51	12.20	41
Merchant	57.62	59.11	53.53	26.77	28.25	14.13	269
Housewife	66.17	63.91	50.00	15.04	17.29	21.43	266
Student	56.25	31.25	43.75	68.75	25.00	18.75	16
Daily laborer	61.83	63.44	51.61	29.03	31.18	22.58	186
Other private business	53.85	46.15	53.85	18.46	33.85	27.69	65
No occupation	58.11	67.57	60.81	17.57	35.14	13.51	74
Total	60.34	59.15	52.68	24.25	26.24	18.79	1006

Table 14: Items that are most difficult to fulfill by occupation (%)

The finding has also witnessed that 89% have bed 31% have chair and table. Respondents from Arbaminch, Dire Dawa, Harar and Kemisie have reported relatively no bed and those from Dire Dawa, Harar, Sekota and Woldiya reported to have no chair and table (Table 15).

The culture in Dire and Harar may not invite for ownership of this asset as it is of least use, but it is interesting to find such result in the other two towns, which are located to the north very far from Dire or Harar. Bicycle is owned by 7% of HHs only, and this is mainly contributed by HHs in Bahir Dar and Batu towns. Although Hawassa city is traditionally known for its bicycle culture, the vulnerable quarters in Hawassa, failed to contribute to the statistics.

Small proportion of residents in vulnerable quarter was found to own refrigerator and vehicle. It was found that 26% reported to own refrigerator and 1.1% own vehicle and most of these are from Addis Ababa, Bahir Dar and Mekelle.

Ownership of house equipments	Responses		Percent of Cases
	N	Percent	
Couch/Sofa	356	8.9%	30.8%
Bed	1026	25.6%	88.9%
Table	789	19.7%	68.4%
Bicycle	86	2.1%	7.5%
Radio	587	14.7%	50.9%
Television	845	21.1%	73.2%
Refrigerator	301	7.5%	26.1%
Automobile	10	0.2%	0.9%
Truck	2	0.0%	0.2%
Total	4002	100.0%	346.8%

Table 15: Percentage of respondents owning household items

4.2.3 Occupation of respondents and household income

Occupation

Occupation of residents in vulnerable quarter of the study setting shows that male government and NGO employees account for 15% and 9%. Twenty four and 28% of male and female respondents respectively reported to generate their livelihood from petty trade. More male (22%) are daily laborers compared to female (14%); while 14% and 5% of male and female reported to have no job (Table 16). A considerable number (37%) of women in vulnerable quarter were housewives. In general, therefore, more male residents are employees, daily laborers or have no job, while females are known for doing petty trade or serve as housewives. Marked difference was noted between vulnerable quarters in terms of the means of livelihood. Regional towns such as Addis Ababa, Bahir Dar, Hawassa, Mekelle and Adama host more petty traders.

What is your occupational status?	Sex of the respondent		Total
	Male	Female	
Farmer	33.33	66.67	27
Government employee	45.63	54.37	103
NGO employee	56.00	44.00	50
Merchant	22.12	77.88	330
Housewife	0.60	99.40	334
Student	44.44	55.56	18
Daily laborer	34.52	65.48	197
Other private business	39.47	60.53	76
no occupation	49.41	50.59	85
Total	25.16	74.84	1220

Table 16: Occupation of respondent by sex

Income

The main source of livelihood was found to be petty trade (44%), salary from long term employment (22%) and daily labor (16%). Other sources of livelihood contribute about 6%. Remittance and begging stood at the bottom of the table as source of livelihood. Support from children accounts for 6% of the respondents, although this is not considered as remittance since they either live together or in neighborhood and share resources (Table 17). Support combined from different sources (children, relatives, NGO, begging) account for 13% of source of income. Generally, majority (87%) of residents in the vulnerable quarter support themselves by generating their own livelihood. Source of income and gender are significantly associated ($p < 0.0001$) where more women are involved in small business, receive remittance, and receive support from family and children, while more men are employed, pensioned, do more labor work or beg.

Household members were found to engage in raising income. As such, spouses raise 39% of households income while children raise 17% and others raise 2%. On average about one family member in a household (mean = 0.7, sd = 0.73), other than household head, earn income

What is the main economic source of your household?	Gender (%)		Descriptive Statistics		Total (N)
	Male	Female	Mean	SD	
Employment/salary	30.59	69.41	2570.3	1801.7	255
Children support	18.84	81.16	1465.2	1260.5	69
Other families support	10.53	89.47	2024.0	1912.1	38
Business	20.30	79.70	1920.3	1482.9	537
Remittance	7.14	92.86	1115.4	610.8	14
Pension	35.94	64.06	1510.1	1088.6	64
NGO or community	21.74	78.26	1118.2	766.0	23
Daily labor	33.16	66.84	1228.3	878.1	196
Begging	33.33	66.67	665.0	353.3	12
Total	25.00	75.00	1867.35	1509.65	1208

Chi-square value = 30.23, $p < 0.0001$

Table 17: Main economic sources of respondents by sex and descriptive statistics of monthly income of HH

Source of livelihood and towns were significantly associated (p value < 0.05). More daily laborers were reported from Arbaminch, Bahir Dar, Dire Dawa and Harari while salary from long term employment is dominant in Adgrat and Mychew.

Although finding on income is precarious, monthly income of HHs in the vulnerable quarters ranged from 100 to 10000 birr per month ($N=1174$), with 55% earning 1500 birr or less, 20% earn 3000 or more and about 5% earn 5000 or more. Out of the 1174 respondents, monthly average HH income is estimated at 1867.35 birr ($SD=1509.7$); the SD showing huge disparity among HHs in terms of monthly

income. Maximum monthly average income come from employment (2570.3 birr) followed by support from other family members (2024.0 birr); while the least (665.0 birr) comes from begging.

There is significant difference ($p < 0.025$) between men and women and young and old in terms of monthly income. Men earn on average 2036.5 birr while women earn on average 1810.0 birr per month. Young to adult (15-44) earn significantly higher than those > 65 ($p < 0.001$). Significant difference was found between regions and vulnerable sections in terms of monthly average income. While monthly average income of 2491.7 birr was recorded in Ambo, Woldiya and Hawassa reported minimum average of 838 birr and 884 birr respectively.

More male save money than female HH heads (42% and 36% respectively). In terms of sources of income, regular employees are more conscious about saving than residents generating their income from other sources. Similarly residents of vulnerable quarters of few towns are well aware about savings as proportions of savers are greater than non-savers in D/Markos, Hawassa, Jimma, Kemisie, Mychew and Sodo towns. Most of the respondents who save money reported to saving in banks.

Saving ranges from 20 to 6000 birr per month per HH, but with average monthly saving of 360 (SD=547). The large SD is evident that saving per HH is highly variable, some saving very small, and few saving large sum; evidence that the vulnerable quarters are heterogeneous in livelihood too.

There is lots of changing jobs among residents of vulnerable quarters, mainly for jobs that have temporary nature. Change of jobs of up to 20 times was recorded. The easiest job one can find in all study setting is daily labor (75%).

4.2.3.1 Cooking Fuel

Although 92% of the HHs have electricity, only 21% of the respondents use electricity for cooking. On the contrary, 75% of them use firewood or charcoal; Unfortunately less than 1% each use kerosene or animal dung. When viewed across towns, more than 50% electricity users are from Addis Ababa. Towns may be divided along the use of charcoal or firewood; towns like Adgrat, Adama, D/Markos, Dire, Hawassa, Mychew and Mekelle heavily depend on charcoal, while most of the other group of towns use fire arm, except Addis where majority use electricity.

4.4 Felt problems and health concerns

4.4.1 Felt health problems

Finding shows that lack of access to mental health care (90.7%), household food insufficiency (80%), lack of access to latrine (42.6%), emergency care service (33%), access to medical supplies (32.4%) and access to road (29%) were mentioned as common felt needs by respondents. It was also mentioned that accesses to family planning service (16%), health care for children's (16%), health care for women's (15.3%) and immunization care service (8.4%) were mentioned to have been affected by lack of access to road. Challenges in conneciton to access to road was found critical in vulnerable quarters of Amhara (42.4%), Oromia (20%) and Addis Ababa (13.4%).

Felt health needs were not uniform in all the regions. Mental health is major felt health need in the vulnerable quarters of Oromia (23.9%) followed by Amhara (18.4%). Food and shelter were major needs in Addis Ababa (25.1%) followed by Oromia (23.6%). Need for communal latrine is 25% among residents at vulnerable sections of Amhara and Oromia regions. Emergency care service was mentioned as felt need by 33% of respondents in Oromia, 27% in Amhara and 18.8% in Addis Ababa. (Table 18).

FELT HEATH NEEDS	REGIONS							Total
	A.A	AMAHRA	SNNP	DERE DAWA	HARAR	OROMIA	TIGRAY	
Access to clean water	7	6	1	0	0	57	1	72
	9.70%	8.30%	1.40%	0.00%	0.00%	79.20%	1.40%	6.20%
Access to communal latrine	23	126	83	44	1	125	91	493
	4.70%	25.60%	16.80%	8.90%	0.20%	25.40%	18.50%	42.60%
Access to health facility	0	6	2	0	0	26	1	35
	0.00%	17.10%	5.70%	0.00%	0.00%	74.30%	2.90%	3.00%
Accesses to family planning service	42	34	44	0	1	63	2	186
	22.60%	18.30%	23.70%	0.00%	0.50%	33.90%	1.10%	16.10%
Health care for children's	19	85	5	1	1	74	0	185
	10.30%	45.90%	2.70%	0.50%	0.50%	40.00%	0.00%	16.00%
Health care for women's	16	72	3	1	1	83	1	177
	9.00%	40.70%	1.70%	0.60%	0.60%	46.90%	0.60%	15.30%
Immunization care service	30	43	4	0	0	16	4	97
	30.90%	44.30%	4.10%	0.00%	0.00%	16.50%	4.10%	8.40%
Access to pharmacy for drugs	51	93	25	0	1	126	3	299
	17.10%	31.10%	8.40%	0.00%	0.30%	42.10%	1.00%	25.90%
Access to road service for basic needs	45	142	41	34	0	67	6	335
	13.40%	42.40%	12.20%	10.10%	0.00%	20.00%	1.80%	29.00%
Access to ambulance service	44	55	9	0	1	19	0	128
	34.40%	43.00%	7.00%	0.00%	0.80%	14.80%	0.00%	11.10%
Emergency care service	72	106	32	1	40	127	4	382
	18.80%	27.70%	8.40%	0.30%	10.50%	33.20%	1.00%	33.00%
House hold food insufficiency	232	168	97	43	54	218	112	924
	25.10%	18.20%	10.50%	4.70%	5.80%	23.60%	12.10%	79.90%
Access to mental health care service	224	193	145	60	54	250	122	1048
	21.40%	18.40%	13.80%	5.70%	5.20%	23.90%	11.60%	90.70%
Lack of waste disposal system	21	160	70	12	5	121	36	425
	4.90%	37.60%	16.50%	2.80%	1.20%	28.50%	8.50%	36.80%
Medical supplies during treatment	94	121	24	1	3	121	11	375
	25.10%	32.30%	6.40%	0.30%	0.80%	32.30%	2.90%	32.40%
Total	236	214	187	60	57	262	140	1156

NB. Percentages and totals are based on respondents.

Table 18: The most felt health problems at urban vulnerable health sections in Ethiopian, 2017

4.4.2 Health related concerns at urban vulnerable sections

As part of the survey, participants were asked to mention at least four major health related concerns in their locality. Accordingly, slightly more than one-fourth (27.3%) mentioned problem of solid waste management, and 26.4% flagged concern about liquid waste management as major concerns. Problem of solid waste was mentioned relatively more frequently in Amhara (27.6%), SNNP (24%), and Oromia (18%). Similarly, Amhara (20.9%), SNNP (25%) and Oromia (12.5%) flagged problem related to liquid waste management (Table 19).

Health concerns	Regions							Total
	A.A	AMAHRA	SNNP	DERE DAWA	HARAR	OROMIA	TIGRAY	
Solid waste management related	71	205	179	7	65	134	83	744 (27.30%)
	9.50%	27.60%	24.10%	0.90%	8.70%	18.00%	11.20%	
Liquid waste management related	173	151	180	17	43	90	67	721(26.40%)
	24.00%	20.90%	25.00%	2.40%	6.00%	12.50%	9.30%	
Communicable diseases	25	10	120	24	8	331	3	521(19.10%)
	4.80%	1.90%	23.00%	4.60%	1.50%	63.50%	0.60%	
Non communicable diseases (in general)	0	2	0	6	0	60	0	68(2.50%)
	0.00%	2.90%	0.00%	8.80%	0.00%	88.20%	0.00%	
Drinking water problem	10	14	37	3	20	29	1	114 (4.20%)
	8.80%	12.30%	32.50%	2.60%	17.50%	25.40%	0.90%	
Crowdedness problem	31	42	14	0	12	11	2	112(4.10%)
	27.70%	37.50%	12.50%	0.00%	10.70%	9.80%	1.80%	
Food, shelter and others	57	112	95	5	42	116	19	446 (16.40%)
	12.80%	25.10%	21.30%	1.10%	9.40%	26.00%	4.30%	
Total	367	536	625	62	190	771	175	2726

N.B. Percentages and totals are based on responses. a. Group

Table 19: Prevailing concerns related to health at vulnerable quarters in Ethiopia, 2017

4.5 Prevailing health problems

4.5.1 Common prevailing health problems at household

The Prevailing health problems were identified among residents of vulnerable quarters. The most commonly prevailing health problem at the quarters were: eye problem (32.1%), dental care (32.9%), and malnutrition (29.7%), Hypertension (22.8%), substance abuse (23%), and general medical problems (22.8%). The prevalence of these health problems was found to vary across vulnerable quarters. Accordingly eye problem was prevalent in Amhara (18.8%), SNNPR (22.5%), and Oromia (28%). Dental health care problem was reported in SNNP (22.7%), and Oromia (27.4%); malnutrition in Amhara (41.6%), and SNNP (32.8%); Hypertension in Addis Ababa (18.8%), and Oromia (24%); and substance use/abuse in SNNPR (45.4%), and DireDawa (19.6%). (Table 20)

Furthermore, Diarrheal disease was reported, in general, by 17.6% respondents. When viewed across regions, it is - as high as 54.1% in SNNP, and 27.7% in Amhara. Risk of HIV infection was reported by 13.5%; - as high as 42.1% in SNNP and as low as 18.4% in Oromia; diabetes mellitus (14.6%) - as high as 47.2% in SNNPR, 18.7% in Oromia and 15.4% in Addis Ababa. Hearing problem was also reported to be 12.6% as high as 37.7% in SNNP, 19.8% in Amhara, and 17.9% in Oromia. Prevalence of respiratory infection was estimated at 12.6%, as high at 48.1% in Amhara and 28.3% in SNNP. Disability among adults (11.9%): which is high in Amhara (48.1%), and low in SNNP (28.3%). (table 20)

DISEASE PROBLEM	REGIONS							
	A.A	AMAHRA	SNNP	DERE DAWA	HARAR	OROMIA	TIGRAY	Total
Adult diagnosed with disability	12	10	50	4	6	13	5	100
	12.00%	10.00%	50.00%	4.00%	6.00%	13.00%	5.00%	11.90%
Exposure to AIDS/HIV risks	7	14	48	6	8	21	10	114
	6.10%	12.30%	42.10%	5.30%	7.00%	18.40%	8.80%	13.50%
Child diagnosed with disability	2	5	23	2	6	2	2	42
	4.80%	11.90%	54.80%	4.80%	14.30%	4.80%	4.80%	5.00%
Dental care	38	24	63	12	33	76	31	277
	13.70%	8.70%	22.70%	4.30%	11.90%	27.40%	11.20%	32.90%
Diabetes	19	11	58	1	7	23	4	123
	15.40%	8.90%	47.20%	0.80%	5.70%	18.70%	3.30%	14.60%
Eye/vision problem	43	51	61	10	6	76	24	271
	15.90%	18.80%	22.50%	3.70%	2.20%	28.00%	8.90%	32.10%
General Medical problem	24	46	27	3	32	49	11	192
	12.50%	24.00%	14.10%	1.60%	16.70%	25.50%	5.70%	22.80%
Hearing problem	9	21	40	0	9	19	8	106
	8.50%	19.80%	37.70%	0.00%	8.50%	17.90%	7.50%	12.60%
Heart Disease	11	11	36	4	9	18	5	94
	11.70%	11.70%	38.30%	4.30%	9.60%	19.10%	5.30%	11.20%
Hypertension	36	25	70	5	5	46	5	192
	18.80%	13.00%	36.50%	2.60%	2.60%	24.00%	2.60%	22.80%
Mental Health problem	6	10	13	0	4	9	2	44
	13.60%	22.70%	29.50%	0.00%	9.10%	20.50%	4.50%	5.20%
Pulmonary Disease (9	51	30	2	4	4	6	106
	8.50%	48.10%	28.30%	1.90%	3.80%	3.80%	5.70%	12.60%
Sexually Transmitted Diseases	2	3	20	0	6	2	5	38
	5.30%	7.90%	52.60%	0.00%	15.80%	5.30%	13.20%	4.50%
Substance abuse	2	10	88	38	30	21	5	194
	1.00%	5.20%	45.40%	19.60%	15.50%	10.80%	2.60%	23.00%
Teenage pregnancy	0	2	44	0	3	2	2	53
	0.00%	3.80%	83.00%	0.00%	5.70%	3.80%	3.80%	6.30%
Sleep problems	3	9	9	0	13	37	8	79
	3.80%	11.40%	11.40%	0.00%	16.50%	46.80%	10.10%	9.40%
Malnutrition	6	104	82	0	25	26	7	250
	2.40%	41.60%	32.80%	0.00%	10.00%	10.40%	2.80%	29.70%
Diarrheal diseases	6	41	80	2	5	13	1	148
	4.10%	27.70%	54.10%	1.40%	3.40%	8.80%	0.70%	17.60%
Total	125	178	166	48	59	197	70	843

N.B. Percentages and totals are based on respondents.

Table 20: Prevailing health problems mentioned at urban vulnerable sections of Ethiopia, 2017.

4.6 Morbidity and Mortality at urban vulnerable quarters

Morbidity

Perceived prevalence of morbidity in connection to specific cause was estimated. Accordingly non-communicable diseases (general) accounted for 29.2%, respiratory diseases for 27.6%, HIV and other communicable diseases accounted for 24.5%, of morbidities in vulnerable quarters of urban centers (fig 3).

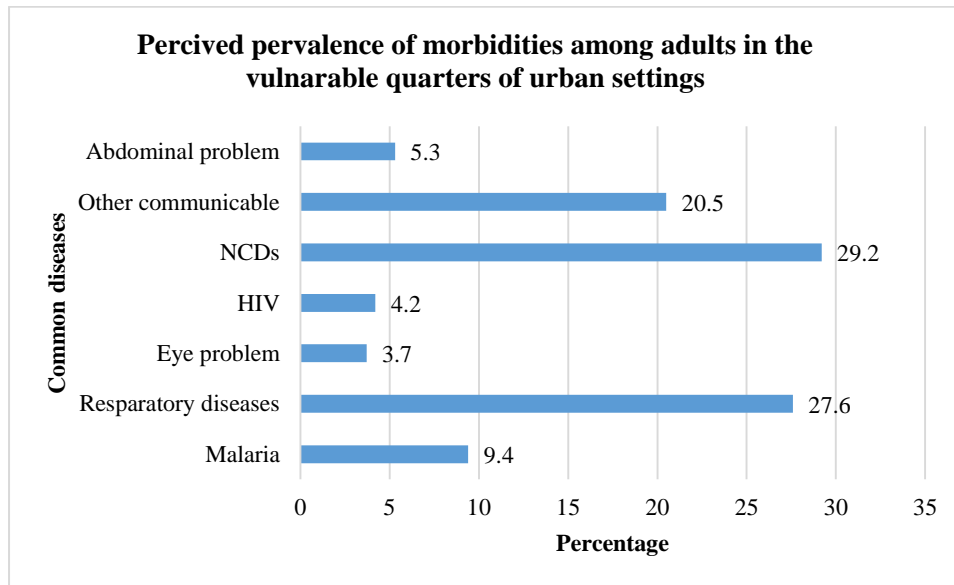


Figure 4: Morbidity among adults in the urban vulnerable section households

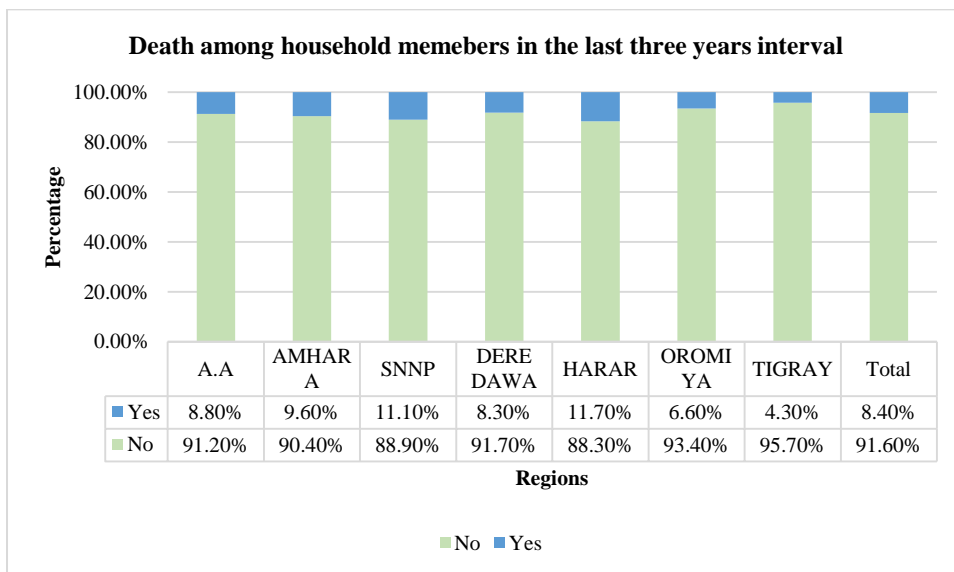


Figure 5: Death among household members at urban vulnerable sections in the last three (2014/2015 to 2016/2017) years.

Level of morbidity, one month preceding the study, was found to be 32.6%. The highest morbidity was in SNNPR (47.5%), while the minimum was in Tigray region (17.3%). Over 44% of those who were sick reported to visit health center followed by hospitals (36%). Visit to health centers ranges from 65.2 % in Harar to 26.5% in Tigray and visit to hospitals range from 59.3% in Tigray to 18.5% in Dire Dawa. Close to 10% of those who were sick visited traditional healers.

In view of this finding from qualitative study reveals that service provision in the health centers was not holistic, have longer waiting time, consistent lack of drug are common challenges clients encounter. "Drugs are not available at our health centres, even-though, health service is free of charge for those who can not pay. Services for mental problems and chronic diseases including hypertension and cancer however lacking in the health center" (Jimma, resident).

Overall, the waiting time at health facilities to get service showed that 54% waited for less than 30 minutes. However, 23.4% waited between 30 minute to one hour and 12% waited for more than two hours with considerable variation among the regions. In Addis Ababa and Amhara, two thirds of the respondents from the vulnerable quarter reported waiting time of less than 30 minutes while one-fourth of those in Oromia, SNNP and Tigray regions reported waiting time of more than one hour.

Qualitative evidence revealed long waiting time. "Prolonged waiting time at triage and unavailability of essential drugs at public facilities, are major complaints from the patients." (Hawass, HEW). This was further emphasized that "Community members usually complain about shortage of medication and prolonged waiting time at the health facilities. They also complain about mis-treatment by health professionals" (Shashamane, health department head)

Mortality

Household level death history at vulnerable quarters of urban setting was assessed for the last three year prior to the survey. Finding shows that during the last three-year preceding the study, death was reported in 8.4% of the households. The highest proportion of death were reported in Harar (11.7%) and SNNP (11.1%), whereas the lowest death encounter was reported from Tigray (4.3%) at the vulnerable quarters (Figure 4). Among all deaths reported nearly two third (65%) were attributed to kidney, blood pressure and heart. Tuberculosis, Hepatitis and HIV were perceived causes of death for 7% of respondents. (Figure 5).

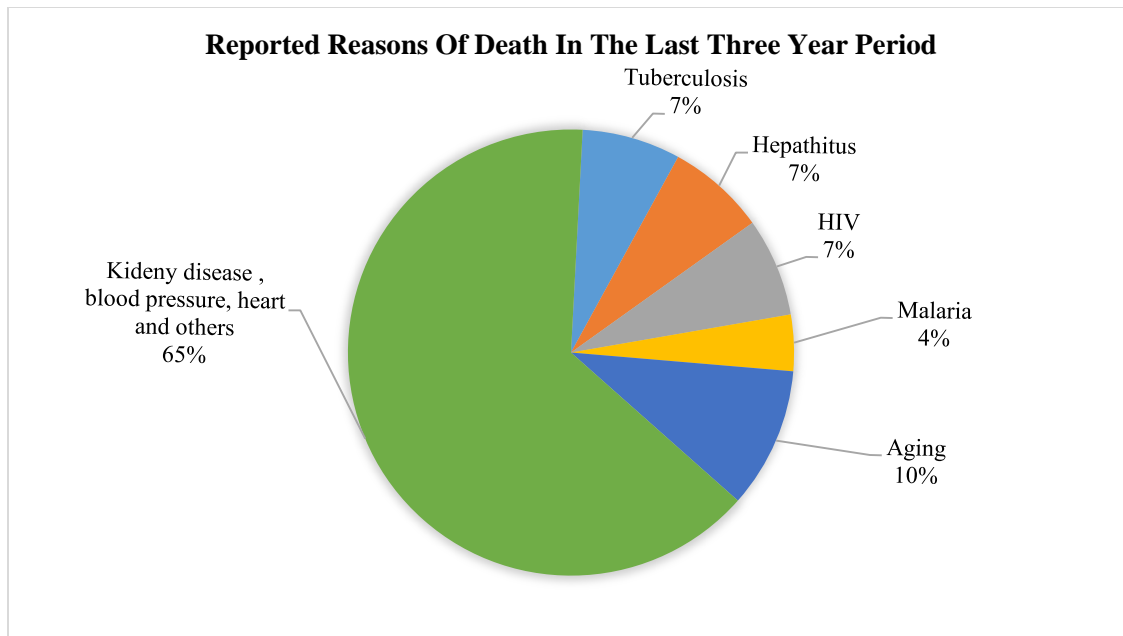


Figure 6: Perceived causes of death during the three-year at vulnerable quarters of urban settings in Ethiopia.

Tuberculosis in the urban vulnerable sections

Assessment of the prevalence and treatment of Tuberculosis (TB) at vulnerable quarters show that overall confirmed TB case under follow up in the households was found to be 3.6 %. The highest prevalence (5%) was recorded for Addis Ababa, Harar and Dire Dawa (7%), and Oromia (2.4%). It was found that 4% of those who were sick from TB completed their treatment with some regional variation (Table 21).

VARAIBLE		REGIONS							Total
		A.A	AMHARA	SNNP	DERE DAWA	HARAR	OROMIYA	TIGRAY	
Confirmed TB case under follow up in the household	Yes	13	7	8	3	3	8	2	44
		5.40%	3.20%	4.00%	5.00%	5.00%	2.70%	1.40%	3.60%
	No	227	213	191	57	57	291	138	1174
		94.60%	96.80%	96.00%	95.00%	95.00%	97.30%	98.60%	96.40%
Total		240	220	199	60	60	299	140	1218
Household member who completed treatment for TB	Yes	13	6	7	4	4	7	7	48
		5.40%	3.40%	3.60%	6.70%	6.80%	2.40%	5.00%	4.10%
	No	226	171	190	56	55	286	132	1116
		94.60%	96.60%	96.40%	93.30%	93.20%	97.60%	95.00%	95.90%
Total		239	177	197	60	59	293	139	1164

Table 21: Tuberculosis case and treatment at urban vulnerable section households in Ethiopia

4.6.1 Common childhood problems at households

Figure 4 shows the Percentage distribution of perceived childhood health problems mentioned by the households at the vulnerable quarters in the last one-year and finding shows that, 30% of children encountered acute respiratory tract infection and 29% had diarrhea, 20% had Typhoid fever, 8% malaria, 7% pneumonia and tonsillitis (Figure 6).

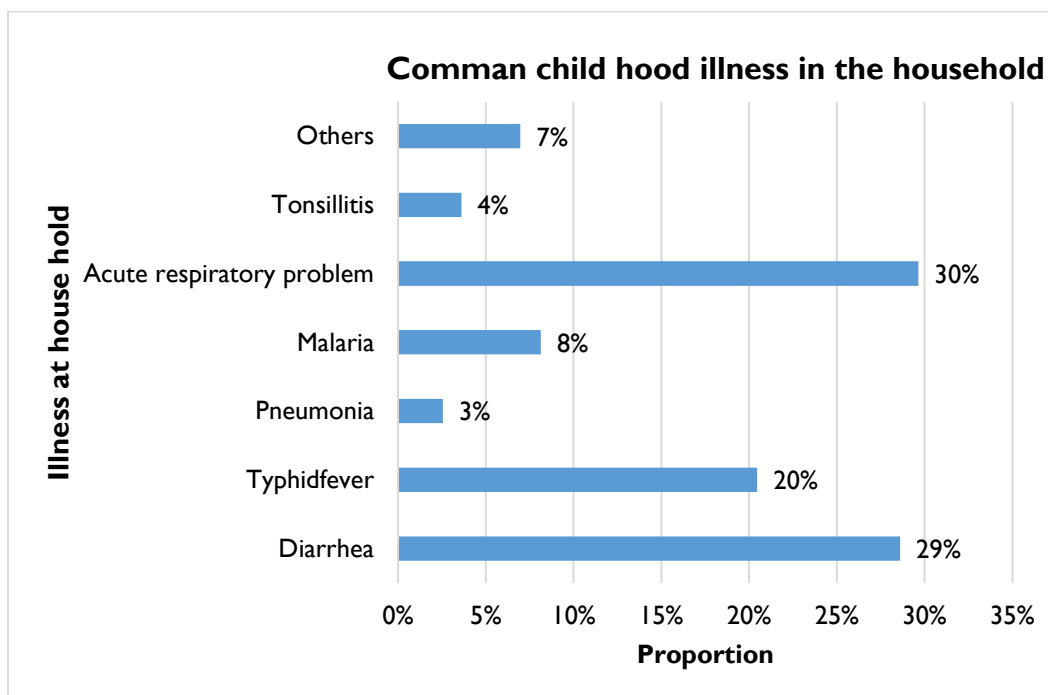


Figure 7: Common childhood illness at vulnerable quarters of urban centered in Ethiopia, 2017

Diarrhea and its management among children's

More specific assessment was made on management of diarrhoea among children at vulnerable quarters of urban settings. Among children's assessed for diarrheal episode during the two weeks preceding the study, 7.6 % of them had diarrheal disease. Of these 30% reported to have blood in the stool. At the time of diarrhea incidence, almost 58% reported to give the same or less amount of drinks while 26.5 % give more drinks and 4.8% give nothing to drink. With respect to food, 13.3 % eat much less and 70% eat the same or somewhat less to usual intake. However, almost 16 % give more than usual to eat during the incident of diarrhea.

The practice on diarrhea treatment shows that, 88% of the household with diarrheal problem seek advice or treatment. Among those who seek treatment, 78.6% visited the health center, 11% government hospital and 11.4% private clinic. More than two third (82%) of children were given ORS to treat the dehydration related to diarrhea and almost 35 % were given homemade fluid (Table 22).

Variables	Categories	Frequency	proportion
Children had diarrhea in the last two weeks	Yes	83	7.6
	No	1007	92.0
	Don't know	5	0.5
	Total	1095	100
Was there any blood in the stools?	yes	25	30.1
	No	58	69.9
	Total	83	100
Drink given during the diarrhea	Much less	9	10.8
	Somewhat less	24	28.9
	about the same	24	28.9
	more	22	26.5
	nothing to drink	4	4.8
	Total	83	100
Eat food during the diarrhea	Much less	11	13.3
	Somewhat less	36	43.4
	about the same	22	26.5
	more	13	15.7
	nothing to drink	1	1.2
	Total	83	100
Seek advice or treatment for diarrhea from any source	Yes	73	88.0
	No	10	12.0
	Total	83	100
Place treatment sought	Gov't hospital	8	11.0
	Gov't HC	55	78.6
	Private clinic	8	11.40
First seek advice or treatment to diarrhea	Gov't hospital	7	9.7
	Gov't HC	52	72.2
	private clinic	11	15.3
	Gov't HP	2	2.8
	Total	72	100
Fluid given made of ORS to during diarrhea	Yes	66	82.5
	No	1	1.3
	Don't know	13	16.2
	Total	80	100
Homemade fluid given to during diarrhea	Yes	25	34.7
	No	2	2.8
	Don't know	45	62.5
	Total	72	100

Anything else given to treat diarrhea	Yes	63	79.7
	No	16	20.3
	Total	79	100

Table 22: Diarrheal problem and its management among children's at vulnerable sections in Ethiopia

Figure 5 displays types of medical treatment considered for treatment of diarrheal disease. It was found that pill or antibiotic syrup (50.8%), a Zinc (47.6%) and anti-motility (28.6%) were common treatment options against diarrhoea among children. However, about 78% of children were treated with unspecified type of intravenous treatments for diarrhea disease and only 11.1% of them were given antibiotic injection for treatment of diarrhea.

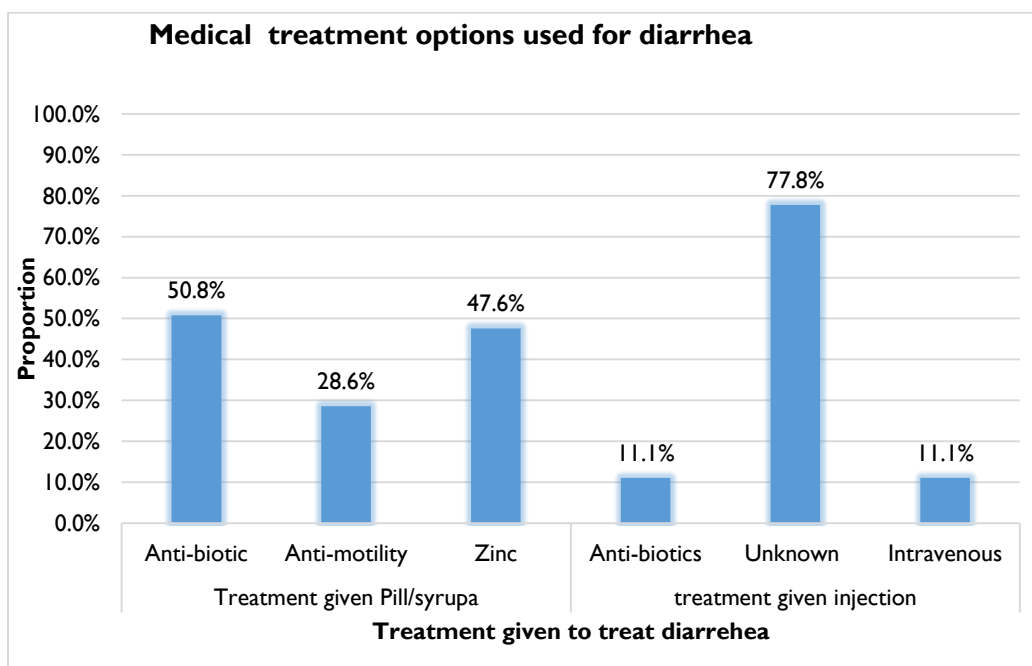


Figure 8: Type of treatment options used for diarrhea at urban vulnerable sections in Ethiopia, 2017

4.7 Availability and use of health service

Health facility is found be accessible in all the study settings. Residents in vulnerable quarter of urban centers in Ethiopia travel on average 17.9 minutes to the nearest health center with variations between study settings. There is significant differences between some regions in terms of time taken to travel to health facilities where Dire Dawa scoring the longest travel time of 25.8 minutes and Oromia the shortest mean travel time of 14.2 minutes, while travel time in Ambo and Nekemt was found to be 7 and 11 minutes respectively (Table 23). Although we did not obtain average travel time for non-vulnerable HHs, there is no evidence to suggest that vulnerable HHs are disadvantaged.

Region	Presence of health facility		Total	Distance (minutes) travelled to nearest HF		
	yes	No		Mean	N	Std. Deviation
	A.A	99.6		0.4	240	16.3
Amhara	99.65	0.5	220	22.4	219	11.3
SNNP	99.5	0.5	200	20.7	200	10.7
Dire Dawa	100.0	0.0	60	25.8	60	6.8
Harar	100.00	0.00	60	14.35	60	5.4
Oromia	99.33	0.67	298	14.19	298	10.1
Tigray	100.00	0.00	140	15.64	140	8.8
Total	99.59	0.41	1218	17.90	1216	11.0

Table 23: Presence of Health facility in the vulnerable quarters by region

VARIABLES		REGIONALS							
		A.A	AMHARA	SNNP	DIRE DAWA	HARAR	OROMIYA	TIGRAY	TOTAL
Health facility in the locality (Maximum 13 km distance)	Yes	239 (99.6%)	219 (99.5%)	199 (99.5%)	60 (100.0%)	60 (100.0%)	298 (99.3%)	140 (100.0%)	1215 (99.6%)
	No	1(0.4%)	1(0.5%)	1(0.5%)	0(0.0%)	0(0.00%)	2(0.7%)	0(0.0%)	5(0.4%)
	Total	240	220	200	60	60	300	140	1220
Family member ill in the last month	Yes	83(34.7%)	80 (36.5%)	95(47.5%)	12(20.7%)	16 (26.7%)	86 (28.7%)	24(17.3%)	396(32.6%)
	No	156 (65.3%)	139 (63.5%)	105(52.5%)	46(79.3%)	44(73.3%)	214(71.3%)	115(82.7%)	819(67.4%)
	Total	239	219	200	58	60	300	139	1215
Type of Health facility HH members visited	Hospital	40(30.8%)	39(32.0%)	56(44.4%)	5(18.5%)	5(21.7%)	57(38.0%)	29(59.2%)	231(36.8%)
	Health center	71(54.6%)	63(51.6%)	54(42.9%)	17(63.0%)	15(65.2%)	46(30.7%)	13(26.5%)	279(44.5%)
	Clinic (private)	19(14.6%)	8(6.6%)	16(12.7%)	5(18.5%)	3(13.0%)	46(30.7%)	7(14.3%)	104(16.6%)
	Traditional healer	0(0.0%)	12(9.8%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.7%)	0(0.0%)	13(2.1%)
	Total	130	122	126	27	23	150	49	627
Waiting time to service (Minute)	<=30	83(68.6%)	77 (67.0%)	49(39.2%)	19(73.1%)	9(40.9%)	65(43.6%)	26(53.1%)	328(54.0%)
	30-60	18 (14.9%)	19 (16.5%)	36 (28.8%)	5 (19.2%)	8 (36.4%)	46 (30.9%)	10 (20.4%)	142(23.4%)
	60-120	12 (9.9%)	4(3.5%)	21(16.8%)	1(3.8%)	0(0.0%)	21(14.1%)	5(10.2%)	64(10.5%)
	>121	8 (6.6%)	15(13.0%)	19(15.2%)	1(3.8%)	5(22.7%)	17(11.4%)	8(16.3%)	73(12.0%)
	Total	121	115	125	26	22	149	49	607

Table 22: Health facility availability at urban vulnerable quarters across regions in Ethiopia, 2017

Qualitative findings show that location of health facilities in vulnerable quarter of study setting is often in the center and not in the outskirts making health services accessible to residents. However, the type and mix of health professionals was found to be a problem. One of the participants argued that, "if you observe the health workers in the urban health centers they are not active and apt in addressing the health need of residents. Most importantly, they are not respectful to their clients" (Adigrat, Head, District Health office). Another respondent noted that, "the nearby health centers do not provide holistic health service. For every single health complaint from a client they tend to refer to hospital. Those who afford do not want to go to health center but directly go to hospitals to avoid the hassle"(Hawassa, HEW)

4.7.1 Maternal health service

ANC

Delivery experience

Assessment result shows that 79.9% of participants reported to have at least one child. Of these, 69.8% of births were assisted by skilled providers within public facility (Hospital and health centers) (97.2%) and 2.8% in a private facility. About 16% assisted by traditional birth attendant (5.6% with trained and 11.2% untrained attendants). The overall percentage of births delivered in health facilities range from less than 47.2% in Harar to 85.6% in Addis Ababa. Of these, finding shows that 31.4% of women delivered at home. The regional distribution shows that, home delivery is as high as 52.8% in Harar, 38% in DireDawa and SNNP, and 30% in Amhara, Tigray and Oromia regions (Table 24).

Variable	Category	REGION							
		A.A	AMHARA	SNNP	DERE DAWA	HARAR	OROMIYA	TIGRAY	Total
Place of delivery for last baby	Home	22	54	65	11	28	86	39	305
		14.40%	28.90%	37.80%	37.90%	52.80%	34.50%	30.20%	31.40%
	Public Hospital	72	69	48	9	23	104	57	382
		47.10%	36.90%	27.90%	31.00%	43.40%	41.80%	44.20%	39.30%
	Private Hospital	5	4	2	0	0	3	0	14
		3.30%	2.10%	1.20%	0.00%	0.00%	1.20%	0.00%	1.40%
	Public Health center	50	60	57	9	2	55	33	266
		32.70%	32.10%	33.10%	31.00%	3.80%	22.10%	25.60%	27.40%
Private Clinic	4	0	0	0	0	1	0	5	
	2.60%	0.00%	0.00%	0.00%	0.00%	0.40%	0.00%	0.50%	
Total		153	187	172	29	53	249	129	972

Table 24: Place of delivery among urban vulnerable sections in Ethiopia, 2017

Figure 6 shows distribution of reasons for women delivering at home in vulnerable quarters. The survey revealed that about half (48%) mentioned that it was not customary or conventional to deliver at health facility, and 38.7% stated it as unnecessary. The rest mentioned unavailability of female birth attendants

at health facilities (6%), perceived quality of services as being poor (2.8%), the long distance from health facility (2.8%), lack of permission from husband/family (2.8%), and the high cost for services (0.5%)

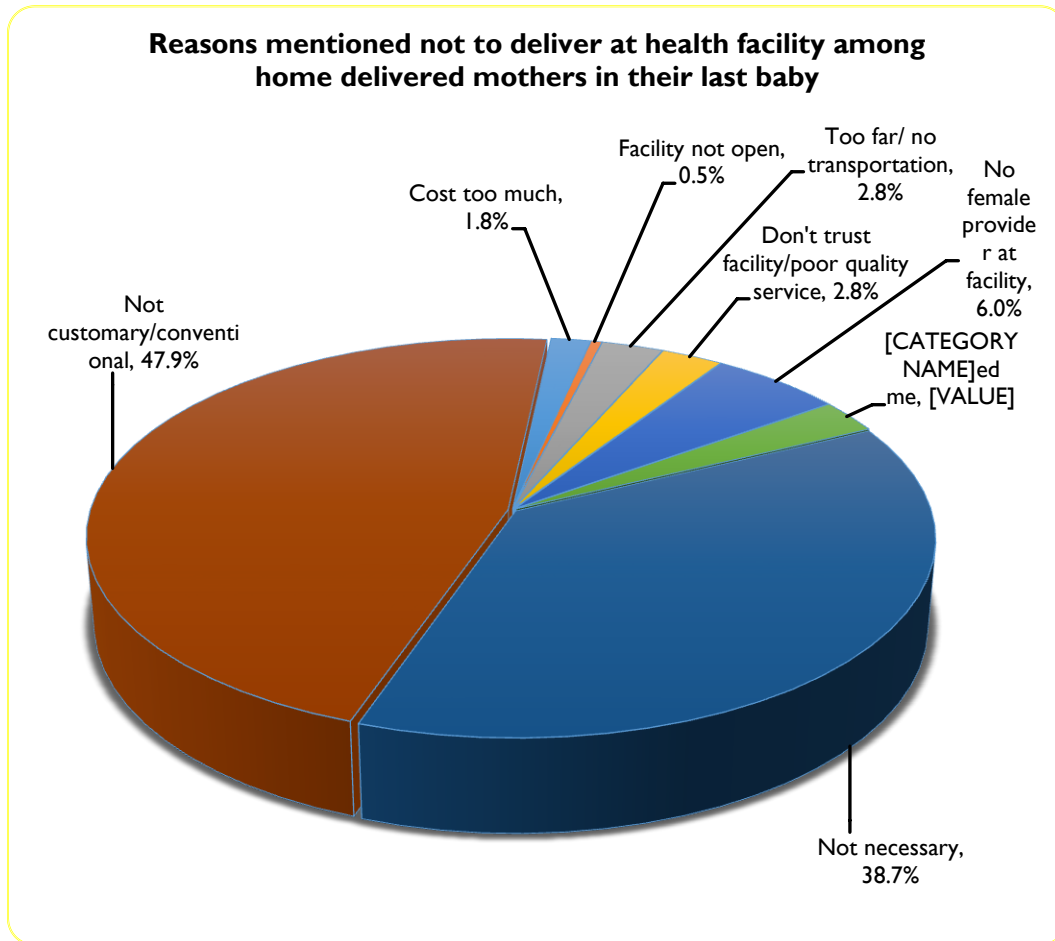


Figure 9: Reasons for not to deliver at health facility among urban vulnerable section of Ethiopia, 2017.

PNC

Finding revealed that among women who received postpartum care, 44 % were examined within an hour following delivery, 8% within 1-2 days, and 20% within 3 and more days after delivery.

Majority of women (63.4%) received postnatal care. However, considerable proportion (36.6%) of women did not receive checkup after they left the facility. In total, among mothers who have delivery experience, 48.5% visited the health facility within two days after delivery. Majority of women were examined by doctors (58%), and nurses or midwives (38%) in their visit (Table 25).

Variables	Categories	Frequency	Proportion
Do you have biological child/children	Yes	975	79.9
	No	234	19.2
	Total	1209	100
Number of Ever born children	1-3 children	607	63
	4-6 children	287	29.8
	7 or above	70	7.3
	Total	964	100
Did you yourself actually want to become pregnant for your last baby	Wanted	804	82.5
	Wanted later	138	14.2
	wanted no more children	33	3.4
	Total	975	100
Who assisted the delivery of your last baby	Doctor	270	28
	Nurse/midwife	406	42.1
	HEW	5	0.5
	TTBA	54	5.6
	UTBA	108	11.2
	Relative/friend	1	0.1
	None	120	12.4
	Total	964	100
Type of delivery in the last baby	Cesarean section	179	18.6
	Vaginal /normal	785	81.4
	Total	964	100
Check up on your health while at health facility	Yes	591	70.4
	No	126	15
	Not allotted	123	14.6
	Total	840	100
Mother first check up after delivery	Within hour	332	44
	Within 1-2 days	63	8
	After 3 or more days	154	20
	Don't know	211	28
	Total	760	100
Heath checkup after left the facility	Yes	505	63.4
	No	292	36.6
	Total	797	100
Visit any health facility within two days of last delivery	Yes	452	48.5
	No	432	46.4
	Don't remember	48	5.2
	Total	932	100
Who checked on your health within two days visit of last delivery	Doctor	170	38.1
	Nurse/midwife	259	58.1

	HEW	7	1.6
	None	10	2.2
	Total	446	100

Table 25: Maternal delivery experience and postnatal checkup at urban vulnerable sections in Ethiopia, 2017

The finding reveals that child health checkup experience among women in the vulnerable quarters of urban centers is very low. It was reported that 67% new born baby were checked by health personnel or traditional birth attendants at 2 months. However, a considerable proportion of babies (25%) were not examined.(Table 26).

Variables	Categories	Frequency	Proportion
Health personnel or traditional birth attendant checked on baby health at 2 month	Yes	628	67.1
	No	239	25.5
	Do not know	69	7.4
	Total	936	100
First check up after delivery for last baby	Within hour	269	32
	within 1-2 days	159	19
	within weeks	204	24
	Don't' know	204	24
	Total	836	100
Person Who seen baby at first check up	doctor	229	28.8
	Nurse/midwife	406	51.1
	HEW	28	3.5
	TTBA	4	0.5
	UTBA	15	1.9
	relative/friend	2	0.3
	none	111	14
	Total	795	100
Where did this first checkup of the baby take place?	Home	21	2.8
	Government hospital	301	39.8
	private hospital	16	2.1
	government health center	398	52.6
	private clinic	10	1.3
	government health post	11	1.5
	Total	757	100

Table 26: Child health checkup practice after delivery at the urban vulnerable sections of Ethiopia, 2017

4.7.2. Health education service to Household

Almost all households in vulnerable sections in the regions have access to health education at the household level by health extension workers or other health professionals. However, the distribution varies across regions where 71% of respondents from Addis Ababa, 73.7%, from Tigray, and 54% from

Amhara were reported to have access to health education at the household level while in the remaining regions the provision of health education at the household level was below 50% (Figure 9).

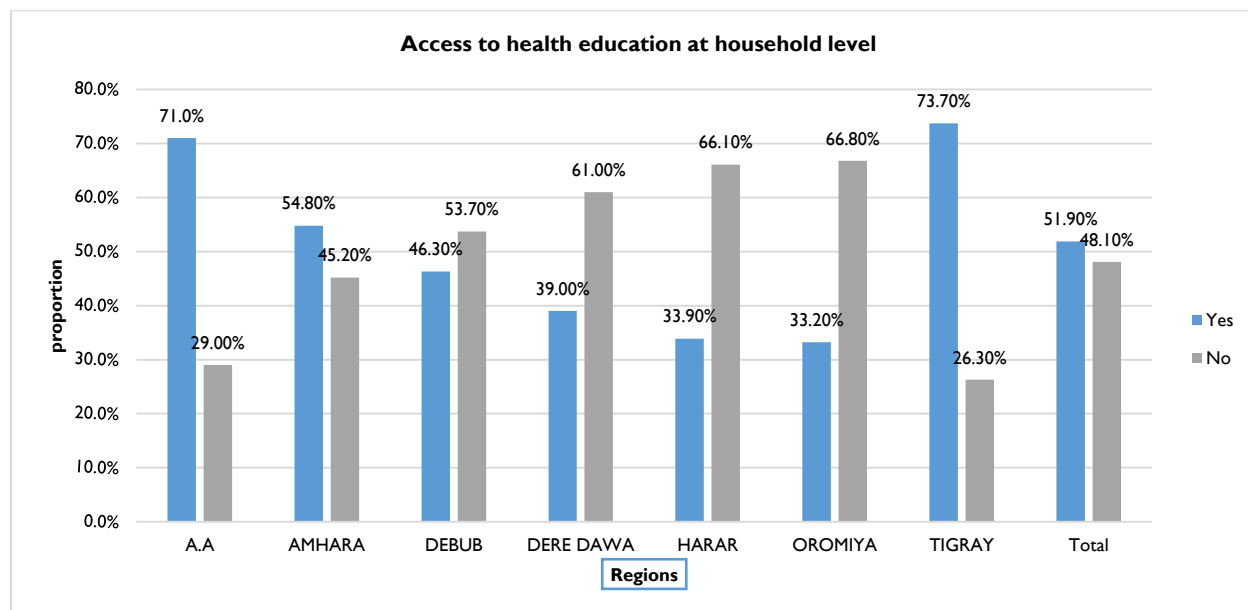


Figure 10: Access to health education at household level in the urban vulnerable sections, 2017.

4.8 Satisfaction with health service

Table 26 presents the percentage distribution of satisfaction to health service and drug access and day off from work. Almost 80% of residents in vulnerable quarters were reported to be satisfied (measured using yes/no response to the question) with the health service provision. Access to drugs were reported where 78.8% bought the drugs from pharmacies while 19.5% were given the drugs from the health facility. Regional distribution of access to drugs was found that 94% bought the drug in SNNPR and Oromia while 54.5%, 40.7% in Harar and Amhara bought drugs respectively. Concerning cost of drugs, it was reported that 90% of the respondents spent 500 birr or less and only 5% spent more than 1000 birr. However, 12% in SNNP and 7% in Harar spent more than 1000 birr. An assessment of the proportion of respondents who are off work due to illness, it was found that 17 % were off from work for more than 16 days due to illness (the maximum being 18.9 % in Amhara and the minimum 2.2% in Tigray) and 12.6 % had off work for 7-15 days (Table 27).

VARIABLES		REGIONALS							TOTAL
		A.A	AMHARA	SNNP	DIRE DAWA	HARAR	OROMIYA	TIGRAY	
Satisfied with the services given	Yes	111	107	87	19	13	105	36	478
		91.70%	90.70%	71.90%	79.20%	59.10%	73.40%	73.50%	79.90%
	No	10	11	34	5	9	38	13	120
		8.30%	9.30%	28.10%	20.80%	40.90%	26.60%	26.50%	20.10%
Total	121	118	121	24	22	143	49	598	
Did you buy or given drugs?	Bought	94	68	118	17	10	137	33	477
		77.00%	57.60%	94.40%	70.80%	45.50%	93.80%	68.80%	78.80%
	Given	26	48	6	6	12	6	14	118
		21.30%	40.70%	4.80%	25.00%	54.50%	4.10%	29.20%	19.50%
	Both	1	2	1	0	0	0	0	4
		0.80%	1.70%	0.80%	0.00%	0.00%	0.00%	0.00%	0.70%
	Not needed	1	0	0	1	0	3	1	6
0.80%		0.00%	0.00%	4.20%	0.00%	2.10%	2.10%	1.00%	
Total	122	118	125	24	22	146	48	605	
Cost of drug	<=500	93	71	98	19	13	136	29	459
		88.60%	95.90%	80.30%	90.50%	92.90%	97.10%	87.90%	90.20%
	501-1000	9	1	9	1	0	2	3	25
		8.60%	1.40%	7.40%	4.80%	0.00%	1.40%	9.10%	4.90%
	>=1001	3	2	15	1	1	2	1	25
2.90%		2.70%	12.30%	4.80%	7.10%	1.40%	3.00%	4.90%	
Total	105	74	122	21	14	140	33	509	
How long you were in day off	<=2 days	122	120	98	41	33	99	126	639
		54.20%	55.30%	52.70%	74.50%	70.20%	50.50%	91.30%	60.10%
	3-6 days	33	13	21	8	1	31	3	110
		14.70%	6.00%	11.30%	14.50%	2.10%	15.80%	2.20%	10.30%
	7-15 days	24	41	32	3	2	29	3	134
		10.70%	18.90%	17.20%	5.50%	4.30%	14.80%	2.20%	12.60%
>=16 days	46	43	35	3	11	37	6	181	
	20.40%	19.80%	18.80%	5.50%	23.40%	18.90%	4.30%	17.00%	
Total	225	217	186	55	47	196	138	1064	

Table 27: Satisfaction to health service and access to medical drugs at the urban vulnerable sections in Ethiopia, 2017

4.9 Support expected at urban vulnerable sections.

The survey also assessed the needs of vulnerable quarters of urban environments. Findings indicated that more than two thirds of the households needed assistance for employment or to secure job (93%), health care (85.9%), education and training (83%), health care for family (80.2%), housing (78.9%) and transportation (59.2%). However, the need for assistance was found to vary in the different regions.

Regional distribution shows that, the most needed assistance was employment in Addis Ababa (20%), Oromia (25.4%), Amhara and SNNP (about 18% each). Health care support was desired by respondents from Oromia (26.8%), Addis Ababa (21.2%), and SNNPR (17%); while educational and training support need was mentioned in Oromia (25.4%), Addis Ababa (20.7%), and SNNPR (17%). Need for health care of the family members was reported in Oromia and Addis Ababa accounting for 26%, 21.3% respectively. Besides, need for housing support was reported by respondents from Oromia (25.1%) and Addis Ababa (24.2%). Need for transportation assistance was reported from Oromia (29.4%), Amhara (19.9%), Addis Ababa (16.1%) and SNNPR (17.5%).

4.10. Perceived barriers to health service provision among residents of the vulnerable section of urban center

Barriers to health services in all selected towns were found to be at individual, community and health care provider levels. It was gathered that though health and health related problems are pervasive in the vulnerable sections of the settings, at times the problem are not limited to these areas. The findings highlighted that perceived barriers were often connected to such services as postnatal care, family planning, child care and issues connected with respectful care by health professionals. Besides, shortage of essential drugs and medical equipment in governmental health facilities were found to compromise health provision and client satisfaction in vulnerable quarters of the towns.

Individual and Community related barriers

The barrier at individual level begins from lack of awareness about the services and motivation, and goes up to the extent of lack of money to visit and use health services. Lack of awareness and motivation was mainly reported to affect the uptake of HIV screening at vulnerable quarters of town. One of the interviewee argued that:

“...There was resistance to accept HIV screening at first visit. Some of them get convinced after repeated visit at their homes before accepting the HIV test” (Adgrat, K04, HEW)

A well-established cultural belief of the community towards staying at home after delivery was commonly mentioned to affect use of postnatal care. One of the participants explained that:

“...culturally, women are not encouraged to get out of home before 12 days. There is an established belief that women and the newborn should not be exposed to sunlight and wind at least for 12 days following delivery. This has affected our performance regarding post-natal care not only in rural and vulnerable sections of towns but also in the better-off parts of towns.”(Adgrat, Head, District Health office).

On the other hand religious belief and longstanding community perceptions are identified as barriers for the low uptake of family planning and child care in Harar town. One of the key informants pointed out that:

“There are problems regarding family planning provision among Muslim community in connection to their religion. Often husbands refuse use of such services although women tend to be interested in the service” (Shenkor, DehaSefer, HEW)

There are challenges posed by how local community feel about services be it for women or children, Local perceptions of services were generally found to affect how services are provided to specific targets. For example provision of vitamin A supplementation for children is one of the challenges in some settings. In Harar, one of the respondents highlighted that

“... there are households that refuse provision of vitamin A and deworming service to children. They assume that such services hinder physical growth and brain development of children” (Shenkor, DehaSefer, HEW)

Living condition of communities in vulnerable quarters of towns

Most key informants unanimously argued that being poor is a key factor for low uptake of any health and related services rendered at all levels of health facilities as peculiar characteristics of vulnerable sections of the towns. One of the health extension workers claimed that:

“Since members of the community lives in very poor economic state, they are resistant to educational activities for they do not have time and interest for that. They say that, “If I have enough money, I know what to do to my children and keep my personal and environmental hygiene. But in this situation, while I am struggling to find my daily bread, I do not understand how I would take your advice to build latrine. I can’t afford to do that”. Their major problem is economy, they are well aware about all health issues. They are highly exposed to the media and they know most of what we tell them” Arbaminch, GucheraaSefer, HEW)

Another key informant emphasized that:

“The poor often struggle for survival and they often do not care much about visit to health facility despite ill feeling until it gets worse. They say I have no money to buy drugs and some believe their body would get used to the drug weakening their resistance. (Harar, Keladamba, Kebele, HEW)”

Lack of respectful care by health professionals:

Findings show that lack of respectful care by health professionals at all levels of the health structure (Health center and hospital) was repeatedly mentioned as a major factor to hinder health care seeking attitude of residents. Mistreatment of patients by health workers in this case identified as humiliation and withholding services to the patients. Participants unanimously argued that the extent of abusive treatment affecting their perception about professionals in the facilities. One of the local opinion leaders underscored that:

“Some of the providers disappoint clients. After having come to the health facility for service, clients return without receiving expected service. Sometimes providers give lame reasons such as ‘time is over’ not to provide the required service. He further stressed that health care workers do not have slight respect and care for a laboring women which makes not only the laboring women but us to hate health facilities”(Mekelle, Jibruk, Opinion leader).

The finding shows that the service is not only weak in supporting clients by health professionals affect service provision at facility level but also the quality of service in the facilities is equally problematic affecting the intension to use health services. One of the key informants mentioned that:

“In our city, health centers are much better than hospitals. Many mothers have died while giving birth in the Hospital. Previously the Hospital was known by its quality service but currently I doubt that it has an owner.” (Arbaminch, Health office representative)

Shortage of drugs and medical equipments at HF’s pharmacy

Given the fact that the poor lives in vulnerable section of the towns, all participants across all study settings unanimously reported shortage and lack of prescribed drugs in health facilities where they were diagnosed. It was found that government health facilities do not have essential drugs requiring the client to buy drugs from private pharmacies with expensive price. Moreover, poor individuals from vulnerable sections mostly fails to buy the prescribed drug from private pharmacies for they do not have money for that. One of the participants underscored this as follows:

“The main problem is that the health facilities want us to buy drug from private pharmacies. Even if you have letter from the kebele for free treatment, you will still be advised to buy drug from outside. Unfortunately, there are times when those who can pay access the same drugs we requested from the health facility itself (Woldiya, TasaSefer, secretary of local Edir)”.

Such lack of drugs within the facility is further emphasized by one of the HEWs that

“If hospitals pharmacies do not have medications prescribed by the provider patients have to buy medication from either the non-free pharmacy of the hospital or from private drug vendors. This is difficult for patients were supposed to be offered health services free of charge” (Harar, Keladamba, HEW).

Moreover, the findings witnessed that those poor people from vulnerable section are not given as much attention as others by health professionals. One of the participants argued that:

“Those people who are very poor are given an ID card to receive free health services, but the health professionals do not treat them very well. They are not receiving the intended health service properly.” (Arbaminch, GucheraaSefer, HEW).

Infrastructural barriers

Findings suggested that in vulnerable settings, residents may need to travel with uncomfortable roads and paths to access the health services. This is evident in view of poor road access and lack of public

transportation in vulnerable quarters of the study settings which affect timely access to health facilities especially in emergency situations. This was further substantiated by one of the participants"

"No vehicle to enter into our village. Leave alone to quickly take a patient to health facility, it is difficult to carry dead body for burial. One finds it difficult to pass through this village and I do not know how this could be solved."(Woldiya, opinion leader)

Selection of the poor for free treatment

Selection of the poorest among residents of vulnerable section was found to be the reason for dissatisfaction and lack of trust in governmental health facilities of study settings by residents of these quarters. According to the participants view while the selection undertaken to provide the free treatment for deprived family, individuals deliberately select those who are better off. Therefore, most participants from different vulnerable quarters complained that selection of the poor for free health services at times miss the most vulnerable ones. This is believed to bias health service providers and impose lack of trust on them. One of the key informants argued that:

"Identifying the most disadvantaged people without bias remains a challenge. As a result we cannot pass through the residents of the poor. They complained a lot on the selection criteria of the people for getting free treatment. They said while we the poor suffer, the rich are getting the support."(Hawassa, community leader).

4.1 | Challenges in providing health service to selected vulnerable sections of the towns

In this section, an attempt was made to draw on perceived challenges in providing health services from the health providers' perspective. The study participants outlined the different challenges that have been affecting the overall health service provision in the study settings. The main challenges identified during the process were; perceived low acceptability to UHE-ps, overburdened UHE-ps by other commitment, shortage of health workers, limited infrastructures and lack of community integration and community fatigue.

Low acceptability to UHEPs

Many Health Extension Workers in all study settings expressed frustration and concerns over at best limited community recognition of their role in health service provision. However, there are useful contributions in the eyes of UHE-ps to the urban health programs, at community level, community members were generally appear to have failed to appreciate such contribution. One of the UHE-ps pointed out that;

"Nobody in the community stands by our side and cares if something happen to us. The community has already considered UHEPs as worthless since they feel we have failed to meet their expectations mainly because of lack of supplies." (Shashemene, UHE-ps)

Most of the key informants mentioned that the community members do not consider awareness creation efforts by UHE-ps and advice they provide to community members as useful and influential. Such views of community members affect motivation of the UHE-ps. One of the key informants underscored that:

“Community members say, ‘leave the UHE-ps. They are not that useful to us. They just come and work on vaccination, took pregnant mothers to ANC. That is it. At times they tell us things that community members could not afford and do anything about it.” (Woldiya, TasaSefer, HEWs).

In addition, the UHE-ps are threatened especially by young people who are bystanders when they are on duty in the villages. One of the participants indicated that:

“Though this may not be a common practice everywhere and by all young people, there are some youth who attempt to coerce UHE-ps for sex and may abuse them, which affects their routine activities.” (Mekelle, District surveillance expert)

Despite all the attempts to help local people in all capatowns they have, UHE-ps fail to get as much followers as desired. One of the respondents underlined that:

“Community members usually do not practice as per what we educated them. There was a time when a woman splashed liquid waste on my face and I was confused for a while. People in the community are too resistant to our advice. What really disappointed me most is that no measure is taken on individuals who mistreat and abuse us. Even if we are raped, nobody will accuse them and take proper measure. We, HEWs, are at high risk, and nobody stands by our side and cares if something happen to us.”(Arbaminch, GucheraaSefer, HEW)

Overburdened UHEPs

UHEPs are overburdened with different roles given to them by different sectors. This is believed to be a major challenge to delivering their services. In all the study settings, participants indicated to be engaged in not only their assigned jobs, but some other tasks beyond what has been expected of. A participant argued that:

“We are overburdened by many more expectations by other sectors including distribution of letters to offices. Every sector has something for us and these additional tasks has nothing to contribute to community’s health needs as much as expected” (Shashemene, UHE-ps and Arbaminch, GucheraaSefer, UHE-ps).

Such extra responsibilities affected their potential contributions. For example, a participant pointed out that:

“Community TB case detection and referral remains limited since UGHEPs could not perform their duties properly and are forced to do additional duties. This has contributed to the gap in TB prevention and control program” (Bahir Dar, community leader).

Findings from other participants have ascertained such complaints by UHEPs. A participant from one of the Woreda health office indicated that:

“UHEPs are not responsible only to health related activities. They are often called upon take charge of conducting assessments on unemployment, school defaulters and income of the community. We also use them to deliver letters to different stakeholder as part of their movement within the villages” (Arbaminch, Woreda health office)

Shortage of health workers and infrastructures

Findings indicate that health service provision was found to be affected by the lack of human resources. Such inadequacy of human resources contributes to difficulties in service provision to the satisfaction of service seekers. This is a problem recognized as barrier in all study settings. One of the participants explained that:

“There are critical shortages of the health professionals in the health centers since the active workers are much below what the structure requires. Currently, we are providing services for many patients per day but providing services to these all clients is challenging due to inadequate human resources.” (Adgrat, Health office head)

In addition to limited human resources, lack of necessary medical consumables such as gloves, emergency kits and blood pressure measurements is critical challenge for health service provision, especially at municipal health facilities of some towns like Arbaminch, Mekelle, Adgrat and Shashemene. One of the UHEPs argued that:

“There is nothing here (at the health post) even we don’t have a single goose if someone comes to us with bleeding. Let alone the others, we don’t even have a first aid kit” (Arbaminch, GucheraaSefer,HEW).

Besides, UHEPs in some places do not have the space needed to receive and deal with the problems of their clients. One of the participants indicated that:

““We have no room for HIV testing and counseling. We are working in troubled situation where we have no space to keep medical equipment. We are carrying the BP apparatus and HIV screening all the way to our home.”(Mekelle, HEW)

Characteristics of people in vulnerable settings

Given the fact that most residents in vulnerable quarters generate their livelihood from the informal sectors in jobs such as daily laborers or remain unemployed and living in rented house, they tend to moves to other places. Accordingly, home-to-home service provision and follow up by the urban health extension professionals has become inconsistent since people are moving frequently in search of their livelihood.

“The residents in these sections are consistently moving. You may not find them when you return back after a week in the same place you found them earlier. Perhaps you may find another person in the house who recently rented it” (Adgrat, HEWs).

Communities in these sections of urban centers lack an awareness about diseases, equipments used and services. They are found to be complaining about issues just because they did not understand them or since they lack knowledge of its usage or the reason for the intervention taking place. A very good example mentioned to substantiate on what it means when a community complains was provided by one of the participants;

“For instance, the community members complain that currently bed net is not soaked in chemical and it is not killing mosquitoes. Instead it exposes us to bed bugs. Sleeping under bed net is not comfortable since it is too hot. So we don’t want to get suffocated and suffer from bedbugs that are becoming major concerns” (Arbaminch, Health Office).

5. DISCUSSION

In 2008, the world's urban population became at par with that of the rural population for the first time (20). However, this is not the case in the Sub-Saharan African and especially Ethiopia where urbanization is just beginning to accelerate. Similarly, the slum target under the motto 'Towns without Slums' or 'Target 11' aims to achieve major improvement in the lives of at least 100 million slum dwellers by 2020(20). This estimate seems ambitious in view of the fact that slum dwellers are getting sky rocketed making it harder to achieve the set target.

UN-HABITAT defines 'slum residents' as a group of individuals living under the same roof in an urban area and who lack one or more of the following:

1. Durable housing of a permanent nature that protects against extreme climate conditions,
2. Sufficient living space which means not more than three people sharing the same room,
3. Easy access to safe water in sufficient amounts at an affordable price,
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people,
5. Security of tenure that prevents forced evictions(21).

Based on this definition and in light of our vulnerability model, residents in vulnerable quarters live in a crowded houses made from cheap materials and with limited space, compromised availability of water, and poor sanitation as was reported in the finding section. However, it is hard to completely delineate the slum area as this is unevenly distributed all over the towns. Contrary to the UN report, not all populations living in slum areas are entirely marginalized neighborhoods which are probably an indication of cultural differences posing challenges to intervention programs targeting slums.

Delineating vulnerable quarters of urban center is not easy and forthcoming because it is haphazardly distributed in urban centers. Finding shows that size of vulnerable quarters in terms of household size varies from 240 to 17000 HHs, eluding to the fact that vulnerable quarters in an urban setting ranges from small village in some urban setting to the whole kebele in others. The small villages are often annexed to market places (for example one vulnerable section in Dire Dawa) but used fully as residential area. Therefore, it is difficult to set standard for the vulnerable section in terms of area and population size.

The United Nations reported that migration from rural to urban areas has historically played a key role in the rapid growth of population in urban setting (23). In Ethiopia, migration is linked to disparities in job opportunities and wages between the urban and rural sectors and among regions (13, 28). Lack of sufficient gainful employment in the rural areas in the agricultural provinces/regions is the main reason why rural workers migrate to towns. Migrants in this study have diverse profile. Both sexes, those with wide range of age classification and educational accomplishments reported to migrate to urban settings. At a setting, and during the study they were found to have stayed for different number of years. Yet, they do not have identification of their own and do not benefit from local resources nor are they contributing enough to community in their residential areas. This is critical concern for development partners and the country at large calling for attention.

Contrary to the UN report, not all populations that live in vulnerable quarters are entirely marginalized neighborhoods since they have facilities though these are not well developed. The finding has shown that half of those who reside in vulnerable quarters of urban centers are in most active and productive age group which may explain the fact that there are residents who lead relatively better life.

Although it is not forthcoming to differentiate income level of residents with the entire population and despite difficulty in generating evidence on income, finding is not discouraging in vulnerable quarters of urban centers. The most common definition used by development agencies refers to a monetary value of a basic “basket of needs”, for example, the World Bank’s one-dollar-a-day poverty line. Accordingly, the majority (55%) of participants earn an average of 2.5 USD per day, which is well above poverty line while about 18% earn less than one dollar a day and regarded as below poverty line. Few were found to earn about 330 birr a day (about 15 USD a day, based on August 2017 rate) which makes to middle income group by the country’s standard, justifying the fact that not all residing in vulnerable quarters are vulnerable. Nevertheless, the UN document (22) argues that level of income may not preclude vulnerability. Variables such as freedom, human rights, community participation, freedom of expression, and other issues related to governance are essential to human development. It seems that the small monthly salary they receive, although stable, leaves many holes unfilled. Yet, from the finding it is clear that such basic needs as clothing, food, and health care were contested as items considered hard to fulfill. This gives an impression that residents in the vulnerable sections of the study settings are not extremely destitute as is the case for urban slums. This needs further study though.

Local networking and partnership with residents in the form of participation in an ‘iddir’ (a non-for-profit association formed by residents as a means of insurance during death) and ‘equb’ (regular contribution of money given to members in turns) are considered as important social insurance in Ethiopia. In this study it was found that residents in vulnerable quarter did not have identification card and are not participating in local affairs. As a result, they do not have social, economic and political space in the towns and are often isolated. Indeed the fact that they are not formally registered and recognized by local administration denies them opportunities coming through such formal structure.

Thus, per the UN extended definition of poverty, our study participants are socially deprived of opportunities to participate in social activities, accessing resources and of social links. However, even if excluded from the rest of the world, they enjoy limited social networks as a result of strong bonds established among residents of vulnerable quarters.

Majority of respondents have access to improved water (piped water), although most of them use piped water from neighbors. Nevertheless, water security standards among vulnerable quarters were not met, because residents in such quarters do not have physical access to the tap at all times especially when owners are not around. This compromises rights of residents to water and with evident implication on their health.

Lack of sanitation is a critical public health problem, particularly in vulnerable sections of towns. Infectious and excreta-related diseases such as AWD affect members of the community. UN-Habitat in 2003 reported that diarrhea kills about 2.2 million people each year, most of them children under-five and this happens in poor hygiene environments with inadequate sanitation. Poor sanitation has considerable implications for economic development causing health problems and subsequent

absenteeism from work, due to sickness resulting from excreta-related diseases. Moreover, lack of liquid and solid waste management poses a critical threat to resident's health. Generally, drainage systems in towns are not properly built, their purpose is not well defined, and sufficient awareness does not exist among residents, including those in non-vulnerable sections of their usage. Such drainage systems are open ditches and designed to drain water. However, very often they are used by residents to drain liquid waste. Liquid waste coming from houses accumulates over time, and can sometimes even block the main city sewerage systems disrupting the normal function of the city. Accumulated liquid waste sometimes partly stagnates, creates a bad odor, and exposes residents, and even passersby to health problems. This shows that interventions meant to promote safe and healthy environments is so weak or non-existent in vulnerable quarters of urban centers. As a result of poor drainage system and lack of Integrated Waste Management System (IWMS), sanitation is highly compromised in vulnerable quarters of urban centers. Participants of qualitative study witnessed this reality where respiratory infections and continued diarrhea are attributed among others to such conditions.

Improved sanitation is commonly defined as hygienically separated human excreta from human contact and higher proportions of a population using an improved sanitation facility. Based on definition given by the Joint Monitoring Program for Water Supply and Sanitation (JMP-WSS) (24), 94% of HHs in the study area reported using either unimproved latrine (71%) or traditional improved latrine (23%) which may not be connected to septic tanks and may be shared among several HHs. This clearly shows the proportion of HHs in vulnerable section of the household that in poor sanitation condition.

Abebe et al., in their study of sanitation conditions in slum quarters of Addis Ababa, found that 88.6% of Addis Ababa's slum dwellers and 73% of its total population use unimproved sanitation facilities(18) which is the same to the findings from this study. UN-Habitat (2003) has estimated unimproved sanitation for Addis Ababa to be about 75%, Bole being the lowest (59%) and AkakiKality the highest (89%), which means there has been an upsurge in deterioration of sanitation in Addis Ababa. The difference, however, is that Abebe et. al, and UN-Habitat studied residents in all sub-towns (and Abebe et al in all slums in Addis) while our study covered selected slums in selected sub-towns. Interestingly, however, about two thirds (65.9%) of urban poor households in the slum areas in India do not even have a toilet (25), let alone improved, which is very high compared to results from Abebe et al and this study.

Abebe et al also analyzed the 2014 inventory of sanitation technologies for Ethiopia (using the sanitation ladder) and found that 52.1% of the Ethiopian population still use unimproved sanitation facilities, most practicing open defecation. Baum et al estimated that 60% of the global population used unimproved sanitation for the year 2010. Although this figure slightly deviates from the JMP estimate, it is an indicative figure to compare to the result of Ethiopia obtained after four years (after 2014).

Majority of respondents wash their hands anywhere in the compound; some do not wash hands before and after eating or preparing food; most do not wash hands before or after attending to children; even if some of them wash their hands, majority do not use soap.

According to criterion from UN-Habitat most of the households in the vulnerable quarter could be 'extremely deprived' as summarized from the finding, where:

- 77% of all HHs have 3 family members living in a single sleeping room, so no sufficient living space;
- 86% do not treat water before drinking, in addition almost 100% respondents do not get water in sufficient amount and cheaply;
- 63% do not wash hand before feeding children, 72% do not wash hand after attending to defecated children, and 94% use unimproved latrine;
- 4% live in non-durable houses made from cheap materials
- 66% live in rented houses

In light of these, residents in vulnerable quarters of the study setting are in extremely deprived of basic necessities defined by UN Habitat.

Following the definition from UN-Habitat for houses and measured by materials used to construct a house: roof, wall, and floor, houses in our study setting generally do not meet the required standard of houses. This coupled with overcrowding makes vulnerable section of urban quarters closer to what is referred to as slums.

- i) Accordingly, at least 77% of the respondents fulfilled three of the criterions, lack of access to quality water with sufficient amount and cheaply,
- ii) ii) no sufficient space to sleep, and
- iii) iii) use unimproved latrine.

Hence, these residents may sadly be classified as *extremely deprived*.

These findings agree with findings of the UN (23) that countries such as Angola, the Democratic Republic of the Congo, Ethiopia, Guinea-Bissau, Madagascar, Mozambique, Niger and Rwanda, have more than one-fifth of the slum population living in extremely severe deprivation. The same report considered countries such as Central African Republic, Chad, and the Sudan to be the worst, even compared to countries listed above in the Ethiopian group.

Houses are overcrowded with a minimum of 3.2 m²area per HH in the study setting, which is simply 2m long and 1.6m wide just enough for a 1.2m bed/mattress; hence insufficient living area for family with an average size of 5.5 persons per household. Overcrowding is associated with high occupancy rates, several persons sharing one room. Typical slum areas are expected to be overcrowded with five and more persons sharing a one-room unit used for cooking, sleeping, and other household activities (compared to an average of 2.5 persons per room for Addis as a whole), which is in agreement with our findings..

The summary information regarding shelter deprivation is disaggregated by towns and presented in Table 28. The table shows proportions of HHs that are extremely or severely deprived for each city, listing towns according to their proportions. For example, about 95% of HH in vulnerable section of Sodo are extremely deprived while only about half of HHs in Adgrat is extremely deprived. Since the criterion listed above are related to clean water, healthy living space, and sanitation, deprived HHs will have problems related to access to health services. This table, therefore, can be used to guide interventions when required.

Towns	Minimum % of HH deprived	Towns	Minimum % of HH deprived
Extremely Deprived (3 or more shelter deprivation)			
Sodo	95	Shashemene	76
Hawassa	88	Nekemt	72
Wolkittie	86	Mychew	70
Arbaminch	86	Harari	70
Asela	84	Mekelle	67
D/Markos	83	Dire Dawa	62
Addis Ababa	83	Bahir Dar	60
Woldiya	80	Adgrat	58
Adama	80		
Severely Deprived (2 shelter deprivation)			
Ambo	61	Batu	72

*Towns are included only if 50% or more HHs fulfilled at least one of the shelter deprivation criterion.

Table 28: List of towns by level of shelter deprivation

Availability of health facilities was not a concern in the study settings. Distance to health facilities was also not a major issue of concern in vulnerable quarters.

Respondents did not complain much about access to the nearest health facility in this study, but some of them have not used the facilities when become sick and turned to traditional healer. In India, although slum residents often live close to many health care providers, they generally have little access to high-quality care. Care-seeking patterns in India show that although the services are less expensive, higher-quality government clinics is available, slum residents who do seek care tend to choose more expensive private providers - for a multitude of reasons, from perceived quality to ease of access (25). This is different from the setting we studied; residents in vulnerable quarters studied were found to use the public facilities very well, except in few cases. However, the facilities were challenged with growing demands for service, limited supplies and equipment, limited number and mix of providers and their friendliness in service provision. These factors are flagged as barriers to routine health service utilization. However, these barriers may not exhibit any major difference compared to barriers to the country at large although variation within urban centers is important to appreciate.

A major problem reported however is longer waiting time, poor hospitality, lack of proper guidance and advice. From qualitative studies, it was learnt that residents of vulnerable quarters perceives government health centers cheaper, better equipped and provide better quality of care, compared to private clinics which are perceived money oriented and less equipped.

Institutional delivery assisted by skilled attendants stands at a little over two-third in all studied area, with some variations between vulnerable quarters of the study settings. This is below EDHS 2016 estimate of 79% for urban settings (12). This is not surprising in view of the fact that women residents in vulnerable quarters of urban settings have livelihood challenges that they do not consider institutional delivery as important. Interestingly, still a third of women deliver at home which is against reports that show eighty percent of births in urban setting is assisted by skilled providers (12). The most reported reasons for home deliver were found to be belief that this is not customary, not conventional, not necessary, lack of female birth attendants and the perceived poor quality of services.

From this study, non-communicable diseases such as hypertension, diabetes and heart diseases; communicable and infectious diseases such as HIV, diarrhoea and respiratory tract infections were perceived to commonly prevail. These health problems are believed to cause morbidity and mortality in vulnerable quarters of the study settings. The prevalence of these health problems clearly depict the triple burden of diseases prevailing in urban centers of Ethiopia (29). Other nation wide studies (STEPS) have also confirmed the rising concern from NCDs and this finding is in line with growing concern in the spread of NCDs. (30 , 31).

Prevalence of death in the household that participated in the study was estimated at 8.4%, at vulnerable quarters of the study setting during the last three year preceding the survey. Such deaths were attributed to kidney disease, hypertension, heart disease among others making NCD as looming challenge for urbanites in Ethiopia including those residing in vulnerable setting.

Postnatal care (PNC) is considered to improve maternal and neonatal. Postnatal checkup of mothers after two days of delivery was found 63.4% among mothers in the vulnerable quarters of the study setting. This finding is relatively low compared to the national report of the Ministry of Health in 2008 that showed 89.3% of mothers benefitted from post-natal care (29).

Acute respiratory illness (ARI) and diarrhea are common childhood illness among households in vulnerable quarters. The finding is consistent with EDHS 2016 that has reported 7% of under five children had ARI symptoms, 14% had a fever. This as well as eye diseases reported in the finding may not be surprising given cooking in the same house (bedroom and/or living room) is the case for most residents. In this study, the prevalence of diarrhea among children in vulnerable quarter during two weeks preceding the survey was found 7.6% with one third having bloody diarrhea. This prevalence is lower than EDHS 2016 report of 12% (12) which may have to do with the timing of the study where in this case, study was carried out right before the rainy season..

In the study, majority of children (88%) also seek advice or treatment from the health facility and almost all had visited the health facility for the treatment. The use of oral rehydration salt (ORS) for the treatment of dehydration due to diarrhea was 82.5% in vulnerable sections. According to the EDHS 2016 report, 40 % of the urban children received a rehydration solution from an ORS during diarrhea. The utilization of health facility and ORS during diarrhea incidence was high in the vulnerable quarters compared to the EDHS 2016 report in urban setup. These might be associated to the urban health extension worker effort in improving the household health wellbeing.,

According to Peter et. al, 2008, access to health service is not uniformly characterized within countries, the poor have less access to health services compared to those who are better-off(33). Different definitions and perspectives have been used to look at the association between poverty and health service utilization. In this study, we used demand and supply side parameters to define barriers to access health care services. Similarly, findings suggested that being poor or residing in the identified vulnerable quarter of urban center is one of the barriers to seek health services. Findings from this study suggested that, though the identified barriers to health services are not specific to those who reside at vulnerable quarters, the extent of the problems is relatively pressing in this section. Longstanding cultural and religious beliefs such as a women should not go out before forty days of a child birth and considering large family as blessings and wealth were found to be the associated to use of selected health services such as postnatal care and family planning (34). As stated by the definition provided above, the supply side problems contribute to low uptake of available health care services. Findings from this study indicated that the shortage of medications and medical equipments have been frequently mentioned that exposed clients to buy medicines from privatepharmacies.

The most prominent barrier related to accessing facilities in all the study settings was disrespect to patients by health professionals at all levels. Findings clearly stipulated that mistreatment of patients by health workers ranges from humiliation to withholding services to the patients. Participants unanimously argued that the extent of abusive treatment in hospitals compared to health centers in the study settings was greater. Such types of care by health professionals were blamed to affect health care seeking by residents. The disrespect/abuse during service provision has been studied elsewhere and found to be associated with low satisfaction of care and reducing the patient's confidence in health facilities(35).

Access to health facilities was mainly measured by availability of roads in slum areas. This was particularly found to be critical barrier in some selected towns such as Adama and Woldiya. Participants from these settings characterized their section as locked in and not having the route for exit and entry for bigger cars and ambulances. Participants also argued that such problems were mostly prominent during emergencies when they require ambulances during the late evening. This finding is consistent with studies conducted by Hodge, Aet. al (36).

In as much as beneficiaries'complain of barriers to services, providers were found to have complained about challenges they encounter in the provision of health services. This was particularly emphasized by UHEPs who are overcrowded with additional responsibilities and are blamed for failing to meet expectations. In general, the living conditions in the vulnerable quarters of the study setting reveals crowdedness, poor sanitation due to lack of liquid and solid waste disposal and lack of local roads to access the main road. People live in unhealthy setting not only in terms of poor sanitation but also in terms of crowdedness, poor housing structure, and poor socio-economic opportunities.

The health service delivery was generally complained to be poor. While health facilities are poorly equipped with relevant supplies, providers were perceived to be unfriendly and often disrespect clients, which contribute to vivid barriers to health service use. It was commonly argued that although clients receive free health care documents to access service, this has not been the case since facilities either discriminate against such patients or often medicines are not available in the facilities.

6. CONCLUSION

Urban settings in Ethiopia are generally not uniform in the distribution of vulnerable quarters. As it was conceptualized initially, vulnerability is the function of various factors plus some additional ones. Lack of resources were vivid at household level characterized as lack of sufficient and owned water resources, latrine, poor housing, lack of livelihood, overcrowding etc. Besides, lack of resources were vivid in the form of lack of sanitation facilities, limited number and mix of health professionals as well as access to roads at place level. It is also important to note the lack of coping capacity at individual and household level that further fuels up vulnerability. Thus, there are indeed vulnerable quarters in urban settings and there are multiple factors that work in tandem to maintain and sustain vulnerability of such settings as places and residents. Such settings neither are distributed in the same pattern in all urban centers nor are uniform in size of land and population size. Vulnerable quarters in urban centers on the one hand are distributed haphazardly and on the other hand size is found to be different. This calls for focused programming and intervention.

Overcrowding, poor housing, poor waste disposal system and sanitation and access roads are common characteristics of vulnerable places. On the other hand, most of the residents in such settings are poor with unreliable livelihood and are migrants from rural set ups. After longer stay in the vulnerable quarter, their integration with local structure remains poor. This appears to have serious implications not only service provision to this section of the population but also their potential contribution to local development initiatives.

The characteristics of vulnerable quarters in terms of poor availability of services and amenities on the one hand and residents' characteristics such as non-sustainable livelihood and poor income make vulnerability to various health problems vivid. As such, not only communicable and infectious health problems but also non-communicable diseases were found to be the causes of morbidity and mortality in vulnerable quarters of urban settings studied. This calls for an integrated multisectoral approach to address factors of vulnerability and build the capacity of residents to cope with the problem on the one hand and strengthen existing facilities to provide appropriate services.

Overcrowding is a common phenomenon in almost all vulnerable sections of towns. On average 3 people live in a single room with insufficient space to sleep in, cook, eat and store items in. This situation is fueled by rural-to-urban and urban-to-urban migration; because majority of residents of vulnerable sections are migrants who have come from other places at one stage in their life. Most migrants have lived on average for more than 10 years, and have received higher level of education. Unemployed university graduates perceived as being abundant in the well-off sections of towns are also available in vulnerable quarters in large numbers; the number of degree holders in vulnerable section was found to be larger than technical/vocational graduates against expectations, showing that appropriate strategies and policies for the vulnerable quarters is not in place or not functioning.

Families in vulnerable quarters sacrifice most of their resources and time to raise children, because children in this quarters are perceived as insurance. But that perception mostly did not materialize, because there is no difference between those who completed university education and non-educated/primary in terms of employment, income or type of job they are currently doing. The graduates often returned to their village and perhaps no job or do jobs that their non-educated counterparts are doing. This may

have serious psychological consequences: families may lose trust in the education system, lose hope in their children's future, and even deter other children from school in the future.

Majority of households do not have separate cooking areas; either within the house, in the same room they sleep in, in a separate building as a temporary solution, or in an open field. When overcrowding is combined with inadequate ventilation, the risk of infection, especially among women and children increases.

There is a strong relationship between dissatisfaction with dwellings, overcrowding and lack of space (whether sleeping or cooking); overcrowding leading to lack of space, and this in turn leads to dissatisfaction about the residence. Overcrowding occurs both from residents and houses perspective; for city administration owned houses, the legal residents often divide rooms into small compartments, and add more rooms in the compound on whatever space is available and have as many rooms as possible to maximize income with no space left for other communal outdoor activities. On the other hand, while an average of 3 tenants live in a single room, several people end up living in the compound due to large number of small rooms, with limited space and limited communal service provision. That is why liquid waste is often disposed in open spaces outside of compounds; and shared toilets turn out to be so unhygienic such that some people decide to keep their feces/urine inside and dispose on the street (sometimes known as flying toilets).

Although residents in all vulnerable sections of towns appear to have good access to improved water sources (which is mainly tap water), this perception is challenged when the location of the water meter (as it determine access), cost, time of availability (that is whether the person can get water anytime one wants) are all examined together. Access to water is not something 100% fulfilled even for non-slum areas, although a majority in the vulnerable quarters claimed to use tap water and were able to do so in less than 15 minutes. There are towns, which use standing water (Hawassa, Dire Dawa, and Mekelle). Some vulnerable sections in SNNPR still use a river/stream; some others (Sekota and Woldiya) heavily depend on a community water point; considerable number of households do not treat water before drinking. Therefore, the vulnerable quarters of most towns require targeted intervention to attain the 'safe drinking water' motto.

Water and sanitation are important indicators of town development. Access to water correlates strongly with the survival of children under-five-years (Gleick, 1993). Connection to improved water supply, proper sewage systems, solid and liquid waste disposal systems, among other services, is a critical process of ensuring healthy community, safe and clean environment, reduced morbidity and mortality, and improved business productivity in towns. With a large proportion of unsanitary conditions (94%), poor waste management systems, and extremely dirty sewerage systems in vulnerable quarters, it is hard to attain the development goals envisaged by the WHO. Particularly in large towns like Addis, although other parts of the towns may some how affected, vulnerable quarters particularly are identified by the bad odor emitted from the sewerage going through the villages. At the household level, because women and children are the ones responsible for water collection and for maintaining hygiene in the home, any disruption in these services increases their burden and greatly impacts on other aspects of their lives including education (absenteeism of children), career development for women, and childcare.

In terms of security of tenure, a high proportion of the households (66%) that do not own or do not have a long-term lease on land felt they were not secure. Qualitative study showed the vulnerable quarters, normally dominated by the usual old, crowded, sub-standard city administration owned houses, are these days regarded as 'slum' areas and are targeted for town expansion (particularly in large towns), where the government lease the land to investors. Even the 34% who own houses do not feel secured, because they too can be evicted any time if the government, for city development programs or other similar purposes, requires the land (nagarit Gazetha on land lease). Although not able to capture gender differences in terms of secure tenure numerically, the qualitative study showed that women household heads tend to feel insecure fearing uncertainty about their future in the absence of badly needed support from spouse.

The level of insecurity varies from region to region and town to town depending on the size of towns and culture of the people. Security of tenure is difficult to measure because of the differences in perceptions of "security" among residents of cities. However, security of tenure is an important measurement due to four main factors: i) the rapid expansion of urban areas in developing towns; ii) the development of urban regions (mega-polis like Addis Ababa); iii) transformation of rural villages to secondary towns; and iv) increasing levels in urban poverty. Therefore, government and city authorities have to consider security of tenure as an important component of development.

UN-Habitat (2003) reported that households in vulnerable sections of AkakiKality and Addis Ketema sub-towns had the highest use of these materials, where the highest need for repairs was also apparent. However, after 14 years of that study, such buildings are rarely found in Addis. In addition, dust from the mud and earth used for the floors and walls lead to increased susceptibility of the dwellers to respiratory diseases, especially among children. It is clear from this study that the government and the city authority need to enforce the building bylaw to protect the residents. Vulnerable quarters are often located where the area lacks infrastructure, and where the area is not officially planned for residence. It is thus useful for future studies to assess the location of houses in slum areas in view of hazardous locations and their possible consequences.

Membership to informal groups such as iddir is an indication of effort by residents to bring solution to monetary poverty. Those disadvantaged are more likely to belong to associations to gain access to assistance during hard times (such as death or morbidity) or gain access to informal financial system in the form of expensive loans, often in exchange of valued items such as gold bracelets. Those in vulnerable sections, who are not recognized as residents and could not join Iddir, have no alternative than the latter option. This is because, support from neighbors and relatives may not be relied upon, as most neighbors/relatives afford very little support which may be less than the amount required, if individuals encounter serious health related issue. These results indicate the need for the local authorities to design and provide microfinance or similar services to address the plight of the poor. There are indications that when people have too many needs, assistance from neighbors is mainly confined to major shocks, mainly death and major illnesses. Investment in a public support system for vulnerable group will bridge the gap in access to services.

Barriers to health service access are multifaceted; culture, religion, income, distance to health facilities, nature of job, social interactions and information and communication play great role. Cultural and religious beliefs particularly among less educated and less informed residents of urban centers was found

to seriously affect demand for selected health services such as postnatal care and family planning. This problem is even more pronounced for residents of vulnerable sections, as about 10% of them were ill a year before this study visited traditional healer.

Most of those in vulnerable quarters of towns are engaged in temporary work or petty trades. They value their time for their job more than their health status. Thus with complaints on long waiting time at health facilities, although varied from region to region, patients in such quarters may be discouraged from visiting health facility even when they are sick.

Although facility based survey was not done, there is indication that, medications and medical equipments are in short supply in some governmental institutions. Thus, some health facilities close to such residents are mostly not equipped with essential drugs and basic medical equipments. Patients are directed mostly to private facilities for laboratory tests and use of such medical equipments. This exposes patients to the ever-growing cost of medication in private facilities for tests and private pharmacies for drugs.

Access to drugs is very challenging for residents of vulnerable sections. Non-communicable disease (NCD) is the most frequent cause of morbidity among adults followed by respiratory problems and other communicable diseases. However, among the 8.4% deaths reported, kidney disease is accountable for about half of it.

The proportion of women who delivered at health facility that was attended by skilled provider in the vulnerable quarter is reported to be low (67%) ; reasons for home delivery being mostly lack of awareness about the benefits of facility delivery and misconceptions about the services provided at health facilities. Most women in the vulnerable section got pregnant (67%) intentionally. This figure is close to proportion of those delivered at health facilities, which may lead to believe that most of those got pregnant unintentionally, may deliver at home. However, the one-third that got pregnant unintentionally is worrying, because there are several reasons behind this fact. Among those delivered, only 48% came for postnatal checkup in the two days following deliver, and 36% did not come for postnatal checkup at all; which indicate poor usage of the services by residents of vulnerable quarters.

The common childhood illnesses among the household in the vulnerable sections were acute respiratory illness (ARI), diarrhea, typhoid fever, malaria and pneumonia. These illnesses commonly present in the other parts of urban centers in same proportion with that of vulnerable quarters, so vulnerable quarters residents may not need special treatment regarding interventions targeting these diseases.

7. RECOMMENDATIONS

This study has provided a useful profile characterizing vulnerable places and its residents. From the findings, it is clear that despite some variations between study settings, places were found to share common characteristics. This study has generated important insight on different avenues: the settings itself and residents. The findings may serve a useful purpose for improved urban health programming, policy, and research.

In this section, recommendations were categorized under urban health programming, policy, and strategy, and research so as to guide all stakeholders to benefit from this report.

A. Programming

- i. Water, sanitation, and housing: More than 50% of residents of vulnerable sections of urban centers are extremely deprived from basic services as measured by the five indicators developed by UN-Habitat in most towns, even in the small towns. The indicators operate mainly around water, sanitation and housing, the key items for survival. When the data for each town is closely inspected, the outcome is frustrating. Access to tap water at household level, availability of waste disposal, access to main road was found to be uniformly poor. The housing conditions in these settings were characterized by gross overcrowding, dilapidated houses with large family size sharing the same room. It was found that there is no coordinated effort to address the problems nor are there any foreseeable measures at least from the evidence generated from the study settings in the country.

Housing issues in vulnerable sections of towns need attention. Although very few plastic houses are reported in this community, 66% still live in a house that is owned by somebody else; this entails issue of tenure security, where tenants are in constant fear of evictions. Measurement of secure tenure is complex given the varied types of housing scheme, location, type of houses and future development plan for the area. Comprehensive measurement method needs to be developed and residents in vulnerable quarters have better tenure security for their future.

Adequate sanitation is critical to the health and well-being of urban dwellers and to residents of the vulnerable quarters in particular as they are more susceptible to illness. In a community where 94% households use unimproved latrines, outbreaks of communicable disease are eminent; children under five may be the victims of such lack of sanitary condition in the area. Therefore, there is need for city authorities to formulate and implement policies in view of ensuring that all people in the vulnerable quarters have the same level of access to these services as those living in none slum areas.

The government's housing development scheme is believed to help address such problems given prior attention is given to the problems and effort is made to initiate close working relations with different stakeholders that are responsible for the different schemes. Unless the water, sanitation, road, health and housing sectors work together hand in hand, there is no guarantee to make the new sites slum free.

This recommendation may work if rural-to-urban and within urban migration is controlled and/or mitigated. This has constrained not only the physical setting but also constrained full integration of residents in such setting to the social environment. This particular action requires a clear policy direction on controlling or mitigating migration.

- ii. Health facilities and services: The organization of health service provision in vulnerable quarters of the study setting revealed that facilities are poorly staffed with supplies and providers that are not friendly. It was gathered that clients including those who bring a letter for free treatment are at best expected to buy drugs while mistreatment by providers appear to be generally universal. Contrary to this, Urban Health Extension Professionals complained to have been disrespected by the community and their services are not appreciated by members of the community in all the study settings.

Available services in vulnerable sections were found to be numerous and diverse. However, it was clear that infectious/communicable diseases (HIV, TB, and diarrhea) are the most common ones prevailing in vulnerable sections of the town.

As it is clear from the preceding, both clients and providers on the one hand and constellation of the service itself on the other have major pitfalls. Thus, health facilities in vulnerable quarters of urban settings may have to develop a clear code of conduct for providers at different levels and observe/enforce its practice. At the community level, awareness on the roles and functions of providers and their expectations including UHEPs needs to be built. Special attention must be given to such facilities at the forefront to vulnerable section of urban setting to have stock of supplies that client's demand is not turned down in all situations.

There is an urgent need to avail basic medical materials and essential drugs at the primary health care facilities and hospitals for people seeking care. The health facilities have to improve on the long waiting times for diagnosis and treatment using proper screening tactics as well as strengthening the capacity of the staff.

Intervention mechanisms should be devised to put in place preventive measures that minimize morbidity and mortality rates related to NCDs and other prevailing diseases in the vulnerable sections.

Innovative interventions that encourage women to trust the process of delivery at health facilities and the use of postnatal care should be in place. This includes creating awareness between both the provider and the residents, the convincing of the women and husbands regarding benefits of delivery at facility in terms of mother-child health, the strengthening of support for vulnerable group, etc.

The vulnerable sections have so many basic needs and questions that require urgent solutions. These problems cannot be answered by a single body but require an integrated approach by the health bureaus, the different administrative structures, NGOs, the facilities and the residents themselves.

B. Policies and strategies

- i. More than ever, urbanization is advancing at unprecedented rate in Ethiopia. This requires commensurate policy and strategy that target and developed in consideration of the characteristics of urban setting. Urban health is much beyond the health sector's scope and mandate. Every sector is responsible for specific services e.g.water, health, sanitation and roads have their own respective plans and expectations, there is no mechanism to ensure and control their interface thereby improving the wellbeing of residents in urban setting.

In view of this, it is critical to develop, at least, an integrated urban health strategy and implementation guideline that holds every stakeholder to work together for a common objective. That way it would be possible to develop indicators that could eventually build up to the same common goals with clear lines of responsibilities.

C. Research

In the course of this study, attempts were made to consult available evidence on vulnerable sections of urban settings. Unfortunately, that was realized to be a luxury at least in an Ethiopian context. This exhibits the fact that urban health focused research is at its infancy. Equally relevant are nationwide studies, which serve as a basis for plans in diverse development sectors in Ethiopia remain to aggregate urban evidence. As a result, evidence is lacking on urban health and even existing ones are short of details and have failed to appreciate variations.

Thus, it is recommended that implementing bodies work with teaching universities to plan and implement a series of studies focusing on specific aspects of urban health and associated factors. To ascertain long-term data for urban health, in consultation with vital events registration and the central statistical authority effort should be made to establish strong urban health database for the country.

8. REFERENCES

1. Obaid TA. Health towns for the elderly. UN-HABITAT, Habitat Debate 2007; 13(4):14.
2. Friel S, Akerman M, Hancock T, Kumaresan J, Marmot M, Melin T et al. Addressing the Social and Environmental Determinants of Urban Health Equity: Evidence for Action and a Research Agenda. *Journal of Urban Health* 2011; 88(5):860.
3. Awadalla HI. Health effect of slums: A consequence of urbanization. *Scholarly Journal of Medicine* 2013;3:7-14.
4. Abbi M. Understanding urban chronic poverty: crossing the qualitative and quantitative divide. *Environment & Urbanization* 2005; 17(2):43–54.
5. WHO. Implementing Rio: Monitoring action on the Social Determinants of Health: Background paper: 20–22, 2016, Canada.
6. Ezeh A, Oyebode O, Satterthwaite D, Chen Y-F, Ndugwa R, Sartori J et al. The history, geography, and sociology of slums and the health problems of people who live in slums. *The Lancet* 2017; 389(10068):547–58.
7. Judy B. *Urban Poverty: A Global View*. Urban papers. Washington; Jan 2008.
8. CSDH (2008). *Closing the gap in a generation: health equity through action on the social determinants of health*. Final Report of the Commission on Social Determinants of Health. Geneva, World Health Organization.
9. Daniel Lirebo. *Housing in urban context: Informal settlements in Addis Ababa*: Addis Ababa University.
10. Prasad A, Kano M, Dagg KA-M, Mori H, Senkoro HH, Ardakani MA et al. Prioritizing action on health inequities in towns: An evaluation of Urban Health Equity Assessment and Response Tool (Urban HEART) in 15 towns from Asia and Africa. *Soc Sci Med* 2015; 145:237–42.
11. WHO. *Urban HEART: Urban Health Equity Assessment and Response Tool*. The WHO centre for Health Development, Kobe, 2010.
12. CSA. *Ethiopian Demographic and Health Survey*. Addis Ababa, Ethiopia; 2016.
13. MirgissaKaba, Girma Taye, MulukenGizaw, Israel Mitiku, Zelalem Adugna, Addis Tesfaye. A qualitative study of vulnerability to HIV infection: Places and persons in urban settings of Ethiopia. *J.Health Dev.* 2016; 30(3):105–11.
14. TsegayeTegenu. *Urbanization in Ethiopia: Study on Growth, Patterns, Functions and Alternative Policy Strategy* Stockholm: Stockholm University; 2010.

15. World Bank. The Ethiopian urban migration study 2008: The characteristics, motives and outcomes of migrants to Addis Ababa. Final Version, August 24, 2010. Report No. 55731-ET.
16. Ozlu MO, Alemayehu A, Mukim M, Lall SV, Kerr OT, Kaganova O et al. Urbanization review : urban institutions for a middle-income Ethiopia. Washington, D.C. : World Bank Group.2015 [cited 2017 Apr 5]. Available from: URL: <http://documents.worldbank.org/curated/en/543201468000586809/>.
17. Ethiopians adjust to life in Africa's most ambitious social housing project -Oct, 2016: Reuters.
18. Beyene A, Hailu T, Faris K, Kloos H. Current state and trends of access to sanitation in Ethiopia and the need to revise indicators to monitor progress in the Post-2015 era. BMC Public Health 2015; 15:451.
19. Silje Paulsen Breckan. Water resilience and social capital Comparing informal and formal housing areas in Addis Ababa. Masters thesisi, 2014.
20. Harmonious towns. I. publ. London: Earthscan [u.a.]; 2008. (The state of the world's towns report2008/09).
21. United Nations Human Settlements Programme. The challenge of slums: Global report on human settlements, 2003 / United Nations Human Settlements Programme. London: Earthscan; 2003.
22. Rockefeller Foundation. Health Vulnerability of Informal workers. Study report; 2013. Available from: URL: <https://assets.rockefellerfoundation.org/app/uploads/20130528214745/Health-Vulnerabilities-of-Informal-Workers.pdf>.
23. UN, Department of Economic and Social affairs, population division. Population Distribution, Urbanization, Internal migration and development: International perspective.; 2011. Available from: URL: <http://www.un.org/esa/population/publications/PopDistribUrbanization/PopulationDistributionUrbanization.pdf>.
24. WHO/UNICEF. Meeting MGD drinking water and sanitation target: the urban and rural challenges of the decade. Switzerland; 2006. Available from: URL: http://www.who.int/water_sanitation_health/monitoring/jmpfinal.pdf.
25. S. Agrwal KS. Urban Health: the emerging social imperative for India in the new Millinium: Review Article; 2012. Available from: URL: <http://medind.nic.in/jaw/t10/i2/jawt10i2p1.pdf>.
26. Yemane Berhane, Damen Haile Mariam, Kloos H. Epidemiology and ecology of health and disease in Ethiopia. 1st ed. Addis Ababa, Ethiopia: Shama Books; 2006, ©2005.
27. MOH. Health Sector Transformation Plan(HSTP) 2015/16 - 2019/20; 2015. Available from: URL: <http://www.moh.gov.et/documents/26765/0/Health+Sector+Transformationplan>.
28. Fan CC. Modeling Interprovincial Migration in China, 1985-2000. Eurasian Geography and Economics 2005; 46(3):165–84.

29. MOH. Health Sector Transformation Plan I Annual Performance Report (2015/16).
30. Muluneh AT, Haileamlak A, Tessema F, et al. Population Based Survey of Chronic Non-Communicable Diseases at Gilgel Gibe Field Research Center, Southwest Ethiopia. *Ethiopian Journal of Health Sciences*. 2012;22(Spec Iss):7-18.
31. EPHI. Ethiopia Steps Report on Risk Factors for Non-Communicable Disease and Prevalence of Selected NCDs; 2016 [cited 2017 May 4]. Available from: URL: <https://www.ephi.gov.et/images/pictures/download2009/NCD%20Report%20Ethiopia/NCDsteps%20Report%20-%20Ethiopia.pdf>.
32. The state of the world's towns 2006/2007: The Millennium Development Goals and urban sustainability : 30 years of shaping the Habitat Agenda. London, Sterling, VA, Nairobi, Kenya: Earthscan; For and on behalf of the UN-HABITAT; 2006.
33. Peters DH, Garg A, Bloom G, Walker DG, Brieger WR, Rahman MH. Poverty and access to health care in developing countries. *Ann N Y Acad Sci* 2008; 1136:161–71.
34. Belachew T, Taye A. Postnatal Care Service Utilization and Associated Factors among Mothers in Lemo Woreda, Ethiopia. *J Women's Health Care* 2016; 5(3).
35. Kujawski S, Mbaruku G, Freedman LP, Ramsey K, Moyo W, Kruk ME. Association Between Disrespect and Abuse During Childbirth and Women's Confidence in Health Facilities in Tanzania. *Matern Child Health J* 2015; 19(10):2243–50.
36. Hodge A, Byrne A, Morgan A, Jimenez-Soto E. Utilisation of health services and geography: deconstructing regional differences in barriers to facility-based delivery in Nepal. *Matern Child Health J* 2015; 19(3):566–77.

ANNEXES

Annex I: Selected Cities and vulnerable sections

Total Number of vulnerable section (number selected)	City	Number of enumerators to finish the work in ten days	List of selected vulnerable sections	Number of person-days	Number of respondents
Regional Cities					
4 (2)	Bahidar		-Belay Zelekekifleketema, kerasefer Shimbetkifleketemaakababikite lsefer		60
3(2)	Adama		- Kebele 6, 8		60
2(2)	Hawassa		- Tenakelasefer - Arab sefer		60
6(3)	Mekele		-Mamonatabia -Yegbrukakebabi - Selam		60
2(1)	Harar		-Shenkor Woreda *Yedehasefer		50
3(2)	DireDawa		- Ashewameda - Addis Ketema		50
3(2)	<u>Kemise</u>		-Kebele 03 -Kebele 07		40
7(3)	<u>Debrema</u> <u>rkos city</u>		-Kebele-01, sefer 3 - Kebele 04, sefer 1 - Kebele-06, sefer 6		40
2(2)	Sekota city		- Nigusatir (01 kebele, ketene 9) -Adis mender (02 kebele, ketene 10)		40
4(2)	Woldia		- Tasakebele - Mitigenda		40

4(2)	Ambo		-kebele 03 zone 01, -Kebele 02 zone 08		40
1(1)	Asela		- AradakebeleKetena 2		20
3(2)	Jimma		- hermatamentina -Hermatamerkato		40
2(2)	Nekemeti		-02 (around GedelGibu) -01 (Katanga)		40
3(2)	Shashemene		-Arada -Kuyera		40
2(2)	Wolkite		-Yeidgetberkebele -Yebolemerkato mender		40
5(3)	Arebaminch		-Kulfokebele (Gucherasefer) -Edgetberekebele - Weze		60
5(3)	Sodo		-Kodamenkeria (hibretkebele) -Damotamba mender (gebeyakebele)		40
1	Adgrat		- Near 04 Kebele		20
3(2)	Maichew		-02 Kebele, Zone I - 04 Kebele		40
3(2)	Debark		-Gomedeweha -BezaberKebele 02		40
1(1)	Batu/Ziway		Kebel 01 ketena 02 (around Dan libet)		20
3(2)	Shire Endasillasie		-Kebele 03, Ketena 3 -Kebele 05, AgaduSefer near Slasie church.		40
Addis Ababa					

Addis Ketema					
3	Woreda 01		Kebele 19		20
3	Woreda 04		Kebele 08		20
3	Woreda 06		Kebele 23		20
3	Woreda 08		Kebele 12		20
3	Woreda 10		Kebele 08 Ketena 5		20
Arada					
4	Woreda 02		-Beg Tera -Tigre Sefer		40
2	Woreda 04		Zebegnasefer		20
3	Woreda 05		Gedaysefer		20
Kirkos					
2	Woreda 02		26 Akababi		20
2	Woreda 09		DC/ Katanga (Ketena I)		20
Bole					
3	Woreda 13		Ketena 6 gerarsefer		20
Total	50		77		1220

Annex II: Routes for data collection

Route	No of data collectors	Person-day
Bahir Dar, D/Marikos, Debark	2	20
Kemissie, Woldia, Sekota	2	20
Adama, Asela, Batu Ziway,	2	20
Shashamane, Awassa, Sodo	2	20
Arbaminch	1	10
Ambo, Nekemt, Jima, Wolkite	2	20
Shire Endasselassie	1	10
Mekele, Adgrat, Maichew	2	20
Addis Ababa	3	30
Dire Dawa, Harar	1	10

Annex III: Qualitative data collection plan

Selection of study towns

The following key assumptions were followed in the choice of towns for qualitative data:

- The capital of major regions Adama, Bahir Dar, Hawassa and Mekele have their own unique features which may some of the regional plan for urban development, attention given to urban infrastructure and investment made to improve urban living
- Dire Dawa and Harar are close by and share a lot in common as business hub and/or route, in terms of residents' characteristics and opportunity to learn from each other. Thus, considering one of these may serve the purpose
- Addis Ababa as a mega city of its own feature it may have to be considered for the study
- Zonal towns of the respective regions are assumed to share common features in terms of size, structures, facilities and infrastructure. As a result, of towns under JSI's program in specific regions towns were chosen proportion to the number of such towns in the region. However, towns that are recognized as transport hubs were particularly considered
- Given the fact that Kemisse was the only towns under special zone we dropped it. Similarly, due to uncertainty of security situation, we dropped Debarq from both quantitative and qualitative study.

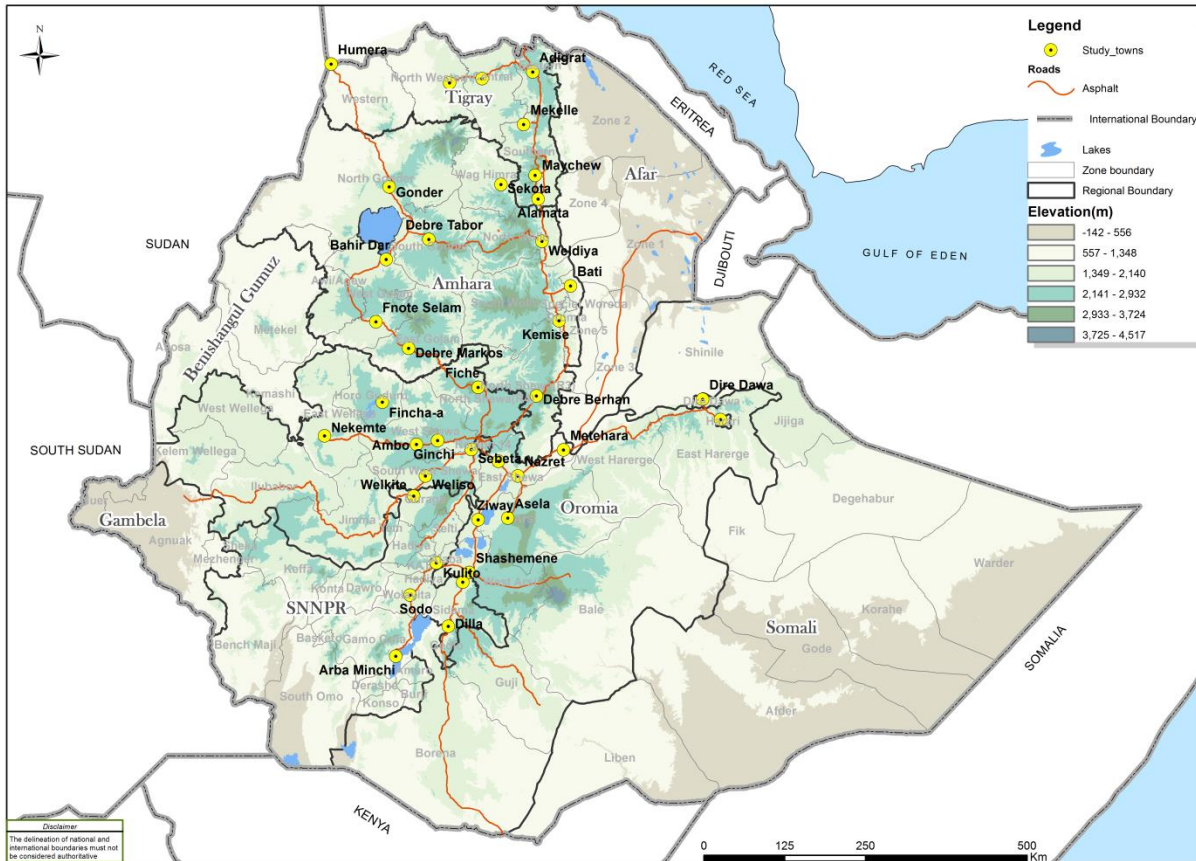
Accordingly the list of towns chosen for qualitative study is specified in the table below:

Regional towns	Regional towns chosen	Zonal towns	Zonal towns chosen
Adama	Adama	Amhara	
Bahir Dar	Bahir Dar	Debre Markos	
Hawassa	Hawassa	Debarq (Uncertain security)	
Mekelle	Mekelle	Kemisse (Special Zone)	
Dire Dawa	Dire Dawa	Woldia	Woldia
Harar		Oromia	
Addis Ababa	Addis Ababa	Assela	
		Shashemene	Shashemene
		Ambo	
		Jimma	Jimma
		Nekemte	
		SNNPR	
		Sodo	
		Araba Minch	Arab Minch
		Wlkite	
		Tigray	
		Adigrat	Adigrat
		Maychew	

Annex IV: Outcome, data source and approach by objective

Objectives	Data collection approach	Data source	Outcome
Characterize and develop profile of vulnerable sections of selected urban centers	Quantitative approach	urban sections that are vulnerable to health problems	Prevalence of Diarrhea, TB, PNC, Skilled Delivery assistance
Produce digital map of vulnerable sections of all 49 urban centers	Electronic mapping	Vulnerable sections of urban centers identified earlier (JSI-AAU report 2016) in all 46 urban centers	Map of vulnerable sections of all 46 urban centers, subjected to prior verification of the vulnerable sections already identified
Identify felt health needs of selected vulnerable section of the cities	Quantitative approach	urban sections that are vulnerable to health problems	Felt needs of residents and associated factors identified and listed
Identify barriers facing residents of vulnerable urban center to health services	Quantitative approach	urban sections that are vulnerable to health problems	Challenges of acquiring services by residents identified, prioritized and listed
Assess challenges faced by health offices and providers in service provision for selected vulnerable section of the cities	Qualitative approach		Challenges of providing services identified, prioritized and listed for planning interventions

Annex V: Map of study area



Annex VI: Work Schedule

1.	Refine Proposal	Three weeks
2.	Refine tool	Three weeks
3.	Ethical review	One month
4.	Data collection	Preparation week (Training of enumerators and pre-testing)
		Data collection three weeks
5.	Data entry and analysis	One month
6.	Draft report	Three weeks
7.	Dissemination	Draft manuscript
		Policy briefs

Annex VII: Participant's information sheet

Good morning/afternoon. Thank you for your interest in taking time with me today. I am _____ who is a member of a team conducting a study entitled "Assessing vulnerability to health and other problems: Places and people in urban centers of Ethiopia" The study is being carried out in collaboration with School of Public Health (SPH) and John Snow Incorporated (JSI) Ethiopia. Your participation in the study is on voluntary bases; however, your honest response will help us in understanding the situation better and will contribute for the improvement of health problems in urban settings.

Title of the study: - Assessing vulnerability to health and other problems: Places and people in urban centers of Ethiopia

Objective: - To characterize vulnerable sections of selected JSI's operational urban centers along with factors of vulnerability and develop residents profile.

Benefit: - This study will not give any direct benefit to the participants; but the information which will be gained from the participants will help relevant stake holders working in such area to design an appropriate intervention.

Risk: - The study will not impose any risks on the participants.

Right of the respondents: - any participant will participate on this study voluntarily. At any time they can quit from responding to the questionnaire that he/she is not willing to answer.

Confidentiality: - Collected questioners and taped interviews will not be accessible to anybody other than the study members and any information that you will give will not be linked to personal identification and be kept confidential.

Name and contact address of principal investigator: Dr. GirmaTaye, Tel no. 0911769926 and MulukenGizaw, Tel no. 0912281001

Annex VIII: Consent form

Are you willing to participate in this study?

I hereby agree to participate in this study and give my voluntary consent.

Yes _____

No _____

Name of research assistant _____ signature _____

Annex VIII: Vulnerability Assessment tool

I. **Qualitative tools**

a) Opinion leaders

1. What are the common health problems complained by residents of selected venerable sections of the town? How do you explain such complaints (if these are right? Indeed residents are affected, if it is specific to residents of this section of the town...). If not mentioned in the course of discussion, please ask specific question on whether diarrhea, TB and non attendance of PNC are problems in the vulnerable section of the town?
2. How often do these problems occur in these communities? Probe if this is frequent or occur only ones in a while? Check also how this is different from other sections of the towns?
3. Why do you think these problems prevail in the area as compared to other section of the twon? Can you please help me understand causes of the problems (please define causes for each problem areas. Make sure causes of diarrhea, TB and non attendance of PNC are specified
4. From among those residents in the vulnerable section of the town, who are most affected by those problems? Why are these groups more affected? Please list all possible reasons?
5. What do residents against such problems? Please probe what actions are taken by the community, by local authorities?
6. How do you explain if residents in this vulnerable section of the town use available health services? Can you help me understand why residents use or not use available services? What are the reasons for use or non use of available services?
7. What needs to improve in order to improve health service use by residents of the vulnerablesection of the town?

b) Local health manager, HEWs, HEP coordinators and supervisors

1. What is the common health problems complained by residents of selected venerable sections of the town? How do you explain such complaints (if these are right? Indeed residents are affected, if it is specific to residents of this section of the town...). If not mentioned in the course of discussion, please ask specific question on whether diarrhea, TB and non attendance of PNC are problems in the vulnerable section of the town?
2. How often do these problems occur in these communities? Probe if this is frequent or occur only ones in a while? Check also how this is different from other sections of the towns?
3. Why do you think these problems prevail in the area as compared to other section of the twon? Can you please help me understand causes of the problems (please define causes for each problem areas. Make sure causes of diarrhea, TB and non attendance of PNC are specified
4. From among those residents in the vulnerable section of the town, who are most affected by those problems? Why are these groups more affected? Please list all possible reasons?
5. What do residents against such problems? Please probe what actions are taken by the community, by local authorities?
6. How do you explain if residents in this vulnerable section of the town use available health services? Can you help me understand why residents use or not use available services? What are the reasons for use or non use of available services?
7. What needs to improve in order to improve health service use by residents of the vulnerable section of the town?

8. Who are the frequent users of available services? Can you please specify which services and who? Why are these frequent users of such services? (type of services – frequent users)
9. What health services do you think are expected but missing by those who are living in the 'vulnerable' quarter of the town? Why are such services missing? Where is the problem?
10. How do you explain the health systems capacity in responding to health service expectation of vulnerable sections of the urban settings? Please explain to me if service constellation in terms of HRH, medicines and supplies, leadership, information, financial resources and service delivery? Where is the problem and why is this a problem?
11. How do you explain if vulnerable sections of your city are served with health services they deserve? Why do you think so?
12. How do you explain if residents in this vulnerable section of the town use available health services? Can you help me understand why residents use or not use available services? What are the reasons for use or non use of available services?
13. What do you think are the major challenges in providing services to vulnerable section of your city? Why are these challenges picked?
14. What needs to improve in order to improve health service provision to vulnerable section of the population in this city? Who do you think is responsible for this? Why do you think so?

Dear participant

Greetings,

This is a study that aims to generate evidences on vulnerable sections of this town the outcome of which will help improve policy and programs to improve urban health. You were identified to participate in this study due to your established knowledge about this town and more particularly this section of the town. The information you will provide remains anonymous and will serve only for the intended purpose. I would like to request you to provide me with the information I will ask you for.

Would you agree Yes _____

No _____

A. Local opinion leaders

S.No	Specific objective	Themes	Key Questions	Responses - make sure verbatim are captured
1	What are the common health problems complained by residents of selected venerable sections of the town? How do you explain such complaints (if these are right? Indeed residents are affected, if it is specific to residents of this section of the town...). If not mentioned in the course of discussion, please ask specific question on whether diarrhea, TB and non attendance of PNC are problems in the vulnerable section of the town?	Theme 1: Common health problems Make sure if TB Diarrhea Anemia	Commonly complained health problems in the community How do you know if these are commonly complained health problems?	
		Theme 2 Causes of the problems	What are the causes of the respective health problems that are commonly complained by residents? Are these causes equally distributed in all sections of the towns? Why?	
		Theme 3 Symptoms	What are the symptoms of the health complaints? Explain if symptoms are different for different people? why?	
		Theme 4 Most affected group	Who are most affected by the different health problems Why are these groups most affected	
	Identify felt health needs of residents in vulnerable section of the town	Theme 1 Felt health needs	What are the commonly fet health needs of residents in vulnerable sections? Explain if such felt health needs are shared by all residents in vulnerable section of the town? Who often exhibit such felt health	

			needs? Why?	
	How often do these problems occur in these communities? Probe if this is frequent or occur only ones in a while? Check also how this is different from other sections of the towns?	Theme 1 Frequency of occurrence	How often do people complain about such problems in a year? month? week?	
		Theme 2 Frequently affected group	Who are frequently affected by the health problems? Why do you think is this the case?	
		Theme 3 Frequently affected section of the town (name of the section of the town)	Residents of which village/zone (specific name please) of the town are known to be frequently affected by prevailing health problems (check above)	
		Theme 4 Characteristics of affected sections	Why are residents of these section of the town most affected? What is lacking in this section of the town? (probe: infrastructure, water, services...) What are the key characteristics of this section of the town (probe: sanitation, crowdedness, type of housing, means of livelihood...)	
	What do residents do against such problems? Please probe what actions are taken by the community, by local authorities?	Theme 1 Actions	What are the common measures residents affected by these problems do against prevailing health problems? Please specify actions at: a) individual b) Household c) Kebele d) Local leaders e) health facilities f) NGOs g) others	
	How do you explain if residents in this vulnerable section of the town use available health services? Can you help me understand why residents use or not use available services? What are the reasons for use or non use of available services?	Theme 1 Use of available services	How do you explain resident's use of available health services ? Who often use available services? Why?	
		Theme 2 Reason for non use	Of the residents who often do not use available services? Why	

		The 3 Suggestions	What do you suggest should be done in order to improve service use? Can you tell me who is responsible to improve service use?	
--	--	-------------------	---	--

II. Quantitative tool

To be completed prior to the interview by supervisors, and distributed to the interviewer

Questionnaire ID?

1. Region

2. District name.....

3. Kebele code

4. House hold number.....

5. Village name (vulnerable section).....

a. Estimated population in the village-----

b. Area in meter: from North-----to South, from East-----to West

c. Neighboring villages (East-----, West-----, North-----)

TO BE READ TO THE STUDY PARTICIPANTS PRIOR TO THE INTERVIEW

Good-day/evening, my name is _____. I work for Addis Ababa university doing a study to assess vulnerability to health and other problems: Places and people in urban centers of Ethiopia. There are no “right” or “wrong” answers to the following questions; I would just like to find out a little more about your view here concerning vulnerability and barriers to felt need. You have the right to refuse to answer any questions; or to stop the interview at any time. This questionnaire is anonymous. Your answers will remain confidential and will not be disclosed to the government or to any other organizations. Your name will not be mentioned in our report.

I cannot offer you anything in exchange for your contribution, apart from my thanks. Your participation and testimony are very important. For more clarification you can also contact PI of the study Dr. GirmaTaye from Addis Ababa University with his address mobile +251911769926. Email: girmataye2009@gmail.com

Informed Consent

This interview should take approximately 30 minutes. Do you have any questions mentioned above? Are you willing to continue?

YES _____ NO _____

Interviewer name:	Date.....	Sign
Supervisor name.....	Date	Sign

Part I- Socio Demographic Information			
S.No	Questions	Categories	Skip
Q1	Record sex of the respondent	Male.....1 Female.....2	
Q2	How old were you at your last birthday?	_____year	
Q3	What is your current marital status?	Married.....1 Living together/union.....2 Divorced.....3 separated.....4 Widowed.....5 Never married but engaged.....6 Never married not engaged.....7	
Q4	What is the highest level of school you completed? (CIRCLE one)	Primary-----1 Secondary-----2 Technical/Vocational -----3 Higher -----4	
Q5	How long have you lived in this village/locality: (or read loud the Name of community/ town neighborhood/ village)?	Number Of Years _____ (Record 00 If Less Than 1 Year) Don't Know -----88 No Response -----99	
Q6	Where were you living before you came here? Write down answers	Region _____ Zone _____ Name of locality _____	
Q7	Why have you left your previous residence place?	Job related _____ Family problem _____	

		Safety and security _____ Other reason (write down) _____ _____	
Q8	Where is your birth place?	Region _____ Zone _____ Specific area _____	
Q9	Are there migrants in the area?	Yes-----1 No-----2	
Q10	What is profile of these migrants?	1. Dominantly Young ----- 2. Adults ----- 3. Young and male ---- ----- 4. Young and Female- ----- 5. Other (list)-----	
Q11	Which of the following three are hard to fulfill with your income? (circle three only)	1. Clothing----- 2. Food----- 3. Health care----- 4. School fee----- 5. Rent----- 6. Purchase of TV or Radio 7. Other _(write down)----- _	
Q12	What is your religion? Circle one	No Religion-----1 Christian -----2 Muslim -----3 Other (specify)-----4 Don't Know -----88 No Response -----99	
Q13	What is your ethnicity or ethnic group?	Amahara -----1 Gurage-----2 Wolayta-----3 Oromo-----4 Tigre -----5 Other (specify)-----6 Don't Know -----88 No Response -----99	
Q14	What is your occupational status?	Farmer-----1 Government employee-----2 NGO employee-----3 Merchant-----4 Housewife-----5 Student-----6 Daily laborer-----7 Other (specify)-----8	
Q15	How many are you in your household? OR what is the number of your	_____ In number	

	household members?		
Q16	With whom are you living?	Mother only----- Father only----- Both mother & father----- Brother or sister----- Other relatives (list)-----	
Q17	How many people live in one house in your neighbors	In the House to your left----- In the house to your right-----	
Q18	What is the maximum and minimum people living in the house that you know in your neighbor (write the number)	Household with minimum----- Household with maximum-----	

Part II- Housing, Household asset and Income			
S.No	Questions	Categories	Skip
Q19	Are there other households (members belonging to other HHs) living with you	1.Yes ____ 2.No ____ 3.If yes, how many _____	
Q20	The number of sleeping rooms in the household	_____ In number	
Q21	Please indicate the main material of the roof, floor and walls of the main house? (please fill the code from the list based on observation – Don't ask) 1. Roof _____ 2. Floor _____ 3. Walls _____	Roof material 1 = Thatch 2 = Iron sheets 3 = Tiles 4 = Plastic 5=other	
Q22	Please indicate the main material of the floor of the main house?	Floor material 1= Dirt/mud/sand 2 = Wood 3 = Concrete 4 = Asbestos 5= other	
Q23	Please indicate the main material of the wall of the main house?	Walls material 1 = Concrete/fired brick 2 = Mud or mud brick 3 = Mud/wattle 4=0ther	
Q24	Where is the Kitchen or where you did the cooking?	In the household observed-----1 In the household not observed-----2	

	(Observation?)	In a separate building observed -----3 In a separate building not observed --- --4 Outdoors observed ----- 5 Other(specify)-----6	
Q25	Does the house have electricity?	Yes-----1 No -----2	
Q26	What type of cooking fuel does your Household use?	Charcoal----- 1 Firewood----- 2 kerosene/paraffin -----3 Gas cylinder----- 4 Electricity----- 5 Biogas----- 6 Animal dung----- 7 other (specify) -----8	
Q27	Ownership of the house?	Own-----1 Rented-----2 Other-----3	
Q28	Which of the following items do the household own? (read the list and circle according to response)	YES NO Couch/Sofa----- 0 Bed----- 0 Table----- 0 Bicycle----- 0 Radio ----- 0 Television----- 0 A Refrigerator----- 0 Automobile..... Truck..... OTHER (specify)-----	
Q29	Do you consider your residential area as :	Slum _____ 1 Semi-slum _____ 2 Not slum _____ 3.	
Q30	Why is your response to Q26 so? Write response	_____ _____ -----	
Q31	Dominant housing type in the neighborhood (write number & type)	1 = Thatch 2 = Iron sheets 3 = Tiles 4 = Plastic 5=other	
Q32	Type of road available in your village	1. Asfalt 2. Coble stone 3. Gravel 4. No proper road 5. Other-----	
Q33	Is there a ditch in front or (or behind) your	1. Yes, properly done	

	house used as liquid waste disposal	2. Yes, informally done by community 3. Yes, me and my neighbors 4. None	
Q34	What is the main economic source of your household?	Employment/salary -----1 Children support----- 2 Other families support -----3 Business-----4 Remittance-----5 Pension-----6 Other (specify) -----7 Support from NGO or community...8	
Q35	How many members of your family earn money?	_____ In number	
Q36	Who are these members?	Wife _____ Children _____ Other dependents _____ _____ From other HH _____	
Q37	How much do you earn per month?	_____ In Birr	
Q38	Does your household have any savings?	Yes-----1 No -----2	
Q39	If yes, how much do you save per month?	Birr amount [_____]	
Q40	Where do you save this money?	House-----1 Bank -----2 Other -----3 No Response -----99	
Q41	Is there 'food-for-work' type of arrangement in your community?	Yes-----1 No-----2	
Q42	How many jobs have you ever changed since you started working?	-----In number	
Q43	Why do you change jobs (circle all that apply)	Temporary nature-----1 Could not manage (hard)-----2 Made redundant-----3 Disagreement with employer-----4 Dismissed-----5	
Q44	What is the easiest job one can find in this community or elsewhere in the town?		
Q45	When you compare with most HHs in your community, how do you rate your income	Much better than others----1 Just better than others----2 Similar to most----3 Less than most----4 Worst of all----5	

Part III- Water and sanitation Status			
S.No	Questions	Categories	Skip
Q46	What is the main source of drinking water for your household?	Tap-----1 Well-----2 Community Pump-----3 River/Stream-----4 Standing Water-----5 Other-----6	
Q47	How much time do you spend per day gathering water?	Hour _____ Minuet _____	
Q48	Do you treat your water in any way to make it safe for drinking?	Yes-----1 No -----2	
Q49	If yes, what do you usually do to the water to make it safer to drink?	Sedimentation-----1 Strain it through cloth-----2 Boil-----3 Add bleach/Chlorine-----4 Water filter (Ceramic, sand, composite) -----5 Solar Disinfection-----6 Other-----7 Don't Know-----88	
Q50	Have you changed the way you gather or store water in the past 12 months?	Yes-----1 No-----2	
Q51	What changes have you made?	_____ _____ _____	
Q52	Can you show me where you usually wash your hands? [ASK TO SEE AND OBSERVE]	Inside/near toilet facility-----1 Inside/near kitchen-----2 Elsewhere in yard-----3 Outside yard-----4 No specific place-----5 No permission to observe-----6	
Q53	When do you usually wash your hands? [record all mentioned. do not read the answers, ask to be specific, encourage “what else” until nothing further is mentioned	Before food preparation-----1 Before feeding children-----2 After defecation-----3 After attending to a child who has defecated -----4 Before eating food ----- 5 After eating foods ----- 6 Other ----- 7	
Q54	Is there soap or detergent or locally used cleansing agent for hand washing? NB. Observation Required	Yes-----1 No -----2	

Q55	Does the household have latrine? NB. Observation required	Yes-----1 No-----2 Do not know -----88 No response -----99	
Q56	What types of latrine you use? [ASK TO SEE AND OBSERVE]	Unimproved latrine-----1 Traditional Improved Latrine-----2 Improved Latrine (with support structure-----3 Non-flush latrine connected to septic tank-----4 Flush latrine connected to septic tank-----5 Other-----6 No response-----99	
Q57	How is liquid waste from houses managed (please observe and write)	-----	
Q58	Where and how is dry waste managed and disposed (please observe and write down)	-----	

Part IV- Health care			
S.No	Questions	Categories	Skip
Q59	Is there any health facility in the locality?	Yes-----1 No-----2 I don't know -----88	
Q60	If yes for Q35, could you tell us the average distance in Km (meter) and in hour it took to travel?	_____(Km, meter) _____(hour, minute)	
Q61	During the last month, Is there a family member who are ill in the house hold?(focus on Children)	Yes-----1 No-----2 How many: adults-----Children-----	
Q62	Have you visited the health care facility for any illness in the last 1 year period?	Yes -----1 No -----2 No response -----99	
Q63	Which health facility did you go for the illness of your HH member in the last one year?	Hospital -----1 Health center-----2 Clinic -----3 Traditional healer -----4 Other (specify)-----5	
Q64	How long did you wait to get the service (in minutes or hours)?	-----	
Q65	Are you happy with the services?	Yes-----1 No-----2	
Q66	Did you buy or given drugs?	1. Bought 2. Given 3. both-----	

		Drug not required----4	
Q67	If bought the drug what was the cost of drug for the recent purchase (in birr)	-----	
Q68	How long have you been sick and off-duty in the last one year? (please add and write the total, if off-duty at different times)	-----	
Q69	How long any of your HH members was sick and off-duty?	-----	
Q70	How many people in your neighborhood were sick and absent from work for at least five days	-----	
Q71	What is common disease for adults in your community? (list)	_____ _____ -----	
Q72	How many HH members died in the last three years?	-----	
Q73	If yes what was the reason?	_____ _____ -----	
Q74	How many people died from your neighborhood in the last three years?	_____ _____ -----	
Q75	Have you got any health education in your house hold?	Yes-----1 No -----2	
Q76	Which child hood illness is more common in the house hold? (<i>don't mention them</i>)	Diarrhea -----1 Typhoid fever-----2 Pneumonia -----3 Malaria -----4 Acute respiratory problem -----5 Other (specify)-----6	

Part V- Maternal and Child health			
(Focus on Delivery and post-natal care service and Diarrheal problem)			
S.No	Questions	Categories	Skip
Q77	At the time you became pregnant for the last birth, did you yourself actually want to become pregnant <u>then</u> , did you want to stay until <u>later</u> , or did you <u>not want</u> to have any (more) children at all?	Wanter by then-----1 Wanted later-----2 Wanted no more children.....3	
Q78	Where did you give birth to your last baby?	Home-----1 Government hospital-----2 Private hospital-----3 Government health center-----4	

		Private clinic-----5 Government health post----- 6 Other (specify)-----7	
Q79	Who attended the delivery of your last baby? Any else? (Probe to mention and record all mentioned)	Doctor-----1 Nurse/midwife-----2 HEW-----3 TTBA-----4 UTBA-----5 Relative/friend-----7 Other (specify)-----8 No one -----9	
Q80	Was the baby delivered by caesarean, that is, did they cut your belly open to take the baby out? OR What was the mode of delivery for your last birth?	Yes-----1 No -----2 OR Vaginal delivery....1 Cesarean section...2	
Q81	After you gave birth to your baby, did anyone check on your health while you were still in the facility?	Yes-----1 No -----2	
Q82	Did anyone check on your health after you left the facility?	Yes-----1 No -----2	
Q83	Did you visit any health facility within two days after your last delivery for postnatal care?	Yes-----1 No -----2 Don't remember.....3	
Q84	Why didn't you deliver in a health facility?	Cost too much -----1 Facility not open-----2 Too far/ no transportation----- 3 Don't trust facility/poor quality service -----4 No female provider at facility-----5 Husband/family did not allow ----6 Not necessary-----7 Not customary-----8 Other (specify)-----9	
Q85	Who checked on your health at that time? (PROBE FOR MOST QUALIFIED PERSON).	Doctor-----1 Nurse/midwife-----2 HEW-----3 TTBA-----4 UTBA-----5	

Q91	Has any of your children had diarrhea including your last birth in the last 2 weeks?	Yes-----1 No -----2 Don't know-----88	
Q92	Was there any blood in the stools?	Yes-----1 No -----2 Don't know-----88	
Q93	Now I would like to know how much was given to drink during the diarrhea (including breastmilk). IF LESS, PROBE: Was he/she given much less than usual to drink or somewhat less?	Much less-----1 Somewhat less-----2 About the same-----3 More-----4 Nothing to drink-----5 Don't know-----88	
Q94	When the child had diarrhea, was he/she given less than usual to eat, about the same amount, more than usual, or nothing to eat? IF LESS, PROBE: Was he/she given much less than usual to eat or somewhat less?	Much less-----1 Somewhat less-----2 About the same-----3 More-----4 Nothing to eat-----5 Don't know-----88	
Q95	Did you seek advice or treatment for the diarrhea from any source?	Yes-----1 No -----2 Don't know-----88	
Q96	Where did you seek advice or treatment? Anywhere else? PROBE TO IDENTIFY EACH TYPE OF SOURCE.	Government hospital-----1 Private hospital-----2 Government health center-----3 Private clinic-----4 Government health post-----5 Other (specify)-----6	
Q97	Where did you first seek advice or treatment?	Government hospital-----1 Private hospital-----2 Government health center-----3 Private clinic-----4 Government health post-----5 Other (specify)-----6	
Q98	Was he/she given any of the following to drink at any time since	Yes No DN	


	he/she started having the diarrhea: a. A fluid made from a special ORS packet like LEMLEM? b. A government-recommended homemade fluid?	Fluid from ORS pkt 1 2 88 Homemade fluid 2 88	
Q99	Was anything (else) given to treat the diarrhea?	Yes-----1 No -----2 Don't know-----88	
Q100	What (else) was given to treat the diarrhea? Anything else Record all mentioned	Pill or syrup Anti-biotic-----1 Anti-motility-----2 Zinc-----3 Other -----4 Injection Anti-biotic-----5 Non anti -biotic-----6 Unknown injection-----7 Intravenous-----8 Home remedies/herbal medicine-----9 Other (specify)-----10	
Part VI: Access to information and related issues			
Q101	Do you know about HIV?	Yes-----1 No-----2	
Q102	If yes where did you get the info? (list)	----- -----	
Q103	Are you member of Idir in the community?	Yes-----1 Not intersted-----2 Refused to accept me---3 No money tp pay---4 No Edir-----5	
Q104	Are you registered as resident in the kebele?	Yes----1 Not attempted---2 Did not accept me—3 Not interested----4	
Q105	Do you normally purchase from kebele shop?	Yes----1 No access---2	
Q106	Do you listen to radio?	Yes----1 No time---2 Not interested---3 Have no radio---4	
Q107	Do you have television?	Yes---1 No----2	
Q108	How many HHs in your neighborhood have TV (approximately)	----- -----	

Q109	Have you ever been discriminated by any members of your community?	Yes---1 No---2	
Q110	If yes to Q106, what do you think is the reason? List	_____	
Q111	How were you treated at Kebele office?	Fairly---1 Poorly---2 Badly---3 Never been at kebele office---4	
Q112	Who is responsible for violence in your community?	Drankers---1 Thefts---2 Dispute among neighbours---3 Dispute among HH members---4 Dispute among passers by---5 Dispute is very rare ---6 No dispute at all---7	
Q113	What is the common reason for violence among community members	Water---1 Toilet---2 Cooking place---3 Waste disposal---4 Other-----5	

Thank you for your time!

The End

Annex X: Ethical clearance letter

	ADDIS ABABA UNIVERSITY College of Health Sciences School of Public Health Ethical Clearance Form	Version 01.03. 2016
		Date: /24/03/2016/ Ref.No. SPH/244/2008
Project number / <u>002</u> /		
Date of approval (D/M/Y) <u>/23/03/2016/</u>		
Project Title: <u>Assessing vulnerability to health and other problems: Places and people in urban centers of Ethiopia.</u>		
Name of PI <u>Girma Taye (PhD)</u>	Phone Number <u> </u>	
Institution Department	<u>School of Public Health</u>	
Decision of Research and Ethics Committee:	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Approved with Recommendation <input type="checkbox"/> Resubmission <input type="checkbox"/> Disapproved	
Valid until	<u>June 31,2017</u>	
Dean, School of Public Health		
Signature <u>[Signature]</u>		
Date <u>/24/03/2016/</u>		