ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Retrospective record assessment of visceral leishmaniasis(VL) patients in Kahsaye-Abera Hospital and knowledge, attitude and practice pertaining to visceral leishmaniasis among the indigenous people and migrant workers in Kafta-Humera District.

BY- Tadesse Fesseha (B.sc)

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ACRONYM

VL	Visceral leishmaniasis
CL	Cutaneous leishmaniasis
K/Humera	Kafta-Humera District
HIV	Human immuno deficiency syndrome
HAART	Highly active anti retro viral therapy
rK39	A recombinant antigen derived from a 39-amino acid repeat in L. chagasi
ITN	Insecticide treated nets
KAP	Knowledge, attitude & practice
K/Abera Hospital	Kahsaye-Abera Hospital
PKDL	Post Kala azar dermal leishmaniasis
DAT	Direct agglutination test
SSG	Sodium stibo gluconate
VCT	Voluntary counseling and testing
WHO	World health organization
S/P	Splenic aspirate

ABSTRACT

According to a substantial body of evidence, leishmaniasis is posing burden on people of all ages living in different parts of the world at varying degrees of morbidity and mortality. Visceral leishmaniasis (VL) is endemic in the south, southwest, north, North West and north east peripheral low lands of Ethiopia. K/Humera, in Tigray Region is VL endemic. Its proximity to the Sudan, economic attraction and a venue for several migrant workers further complicates the problem. With the objective of describing the magnitude of visceral leishmaniasis at Kahsaye-Abera Hospital, a study was conducted using a pre-tested questionnaire and a retrospective clinical records review.

The knowledge and practice of both migrant workers and indigenous people was found to be 56.1%, 77.2% and 6.9%, 68% respectively. Out of the 931 migrant workers, 69% were familiar with the work kala azar compared to 85.8% of the indigenous population. A bit higher than 40% of both cohorts accessed the information from health facilities with only 4% of the labor migrant force and 14.7% of the local inhabitants from the media. A wide gap of behavioral practice was evidenced between the labor migrants and local residents, where 93.1% migrant workers and 29% indigenous people exhibited poor practice towards visceral leishmaniasis. Of the 882 retrospectively reviewed patients' records, only 174 (19.7%) had no any inter-current infections whereas majority of the group 80.2% had atleast one concurrent infection with the highest rate of respiratory infections, 48.4% and the HIV/leishmania co-infection was as high as 25%. HIV co-infected VL cases were seven times more likely to relapse compared to HIV negative VL cases. Respondents were less familiar with the sandflies as the major players in the transmission of VL (kala azar) and had unsatisfactory perception and poor practice towards kala azar. Moreover, mortality and HIV/VL co-infection rate was among the highest. Health workers and other stake holders should join hands to adequately disseminate information to the community to actively participate in the sphere of prevention.

DECLARATION

I, The under signed, declare that this is my original work and has never been presented in this or any other university and that all the source material used for the thesis have been duly acknowledged.

Name Tadesse Fesseha

Signature _____

Place _____

Date of submission _____

This thesis has been submitted for examination with my approval as a university advisor

Name Dr. Ahmed Ali

Signature _____

Date _____

I. Background

1.1 Introduction

Global Situation of leishmaniasis

Leishmaniasis is a disease caused by infection with different species of the protozoan parasite *leishmania*, transmitted by sandflies [1]. *Leishmaniasis* occurs in temperate and tropical climates in all parts of the world except in Australia and Oceania (pacific islands of Melanesia, Micronesia, Polynesia). The vast majority of *cutaneous* cases occur in Afghanistan, Algeria, Brazil, Peru, Iran, Syria, and Saudi Arabia [2]. An estimated 12 million people world wide are infected, while 350 million live in areas where disease may be contracted [3]. It represents a complex of diseases with an important clinical and epidemiological diversity. *Visceral leishmaniasis* (VL) is of higher priority than *cutaneous leishmaniasis* (CL) as it is a fatal disease in the absence of treatment [1].

The number of visceral *leishmaniasis* cases occurring around the world is clearly far higher than officially reported, and the number of infections (4-5 times) higher still. The difficulty in estimating the case burden is due to several factors:

Great fluctuations in the number of cases within short periods of time, focal distribution, numerous cases undiagnosed, as well as, misdiagnosed, not reported and often asymptomatic cases. Cases notification is compulsory in only 30 of the 88 endemic countries [4].

During the last two decades, it has become obvious that most forms of *leishmaniasis* are much more prevalent than had been previously suspected, both in terms of increasing incidence and geographical spread [4]. The vast majority of visceral *leishmaniasis* cases (90%) occur in poor rural areas of Sudan, India, Bangladesh, Nepal and Brazil [5]. Thus visceral *leishmaniasis* (*kala azar*) persists today in very poor, remote, and sometimes politically unstable areas, where health care is extremely hard to come by and there is little access to affordable drugs and preventive measures. This disease leads to substantial illness and sometimes; under conditions of extreme deprivation, the death rate can be high [6].

East African situation of leishmaniasis

The ecology of east Africa includes termite hills, acacia tree, and black cotton soil and is usually lower than 1500 meters of altitude. In some areas, people locate their villages on hill tops to avoid the sandflies, rather than living in lush, agriculturally promising river valleys where sandflies are abundant. *P.martini* is the vector in these areas. In Kenya *visceral leishmaniasis* is endemic in the low lands of Karamoja on the border with Uganda, the rift valley from Kajiado through Baringo, Kitui, Muchachos and through to north eastern province [7]. In Uganda, only the Pokot are affected, their nomadic lands extend across the Kenyian border. There is also an endemic area extending on the Kenya/Sudan to Kapoeta town. In Somalia the endemic area extend from the Kenyan border,

especially Bakol and Gedo [7]. In southern Ethiopia the endemic area is in Aba Roba, Segen Valley following the Segen River and near the Gelana and Dawa rivers. *P.martini* sandfly population is highest during the two rainy seasons, April-June and November-December. In Uganda *phlebotomous martini* can be found in various locations like termite hills, rodent burrows, tree holes, tukul walls which makes vector control virtually impossible [7].

Kenya, Sudan and Ethiopia form one of the major global foci of *leishmaniasis* in east Africa [8]. In western Nile, southern Sudan, previous reports and conclusions of a recent WHO/UNICEF assessment mission have indicated that a severe epidemic of *visceral leishmaniasis* occurred during the last five years in western upper Nile and over 15000 cases have been treated there [4].

Ethiopian situation of leishmaniasis

Ethiopia extends between 3^0-15^0 north latitude and 33^0-48^0 east longitudes, and lies with in the tropical climatic zone [8]. *Visceral leishmaniasis* was reported to be endemic in the south, southwest, north, North West and north east peripheral low lands of Ethiopia. *Phelobotmine* species transmitting *L. donovani* in Ethiopia are *phlebtomous martini*, *parrot* and *p. celiae minter* in the Segen valley, south western Ethiopia and most of the remaining VL foci in the country [9].

Phlebotomous orientalis was reported as a probable vector of *kala azar* and *Arvichanthis niloticus* was suspected as a reservoir in the Humera area [8]. There were also indications of transmission of the disease in Welkaite*,* Tsegedie and Metema. Gemetchu and Fuller 1976 as quoted by Ahmed Ali have reported *p.orientalis* as a possible vector of the disease [7]. Until the 1960s, the Humera-Metema areas were mostly uninhabited, because of kala-azar, but since then large agricultural development in the Humera-metema and immigration have increased the population in this area paving the way for increased risk of exposure to the disease [10].

There seems to be a big gap in giving attention to *visceral leishmanaisis* it deserves though an important disease in Ethiopia causing considerable amount of morbidity and mortality. It is hugely under estimated; enough to point out that there is no national policy for *visceral leishmaniasis* in Ethiopia. The Ethiopian government has recently resettled people from drought affected areas to relatively fertile low lands where *visceral leishmaniasis* is endemic. Under such circumstances it is high time to assess the level of knowledge, attitude and behavioral practice in the community and other *visceral leishmaniasis* related studies in the area where to the best of my knowledge a single research of similar interest is not so far done.

1.2 Literature review

Early evidence of the endemicity of *visceral leishmaniasis* (VL) in southern Ethiopia came from Cole et al. as quoted by Ahmed Ali, who described 31 cases in a military battalion traveling in south-western Ethiopia, northern Kenya and south-eastern Sudan. In a report of 136 cases in a brigade operating in northern Kenya, claimed that 11 cases had been acquired on the Moyale-Addis Ababa road, just inside Ethiopia; eight further cases were reported in troops who passed through an unspecified area near the southern border [11].

These evidences supported by later works of prominent epidemiologists who amassed a considerable knowledge and experience in the field began an eight year long intensive study in southern Ethiopia where *visceral leishmaniasis* is endemic, 142 cases were recorded till 1990. The cases were very unequally distributed between the six villages studied, with more than 90% in the four which were closest to the uninhabited valley of the Segen River. In a year long-intensive study, annual incidence of disease was estimated at 6.9/1000 in the whole population. The annual incidence, taken into account, the previous works was calculated as 1.9% while the rate of immuno-conversion was 5.6 times greater [11].

Visceral leishmaniasis due to *L.donovani* is widely distributed in the low lying and arid parts of Ethiopia while *cutaneous leishmnaniasis* due to *L.aethiopica* is largely restricted to the central high lands of Ethiopia. In a clinico-epidemiological

study of *cutaneous leishmaniasis* and *visceral leishmaniasis* in the middle course of the Ethiopian rift valley involving 1809 residents of 10 villages showed a prevalence rate of 5% in Olge village to 0% in Kello-langano village by using leishmanin skin test [12].

A leishmanin skin test among three villages of Aba Roba peasant association where 730 subjects were studied with 728 (99.7%) of them returning for the reading of the test, an overall prevalence of leishmanin skin test positivity was 36.4 %; 50.9% of males and 23.2% of females. A sharp increase was noted in the age group 10-19 onwards and linear positivity with age was witnessed in both sexes at varying degrees, more in males than females. The highest prevalence was observed in Galga village with 56.1%. leishmanin skin test positive prevalence rate while in Foro and Goinada showed 33.9% and 27.3% respectively.The prevalence in the three villages is indeed suggestive of endemicity [13].

Leishmaniases in the middle course of the Rift Valley between Meki and Arbaminch (Ethiopia) assessed in1994-1996 where adequate study subjects reappeared for leishmanin skin test showed community prevalence as low as 0-5% in the face of rich sandfly fauna and with spleen enlargement rate ranging from 5%-80% [12]. As a result another attempt was made in the same area to collect sandflies in 9 different places on 7 different occasions where 9 species of

phelbotomous and 14 species of *Sergentomya* were identified with the largest portion shared by *P. martini* and *P.orientalis* that are known as vectors for *V. leishmaniasis* [14].

Though the leishmanin test fails to distinguish CL from VL, it is reported to be a good tool for epidemiological surveys of *leishmaniasis*. In a study conducted in Southern Ethiopia 48.4% out of the entire subjects showed negative skin reaction through the course of the study. 38.5% had repeated positive reactions and 8.4% converted from negative to positive while 4.6% converted from positive to negative witnessing that leishmanin skin test could Convert from one end to the other in due course [15].

Another study done with the aim of assessment of the role of nutrition on the risks of developing disease in the southern peoples Administrative region, Abo Roba peasant association where 730 individuals of non-VL were followed, revealed that those with adverse nutritional status had a higher risk of developing VL as compared to their apparently healthy cohorts and those with lower BMI had a relative risk of 5.9 times of developing VL than those with relatively higher BMI [16].

1.2.1 Knowledge, attitude and practice towards leishmaniasis

To date there is no literature that tried to assess the knowledge, attitude and practice of either indigenous or migrant workers towards visceral *leishmaniasis* in Ethiopia and there are even few literatures world wide. Knowledge and practices related to *cutaneous leishmaniasis* was conducted among inhabitants of 7 communities in Colombia [17]. Only 6.7% of respondents knew the disease by the name *leishmaniasis*; the local names were bejuco or Yatevi. 47% believed *leishmaniasis* is caused by the bite of a worm and 35% by a mosquito bite. 94% recognized bejuco as a skin disease. 41% of respondents combined different treatments. Women were significantly less likely than men to know any treatment [17].

But, in a study to assess the knowledge, attitude and practise about malaria, the mosquito and antimalarial drugs in a rural community of Ethiopia, 60% of the study subjects associated the cause of malaria to the bite of mosquito and malaria was thought to be preventable by 85.7% of the respondents [18].

Another study done to assess the level of KAP about *kala azar* and its sandfly Vector In rural communities of Nepal showed that the villagers had poor knowledge about the transmission of *kala azar*, with most villagers perceiving that mosquitoes, instead of sandflies, were responsible for the transmission of the infection [19]. Majority of The

respondents, 78% in Titaria and 48.4% in Haraincha were aware that the condition can be treated [19]. The residents of the two villages were highly responsive to a program to spray houses with insecticides [19].

1.2.2 HIV and leishmaniasis

Studies in many parts of the world show that, *leishmaniasis* is widening especially in the advent of HIV/ AIDS its horizon and new territories of the disease are being discovered as time passes by [20]. Some authorities rank visceral *leishmaniasis*, as the forth most common opportunistic parasitic disease in HIV positive individuals in at least in the south Western Europe, just following pneumocytosis, Toxoplasmosis and cryptosporidiosis [21]. AIDS with visceral *leishmaniasis* has shorter survival time than AIDS with other illnesses [20]. Although *leishmaniasis* has been recognized as health problem for almost a century, its public health impact appeared to have been very amplified owing to its intimate association with HIV/AIDS, which became evident only two decades ago [21].

The overall national prevalence of HIV in Ethiopia is known to be 4.4% [22].

Leishmania / HIV co-infections can lead to epidemiologic changes of *visceral leishmaniasis*. Co-infected patients harbor a high number of *leishmania* in their blood so there is a risk of them becoming reservoirs of the disease that in turn may increase the risk of future epidemics especially in countries of anthroponotic

foci. *Post–kala*-azar *dermal leishmaniasis*, associated with incomplete treatment, becomes another factor for increased transmission through reservoir amplification [23]. Up to 50% of HIV positive VL cases could relapse at some point [7]. The simultaneous co-existence of these two immuno-compromising infections make patients present atypically, pose difficulties to be detected by routine diagnostic tests, most often result in an unfavorable response to treatment, frequent relapses and in premature deaths [21] nevertheless, the introduction of highly active anti-retroviral therapy (HAART) as a standard treatment for HIV has resulted in a significant decrease in the incidence of VL in HIV-infected individuals in southern Europe [24].

Another area of concern nowadays is the environment where every creature including humans interact each other massively and influenced by considerably. Changes happening to the environment would then be changes to the routine phenomena we know**.** Current evidence suggests that inter-annual and inter-decadal climate variability have a direct influence on the epidemiology of vector-borne diseases. This evidence has been assessed at the expected future climate change [25].

By 2100, it is estimated that average global temperatures will have risen by 1.0-3.5 degrees Celsius, increasing the likelihood of many vector-borne diseases in new areas. *Visceral leishmaniasis* (VL) is a vector borne disease highly influenced

by environmental factors, geographical information system (GIS) showed map regression results for environmental variables of 190 villages in the Sudan, Gedarif state that average rainfall and altitude were the best predictors of VL incidence [25, 26].

Reemergence or resurgence of *visceral leishmaniasis* has been over recent decades a problem in many parts of the world. For the last four decades clinicians have discounted *kala azar* as a disease of local origin (imported) in Bombay but it was found that 30.5% of (25) indigenous patients investigated were found to be suffering from the disease in a place called Acworth Leprosy home [27] like wise, the decline in the incidence of *visceral leishmaniasis* in Israel in the 1970s and the slight increase in 1980 (11 cases) and 1990 (17 cases) are signs of *visceral leishmaniasis* reemergence [28].

1.2.3 Inter-current infections, treatment and diagnosis of leishmaniasis

This immuno compromising parasitic disease is likely to be accompanied by bacterial super-infections, in a clinical or post mortem diagnosis of VL cases among 33 hospitalized patients in Brazil, 13 (33.9%) had respiratory infection, 4

(12.1%) had skin infection, 4 had urinary tract infection, 3 (9%) showed ear infection and 2 (6.6%) had infection of the oral cavity [29].

Bacterial super infection in 22 (41%) of 54 patients was found among children admitted to the pediatric Hospital of Shiraz University of Medical Sciences in Iran where respiratory tract infections and septicemia were the most common types of infections, 18.5% and 13% respectively [30]. A report of 60% of bacterial infections of VL cases was noticed in a study done by Andrade [31].

Leishmaniasis is an insect-borne disease that is showing resistance to the highly toxic, heavy metal based antimonials [32]. A cluster of 130-150 patients treated annually in one center of India with locally made sodium antimony gluconate, life threatening cardiotoxicity was observed in 8 patients (6.2%) after 3-28 days of therapy [33]. Reports of unresponsiveness to pentavalent sodium antimony gluconate started in the 1970s. World wide up to 15% therapeutic failures occur with antimonials [34]. In Italy sixteen (10.1%) of 158 patients treated with meglumine antimoniate, irrespective of age and geographical locations failed to respond. Five of them showed primary unresponsiveness or experienced acute toxicity and the rest 11 relapsed in 3-11 months [35]. A recent investigation in Sicily showed that the antimony associated death rate was 7% among HIV-negative adults with or with out underlying disease [35].

In an undetermined role of the drug sodium antimonty gluconate 7 out of 67 died in pundit Ka Puriva village, in Uttra Pradesh with a case fatality rate of 10.5% [36]. In southern Sudan debilitated patients treated with antimonials 10.9% died, (death rate higher than the expected 10% or less [37].) 3% relapsed and 3.2% defaulted [38]. Antimonials are no longer useful in north eastern state of Bihar, where as many as 65% of the previously untreated patients fail to respond to or promptly relapse after therapy with antimonials [39].

Sb^{v} has been for 5-6 decades the main stay in the treatment of *visceral leishmaniasis* through out the globe, but has now proven to be at varying degree less efficient in the treatment of *visceral leishmaniasis* owing to administration of the drug by quack doctors, misuse like splitting the daily recommended dose and unrestricted availability [39]. The arrival of some promising drugs like miltefosine, liposomal amphotercine B, paromomycine and others though, they need to be further substantiated, could possibly play a role in resolving the problem of resistance either individually or in combination. But, socio-economic and cultural conditions have a tremendous bearing on the prevalence of VL, hence the cost and current precise resistance to Antimonials in the place needs to be identified before replacement takes hold [40].

This disease of the underserved and of less profit potential has been neglected for years and the diagnosis remains difficult in rural endemic areas. In recent years, there has been development in the manufacturing of new drugs and diagnostic tools. A prospective evaluation and comparison between DAT and rK39-antigen-based dipstick test for the diagnosis of suspected kala azar in Nepal against parasitological diagnosis in a group of 184 patients showed that rK39 was found to be 97% sensitive and 71% specific, while DAT was 99% sensitive and 82% specific. Thus, rK39 which is cheaper and easy to do than DAT could be used as a means of screening in tertiary health facilities where the prevalence of kala azar is low and possibly as a means of diagnosis in areas of high prevalence [5].

1.2.4 Prevention and control of leishmaniasis

Sand fly breeding sites are generally difficult to find in nature, so control measures that act specifically against immatures are not feasible. Sandflies generally bite various hosts and should be considered as opportunistic man-biters rather than anthropophilic. Their flight, ranges are limited to a few hundred meters. Because of their wide host range, small size and silent, non-hovering flight, people in *leishmania* endemic areas may be unaware of sandfly presence and its role in the epidemiology of the disease, a fact that may compromise *leishmaniasis* control efforts through community participation. The use of ITNs may represent the most sustainable method of reducing

intradomiciliary transmission of leishmania in communities surrounded by forests, where the diurnal resting sites of vectors are unknown or inaccessible [41].

In areas where *leishmania* transmission is extradomiciliary and *leishmaniases* are an occupational hazard, use of insect repellents or protective clothing may be the only preventative measures available. The latter may be impractical in the tropics and prohibitively expensive while repellents are also relatively costly and may be potentially harmful after prolonged use. As such they should only be considered for use by people who are at risks of *leishmania* only temporarily, such as tourists, soldiers and hunters [41].

Fortunately *Phlebotomine* remain susceptible to all major insecticidal groups except partially to DDT [41]. The DDT that was extensively used to control mosquito was also effective against sandflies, the vector of visceral *leishmaniasis*. Discontinuation of the malaria control programme led, however, to an increase in the sandfly population, and a resurgence of *kala azar* in Nepal [19].

A study done in Colombia to see the effectiveness of delthametrin impregnated bed nets in killing sandflies revealed that 95% of the vector population died after 10 hours of exposure in the experimental room and 72 hours of post exposure follow up while only 10% died in the room with an unimpregnated bed nets. The

current control programs involve spray of houses with residual insecticide and the killing of dogs, early detection and treatment including patients with PKDL and community education. However, new ideas such as insecticide-impregnated bed nets and dog collars may have a promise [41, 42].

Implication of the study

This study tried to assess the knowledge and practice gap among the members of the labor migrant force and the indigenous population in K/Humera District, and attempted to come up with important predictors of safer knowledge and practice, so that the future planners of effective health education and intervention program use to mount effective prevention and control programs. From this study, it is assumed that, it will be possible to see the level of knowledge of the migrant workers and indigenous people on visceral leishmaniasis and compare it with the routine practices so that this behavioral surveillance provides data to target interventions more precisely to persons and situations of great risk.

More over, this is the first behavioral surveillance on visceral leishmaniasis which, in its kind will assist evaluation of program effectiveness through establishing the base line of risk behavior prior to an intervention. There are few studies done in Asia, where the presence of risky behavior was indicated and the need of

education, information and communication of these matters were recommended. This study tries to show the necessity of continuing intensive educational intervention based on some specific determinants of high risk behavior among the study participants.

1.3 Statement of the problem

It has been about 60 years since *visceral leishmaniasis* was discovered in Ethiopia. Since then visceral *leishmaniasis* has been recognized as an endemic disease in most low land and arid regions of the country with a patchy distribution in the southern and north Western low lands. The main foci of the disease include the Segen, Woyto and Omo valleys in the southern part of the Rift Valley and the Metema-Humera low lands in the North West [9 14].

Tigray Province, the endemic region in the North West Ethiopia, has historically reported sporadic cases. Since 1997, the number of cases increased which appears to correspond to the extensive program of agricultural development with its annual influx of migrant workers who often times present late and in extremely poor condition to the hospital in Humera [10].

Medicines Sans Frontiers (MSF-Holland) opened *visceral leishmaniasis* treatment center free of charge for all in 1997 in Tigray Region. Proximity to the front line of the conflict between Ethiopia and Eritrea mean that the site had to be moved

twice for security reasons. In K/Humera District 4886 patients were treated in the year 1997-2003. One settlement area called Arbihajira in the Amhara Administrative Region, Armacho Woreda close to Humera with a population of roughly 1033 settlers, 36 people were admitted to Abdurafi for treatment of kala-azar from November 2003 - Feburary 2004 which equates to an incidence rate of 35 cases /1000 population / 4 months and the level of knowledge regarding kala-azar among the community and the health workers in the area was very low [10 44].

A huge labor force estimated in the range 40,000-80,000 migrates to Humera every year, many of whom from kala azar non-endemic areas of the country in search of labor job [45]. According to the recently updated report, of the Ministry of Health of 2004 where the reports of Amhara, Oromiya and Somalia were not included, *visceral leishmaniasis* remained the 4th most killer disease in Tigray and 6th nation wide [46]. Thus, knowledge of the precise KAP of *visceral leishmaniasis* and annual clinical record review is found to be of paramount importance. This study is therefore initiated to throw some light on the level of disease perception and provision of practical solution.

II. Objectives

2.1 General objective

To describe the magnitude of *visceral leishmaniasis* at Kahsaye Abera Hospital and study KAP pertaining to *visceral leishmaniasis* among the indigenous people and migrant workers.

2.2 Specific objectives

1. To assess the frequency and pattern of *visceral leishmaniasis* in the study period

2. To examine the level of KAP pertaining to *visceral leishmaniasis* among indigenous and migrant workers.

3. To assess the most concurrent infections and treatment out come of *visceral leishmaniasis* patients.

III. Materials and methods

3.1 Study design

This is a qualitative retrospective assessment of the records of *visceral leishmaniasis* patients examined at kahsaye Abera Hospital in Humera town in the year 2003-2004, September 1 through August 30. A record review format that fits the purpose was formulated to gather information regarding patients' status with respect to treatment outcome, relapse, duration of illness, and common concurrent infections associated with *visceral leishmaniasis*. Nurses who have been working in the Hospital for atleast two years reviewed patients' records as per the medical record format.

The comparative crossectional study was conducted in three different places selected to collect information from migrant workers and indigenous population on the level of KAP about *visceral leishmaniasis*. Trained 12th grade complete students filled a pre-tested questionnaire, adopted from malaria that was obtained from the Ethiopian Ministry of Health that contains socio-demographic and KAP variables about VL.

3.2 Study area and population

The study was conducted in the northern part of Ethiopia, in the Tigray National Regional State, in K/Humera district. Data was collected from November, 2004 to January, 2005.

K/Humera had until recently a population of 65701 which made it the smallest district in the region in terms of population size, but is the biggest in terms of geographic and territorial possessions that stretches along the Sudanese border in the North West, the Amhara Adminstative region in the south and the Eritrean border in the north where people live in clusters over a wide range of areas. It is one of the agriculture surplus areas in Ethiopia known for producing sorghum and exportable products like sesame which makes it a net contributor to the national economy. It is believed that there are about 400 investors in the District engaged in a number of large scale farming activities.

The District's population has now risen to 86037 due to the government led programme of resettlement. The population will continue to expand over years

as the programme appears to continue atleast for some years. The seasonal influx of migrant workers, who are unaccounted for in the delivery of health service, has seriously compromised the health care rendered to the inhabitants of the District.

K/Abera is the biggest District Referral Hospital with a capacity of 120 beds and offers all basic services to its level best and is peculiarly known for its heavy engagements in the diagnosis and management of VL patients.

Malaria and *visceral leishmaniasis* are major causes of morbidity and mortality in the Hospital.

3.3 source population

The source constituted all migrant workers, indigenous people in the district and all patients' record in the study period.

Study population constituted randomly selected migrant workers out of 19 randomly selected farm areas and randomly selected households, out of randomly selected sub-districts (Tabias) of both sexes whose age was 18 and above.

Exclusion criteria – those who arrived in the area in the last two years under the programme of resettlement and non-Ethiopians, especially the Sudanese were excluded.

3.4 Sample size

To determine the sample size for this study, two population proportions formula was used with the assumption that there was atleast a 10% difference, higher among indigenous people in terms of KAP on *visceral leishmaniasis* than migrant workers, taking critical value at 95% confidence level of certainty from the actual figures for source population and power 80%. The population of the District and the number of migrant workers was relatively comparable. Since multistage cluster sampling was employed, the original sample size was doubled to overcome the design effect and subsequently became 1674 after the incorporation of 5% non-response rate; nevertheless, data was collected from a total of 1911 respondents.

$$\frac{Z\alpha/2\sqrt{(1+1/r)\,p\,(1-p)} + \sqrt{Z\beta\,p_1\,(1-p_1) + p_2\,(1-p_2)/2}}{(p_1-p_2)^2}$$

P_1=Indigenous people [population proportion for indigenous people]

P_2=Migrant workers [population proportion for migrant workers]

R=Indigenous people to migrant workers ratio 1:1

D=Design effect =2

Non response rate =5%

n_1=408 * 2 * 5% =837 [indigenous people]

n_2 = 408 * 2 * 5% =837 [migrant workers]

Z_{β} Standard error of alternative hypothesis= 0.84

$Z_{\alpha/2}$ Standard error of null hypothesis= 1.96

3.5 Sampling procedure

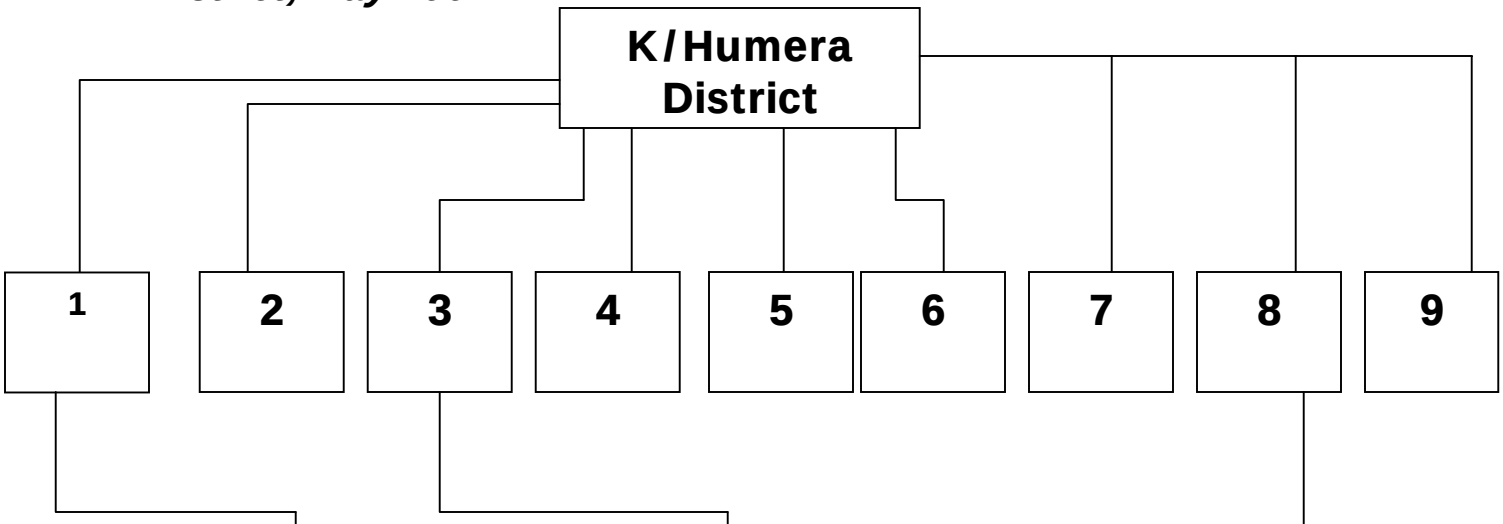
Three sub-districts locally called tabias namely Maikadra, Berket and Humera were selected since those were the places where extensive farming activities were undertaken and hence the venue for a significant portion of the migrant workers. Each sub-district (Tabia) comprised no less than eight farm areas with in 40-80 kms radius of Humera town. Each of them was believed to at least engage 100 migrant workers.

Nineteen farm areas were randomly selected out of 38 farm areas of the above three sub-districts (tabias). Respondents were selected by random sampling technique from the lists of workers' payroll. All migrant workers were considered homogenous in terms of being alien to the place of study as a result farm areas served as clusters where multistage cluster sampling was employed.

In order to have a representative sample of indigenous people, all sub-districts (Tabias) namely Maikcadra, Sola, Humera, Kafta, Baeker, Adigoushu, Adebaye, Rawian and Bereket were represented where house holds of each tabia were selected by systematic random sampling technique probability proportional to size, during which time one eligible person in the house was interviewed.

The sampling frame work is indicated in fig.1 below

Figure 1: Sampling frame work of study subjects, K/Humera District, May 2004.



3.6 Measurement Variables

The dependent (out come) variables include knowledge, attitude and practice with regard to VL. Knowledge on signs and symptoms, the mode of transmission, ways of prevention and the outcome of VL if not treated were included. Information like ever heard of VL and by what source was also part of the outcome variables. Attitudinal and behavioral practice (response) variables such

as possession of bed nets and the desire to have it accompanied by the respondents way of sleeping and perception of the role of nutrition as one means of prevention in the fight against VL were included.

The independent variables include socio-demographic factors such as: Age, sex, marital status, ethnicity, educational level, occupation, distance etc. All questions were prepared for both male and female respondents.

3.7 Date Collection Procedure.

Three trained nurses reviewed patients' record while trained 12th grade students collected data from indigenous people and migrant workers. Socio demographic, economic, nutrition related questions and variables pertaining to KAP was gathered using a structured questionnaire administered by data collectors. A medical record review format was employed to gather information as stated above in section (3.1)

Six male data collectors who knew the farm areas well with a commitment to face foreseeable challenges were trained in Humera town by the investigator for two days followed by one day of pretest.

3.8 Data quality control

Questionnaire was translated from English to Tigrignia and Amharic and back to English as well to reaffirm consistency. Two individuals who were able to speak

and write English, Amharic and Tigrignia very well with a professional background in medicine translated the Questionnaire from English to Amharic individually. Two of them discussed in the translated material and consensus was reached. Another neutral person translated it back to English where amendments and corrections were made. The final comments were discussed and duplication was performed.

3.9 Operational definition

Visceral leishmaniasis (kala azar) – is a parasitic disease caused by *leishmania donovani* following the bite of female *phlebotomine* with clinical

features of fever, spleen and/or liver enlargement and pancytopenia among others and confirmed by serologic (DAT) and/or spleen aspirate.

Indigenous people - are people who have lived in the District for atleast ten years.

Migrant worker – Any worker who has been in the place for a year or less.

Successful treatment/ recovery/cure – discharge after receipt of atleast 25 drug doses (including if indicated, the additional doses specified after a test of cure specimen was positive for parasites) and no admission within a year of follow up.

Relapse – discharge after receipt of at least 25 drug doses (including if indicated, the additional doses specified after a test of cure specimen was positive for parasites.) and became positive after declared cured.

Post kala azar dermal leishmaniasis (PKDL) -dense macular, popular or nodular rash covering most of the face and extending on the chest, back, upper arms and legs.

Splenic aspiration - is a procedure done by an experienced clinician under favorable condition in an attempt to demonstrate leishmania amastigots in spleen tissue.

Direct agglutination test (DAT) - the aqueous antigen which has to be kept refrigerated and/or the freeze-dried antigen which is stable at ambient temperature useful for the serologic diagnosis of *V. leishmaniasis*.

Kala azar – Another commonly used name for *visceral leishmniasis*.

Death – death for any reason in the course of treatment.

Defaulter – One who withdraws by himself/ herself any time before 25 drug doses is received and test of cure (T-O-C) is done.

3.10 Data processing and management

A frequency of different variables using EPI6 and SPSS version 11 was computed for description as appropriate. Odds ratio with 95% confidence interval was computed to assess the presence and degree of association between dependent variables. Chi square (x^2) test was used to calculate significant differences among proportions of categorical variables and multiple logistic regression model was performed with statistically significant predictors on the bivariate analysis for better potential prediction of determinants.

3.11 Ethical consideration

Ethical clearance was obtained from the Addis-Ababa University, Faculty of medicine, ethical committee. Official letter was written to Tigray Bureau of Health,

K-Humera district council, Humera based military force and K-Abera hospital where with each of which discussion was held. Migrant workers in the farm areas were approached with brief and relevant questions so that they could take time out of their busy schedule to respond to the questions. Interviewers tried when deemed necessary to convince the respondents specially the migrant workers and their employers as well with out forgetting to express to them the purpose of the study and other related issues, while their right to disengage from the interview at any point in time was reserved. Efforts were made to provide the interviewers with bed nets to reduce

exposure, while they were in the field. Furthermore, the interviewers gave health education to the interviewees who were apparently unaware of *visceral leishmaniasis*.

IV. Results

4.1 knowledge, Attitude and Practice among the indigenous and migrant workers

Out of the randomly selected 934 migrant workers, all took part in the study, but three of them discontinued in the middle of the interview, whereas all 980 indigenous people selected in the same manner reacted favorably and completed the interview. The response rate was high since data was collected from 980 indigenous and 931 migrant workers though the calculated sample size for each group was 837.

Socio demographic characteristics of the study population

Majority of the migrant force 671 (72.1%) and indigenous population 468 (47.8%) were found to be in the age group of 18-33, followed by 250 (26.9%) and 348 (35.5%) respectively in the age group of 34-49 [Table 1]. The youngest age in both study groups was 18 while the oldest age was 65 and 98 respectively. The mean (± SD) and median age for both study groups were found to be 30 (± 7) and 29, and 36 (±13) and 35 respectively.

Respondents were predominantly males among the migrant workers 895 (96.1 %) while almost equal sex representation among the indigenous population was noticed with 495 (50.5%) males and 485 (49.5%) females. Majority of the respondents in both cohorts were married, 514(55.2%) migrant workers and 549 (56%) indigenous people with less than 10 % divorcee in both cases.

Majority of the migrant workers 665 (71.4%) were basically farmers compared to 448 (45.7%) of the indigenous population. One hundred sixty two (16.5%) were house wives among the indigenous people in contrast, no house wife was observed in the migrant force. 257 (27.6%) among the migrant workers and 237 (24.2%) of the indigenous people were from other forms of occupation under the category of '' others''.

Five hundred and fifteen (55.3%) amidst the migrant workers were not literate and so did 474 (48.4%) of the indigenous people. Nearly a little more than a quarter, 314 (32%) of the local residents were found in the educational range, primary and above while only 121 (13%) of the labor migrants were found to lie in the above range.

Seven hundred and fifty seven (81.3%) of the migrant workers and 839 (85.6%) of the indigenous population were Orthodox Christians while 159 (17.1%) and

133 (13.6%) were Muslims respectively. A small size 23 (2.2%) went to catholic and protestants altogether.

The Amhara ethnic group made up majority of the migrant force accounting for 536 (57.6%), followed by the Tigrians 357 (38.3%) and 38 (4.1%) of them were in the category of other ethnic group.

Table 1: Socio-demographic characteristics of migrant workers and indigenous people in k/Humera District, May 2005.

	number of Respondent			
Variable	**Migrant** (n= 931)	%	**Indigenous** (n=980)	%
1. age in years				
18-33	671	(72.1)	468	(47.8)
34-49	250	(26.9)	348	(35.5)
50 years and above	10	(1.1)	164	(16.7)
2.Sex				
Male	895	(96.1)	495	(50.5)
Female	36	(3.9)	485	(49.5)
3. Marital status				
Single	325	(34.9)	272	(27.8)
Married	514	(55.2)	549	(56.0)
Widowed	38	(4.1)	67	(6.8)
Divorced	54	(5.8)	92	(9.4)
4. occupation				
Farmer	665	(71.4)	448	(45.7)
Merchant	9	(1.0)	133	(13.6)
House wife	0	(0)	162	(16.5)
Others	257	(27.6)	237	(24.2)
5. Level of education				
Not literate	515	(55.3)	474	(48.4)
Can read and write only	295	(31.7)	192	(19.6)
Primary and above	121	(13)	314	(32)
7. Religion				
Orthodox christen	757	(81.3)	839	(85.6)
Muslim	159	(17.1)	133	(13.6)
Catholic	11	(1.2)	6	(0.6)
Others	4	(0.4)	2	(0.2)
8. Ethnicity				

Tigray	357	(38.3)	858	(87.5)
Amhara	536	(57.6)	85	(8.7)
Others	38	(4.l)	37	(3.8)

Travel history and living condition of migrant workers.

A significant portion of the migrant population 827 (88.8%) came from distant places, 201 Kms and above with 104 (11.2%) of them coming from places situated less than two hundred Kms. away [Table 2]. Three hundred and seventy nine (40.7%) visited Humera for the first time ever and 257 (27.6%) and 295 (31%) visited Humera for the second time and more often respectively. Five hundred eighty one (62.4%) currently stayed in Humera for 3 months, 279 (30%) up to six months and 71 (7.6%) as long as one year.

A substantial number of the migrant force 905 (97.2%) lived during their stay in Humera either alone or with friends as opposed to their pervious way of livelihood where most of them 625 (67.1%), used to live in their respective locality with their parents or ones own family.

Table 2: Travel history and living condition of migrant workers in K/Humera District, May 2005. (n=931)

Variable	Number	Percent
1. Distance		
200 km, and below	104	11.2
201 km, and above	827	88.8
2.Frequencey of visit		
One time	379	40.7
Two times	257	27.6
More than two times	295	31.7
3. Length of stay		
Less than 3 months	581	62.4
3-6 months	279	30.0
6 months – 1year	71	7.6
4. Livelihood in Humera		
Alone/ with friends	905	97.2
Others	26	2.8
5. Livelihood at home		
Alone	204	21.9
With parents/own family	625	67.1
With friends	86	9.2
Others	16	1.8

Knowledge on visceral leishmaniasis among the indigenous and migrant population.

Five hundred and twenty two (56.1%) of the migrant population and 757 (77.2%) of the indigenous population, had knowledge about Visceral leishmaniasis [Table 3]. Six hundred and forty two (69%) of the migrant force and 841 (85.8%) of the indigenous population had heard of visceral leishmaniasis. Asked as to the mechanism of visceral leishmaniasis transmission, only 65 (7%) and 395 (40.3%) respectively identified the sandfly.

Fever, body weakness, vomiting and abdominal swelling were among the frequently stated signs and symptoms of visceral leishmaniasis by both study groups; of which fever 520 (55.9%), body weakness 426 (45.8%) were mentioned by the migrant workers and fever 676 (69%), abdominal swelling 319 (46.2%) were mentioned by the local residents. Six hundred and sixteen (66.2%) and 823 (84.4%) of the study groups respectively responded that VL is curable.

Five hundred and seventy five (61.8%) of the migrant workers and 810 (82.7%) of the indigenous people mentioned death as an ultimate fate of VL infected person in the absence of treatment, with 296 (35.8%) and 139 (14.2%) did not have any idea what so ever respectively. Five hundred and seventy five (61.9%)

of the migrant population and 805 (82.1%) of the local residents agreed that kala azar is preventable.

Majority of the migrant workers 612 (96%) and indigenous people 639 (85.3%) came to know about kala azar through health facility or friends while only 26 (4.0%) of the migrant population and 110 (14.7%) of the indigenous people acquired the information from the mass media.

Four hundred and seventy eight (64.3%) of the migrant force incriminated Mosquito as vector responsible for the transmission of the disease whereas 281 (33.4%) of the local residents responded similarly. Migrant workers barely identified sand fly as a major player in the transmission of the disease.

Over 87% of both study groups favored seeking medical assistance from modern health care. Three hundred and fifty one (60.9%) of the migrant workers responded that insecticidal spray could prevent VL as compared to only 141 (17.5%) of their counter-parts.

Few respondents in both groups (< 10%) described worms, isolation from VL patients, and some plants as a means of VL transmission. The highest was worms described by 8.2% of the migrant workers and 6.8% by the indigenous people.

Table 3: Knowledge of the migrant workers and indigenous people on visceral leishmaniasis, in k/Humera District, May 2005.

Variables	Number of Respondents			
	Migrant n=931		Indigenous n=980	
1. Had knowledge on VL				
Yes	522	(56.1)	757	(77.2)
No	409	(43.9)	223	(22.8)
2.Ever heard of kala-azar				
Yes	642	(69)	841	(85.8)
No	289	(31)	139	(14.2)
3. Cause of kala-azar transmission				
Sandflies	65	(7.0)	395	(40.3)
Others	866	(93)	585	(59.7)
4. Signs and symptoms of kala azar				
Fever	520	(55.9)	676	(69.0)
Body weakness	426	(45.8)	319	(32.6)
Vomiting	198	(21.3)	132	(13.5)
Abdominal swelling	244	(26.2)	453	(46.2)
5. Is kala-azar curable				
Yes	616	(66.2)	823	(84.4)
No	315	(33.8)	157	(16.6)
6. Fate of untreated kala-azar patient				
Death	575	(61.8)	810	(82.7)
Chronicity	10	(1.2)	6	(0.6)
Self heals	11	(1.2)	1	(0.1)
Do not know	296	(35.8)	139	(14.2)
7. Is kala-azar preventable				
Yes	576	(61.9)	805	(82.1)
No	355	(38.1)	175	(17.9)
8. source of information	n = 638		n = 749	
Health facility/ friends	612	(96)	639	(85.3)
Radio	26	(4.0)	110	(14.7)
9. Mechanism of kala azar transmission	n = 743		n = 841	
Mosquitoes	478	(64.3)	281	(33.4)

Others	265	(35.7)	560	(66.6)
10. Place of treatment seeking behavior	n = 640		n = 842	
Modern health care	559	(87.3)	793	(94.1)
Others	81	(12.7)	49	(5.9)
11. Insecticidal spray prevents VL	n = 576		n = 805	
Yes	351	(60.9)	141	(17.5)
No	225	(49.1)	664	(92.5)

Attitude and practice of migrant workers and indigenous people towards visceral leishmaniasis.

The attitude towards VL in both cases remained extremely high, but the good practice among the migrant force was as low as 64 (6.9%) compared to 666 (68%) of the indigenous people [Table 4]. Two hundred and forty seven (26.5%) of the labor migrant force and 752 (76.7%) of the indigenous population possessed bed nets, with more than three quarter of both study groups showed interest to have bed nets and were willing to pay for it as well.

Seventy and four (7.9%) of the migrants and 695 (70.9%) of the local residents used bed nets when they slept. Sixty one (6.6%) and 225 (43.9%) of the migrant and indigenous respectively preferred to work at day time when temperature peaks, while 448 (48.1%) of the migrant force and 179 (34.9%) of the indigenous people preferred to work at night. Equally important 422 (45.3%) and 109 (21.1%) respectively preferred to work both day time and night. Only 93 (10%) of the migrant workers made ones own expenses for extra food while the rest 838 (90%) solely depended on poorly prepared porridge for food consumption.

Table 4: attitude and practice of migrant workers and indigenous people towards kala-azar in K/Humera district, July 2005.

Variable	Migrant		Indigenous	
1. Had good practice	n = 931		n= 980	
Yes	64	(6.9)	666	(68)
No	867	(93.1)	314	(32)
2. Possesses bed net	n = 931		n = 980	
Yes	247	(26.5)	752	(76.7)
No	684	(73.5)	228	(23.3)
3. wants to have a bed net	n = 684		n = 228	
Yes	669	(97.8)	215	(94.2)
No	15	(2.2)	13	(5.7)
4. willing to pay for a bed net	n = 684		n = 228	
Yes	657	(96.1)	177	(77.6)
No	27	(3.9)	51	(22.4)
5. Sleeping condition	n = 931		n = 980	
With a bed net	74	(7.9)	695	(70.9)
With out a bed net	857	(92.1)	285	(29.1)
6. Preference of working hours when the temperature peaks	n = 931		n = 513	
Day time	61	(6.6)	225	(43.9)
At night	448	(48.1)	179	(34.9)
Both day and night	422	(45.3)	109	(21.2)
7 .Food consumption	n = 931		n = 618	
Depends only on sorghum porridge	838	(90)	377	(61)
Makes ones own expenses for extra food	93	(10)	24	(39.6)

Numbers in parenthesis are percents.

Multivariate analysis on socio-demographic factors for knowledge on visceral leishmaniasis among the indigenous population

Association of socio-demographic variables of both study groups' knowledge on visceral leishmaniasis was taken from a total of seven questions with two of the questions having multiple responses. A score of one point for correct responses and zero point for incorrect responses were given, and the total score was taken out of seven. The mean score was taken 4 points out of 7. Yes was given for those, scored the mean and above and no for those, scored below the mean. After the mean was calculated in a similar fashion those scored, the mean (3) and above were regarded as exercising good practice and those, scored below the mean were considered as exercising inappropriate practice.

With regard to knowledge of the indigenous population on visceral leishmaniaisis, those who attended primary school and above were three or more times likely to have knowledge than the non literate groups [Table 5].

Table: 5 Multiple logistic regression analysis on socio-demographic factors for knowledge on visceral leishmaniasis among the indigenous population in K/Humera District, July 2005. (n=980)

Variable	No	%	OR, 95% CI (CRUDE)	OR, 95% CI (ADJUSTED)
1.Age in years				
18-33	468	47.8	1.00	
34-49	348	35.5	0.99 (0.70, 1.41)	1.37 (0.94, 1.99)
50 & above	164	16.7	0.66 (0.43, 1.00)	0.95 (0.61, 1.50)
2.Sex				
Male	495	50.5	1.00	
Female	485	49.5	0.90 (0.66, 1.22)	0.88 (0.60, 1.30)
3.Marital status				
Single	272	27.8	1.00	
Married	549	56	1.08 (0.75, 1.55)	1.23 (0.83, 1.83)
Widowed	67	6.8	0.82 (0.43, 1.58)	1.34 (0.67, 2.58)
Divorced	92	9.4	0.96 (0.53, 1.74)	1.37 (0.75, 2.49)
4.Occupation				
Farmer	448	45.7	1.00	
Merchant	133	13.6	1.84 (1.08, 3.18)*	1.41 (0.81, 2.46)
House wife	162	16.5	1.30 (0.83, 2.05)	1.50 (0.86, 2.62)
Others	237	24.2	1.20 (0.81, 1.77)	0.98 (0.63, 1.51)
5.Levelof Education				
Not literate	474	48.4	1.00	
Can only read & write	192	19.6	1.62 (1.07, 2.46)*	1.64 (1.08, 2.50)*
Primary & and above	314	32	3.30 (2.19, 5.00)*	3.77 (2.40, 5.19)*
6.Religion				
Christian	847	86.4	1.00	
Muslim	133	13.6	1.18 (0.75, 1.86)	1.23 (0.76, 2.01)
7.Ethnicity				
Tigray	858	87.5	1.00	
Amhara	85	8.7	0.66 (0.39, 1.11)	0.57 (0.34, 0.96)*
Others	37	3.8	0.45 (0.22, 0.94)*	0.50 (0.24, 1.02)

* $p<0.05$

Multivariate analysis on socio-demographic factors for behavioral practice on visceral leishmaniasis among the indigenous population

The married ones were less likely to exercise appropriate practice compared to the ‘’single’’ group and the house wives were as well less likely to show appropriate practice compared to the farmers [Table 6].

Concerning the practice of the indigenous population on visceral leishmaniasis, the educated ones were found to show a lesser degree of appropriate practice as compared to the non literate groups of the cohort but no significant difference was observed among the group who only read and write and the non literate group. The Tigray ethnic group was more likely to show good practice than the rest.

Table 6: Multiple logistic regression analysis on socio-demographic factors for behavioral practice on visceral leishmaniasis among the indigenous population in K/Humera District, July 2005. (n=980)

Variable	No	%	OR, 95 % CI (CRUDE)	OR, 95 % CI (ADJUSTED)
1.Age in years				
18-33	468	47.8	1.00	
34-49	348	35.5	0.99 (0.70, 1.41)	1.37 (0.94, 1.99)
50 & above	164	16.7	0.66 (0.43, 1.00)	0.95 (0.61, 1.50)
2.Sex				
Male	495	50.5	1.00	
Female	485	49.5	0.56 (0.43, 0.74)*	2.73 (0.51, 1.03)
3.Marital status				
Single	272	27.8	1.00	
Married	549	56	1.61 (1.17, 2.22)*	0.66 (0.46, 0.94)*
Widowed	67	6.8	1.06 (0.59, 1.90)	0.83 (0.45, 1.52)
Divorced	92	9.4	1.30 (0.77, 2.21)	0.69 (0.40, 1.19)
4.Occupation				
Farmer	448	45.7	1.00	
Merchant	133	13.6	1.88 (1.21, 2.49)*	0.94 (0.60, 1.49)
House wife	162	16.5	3.45 (2.10, 5.71)*	0.40 (0.22, 0.71)*
Others	237	24.2	1.16 (0.82, 1.63)	1.00 (0.68, 1.48)
5.Education				
Not literate	474	48.4	1.00	
Can only read and write	192	19.6	0.97 (0.67, 1.40)	0.92 (0.63, 1.36)
Primary and above	314	32	0.40 (1.01, 1.94)*	0.60 (0.41, 0.87)*
6.Religion				
Christian	847	86.4	1.00	
Muslim	133	13.6	1.01 (0.56, 2.26)	1.04 (0.67, 1.62)
7.Ethnicity				
Tigray	858	87.5	1.00	
Amhara	85	8.7	1.38 (0.84, 2.52)	0.73 (0.43, 1.19)
others	37	3.8	12.42 (4.87, 33.59)*	0.09 (0.04, 0.21)*

* P<0.05

Multivariate analysis on socio-demographic factors for knowledge on visceral leishmaniasis among the migrant population

The married group among the migrant workers was one or more, less likely to have knowledge than the single group [Table 7]. The merchants and other occupations included in the “other group” were less likely to know about VL than the farmers. Those participants who attended primary education and beyond, were three to four times more likely to have better knowledge compared to the non literate group.

The Tigray ethnic group was more likely to know about visceral leishmaniasis compared to the Amhara ethnic group and others. Respondents of the migrant workers who lived in the area for 3-6 months and 6-12 months were two and three times more likely to know about visceral leishmaniasis than those who lived in the study area for three months and less respectively. Those, visited Humera for the second time or more were ten times and more likely to be knowledgeable about VL than the first time visitors. The labor migrant force that came from distant places was one or more, less likely to know about VL compared to the group that came from relatively nearby places.

Table 7: Multiple logistic regression analysis on socio-demographic factors for knowledge on visceral leishmaniasis among the migrant population in K/Humera District, July 2005 (n =931)

Variable	No	%	OR, 95 % CI (CRUDE)	OR, 95 % CI (ADJUSTED)
1.Age in years				
18-33	671	72.1	1.00	
34-49	250	26.9	0.84 (0.62, 1.13)	0.68 (0.46, 1.02)
50 & above	10	1.1	0.32 (0.06, 1.36)	0.76 (0.13, 4.46)
2.Sex				
Male	895	96.1	1.00	
Female	36	3.9	0.69 (0.35, 1.34)	0.58 (0.22, 1.5)
3.Marital status				
Single	325	34.9	1.00	
Married	514	55.2	1.07 (0.80, 1.44)	1.15 (0.79, 1.66)
Widowed	38	4.1	0.20 (0.20, 0.68)*	1.54 (0.06, 0.42)*
Divorced	54	5.8	0.59 (0.32, 1.10)	0.88 (0.38 , 2.03)
4.Occupation				
Farmer	665	71.4	1.00	
Merchant	9	1.0	0.89 (0.21, 3.97)	0.77 (0.12, 4.77)
House wife	0	0	-	-
Others	257	27.6	0.72 (0.53, 0.97)*	0.55 (0.34, 0.89)*
5.Level of education				
Not literate	515	55.3	1.00	
Can only read & write	295	31.7	1.09 (0.81, 1.48)	1.01 (0.69, 1.48)
Primary & and above	121	13	1.75 (1.13, 2.71)*	3.71 (1.94, 7.07)*
6.Religion				
Christian	772	82.9	1.00	
Muslim	159	17.1	1.02 (0.73, 1.44)	1.04 (0.83, 1.72)
7.Ethnicity				
Tigray	357	38.5	1.00	
Amhara	536	57.6	0.67 (0.50, 0.89)*	0.67 (0.51, 0.88)*
others	38	4.1	0.27 (0.12, 0.58)	0.27 (0.13, 0.56)*
8.Length of stay				

3 months	581	62.4	1.00	
3 – 6 months	279	30.0	2.82 (2.05, 3.87)*	2.09 (1.41, 3.01)*
6 – 12 month	71	7.6	2.89 (1.63,5.15)*	3.20 (1.57, 6.52)*
9.Frequency of visit				
One time	379	40.7	1.00	
Two times	257	27.6	10.56 (7.16, 15.61)*	10.35 (6.90, 15.54)*
More than two times	295	31.7	21.83 (14.26, 33.52)*	24.77 (15.8, 38.78)*
10.Distance				
200 Kms. and below	104	11.2	1.00	
201 Kms. and above	827	88.8	0.62 (0.40, 0.94)*	1.62 (0.40, 0.95)*

* P<0.05

Multivariate analysis on socio-demographic factors for behavioral practice on visceral leishmaniasis among the migrant population

Females were less likely to show as appropriate practice as needed compared to males and merchants were less likely to exhibit good practice compared to the farmers. The educated group was also less likely in comparison with the non literate group in showing good practice. Participants among the migrant force with a third time or more visits to Humera and those, stayed for 6-12 months in the area were less likely to exhibit appropriate practice as compared to the first time visitors and lived for a relatively shorter period of time [Table 8].

Table 8 multiple logistic regression analysis on socio-demographic factors for practice among the migrant population, K/Humera District, July 2005 (n = 931)

Variable	No	%	OR, 95 % CI (CRUDE)	OR, 95 % CI (ADJUSTED)
1.Age in years				
18-33	671	72.1	1.00	
34-49	250	26.9	0.49 (0.23, 1.01)	1.19 (0.53, 2.65)
50 & above	10	1.1	1.27 (0.19, 8.27)	0.50 (0.04, 5.71)
2.Sex				
male	895	96.1	1.00	
female	36	3.9	0.07 (0.03, 0.15)*	1.18 (0.04, 0.32)*
3.Marital status				
single	325	34.9	1.00	
married	514	55.2	0.29 (0.14, 0.62)*	1.45 (0.75, 2.83)
widowed	38	4.1	20 (10.62, 37.96)*	0.50 (0.14, 1.76)
divorced	54	5.8	3.43 (1.50, 7.78)*	0.51 (0.17, 1.57)
4.Occupation				
farmer	665	71.4	1.00	
merchant	9	1.0	23.38 (4.85,110.03)*	0.11 (0.02, 0.63)*
house wife	0	0	-	
others	257	27.6	5.07 (2.84, 9.09)*	0.65 (0.31,1.36)
5.Level of education				
Not literate	515	55.3	1.00	
Can only read and write	295	31.7	0.55 (0.20, 1.52)	059 (0.28, 1.25)
Primary and above	121	13	0.18 (0.06, 0.58)*	0.20 (0.48, 0.84)*
6.Religion				
Christian	772	82.9	1.00	
Muslim	159	17.1	1.12 (0.54, 2,40)	1.04 (0.46, 2.33)
7.Ethnicity				
Tigray	357	38.5	1.00	
Amhara	536	57.6	0.37 (0.21, 0.64)*	1.60 (0.85, 2.13)
others	38	4.1	0.45 (0.07, 2.04)	2.99 (0.59, 15.3)
8.Length of stay				
3 months	581	62.4	1.00	
3-6 months	279	30.0	2.08 (1.29, 3.15)*	0.57 (0.29, 1.12)
6-12 months	71	7.6	8.86 (4.30, 18.25)*	0.30 (0.13, 0.67)*
9.Frequency of visit				
one time	379	40.7	1.00	
two times	257	27.6	1.91 (0.93, 3.97)	0.58 (0.26, 1.28)
more than two times	295	31.7	2.38 (1.21, 4.71)*	0.39 (0.18, 0.84)*
10.Distance				
200 Kms. and below	104	11.2	1.00	
201 Kms. and above	827	88.8	2.17 (1.08, 4.31)*	0.95 (0.43, 2.07)

* P<0.05

4.2 Retrospective record assessment

This was a retrospective assessment of the records of visceral leishmaniasis patients in Humera town, K/Abera Hospital. It was conducted between 1 September 2003 and 30 August 2004 where 882 patients with first diagnosis of visceral leishmaniasis treated with the main regimen of sodium stibo-gluconate (SSG) of daily dose 20 mg/kg/day for 30 days were reviewed. Out of the 8564 patients' records reviewed, 57 records were left out owing to the incompleteness of data, as a result, 8507 (99.3%) supplemented by patients' kala azar treatment card and registration book were reviewed. Further more, visceral leishmaniasis cases who were on the miltefosine drug trial study and those diagnosed on clinical grounds were excluded from the study.

Socio demographic characteristics of patients

Seven hundred and eighty five (89%) of the treated cases of visceral leishmaniasis in the year 2003 and 2004, September 1 through August 30 were migrant workers and the rest (97) 11% were local residents from around the District [Table 9]. The median age of 882 cases of visceral leishmaniasis was 27 years, one year was the smallest age and 66 was the oldest. The age distribution of visceral leishmaniasis cases showed significant difference, being highest among the 16-30 years age group, followed by those 31-45 years age group, and lowest in the age group 46 years and above.

A large size of the cohort were males accounting for 842 (95.5%) and females were only 40 (4.5%). The male to female ratio was 21:1

Majority of them were of Amhara ethnic group 495 (56%) followed by Tigray 342 (38.8%) and 45 (5.1%) of other ethnic origin.

Treatment status and out come of patients

Of the 882, 667 (75.6%) were cured and 131 (14.9%) died. The over all death rate was 14.9%. Fifty eight (6.6%) relapsed, 16 (1.8%) defaulted and 3 (0.3%) developed PKDL but, no HIV-PKDL associated case was observed. Of the 170 individuals tested for HIV antibodies, 43 (25%) were positive. There was a significant difference in the occurrence of relapse (x^2 =27.9, d.f. = 1.0, p = 0.001) where 10 (23.2%) of the 43 HIV positive relapsed in the course of treatment or later as compared to only 34 (4.1%) of 839 HIV negative visceral leishmaniasis cases, as a result HIV positive cases were seven times more likely to relapse in comparison with other groups of the cohort. Three hundred and twenty five (36.8%) were diagnosed with a positive aspirate, 534 (60.5%) with a positive serology and the rest 23 (2.6%) were diagnosed with both spleen aspirate and DAT. Fifty (10.6%) among 469 who had been ill for a month or below died and 80 (19.3%) out of 413 died with reported duration of illness more than 30 days and this showed a significant difference in mortality with respect to duration of illness (P< 0.002). Seven hundred and eight (80%) had atleast one concurrent infection with RTIs (respiratory tract infections)

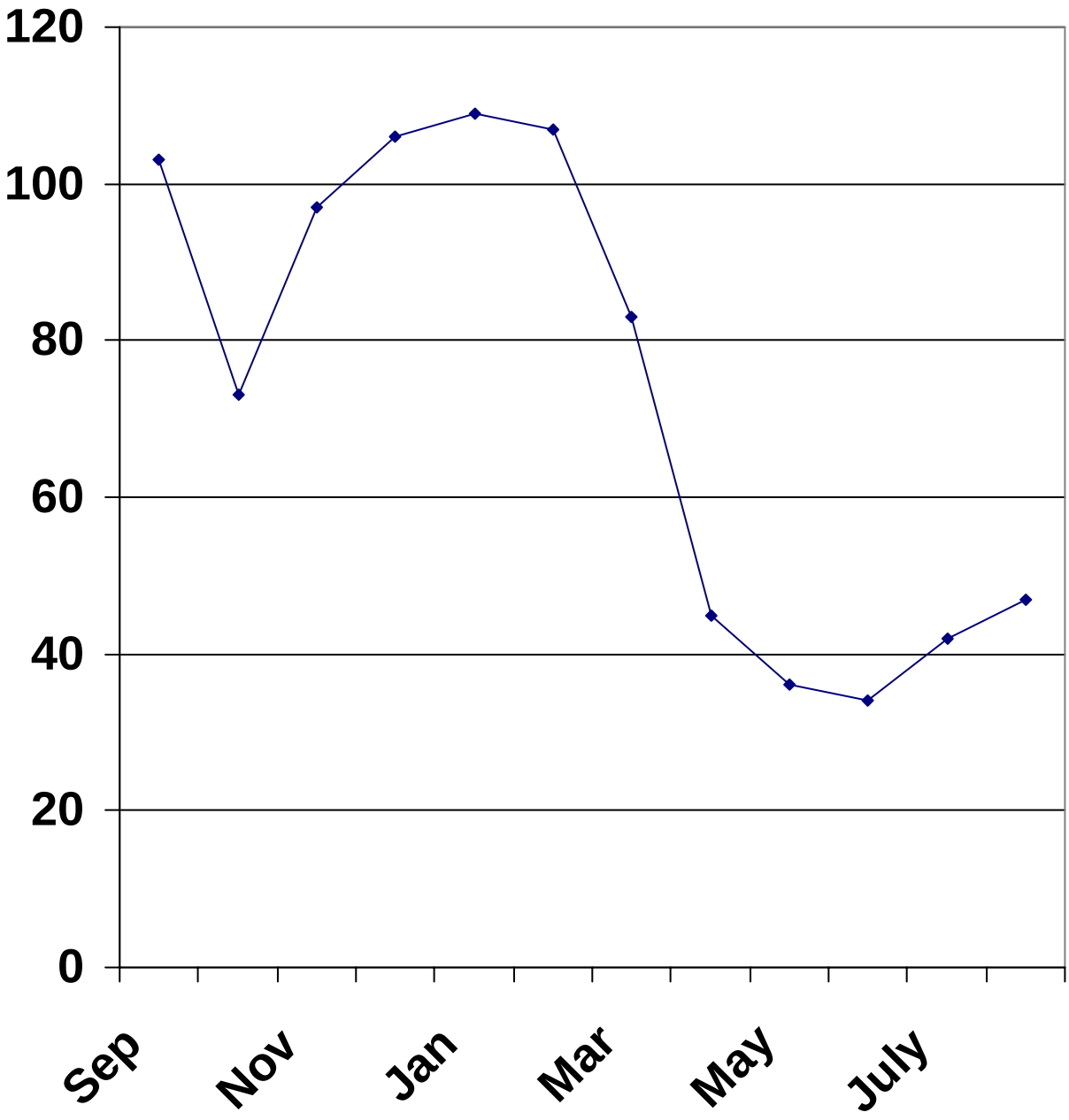
accounting for 343 (48.4%), diarrheal diseases 197 (27.8) and malaria 45 (4.6%). Three hundred and twenty three (36.6%) had multiple inter-current infections while 23 (2.6%) had triple concurrent infections. Only 174 (19.7%) were free of any concomitant infections.

Cases reported in September were 103 with slight increase in the number in due course with peak rise noted in January 109 and declined to the minimum in June 34, with slight increase in August 47. (Fig. 2)

Table 9: Clinical Profile of 882 Patients with Visceral Leishmaniasis,

in K/Abera Hospital, Tigray, Ethiopia, 1, Sept. 2003 – 30, Aug. 2004.

Feature	*No. of Cases*	*%*
Migrant workers	785	89
Indigenous people	97	11
Age in years		
1 - 15	55	6.2
16 - 30	543	61.6
31 - 45	244	27.7
Over 46	40	4.5
Sex		
Male	842	95.5
Female	40	4.5
Ethnicity		
Amhara	495	56
Tigray	342	38.8
Others	45	5.1
Treatment out come		
Recovery	667	75.6
Death	131	14.9
Relapse	58	6.6
Defaulter	16	1.8
PKDL	3	0.3
Means of diagnosis		
Splenic aspirate	325	36.8
DAT (Serology)	534	60.5
Both	23	2.6
Duration of illness with regard to death		
Died within 30 days	50	10.6
Died within more than 30 days	80	19.3
Duration of illness		
≤ 30 days	469	53.2
>30 days	413	46.8
Common concurrent infections		
Respiratory tract infections	343	48.4
Diarrheal disease	197	27.8
Malaria	45	6.4
HIV	43	4.9
Urinary tract infections	8	1.1
Skin infections	5	0.7
Others	69	9.7


120
100
80
60
40
20
0
Sep
Nov
Jan
Mar
May
July

V. Discussion

5.1 Knowledge, Attitude and practice on VL among the migrant workers and indigenous people

In recent years increasing emphasis has been laid on the active participation of individuals and communities in successful disease control programs. Many studies have been conducted to assess the knowledge, attitude and practices of residents towards Malaria and onchocerciasis [19].

Visceral leishmaniasis is a major public health problem in Tigray Region and its prevention and control are priorities. Socio-economic and cultural conditions have a tremendous bearing on the prevalence of visceral leishmaniasis [40]. The present study was, therefore, undertaken to study respondents' KAP towards Visceral eishmaniasis with the aim of using the data collected in a practical way to control visceral leishmaniasis at the individual and community levels.

There had been studies for several years on the incidence and prevalence of visceral leishmaniasis in different parts of Ethiopia. In one study it was shown that the incidence of the whole population was estimated at 6.9/1000 in the six villages studied closer to the uninhabited Valley of the Segen River [11]. Similarly, a leishmanin skin test among three villages of Aba Roba peasant association where 730 study subjects were studied, the prevalence was as high as 36.4% [13] and epidemiological survey of leishmaniasis in Southern Ethiopia,

35.8% of the whole study group had repeated positive leishmanin skin reaction [15]. These are just few from plenty of others confirmatory of studies in different endemic areas of the country that displayed the magnitude of visceral leishmaniasis and cutaneous leishamniasis. But there is a gap of knowledge in understanding the socio-economic and cultural aspects of people residing in leishmaniasis endemic areas of Ethiopia.

This study provided important information regarding the knowledge, attitude and behavior of the indigenous and migrant workers in K/Humera District. In addition this study tried to assess and measure retrospectively the death toll, sero-status for HIV, most common inter-current infections and treatment out come of VL patients in the same place at K/Abera Hospital.

The knowledge and practice of both migrant workers and indigenous people was found to be 56.1%, 77.2% and 6.9%, 68% respectively. It is observed from this study that there is a significant gap of knowledge on visceral leishmaniasis between the migrant and indigenous population. Some studies done in other parts of the world on the level of knowledge and practice on kala azar ascertain the fact that there is low level of disease perception. A study done in Colombia where seven communities were involved, revealed that only 6.7% knew the disease by the name leishmaniasis, the local names were bejuco and yatevi [17]. Forty and seven percent believed that leishmaniasis is caused by the bite of

worm and 35% by mosquitoes bite. Forty and one percent of the respondents combined different treatments. Women were significantly less likely than men to know any treatment.

Of the 931 migrant workers 69% were familiar with the word kala azar compared to

86% of the indigenous population, who had heard of kala azar. This result is higher when compared to the study done in Colombia where only 6.7% knew leishmaniasis by its local name Yatevi [17]. This could possibly be due to friends especially; those who visited Humera more than one time, with better knowledge of Kala azar supplemented by health facilities imparting atleast the name of the disease to other members of the group.

Although it is encouraging to see that a bit higher than 40% of both groups accessed the information from health facilities, it is on the other hand worrying that only 4% of the migrant force and 14.7% of the local inhabitants heard of the disease on the mass media. This shows the disproportionate representation of kala azar on the mass media though it is a disease causing considerable morbidity and mortality in the region [10].

A study done to assess the level of KAP about kala azar and its sandfly vector in rural communities of Nepal showed that majority of the respondents in two

villages perceived mosquito instead of sand fly as a means of transmission of the disease [19]. But, in a study to assess the KAP about malaria, the mosquito and antimalarial drugs in a rural community of Ethiopia, 60% of the study subjects associated the cause of malaria to the bite of mosquito [18]. More than half of the migrant respondents (51.3%) associated visceral leishmaniasis to the bite of mosquito and only 7% of them correctly identified sandfly as a vector transmitting the disease, while 28.7% of the indigenous population attributed it to the bite of mosquito and 40.3% of them correctly associated visceral leishmaniasis with the vector sand fly. This could be apart from inefficient information dissemination, due to the fact that sand flies flight ranges are limited to a few hundred meters, small size and silent, non-hovering flight renders them to be hardly identified even by people in endemic areas [41].

Majority of the migrant workers (87.3%) compared to 94.1% of the indigenous people identified appropriate health facilities to seek treatment for kala azar, while 38.2% and 14.9% respectively stated other than death as the ultimate consequence of kala azar in the face of failure to seek treatment, a fact that could increase morbidity, mortality and epidemiological diversity of the disease [1]. More over, only 61.9% of the migrant workers and 82.1% of the indigenous people believed that kala azar could be prevented, with less than 61% of both groups indicating bed nets as a means and ways of prevention.

Majority of the respondents in both groups showed over 90% of positive attitude towards possessing a bed net and willingness to buy, which is rather encouraging but the social desirability bias here may have played a role in increasing the rate.

A wide gap of difference in behavioral practice between the migrant population and indigenous people was evidenced in this study, where a large number of the migrant force 867 (93.1%) took no personal measure to protect exposure. Majority of them slept under the tree shade with out any bed net or other means of vector prevention what so ever as opposed to 68% of the indigenous people who slept at least in a bed net. But, in Nepal fewer than 5% of respondents slept out doors in farm outhouses and many studies on the use of bed nets to control malaria have shown that individuals living in malarious areas prefer bed nets since they provide privacy as well as a barrier to mosquitoes [19]. Those groups sleeping out doors did not use any bed nets or any personal vector control measures such as mosquito coils, repellents, etc. There is marked difference between these two studies in that, 92.1% of the migrant force and 29% of the indigenous population did not use bed nets. This therefore, constitutes an important group of hosts susceptible to sand fly bites and hence at risk of acquiring visceral leishmaniasis.

Besides, majority of the migrant workers depended on poorly prepared Sorghum porridge for consumption, a situation that could further facilitate the risk of acquiring and developing the disease. A Study conducted in the in Aba Roba peasant association where 730 individuals of non-VL were followed, revealed that those with adverse nutritional status had a higher risk of developing VL compared to their apparently healthy cohorts and those with lower BMI had a relative risk of almost six times of developing VL than those with relatively higher BMI [16]. So this indicates that taking the knowledge, nutritional status and behavioral practice into account, the migrant population is more likely to be exceptionally vulnerable to visceral leishamniasis.

Logistic regression in this study displayed that Education, length of stay; and frequency of visit to Humera were found to be determinants of the knowledge of the migrant workers, while only education was found to be the sole determinant factor of the status of the knowledge of the indigenous people. The above mentioned outcome variables were not found to be determinants of practice in both study groups.

5.2 Record review

The study population displayed various inter-current infections such as respiratory tract infections, HIV, urinary tract infections, diarrheal diseases and others. The case fatality rate in this cohort was 14.9%. It was higher than

expected 10% or less [34]. It compares unfavorably to the death rates in other VL endemic areas, 10.5% in Uttra Pradesh, India [33] and 10.9% in Southern Sudan [35].

The primary outcome of interest in this study was observation of inter-current infections and treatment out come. The retrospective nature of the study meant that, it was limited to the information already recorded, information that had been originally collected to diagnose and treat cases rather than for research purposes. In this study, follow up of individuals for six months to one year following discharge was recommended in an effort to identify primary relapse from others, but records of patients in the Hospital were regarded as relapse that appeared with a diagnosis of VL for the second time or more irrespective of time which in part was found difficult to discern primary relapse from other forms of relapse.

HIV status was assessed for 170 individuals; in some cases based on the results of one rapid test where 41 (25%) were found positive; a rate alarmingly high compared to the national HIV prevalence 4**.**4% [22].

Only 174 (19.7%) of the study cohort were visceral leishmaniasis patients with out any inter-current infections. A fact demonstrating that this immuno compromising disease is likely to be accompanied by secondary infections,

exacerbating the problem. A study done in the Pediatric Hospital of Shiraz University of Medical sciences in Iran showed an overall visceral leishmaniasis associated concurrent infections of 41%; among which respiratory infections and septicemia were the highest 18.5% and 13% respectively [38].

It was shown in another study where clinical or post-mortem diagnosis of bacterial infection was performed in 33 hospitalized VL patients that, an overall concurrent infection was 78.7% with respiratory infections accounting 33.9% and skin infections higher than other concomitant infections [37]. A rate of 60% occurrence of inter-current infections was noticed in the Andrades study [39].

The current study showed the highest co-existence of secondary infections with visceral leishmaniasis amounting to 80.2%, this could be attributed to the fact that majority of the labor migrant force as evidenced by part of this study were farmers, of which 90% were dependent for food consumption only on poorly prepared Sorghum porridge.

Low level of knowledge (56%) and poor practice (93%) towards the inflicting disease coupled with their distant task locations of poor infrastructure, working under formidable weather conditions, opportunistic nature of the disease and most of them were non-immune highlanders could in effect likely render them easily exposed to visceral leishmaniasis and other illnesses.

Eighty nine percent of the retrospectively assessed were found to be labor migrants who very likely had the same characteristics with the above cohort mentioned who may have exposed them selves to all possible risks.

As revealed in this study, those who reported more than one month duration of illness significantly differed ($P<0.002$) than those who reported less than a month in terms of mortality; but there was no significant statistical difference ($P<0.07$) between HIV negative and HIV positive visceral leishmaniasis cases, which might be due to the HIV sero-status results of relatively small number of patients who availed them selves to be tested and the possible presence of HIV positive patients in the group that was not tested.

Relapse among HIV positive VL patients significantly differed from HIV negative VL cases ($p=0.001$). HIV positive VL patients were found to be seven times more likely at risk of relapse compared to the HIV negative sub cohorts. As indicated in some research works, the co-existence of these two immuno-compromising infections make patients present atypically, pose difficulties to be detected by routine diagnostic tests, most often result in an unfavorable response to treatment, frequent relapses and in premature death [20] and up to 50% of HIV positive VL cases could at some point relapse [7].

The finding in this study also echoed the same or even higher, indicative of the problems caused by the interplay of HIV and VL in changing the fate of victims and the epidemiology of visceral leishmaniasis [20] for majority of the relapse cases are migrant workers who are difficult to track them down once they leave the endemic area.

The defaulter rate was 1.8%, lesser compared to the study done in Sudan, 3.2%, but two fold higher in terms of relapse 6.6% compared to 3.0% in the Sudan [35]. In this study 3 cases of PKDL (0.3%) were as well observed.

It is amazing to see in this study that only 45 (6.4%) malaria cases were registered in a place where the disease stands first in prevalence and incidence. This might have happened because patients usually treat themselves even in the farm areas where anti malarial drugs are abundantly available and possibly, the over lap of signs and symptoms of visceral leishmaniasis with malaria might have forced patients to confuse malaria with VL so, inevitably took anti malarial drugs that possibly cured malaria. Last but not least the new treatment protocol of administering anti malarial drug (SP) for any VL patient may have undermined its representation.

In Cicely Italy, 7% [32] and in India 6% [30] implicated the drug it self (Sodium antimony gluconate) as the contributor to the cause of death. The death rate in

this study was found to be 14.9% which is higher than the standard recommendation by WHO [34]. However, little is known about what contribution of the adverse effect of the drug to the death toll.

Strengths and limitation of the study

This is the first knowledge, attitude and practice study about visceral leishmaniasis done on the migrant workers and indigenous population; hence it contributes a lot to future endeavors in this aspect and can be used as a base line data to the coming series of behavioral surveys. The comparative nature of this study is indeed an added value because it clearly elicited the gaps between both study groups and identified possible areas of intervention. This study will

have contribution in providing information on behavioral trends of vulnerable target groups.

The coincidence of the data collection with the abundant availability of migrant workers in the area, pre-testing of the questionnaire to ensure reliability and validity, appropriate methodology and sampling technique, high response rate and sound methods of analysis are features of the strengths of this study.

The retrospective nature of part of this study where all demanded information may well not be in place hence, some variables were missing and all limitations inherent in cross-sectional studies are draw backs of this study.

VII. Conclusions

There is a difference in knowledge and practice about visceral leishmaniasis (Kala azar) between the migrant workers and indigenous people. The non-immune, migrant highlanders work day and night in the absence of any measure to reduce exposure in endemic areas, while it is known that the Sandfly is active from dawn to dusk. Majority of the migrant workers in

Humera are at risk of acquiring visceral leishmaniasis for most of them are less knowledgeable about the disease with remarkably, not favorable practice towards VL. The mobilization of non immune tenth of thousands of young men from different corners of the country with a motive only to make money, but nutritionally compromised, working under difficult situations, with no personal protective measures make the labor migrant force liable and easily exposed to the disease.

VIII. Recommendations

1. Finding from this study suggest that it is necessary to work on effective information, education and communication. The delivery of training to selected people permanently working and residing in the farm areas (health cadres) is a means to reach the labor migrant force.

2. There should also be co-operation and partnership between neighborly districts and regions, especially the Amhara region, where majority of the migrant force come from, in terms of experience sharing, training and timely information exchange mechanism.

3. The role of the mass media so far remains extremely minimal and now is time more than ever before to teach the community about visceral leishmaniasis.

4. The target of k/Humera district as a major site of resettlement from around Tigray makes the responsibility rather tough and the use of ITN needs to be encouraged for settlers, indigenous people and the labor migrant population as well.

5. The presence of VCT service coupled with the well established HAART program is an opportunity, therefore, health workers should strive hard to make patients willingly use it as the HIV/leishmania co-infection in this part of Ethiopia is high.

6. Taking the magnitude, and suffering VL is inflicting on people into account; leishmaniasis should be dealt with independently under special program.

7. At last but not least further series of surveillance surveys are strongly recommended and the undetermined contribution of Sodium stibo gluconate to the over all death toll needs further and comprehensive study.

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ANNEX II

Name of the data collector_____
Qualification_____
Date of data collection_____
Signature_____

Table 2 format for medical record review

No	Card No	Address	Age	Sex	Diagnosis	Duration of illness	Means of Diagnosis	Treatment taken	Treatment outcome

K= Kala azar
S= Skin infection
U= Urinary tract infections
R= Respiratory tract infections
H= HIV
M= Malaria
D= Diarrheal disease
O= Others

Means of diagnosis

Splenic aspirate= S/A
Direct agglutination test=DAT

Treatment out come

Death=1
Relapse=2
Recovery=3
PKDL=4
Defaulter=5

ANNEX - III

Questionnaire for assessment of knowledge, attitude and practice about visceral leishmaniasis (kala azar)

Interviewer name _____ complete _____

Supervisor name _____ Refused _____

Date of interview _____

Part one: Socio demographic characteristics

1	Age in completed years		Specify
2	Sex	1. meal 2. female	
3	Marital status	1. Single 2. Married 3. Widowed 4. Divorced 5. No response	
4	Occupation	1. Farmer 2. Merchant 3. Government employee 4. Student 5. house wife 6. Daily laborer 7. no job 8. Others	
5	Educational status	1. Not able to read and write 2. Only read and write 3. Elementary school(grade 1-6) 4. Secondary school (grade 1-6) 5. higher education 12 +	
6	Religion	1. Orthodox 2. Catholic 3. Muslim 4. Protestant 5. Others	

7	Ethnic group	1. Tigray 2. Amhara 3. Gurage 4. Oromo 5. Kembata 6. Gambela 7. Sopmalie 8. Benshangule 9. Others	
8	Distance from your current place of residence to Humera in kilometers.	1. <50 2. 50-100 3. 101-200 4. 210-400 5. >401	
9	How long have you stayed here?	1. <3 months 2. 3-6 months 3. >6 months	
10	What/how is your living condition in Humera?	1. Alone 2. Friends 3. relatives/parents 4. Others	
11	What/ How was your living condition at home?	1. Alone 2. With family 3. With friends 4. on the street 5. Other	
12	How many times have you visited humera?	1. One time 2. Two times 3. More than two times	

Part Two: 13-22 are questions designed to assess respondents' knowledge about visceral leishmaniasis.

13	Have you ever heard of kala azar?	1. Yes 2. No	
14	How did you know about kala azar?	1. Radio 2. Health facility 3. Friends 4. others(specify)	
15	How is kala azar transmitted?	1. Mosquitoes 2. Worms 3. Sleeping with patients who have the disease 4. Sand fly	

		5. Plants 6. Others(specify)	
16	What are the main signs and symptoms of kala azar? (more than one response is possible)	1. Fever 2. Fatigue 3. Vomiting 4. Liver or/and spleen enlargement (abdominal swelling) 5. Head ache 6. Poor appetite 7. Weight loss 8. Don't know 9. Others (specify)	
17	Is kala azar treatable?	1. Yes 2. No	
18	This is a question for those who accurately answered Q.15 where do sand files reside? more than one answer is possible	1.Tree cracks 2.Straw 3. Black cotton soil 4. Termite hill/mound 5. Do not know	
19	Where do you prefer to seek treatment for kala azar?	1. Traditional healer 2. Health facility 3. Pharmacy (drug shop) 4. Others (specify)	
20	What is the outcome of kala azar if not treated?	1. Death 2. Debility 3. Self cure 4. Chronicity	
21	Is kala azar a preventable disease?	1. Yes 2. No	
22	If yes to Q. 21, How do you prevent kala azar?	1. Treatment with specific medicines 2. Use local cotton sheets 3. Smoke from burning leaves and animal products(Cow Dung) 4. Use of bed nets. 5. Isolation from patients 6. Keep surrounding clean 7. Spraying of insecticide 8. No preventable measures are available. 9. Don't know	

Part Three: 13-22 are questions designed to assess respondents' attitude towards visceral leishmaniasis.

23	Do you have a bed net?	1. Yes 2. No	
24	Do you want to have it?	1. Yes 2. No	
25	Are you willing to pay for it?	1. Yes 2. No	
26	Where and how do you sleep?	1. Mat/Mattress with bed net. 2. Mat/Mattress with out a bed net. 3. Under the tree shade (floor) 4. traditional tower(*kote*) 5. Others (specify)	
27	When do you prefer to work in the farm areas when temperature peaks?	1. Day time 2. In the night 3. Both at night and day time.	
28	Are you only consuming the sorghum porridge provided by the employer?	1. Yes 2. No	
29	If No, how much have you spent for food in the last two weeks?	1. 25 Birr 2. 26-50 Birr 3. 51-100 Birr 4. >100 Birr	
30	How much of your earnings are you going to spend for food?	1. <10% 2. 10-20% 3. 21-30% 4. 31-50% 5. >50%	

ANNEX - IV

ይህ ቃለ - መጠይቅ የተዘጋጀው ካኣሳዛር የሚባለውን በሽታ በተመለከተ የወረዳው ነዋሪዎችና የቀን ተመላላሽ ሠራተኞችን ዕውቀት፣ ዝንባሌ እና ተግባራዊ ልምድ ለመገምገም ነው።

1	***ዕድሜ/በዓመት***	
2	*ፆታ*	1. ወንድ 2. ሴት
3	የትዳር ሁኔታ	1. ያላገባ 2. ያገባ 3. የሞተበት/የሞተባት 4. ፍቺ 5. መልስ ለመስጠት ፍቃደኛ ያልሆኑ
4	*ሥራ*	1. ገበሬ 2. ነጋዴ 3. የመንግሥት ሠራተኛ 4. ተማሪ 5. የቤት እመቤት 6. የቀን ሠራተኛ 7. ሥራ አጥ 8. ሌላ/ይጥቀሱ
5	የትምህርት ደረጃ	1. ማንበብ እና መፃፍ የማይችሉ 2. ማንበብ እና መፃፍ ብቻ የሚችሉ 3. አንደኛ ደረጃ የጨረሱ /1-6/ 4. ሁለተኛ ደረጃ የጨረሱ /7-12/ 5. የከፍተኛ ትምህርት 12^{+}
6	እምነት	1. ኦርቶዶክስ 2. ካቶሊክ 3. እስልምና 4. ፕሮቴስታንት 5. ሌላ /ይጥቀሱ/
7	ብሔር	1. ትግሬ 2. አማራ 3. ጉራጌ 4. ኦሮሞ 5. ከምባታ 6. ጋምቤላ 7. ሶማሌ 8. ቤንሻንጉል 9. ሌላ /ይጥቀሱ/
8	ከሚኖርበት ቦታ እስከ ሑመራ ድረስ ያለው ርቀት በኪሎሜትር ስንት ይሆናል? ነዋሪ ከሆኑ ወደ ጥያቄ ቁጥር 11 ይሂዱ	1. < 50 ኪሎ ሜትር 2. 50-100 ኪሎ ሜትር 3. 101 - 200 ኪሎ ሜትር 4. 201 - 400 ኪሎ ሜትር 5. > 400 ኪሎ ሜትር
9	ለምን ያህል ጊዜ ነው እዚህ ቦታ የቆዩት?	1. < 3 ወር 2. 3 - 6 ወር 3. 6 - 12 ወር

10.	ከማን ወይም በምን ዓይነት መልኩ ነው ሑመራ የሚኖሩት?	1. ለብቻዬ 2. ከጓደኞቼ ጋር 3. ከቤተዘመድ /ወላጅ/ 4. ሌላ ይጥቀሱ
11.	ከማን ወይም በምን ዓይነት መልኩ ነው አገሮ የሚኖሩት?	1. ለብቻዬ 2. ከቤተሰብ 3. ከጓደኞቼ ጋር 4. ጐዳና ላይ 5. ሌላ /ይጥቀሱ/
12	ሑመራ ሲጐበኙ ለስንት ጊዜም ነው?	1. አንድ ጊዜ 2. ሁለት ጊዜ 3. ከሁለት ጊዜ በላይ

ክፍል - 2 ካላአዛር በተመለከተ ተመመላሽ የቀን ሠራተኞችና ነዋሪዎችን ያላቸው ዕውቀት፣ ዝንባሌና ተግባራዊ ልምዳቸውን ለመገምገም ታስቦ የተዘጋጀ መጠይቅ ነው::

2.1 ከቁጥር 13-22 ያሉትን ጥያቄዎች የተጠያቂዎች ዕውቀት ለመገምገም ታስቦ የተዘጋጁ ናቸው::

13	ስለ ካላአዛር ሰምተው ያውቃሉ ?	1. አውቃለሁ 2. አላውቅም
14	በምን መንገድ ነው ስለ ካላአዛር ሊያውቁ የቻሉት?	1. በሬድዩ 2. በጤና ተቋም ኣማካኝነት 3. በጓደኞቼ 4. ሌላ /ይጥቀሱ/
15	ካላአዛር በምን መንገድ ነው የሚተላለፈው?	1. በወባ ትንኝ 2. በትላትሎች 3. በካላአዛር በሽታ ከተያዘ በሽተኛ ጋር አብሮ በመተኛት 4. ትንኝ መሳይ ግን ከትንኝ አነስ ባለች ፍጥረት አማካኝነት 5. በዕፅዋቶች 6. ሌላ /ይጥቀሱ/
16	የካላአዛር በሽታ ምልክት እና ስሜት የትኞቹ ናቸው? /ከአንድ በላይ መጥቀስ ይቻላል	1. ትኩሳት 2. ድካም 3. ማስታወክ 4. የሆድ እብጠት 5. የራስ ምታት 6. የምግብ ፍላጉት መቀነስ 7. ክብደት መቀነስ 8. አላውቅም 9. ሌላ /ይጥቀሱ/
17	ካላአዛር የሚድን በሽታ ነው?	1. አዎ 2. አይደለም

19	የካላአዛር በሽታ ተጠቂ ቢሆኑ የት ሄዶ መታከምን ይመርጣሉ?	1. ባህላዊ ህክምና 2. ዘመናዊ የህክምና ቦታ 3. ፋርማሲ 4. ሌላ / ይጥቀሱ/
20	የካላአዛር በሽታ ህክምና ካላገኘ ምን ሊያስከትል ይችላል?	1. ሞት 2. የሰውነት መዳከም /ማመቀቅ/ 3. በራሱ መዳን 4. ከበሽታው ጋር አብሮ ለረጅም ጊዜ መቆየት ይቻላል።
21	ካላአዛር መከከል ይቻላል?	1. ይቻላል 2. አይቻልም
22	ለጥያቄ ቁጥር 21 መልሱ ይቻላል ከሆነ በምን አይነት መንገድ መከላከል የሚቻለው? /ከአንድ በላይ መልስ መስጠት ይቻላል/	1 .አንዳንድ መድኃኒቶችን በመጠቀም 2. አቦጀዲድ በመጠቀም 3. እበት እና የተለያዩ ቅጠላ ቅሎች በመታጠን 4. አጎበር በመጠቀም 5. ከበሽተኞች በመራቅ 6. የአካባቢን ንፅህና በመጠበቅ 7. ፀረ-ተባይ መድሀኒት በመርጨት 8. ምንም ዓይነት የመከላከያ ዘዴ የለውም 9. አላውቅም

2.2 ከቁጥር 23-25 ያሉትን ጥያቄዎች ካላአዛር በተመለከተ ተጠያቂዎችን ያላቸው ዝንባሌ መገምገም ታስቦ የተዘጋጁ ናቸው።

23	አጎበር አላዎት?	1. አለኝ 2. የለኝም
24	እንዲኖሮዎት ይፈልጋሉ?	1. እፈልጋለሁ 2. አልፈልግም
25	ለመግዛት ፍቃደኛ ነዎት?	1. ነኝ 2. አይደለሁም

2.3 ከጥያቄ ቁጥር 26-30 ካላአዛር በተመለከተ ተጠያቂዎች ያላቸውን ተግባራዊ ልምድ ለመገምገም ታስበው የተዘጋጁ ናቸው።

26	የትና በምን ሁኔታ ላይ ነው የሚተኙት?	1. ፍራሽ/ምንጣፍ ላይ አጎበር በመጠቀም 2. ፍራሽ/ምንጣፍ ላይ ያለ አጎበር 3. ዛፍ ጥላ ስር ወይም ወጭ በረንዳ ላይ 4. ቆጥ ላይ 5. ሌላ /ይጥቀሱ/
27	ሙቀት በሚጨምርበት ሰዓት በማሳው ላይ መቼ መስራት ይሻሉ?	1. ቀን 2. ማታ 3. ቀንም ማታም
28	ማሳው ላይ ሲሰሩ የሚመገቡት የማሽላ ገንፎ ብቻ ነው ?	1. አዎ 2. አይደለም
29	መልሱ አይደለም ከሆነ ላለፉት ሁለት ሳምንታት ለምግብዎ ምን ያህል ብር አውጥተዋል?	1. < 25 ብር 2. 26-50 ብር 3. 51-100 ብር 4. > 100 ብር
30	ከሚገኙት ገቢ ምን ያህሉን ለምግብዎ ለማዋል ወስነዋል?	1. < 10% 2. 10 - 20% 3. 21 - 30% 4. 31 - 50% 5. >50%

ANNEX - V

ክፍሊ - 1 *እዚ ቃለ መጠይቓ ዝተዳለወ ካልኣዛር ዝተባህለ ሕማም ብዝተመልከተ መዓልታዊ ሸቃሎን ነበርትን ዘለዎም ፍልጠት፣ ዝንባለን ተግባራዊ ልምድን ንምግምጋም እዩ::*

1.	ዕድመ /ብዓመት/	
2.	ፆታ	1. ወዲ 2. ሰበይቲ
3.	ኩነታት ሓዳር	1. ዘየእተው 2. ዘእተው 3. ዝምታ/ ዝምቶቶ 4. ዝፈተሐ/ት 5. መልሲ ንምሃብ ፍቃደኛ እይኮንኩን
4.	ስራሕ	1. ሓረስታይ 2. ነጋዳይ 3. ናይ መንግሥቲ ሠራሕተኛ 4. ተመሃራይ/ሪት 5. ባዓልቲ ሓዳር 6. መዓልቲዊ ሠራሕተኛ 7. ስራሕ የብለይን 8. ካልእ ይጥቀሱ
5.	ናይ ትምህርቲ ደረጃ	1. ምንባብን ምፅሓፍን ዘይክእል 2. ምንባብን ምፅሓፍን ጥራሕ ዝኽእል 3. ቀደማይ ደረጃ ት/ቲ ዝወደአ/1.6/ 4. ካልኣይ ደረጃ ዝወደአ /7-12/ 5. ላዕለዋይ ት/ቲ ዝወደአ 12+
6.	እምነት	1. ኦርቶዶክስ 2. ካቶሊክ 3. እስላም 4. ፕሮቴስታንት 5. ካልእ /ይጥቀሱ/
7.	ብሄር	1. ትግራዋይ 2. አምሓራይ 3. ጉራጌ 4. ኦሮሞ 5. ከንባታ 6. ጋምቤላ 7. ሶማሌ 8. ቤንሻንጉል 9. ካልእ ይጥቀሱ
8.	ካብቲ ዝነብሩሉ ቦታ ክሳብ ሐመራ ዘሎ ርሕቀት ክንደይ ይኸውን? ነባሪ እተኸይኖም ናብ ጥያቄ ቁዕሪ 11 ይኩዱ/	1. <50 ኪ.ሜ 2. 50 - 100 ኪ.ሜ 3. 101 - 200 ኪ.ሜ 4. 201 - 400 ኪ.ሜ 5. ≥401 ኪ.ሜ

9.	ኣብዚ ቦታ ንክንደይ ግዜ እዮም ፀኒሖም?	1. 3 ወርሒ 2. 3 - 6 ወርሒ 3. 6 - 12 ወርሒ
10.	ምስመን ወይ ብምንታይ ዓይነት እዮም ናብርኦም ዝመርሕዎ ኣብ ሑመራ?	1. ንበይነይ 2. ምስ የዕሩክተይ 3. ምስ ዘመድ /ቤተሰብ 4. ካልእ ይጥቀሱ
11.	ምስመን ወይ ብምንታይ ዓይነት እዮም ናብርኦም ዝመርሕዎ ኣብ ቲ ዝነብሩሉ ቦታ ?	1. ንበይነይ 2. ምስ ቤተሰብ 3. ምስ የዕሩክተይ 4. ኣብ ጎደና 5. ካልእ ይጠቀሱ
12.	ናብ ሑመራ ክንደይ ጎዜኦም ኢዮም መሚኦም? /ናይዚ ወረዳ ነባሪ እንተዳኣ ኮይኖም ናብ ጥያቄ ቁፅሪ 13 ይከዱ/	1. ናይ መጀመርያየ 2. መበል ካልኣይ 3. ልዕሊ ክልተ ጊዜ

ክፍል - 2 ካላኣዛር ብዘተመልከተ ናይ ተሓተቲ ፍልጠት፣ ዝንባሌን ተግባራዊ ልምዲን ዝግምግሙ ሕቶታት::

2.1 ካብ ቁፅሪ 13-22 ዘለው ትቶታት ናይቶም ተሓተቲ ፍልጠት ንምግምጋም ተሓሲቦም ዘተዳለው ሕቶታት እዮም::

13	ብዛዕባ ካላኣዛር ሰሚያም ዶ? ይፈልጡ ኣይፈልጥን እንተኾይኑ ናብ ቁፅሪ ሕቶ 23 ይዝለሉ::	1. እወ 2. ኣይፈልጥን /ኣይሰማዕኩን/
14	ብምንታይ መነገዲ እዮም ብዛዕባ ካላኣዛር ክፈልጡ ክኢሎም?	1. ብራድዮ 2. ኣብ ጥዕና ትካል 3. ብዐርኪይ 4. ካልእ /ይጥቀሱ/
15	ካላኣዛር ብምንታይ መንገዲ እዩ ዝመሓላለፍ?	1. ጣንጡ/ቡዕዳ 2. ብሓስካ 3. ካላኣዛር ሕማም ብዝተታሓዘ ሕሙም ሰብ ቢርካ ብምድቃስ 4. ጣንጡ/ቡዕዳ መሳሊት ግን ካብ ጣንጡ ዝናኣስት ፍጥረት ኣቢሉ 5. ኣቁዕልቲ 6. ካልእ ይጥቀሱ
16.	ናይ ካላኣዛር ምልክትን ስሚትን ኣየኖት እዮም? /ካብ ሓደ ንላዕሊ ምጥቃስ ይካኣል እዩ/	1. ረስኒ 2. ድካም 3. ተምላስ /ንዓልዒ ምባል/ 4. ናይ ክብዲ ሕብጠት 5. ሕማም ርእሲ 6. ናይ ምግቢ ድልየት ምቅናስ 7. ክብደት ምቅናስ 8. ኣይፈልጥን 9. ካልእ ይጥቀሱ

17.	ካላኣዛር ዝድሕን ሕማም ድዩ ?	1. እወ /ይድሕን/ 2. ኣይኮነን /ኣይድሕንን/
18.	እዚ ሕቶ ዝምልከቶም ቁዕሪ 15 ብትክክል ዝመለሱ ጥራሕ እዩ። እዚ ካብ ጣንጡ /ቡዕዳ ዝናኣሰት ፍጥረት ኣበይ ቦታ ትነብር?	1. ኣብ ዝተሰነጣጠቀ ዕንጨይቲ ውሽጢ 2. ኣብ ሓሰር ውሽጢ 3. ኣብ ዝተሰነጣጠቀ ዋላካ መሬት ውሽጢ 4. ኣብ ጉይላ 5. ኣይፈልጥን 6. ካልእ /ይጥቀሱ/
19.	ናይ ካላኣዛር ሕማም እንተዝሕዞም ኣበይ ከይዶም ምሕካም ይመርፁ?	1. ኣብ ባህላዊ ሕክምና 2. ኣብ ዘመናዊ ሕክምና ቦታ 3. ፊርማሲ 4. ካልእ /ይጥቀሱ/
20.	ሕማም ካላኣዛር ሕክምና እንተዘይረኩቡ እንታይ ሽግር ከምዕእ ይኽእል?	1. ሞት 2. ናይ ሰውነት ምድካም /ምጉስቃል 3. ብባዕሉ ግዜ ይድሕን 4. ምስቲ ሕማም ነዊሕ ግዜ ሓቢርካ ምንባር ይከኣልዩ 5. ኣይፍለጥን 6. ካልእ /ይጥቀሱ/
21.	ካላኣዛር ምክልካል ይከኣል ዶ?	1. ይካኣል 2. ኣይካኣልን
22.	ንሕቶ ቁዕሪ 21 ይካኣል እንተኮይኑ ብከመይ መንገዲ እዩ ምክልኻል ዝካኣል? /ካብ ሓደ መልሲ ንላዕሊ ምሃ ይካኣል/	1. ሓደ ሓደ መድሓኒታት ብምጥቃም 2. ኣቦጀዲድ ብምጥቃም 3. ክቦን/ዒባን ዝተፈላለዩ ቆፅላቆፅሊ ብምዕጣን 4. ላምስያ ብምጥቃም 5. ካብ ሕሙማት ብምርሓቅ 6. ናይ ኣከባቢ ፅርየት ብምሕላው 7. ፀረ-ተባይ መድሓኒት ብምንፃግ 8. ምንም ዓይነት መከላኸሊ ማላ የብሉን 9. ኣይፈልጥን

2.2 ***ካብ ቁፅሪ 23-25 ዘለው ሕቶታት ካላኣዛር ዝተመልከተ ተሓተትቲ ዘለዎም ዝንባሌ ንምግምጋም ተሓሲቡ ዝተዳለው እዮም::***

23.	ላበሲ.ያ ኣለዎም ዶ?	1. ኣለኒ 2. የብለይን
24.	ክህልዎም ይደልዩ ዶ?	1. እወ 2. ኣይፋል /ኣይደልይን/
25.	ንምግዛእ ፍቃደኛ ድዮም?	1. እወ 2. ኣይፋል ኣይኮንኩን

2.3 ካብ ቁዕሪ 26-30 ዘለው ሕቶታት ኣላኣዛር ዝተመልከተ ተሓተትቲ ዘለዎም ተግባራዊ ልምዲ ንምግምጋም ዘተዳለወ እዩ።

26	አበይን ብኽመይ መንገዲን እዮም ዝድቅሱ ?	1. አብ ፍርናሽ /ምንፃፍ ላምስያ ብምጥቃም 2. አብ ፍርናሽ /ምንፃፍ ብዘይ ላምስያ 3. አብ ትሕቲአም ወይ ድማ አብ በረንዳ 4. አብ ስቂላ 5. ካልእ/ይጥቀሱ
27	ሙቀት አብ ዝውስከ እውን አብ ናይ ሕርሻ ቦትአም መዓስ ምስራሕ ይደልዩ?	1. ቀትሪ 2. ምሸት/ለይቲ 3. ለይትን ቀትርን
28	አብ ሕርሻ ቦትአም እንትሰርሑ ዝምግብሎ ናይ መሸላ ጋዓት ጥራሕ ድዩ?	1. እወ 2. ኣይኮነን
29	መልሲ ኣይኮነን እንተኾይኑ አብ ዝሓለፈ ክልፈ ሰሙናት ንምንቦም ክንደይ ዝኣክል ኣውፅኡም?	1. 25 ቁርሺ 2. 26-50 ቁርሺ 3. 51-100 ቁርሺ 4. 100 ቁርሺ
30	ካብ ዝረክብዎ እቶት ክንደይ ዘኣክል ንመግቦም ክውዕሉ ወሲኖም?	1. <10% 2. 10-20% 3. 21-30% 4. 31 - 50% 5. > 50%