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Full Length Research Paper

Perceptions of school going adolescents about substance abuse in Ramotswa, Botswana

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Drug and substance abuse is a global public health problem affecting adolescents and young adults especially in developing countries. This study investigated the perceptions of school-going adolescents about substance abuse in Ramotswa, Botswana. A cross-sectional design study using mixed methods was used to collect data from primary, junior and senior secondary school children aged 13 to 19 years. Some 207 school children were recruited into the study. Almost equal numbers of boys and girls had ever used substances prior to this study and the overall prevalence of substance use is 17.4%. The media is the major source of awareness and knowledge of substances and most schools (59.9%) do not have strategies for reducing abuse of substances. School surroundings provide school children easy access to substances. Knowledge of the association of substance use and abuse is high with mental health (74.9%), traffic accidents (70.7%) and 58.5% with heart diseases. It is concluded concerted effort is needed involving major stakeholders to scale-up campaigns for reducing drug and substance abuse among school children. This can be achieved through raising awareness about the consequences of substance abuse; building capacity to strengthen coping mechanisms to stress and to those presenting with effects resulting from use of these substances and review academic curricula.

Key words: Adolescents, drugs, substance abuse, perception, knowledge.

INTRODUCTION

The 21st Century is characterised by drug and substance abuse as a global public health challenge (Owoaje and Bello, 2010). United Nations Office on Drugs and Crime (UNODC) estimated that between 3.6 and 6.9% of the global adult population aged 15 to 64 years has ever used an illicit substance (WHO, 2004). Opiates are among the commonly used substances in Europe, USA and Asia; cocaine in Southern America and cannabis in

Africa (UNODC, 2013a). With respect to drug abuse, drugs are substances that have detrimental effects on the user including physical, mental, and emotional as well as behavioural (Whichstrom and Hegna, 2003, Galea et al., 2004, UNODC, 2013b). Drug abuse is now generally defined as excessive or inappropriate use of a psycho-active substance by a person; such user being considered or judged to be illegal (immoral) by the culture

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and resulting in harm to the person or society (Pela and Ebie, 1982).

The World Health Organization (WHO) has defined adolescence as a period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. It represents one of the critical transitions in life and is characterised by a tremendous pace in growth and change that is second only to that of infancy (WHO, 2011). Studies in Asia, Europe and USA have reported a significant increase in drug abuse amongst adolescents and youths (Stanton et al., 2001, Babaola et al., 2013, Brooks et al., 2003, Deressa and Azazh 2011, UNODC, 2013, Gebreslassie et al., 2013, Osman 2016) therefore, calling for a thorough investigation on the factors behind this trend. Some countries have introduced strategic measures to reduce drug abuse among populations. In Canada, consumption of alcohol, tobacco, cannabis and drugs are illegal (Adlaf et al., 2005). The Nigerian Government introduced a Law Enforcement Agency but still the trend has not changed (National Law Enforcement Agency, 1992) suggesting control of drug and substance use goes beyond legislations.

The primary developmental change during early adolescence is the re-evaluation of the self and the emergence of self-identity (Forehand and Werson, 1994). At this stage, adolescents experience several biological, cognitive and psychological changes and begin to develop the capacity to think abstractly making them more inquisitive and concerned with peer relationship (Eccles, 1999; Vartanian, 2000; Christie and Viner, 2005). Experimentation with drugs during adolescence is common and reasons driving adolescents to use substances include curiosity, experimentation, amusement, reducing stress and sense of maturity (Erickson, 1968; Greenfield et al., 2007). Some reports suggest that the school environment influences adolescents to engage in drug use (Bond et al., 2007, Fletcher et al., 2009). Peer pressure, drug addict parents and economic reasons (Gikonyo 2005, Lynskey et al., 2006, Gabhainn et al., 2008, Maithya 2009, Mihalca et al., 2012) are additional reasons driving adolescents to engage in substances use.

In Africa, inadequacy of information and a systematic data collection on the subject have hampered the assessment of the extent, the patterns and trends of drug abuse. Literature however, suggests that drug and substance use trends are also on the increase in the region and cannabis, khat, alcohol, amphetamines, opium, cocaine, heroin and lysergic acid diethylamide, sedative hypnotic, glue and petrol sniffing are some of the substances commonly abused by adolescents. A study in Kenya, reported that the rate of lifetime alcohol use was 51.9% (Atwoli et al., 2011) and an estimated overall prevalence of cannabis smoking was 37.2% among youth in Zambia (Siziya et al., 2013).

The 2007 United Nations Office on Drugs and Crime

World Report stated that the highest cannabis production occurred in the African continent where about 1547 kg of marijuana (Cannabis) was confiscated in Botswana (UNODC, 2007). Additional reports in Botswana show that alcohol is the commonest (95%) substance of abuse among school children and cannabis, glue, and other ecstasy drugs were also used by adolescents (1%), (Botswana Alcohol AIDS Surveillance, 2004). The Botswana Youth Risk Behavioural Surveillance (2011) reported common substances of abuse among school children being tobacco (18.6%), alcohol (16.6%), cannabis (14.9%) and snuff (13.8%). Other substances according to the report were cocaine and ecstasy at 5.6 and 3.7% respectively. These reports support that drug and substance use among school children is a public health concern in Botswana that warrants further interrogation because studies have reported that drug abuse at an early school age is likely lead to drug abuse at adolescent, youth and adult life (Schmid et al., 2007).

The effects of drug abuse in Africa have also not been fully studied. However, "*amotivational syndrome*" has been described as an effect of cannabis abuse resulting in poor school performance and the adolescent may eventually drop-out of school (Kurdek, 1992, Shek et al., 1997). Other effects include cannabis-associated psychosis contributing between 12 and 40% of all psychosis in African mental hospitals (Odejide and Sanda, 1976, Henquet et al., 2005). Amphetamines cause among adolescent students a psychosis characterised by acute symptoms especially during examination period and low productivity has been reported among khat users because they spend more time chewing than working (Boroffka, 1996). Drug use therefore has far reaching implications beyond individuals to affecting productivity and hence sustainable economic development of a country.

This study was carried out in a semi-urban area, Ramotswa in Botswana to determine the perceptions of school children. The study reports on knowledge and perception of the studied population towards drug abuse, commonly used and sources of substances and the factors influencing school children to use drugs. The knowledge on the perception of the school children about substance abuse would enable the local and central government to plan a better primary approach to prevent drug abuse among the population segment.

METHODOLOGY

Study design and sample size

Cross-sectional, mixed methods approach was used to collect data from school-going children aged 13 to 19 years in Ramotswa District located about 35 km from the city of Gaborone. Ramotswa has nine including six primary schools, two junior and one senior secondary school. All schools were recruited and according to the Botswana Population Census (2011) the sampling frame was the total of 6025 in the age range 13 to 19 years. A total of 213 school-

Table 1. Demographic characteristics of the study population in the drug use study among school-going adolescents in Ramotswa, Botswana.

Population sample	N	Percentage	Gender	N	Percentage
Primary School 1	16	7.7	Male	109	52.7
Primary School 2	17	8.2	Female	98	47.3
Primary School 3	29	14.0	Total	207	100.0
Primary School 4	26	12.6			
Primary School 5	23	11.1	Religion		
Junior Secondary School 1	25	12.1	Christian	201	97.1
Junior Secondary School 2	33	15.9	Traditional	6	2.9
Senior Secondary School	38	18.4	Total	207	100.0
Total	207	100.0			
Age (Years)			Education grade		
13	96	46.4	Standard 6	14	6.8
14	33	15.9	Standard 7	97	46.9
15	26	12.6	Form 1	21	10.1
16	15	7.2	Form 2	19	9.2
17	14	6.8	Form 3	17	8.2
18	20	9.7	Form 4	1	0.5
19	3	1.4	Form 5	38	18.4
Total	207	100.0	Total	207	100.0

going children were estimated as sample size and adjusted for design error to 267. Permission to collect data from one primary school was not granted, therefore, five primary schools, two junior secondary schools and one senior secondary school participated in the study as shown in Table 1. From each school, eligible candidates were allocated numbers from which respondents were randomly selected by the researcher to participate in the study. Inclusion criteria were restricted to those aged between 13 and 19 years, school boys and girls who were willing to participate in the study. Consent/assent to participate in the study was obtained from parents and participants. Children under 13 years of age, those above 19 years, those with mental illness, blind and those whose parents did not grant consent to participate were excluded from the study.

Data collection and analysis

Quantitative data were collected using a questionnaire developed by WHO designed for student drug surveys (Smart, 1980). The questionnaire was piloted on 10 school children from a school outside Ramotswa. To prevent discussing and sharing responses with each other, the questionnaire was administered to the children in class by the researcher. Information on age, gender, sources of drugs and substances used; substance practices, sources of information and knowledge about drugs and substances of abuse, reasons for initiation of substance use, knowledge and awareness about consequences of substance use; and motivating and demotivating factors for drug and substance use was collected and analysed using IBM SPSS version 20. Descriptive statistics, frequency percentages were used to summarise categorical variables.

Focus Group Discussion (FGD) participants were purposefully and conveniently recruited from the schools. Three groups were conducted, one from the primary, junior and senior secondary schools. Each group consisted of 10 children (5 boys and 5 girls).

Interview guides aimed at generating information on awareness, substance use practices, sources of substances of abuse and knowledge of perceptions, association of substances use and disease conditions. The interviews were audio-recorded and each session lasted about 30 min. Accuracy of the narratives was assured by the researcher who probed further on ambiguous responses. No repeat interviews were carried out. Transcripts were analysed through an inductive approach (Strauss and Corbin, 1994) and themes were identified. Responses were coded manually by the Researcher and like data were grouped into categories.

Ethical consideration

The study received ethical clearance (Ref. URB/IRB/GRAD/151) from the University of Botswana Institutional Review Board and permit to carry out the study at the schools was granted by the Office of the District Education Officer in Ramotswa. The privacy of the information collected was assured by ensuring that non-participating children were not in the interview room and no identifiers which would trace back to the sources of information were placed on the records. Participation was also voluntary and children were informed that they were free to withdraw at any time if they so wished. The purpose and methods were clearly explained to the teachers and school children and the teachers assured availability of participants. Participants were assured that collected information would be kept confidential and informed consent/assent was obtained from all children participating in the study.

RESULTS

The demographic characteristic of the study sample is presented in Table 1. A total of 207 school children (52.7% males and 47.3% female) participated in the

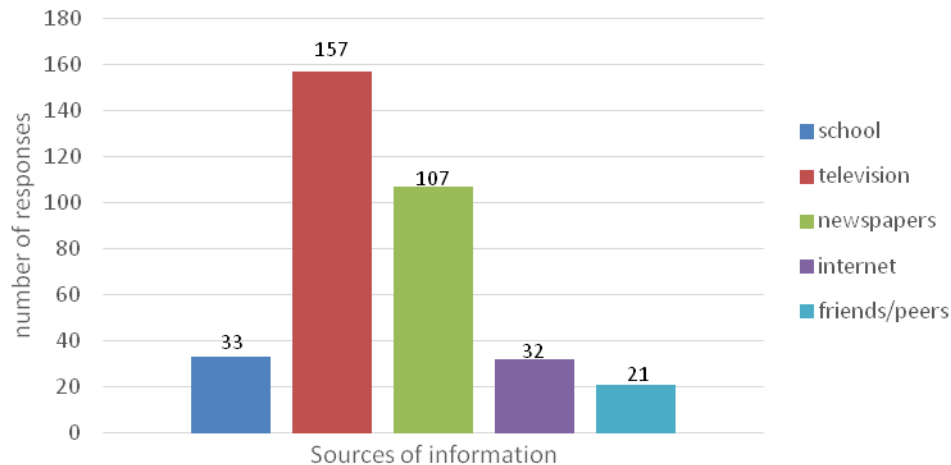


Figure 1. The major sources of information about substance use and abuse among school-going adolescent in Ramotswa, Botswana.

study giving a response rate of 77.5%. Primary school children (standard 6 and 7) were 53.7% (n=111) of the participants. The minimum and maximum age was 13 and 19 years respectively with a median age 16 years. Majority of the participants 62.3% (n=129) fell within the ages of 13 and 14 years and Christians accounted for 97.1% and about 3.0% African tradition believers.

Definition of drugs and substance use

There is a shared perception among school children (n = 86) about the definition and forms of drugs that “*Drugs are substances which give a pleasure feeling to the body when taken*”. A male participant from a senior secondary school added that: “*There are two forms of drugs being used; legal like pain killers and all sorts of medicines; while illegal drugs include cocaine, marijuana and mandrax*”. The children also have a shared definition of substance abuse: “*Substance abuse is when an individual uses substances to the extent that the body can no longer do without these substances*”.

Awareness and knowledge of substance use and abuse

Most children are aware of substance use and abuse and the major sources of information are shown in Figure 1. Television was the most common source of information mentioned [157(75.8%)] followed by printed media [107(51.7%)]. Information from friends and peers was listed by 21 (10.1%). When children were asked whether the schools have programmes to prevent substance abuse, 83(40.1%) said schools have such programmes while the majority 124(59.9%) said no specific and targeted programmes for preventing drugs and substance

abuse exist at their schools.

Substance use and commonly used substances

Substance use in this study was defined as use of any of the items described in the WHO Questionnaire (Smart 1980) during twelve months prior to this study. Figure 2 shows 36 (17.4%) children admitted to have ever used substances prior to the study. Majority were senior secondary school children [27 (75.0%)] and the average age at which they commenced using drugs and substances was 14 years. Most 18(50%) said they were introduced by friends, 7 (19.4%) by family members and 5 (13.9%) by fellow students. When asked whether boys use drugs more than girls, majority said; “*substances are mainly used by boys and boys use tobacco and marijuana most while girls use alcohol*”. However, our results show that almost equal number 19 (52.8%) males and 17 (47.2%) females had used substances prior to this study.

When asked what drugs or substances are commonly used, most primary school children mentioned cocaine, marijuana, glue and alcohol in that order. A junior secondary school boy remarked: “*commonly used drugs include illegal drugs like cocaine, marijuana and mandrax*”. A male senior secondary school adolescent added that: “*In addition to dagga (marijuana), Nyaope, a mixture of dagga and ARVs used by adolescents in South Africa is also used by some Batswana adolescents*”. Least mentioned substances include petrol, heroin, ecstasy and artane (trihexyphenydl).

Sources of substances of abuse

The sources from where school children in Ramotswa access substances are shown in Table 2. Most children

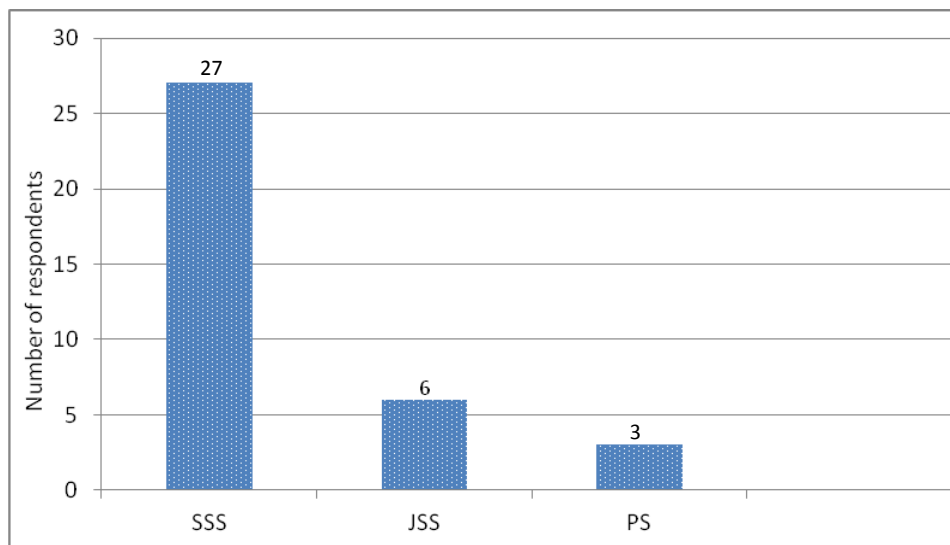


Figure 2. The proportion of school-going adolescents in Ramotswa, Botswana who admitted to have ever taken substances prior to the study. SSS, JSS and PS mean “senior secondary school, junior secondary school and primary school respectively.

Table 2. Sources of substance of abuse to school children in Ramotswa, Botswana.

Sources	Frequency	Percentage
School environment	29	14.0
Parents	6	2.9
Friends	12	5.8
Joints	39	18.8
Unspecified	121	58.5
Total	207	100.0

[121 (58.5%)] know that there are many sources but could not specify exactly where school children collect supplies from. In addition, 39(18.8%) said “*Joints*”, places where young people meet for supplies and fun. The school environment was listed 31 (15.0%) times and small number of children mentioned parents and friends provide substances to their children (3.3%). When asked to be more specific about the sources of the substances one primary school said: “*In the school there are legal and illegal tuck-shops. Illegal tuck-shops are where students bring sweets to the school to sell and then there are those who sell marijuana as well because it is profitable*”.

A senior secondary school boy added that “*There are certain individuals across the streets who sell these substances to the youth. They are street vendors, barber shop owners and carwash owners. So, the places we [school children] get substances from are tuck-shops, barber shops, car wash places, households and also from across the border [Ramotswa borders with RSA]*”. The findings suggest that the substances are easily accessed by the children not far from the schools.

Factors influencing substance use

Out of a total of 36 children who ever used substances, 13(36.1%) reported relieving stress as the major reason followed by fun/pleasure [10 (27.8%)]. Experimentation and peer pressure each accounted for 9(25.0%). Qualitative data provided additional understanding of the factors that drive adolescents to use substances. A male junior secondary school student said: “*Those who use substances are only doing it to boost their confidence*”. He added that he was once told by a substances-user that: “*After taking the substances, nothing is impossible in the world*”. The perception that some use substances for fun and experimentation was also supported by a statement that: “*Those using substances are just doing it for fun. They are just doing it to experiment how it feels because they would have elders using them while they were young*”. A senior secondary school girl added that:

“*sometimes the substances are taken to relieve stress and to get rid of the problems they have. They are doing it because they want to be carefree*”. These findings point

Table 3. Emerged issues on substance use among adolescent school children in Ramotswa and implications for campaign and research.

Sn	Issue/coding concept	Themes	Sub-theme(s)	Implication
1	Information sources	Media content relevance in reducing use and abuse of substances	TV movies and documentaries roles in drug and substance use/abuse	Content that does not focus on strategies to reduce drug and substance use is likely to motivate adolescents to experiment.
2	Knowledge gap on the effects of drugs/substances	Subject content in education curricula at primary, secondary school levels	Different education grade require different material depth Deficiencies in school curricula	Inadequate knowledge results in poor understanding the effects of drugs/substances on health. Curricula review are needed to mainstreaming drugs/substances of abuse in curricula at all education levels
3	Motivating and demotivating factors	Knowledge gap on motivating and demotivating factors	Inadequate understanding and focus on factors demotivating use of drugs and substances.	Strategic interventions focusing on building capacity to adopt demotivating factors for reducing use of substances and further research is needed to understand issues behind those easily motivated to use drugs.
4	Access to drugs and substances by adolescents	School surroundings Community	Criteria used to vet vendors surrounding schools Lack of or ineffective legislation on drug and substance restriction	Weak criteria and ineffective legislations allow circulation of drugs and substances in schools Stringent criteria and effective enforcement are needed to restrict access to drugs and substances in schools.
5	Association of substance abuse with disease burden	Knowledge gap in existing curricula and instructional materials	Mainstreaming drugs/substances association with disease burden in instructional materials	Curricula review is needed to address knowledge gap and increase awareness of the association between drugs/substances and burden of diseases

to stress as a major driving force for adolescents to indulge in drugs and substance use.

Emerging issues from qualitative data

Thematic analysis of the qualitative data revealed five major factors which seem to motivate adolescents to use of substances (Table 3). Information sources is an issue because it is not clear whether the focus of the content aired by TV stations and printed media encourages or discourages adolescents from engaging in drugs and substances of abuse. Content that does not focus on strategies to reduce drug and substance use is likely to motivate adolescents to experiment. Similarly, inadequate knowledge results in poor understanding of the health effects of substance use, and deficiencies in the curricula results in failure to mainstream drugs and substance use/abuse in the schools curricula.

Demotivating factors from using substances

Respondents pointed out two major factors which

demotivate adolescents from using substances including knowing what you want and knowing the health effects of substance use. This was stated during interview: *“Those who do not use substances know the consequences that come with it”*. A female respondent added that: *“It is a matter of knowing what you want in life; other people do not use substances because they are aware of the health risks that come with using substances. They have seen the dangers of using substances just by observing from those who have been using them”*. Other reasons mentioned include inability to buy the substances and ability to cope with stress. These findings suggest a knowledge gap exists on adverse effects of drugs and substance use and abuse and poor copying mechanisms to real life.

Awareness and knowledge of the consequences of substance abuse

Figure 3 summarises the responses to the question on awareness and knowledge about the consequences of substance abuse. A general perception emerged that

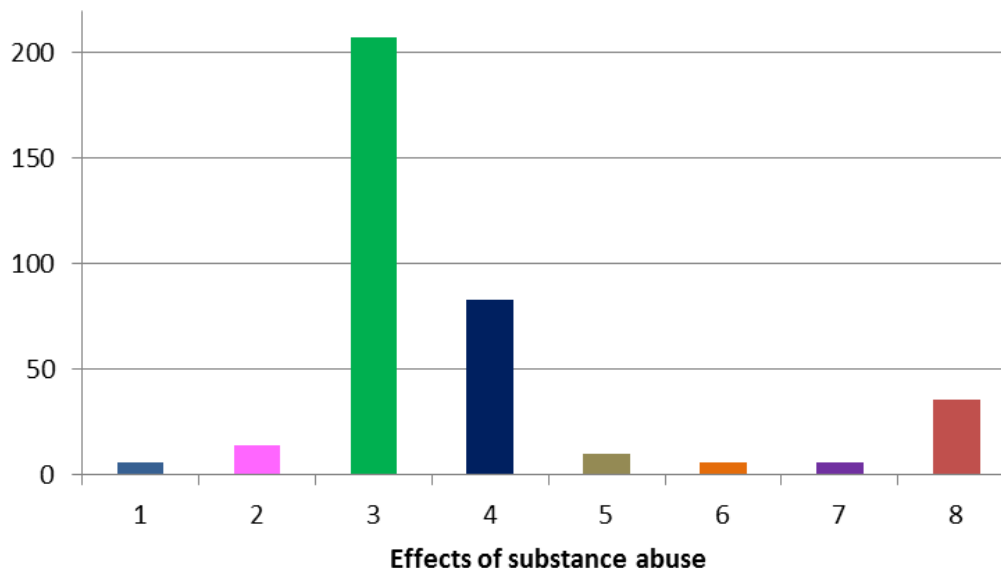


Figure 3. Awareness and knowledge of the health effects on substance abuse among school-going adolescents in Ramotswa, Botswana. 1, addiction (n = 6); 2, absenteeism and poor performance (n = 14); 3, diseases (n = 207); 4, mental illness (n = 83); 5, cancers (n = 10); 6, accidents and violence (n = 6); 7, socio-economic problems (n = 6); 8, death (n = 36).

Table 4. The frequency of the association between drug/substance use and burden of disease among school-going adolescents in Ramotswa, Botswana.

Condition	Frequency of association category and percentages			
	Number of responses	Likely associated	Associated	Not associated
Mental illness	207	40 (19.3%)	155 (74.9%)	12 (5.8%)
Liver disease	204	52 (25.4%)	125 (61.2%)	27 (13.4%)
Heart disease	205	60 (29.3%)	120 (58.5%)	25 (12.2%)

substance abuse is likely to lead to liver diseases, lung diseases, heart diseases, stroke and cancers. Mental health was the most listed condition followed by death. In addition, adolescents are aware that substance use is associated with absenteeism, poor performance at school and could either be short or long term depending on the duration of use. This was supported by a junior secondary school girl; *“Use of substances has short and long term effects. An individual using these substances more, the more likely he will develop long term effects”*.

Knowledge of the association of substance abuse and disease burden

The association between substance use/abuse and burden of disease was explored by asking respondents to categorise responses into “likely associated”, “associated” and “not associated”. The summary of the knowledge of the association between substance use and disease burden is shown on Table 4. Most respondents 155(74.9%)

are aware of the association of drug/ substance use with mental illness; 61.2, 58.5 and 70.7% with liver diseases, heart diseases and traffic accidents, respectively.

DISCUSSION

From the estimated sample the study recruited 207 school children who were willing to participate and met the inclusion criteria giving a response rate of 77.5%. Similar high response rates on similar studies have been reported (Stanton et al., 2001, Onojole and Bamgbala, 2004) and were attributed to high level of education among the studied population of undergraduate students. In the contrary, the study population consisted of primary and secondary school children; therefore the response rate cannot be attributed to the level of education but suggest that health education and information dissemination through social media and political campaigns are likely to be influencing this trend. This study found that television is the major source of

awareness and knowledge on drug and substance abuse (73.0%) followed by printed media (49.8%). Similar observations were reported in Nigeria (Oshikoya and Alli, 2006). The findings therefore suggest that there is information being communicated from where children learn about drugs and other substances. What needs to be determined is the focus of the content aired TV and printed media on raising awareness about the health effects, the consequences of drug and substance use instead of practices that might encourage viewers and readers to experiment drug/substance use.

Previous studies have reported that adolescents and young adults are vulnerable at experiencing and using drugs; marijuana being the most abused substance by undergraduate students in Nigeria (Oyakhilome, 1990, Hides et al., 2006). In this study, 17.4% of the adolescents have ever used drugs and substances prior to this study. This prevalence is comparable with previous reports in Botswana and could be underestimation of the prevalence. Drug and substance use is prohibited by law in Botswana (Drugs and Related Substances Act No. 18, 1992). Therefore, underestimation could result from children's reluctance to disclose, fear of parents, teachers and peers; and the social stigma associated with substances use. The average age at commencement of drug and substance use according to this study is 14 years supporting previous reports that adolescence is accompanied by profound environmental changes as they make a transition to middle and secondary school; environment that is characterised by multiple classes and teachers, less individualised instructions, lower level of teacher-student interactions, more stringent grading and comparative performance evaluations.

According to Nutbeam et al. (1993) student failure to pay attention to studies coupled with peer pressure influence them to turn to drugs as a way of suppressing their feeling of rejection. These psychosocial and environmental changes are sources of stress which increase the vulnerability for high risk behaviour, drug and substance abuse as a coping mechanism (Masten et al., 2008). The fact that adolescents resort to drugs and substances to alleviate stress suggest that there is inadequate knowledge and awareness about the consequences of substance use and weakness in the support systems for addressing the challenges adolescents face. Adolescents should be made aware that the solution to stress and other social challenges cannot be found in substance use but from being able to deal with the challenges by taking advantage of existing support systems in the community. Specific information on parental support, parental pressure, pressure from drug addicts and parental-conflict and teachers is needed to fully understand the complex nature of the predisposing factors driving adolescents to use drugs and substances.

Cannabis grows wild in most parts of Africa but is also cultivated and it is the most widely abused illicit drug in

the region. It is predominantly abused by teenagers and young adults who begin using it at adolescence (Oshikoya and Ali, 2006, Gupta et al., 2013, Tesfaye et al., 2014, Baruch et al., 2015). The common drugs and substances of abuse mentioned by both primary and secondary school children in this study [*cocaine, marijuana, glue, alcohol and mandrax*] are similar to those reported previously in Botswana (Botswana Alcohol AIDS Surveillance, 2004; Diamond Narcotic Squad Report, 2012). The finding that Nyaope (mixture of dagga and ARVs), is a new development in Botswana. Access to ARVs in an HIV pandemic country should be restricted for the intended purpose in order to minimise the side effects of ARVs on the individual and prevent occurrence of resistance of HIV to ARVs. This is a challenge that should be studied extensively to determine the sources of access, extent of use and abuse of "Nyaope" and health consequences if any to the users and the community.

This study has raised two major concerns: Firstly, the sources from where children access drugs and substances are not far from the school surroundings. The numerous vendors, barber shops and car wash places around the schools provide school children easy access to drugs and substances. It is a concern which calls for the school's management and local government authorities to institute stringent vetting procedures to applicants wishing to operate petty business in and around schools. Regular monitoring and evaluation of the vendors is also necessary to ensure compliance to the businesses vendors had been licensed to.

Secondly, 59.9% of the respondents said schools do not have programmes for preventing drug and substance abuse and the school children identified several motivating and demotivating factors for substance use and abuse which need further exploration. Since children spend a good part of their early lives at school, schools should be places where adolescents are prepared for being productive members of the civil society. In this regard, schools should be in the forefront in the campaign to reverse substance use and abuse trends by reviewing curricula and mainstreaming the subject in the curricula, providing education on the harm and stressing the dangers of drugs and substances and enhancing learning experience by adopting interactive teaching and learning approaches. Schools should build on the cited demotivating factors and engage children more in productive activities and introduce measures for early detection of symptoms before symptoms of dependence emerge. Such measures and changing the school environment have shown to reduce drug and substance use among adolescents (Bond et al., 2007).

It is concluded that drug and substance abuse among school-going children is a public health concern needing urgent attention. Most schools have not developed strategies to reduce substance access and use by school-going adolescents in Ramotswa. While children know and are aware of what drugs and substances of

abuse are, the trend of drug abuse among adolescents has not declined. Accessibility and use of “Nyaope” is a new revelation which calls for more comprehensive studies in the country.

It is recommended that consultations involving major stakeholders including parents, the community, government departments and ministries should be carried out with the aim to understand motivating and demotivating factors for drug use and develop strategies for making schools free from drugs and substance. The school managements should review and introduce regulations and conditions that will deter vendors from selling and distributing drugs and substances around school compounds. In addition schools should review their curricula to mainstream drug and substance abuse as a topic(s) focusing on the effects and consequences of substance. Intensive mass media campaigns, strengthening youth sports and clubs that will engage school children more on productive activities that are likely to have a positive impact in the future should be introduced. Families and the schools should develop workable strategies of building capacity to strengthen coping mechanisms to stress among school children. Extending this study to other districts in Botswana will enhance mapping and providing evidence-based data needed for developing comprehensive and strategic interventions for reducing drug and substance use among school-going children.

Limitations

The study is limited to a few school children in Ramotswa, therefore generalizability of the findings cannot be made to other districts in the country. However, the use of mixed methods has provided an in-depth analysis of extent of drug/substance use/abuse among the studied population. Therefore, the results form a baseline data from which more comprehensive studies can be developed.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Community based cross-sectional study on knowledge, attitudes and practices towards rabies in Munesa District, Arsi Zone, Southeastern Ethiopia

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Rabies, one of the oldest and deadliest diseases known to human, is incurable and neglected viral zoonosis which has been threatening the human life for many years despite being entirely preventable. Community awareness play significant role in preventing this fatal disease. Therefore, this cross sectional study was conducted from November to December 2016 with the objective to assess the community knowledge, attitudes, and practices (KAP) regarding rabies in Munesa district, Arsi zone, south eastern Ethiopia. A multistage sampling technique was employed for selection of sample unit and data were collected from 150 household by face-to-face interview using a semi structured pretested questionnaire. Logistic regression was used for assessing the association of independent variable with KAP score. Out of 150 participants interviewed 59.3% of them were males and 40.7% were females. The respondents from urban, peri-urban and rural residence comprise about 32.7%, 30% and 37.3% of total participants, respectively. Almost all (99.3%) participants had heard about rabies and 88.7% of them knew its zoonotic significance which is a good Knowledge. However, knowledge gap was observed regarding the cause, transmission, incubation period and prevention methods. The overall KAP result revealed that 57.3% and 42.3% of participants had a good and poor KAP score, respectively. Multivariable logistic regression analysis indicated that good KAP score was significantly higher in male than female (OR= 3.14, CI=1.01 - 9.79, P = 0.048), in those who experienced dog bite than those who were not bitten by dog (OR=7.37, CI=1.83-29.61, P=0.005), in dog owners than non-dog owners (OR=7.53, CI=2.01-28.19, p=0.003) and in trained participants than untrained (OR= 18.62, CI=1.56-222.47, p= 0.021). Furthermore, education level (p=0.021) and residence (p=0.031) participants were also significantly associated with a higher good KAP score. This study showed that community in munesa district has good general information about rabies. However, there is a need for further awareness creation which requires the collaborative effort of government authority, medical and veterinary professionals.

Key words: Attitudes, community knowledge, Ethiopia, rabies, zoonotic disease.

INTRODUCTION

Rabies is a fatal zoonotic central nervous system disease that is transmitted by both wild and domestic animals.

This disease affects all warm- blooded mammals including human and has been threatening the lives of

mankind for more than 4,000 years (Schnell et al., 2010; Liu et al., 2011). Globally, it is estimated that at least 55,000 people die of rabies each year (Zhao et al., 2008; Matsumoto et al., 2010). The causative agent for rabies is rabies virus which belongs to the order Mononegavirales, family Rhabdoviridae, and genus *Lyssavirus*. This virus has a negative single-stranded RNA genome and the virions are bullet-shaped (Schnell et al., 2010). The disease is characterized by the development of severe nervous symptoms that lead to paralysis and death (Abera, 2015). Once symptoms of the disease develop, it is invariably fatal and deadly viral disease that can only be prevented but not cured (Blackmore, 2014). Dogs remain the primary reservoir in developing countries, whereas wildlife species serve as hosts in developed nations (Rupprecht et al., 2007). According to the WHO, dog rabies potentially threatens over three billion people in Africa and Asia. People most at risk live in rural areas, where vaccines and immunoglobulin are not readily available (WHO, 2013).

The World Health Organization considers rabies to be a neglected disease and declare it to be primarily a problem in areas troubled with poverty and with a lack of economic resources (WHO, 2013). With over several deaths per year (Nilsson, 2014) and signs of it re-emerging (Depani et al., 2012). In Ethiopia rabies has been known for centuries in society as "Mad Dog Disease" (Fekadu, 1997) and has been recorded scientifically since 1903 (Pankhrust, 1990). To date, rabies is an important disease in Ethiopia both in human and animals (Tschopp et al., 2016; Deressa et al., 2010; Yimer et al., 2012; Teklu et al., 2017). In Four-Year Retrospective Study by Teklu et al. (2017) in Northwestern Tigray the incidence of human rabies exposure cases calculated per 100,000 populations was 35.8, 63.0, 89.8 and 73.1 in 2012, 2013, 2014 and 2015, respectively.

The proximity of the site of the virus entry to the CNS increases the likelihood of a short incubation period (Yin et al., 2012). Following the bite of rabid animal the incubation period varies from 5 days to several years (usually 2 to 3 months; rarely more than 1 year) depending on the amount of virus in the inoculum, the density of motor endplates at the wound site and the proximity of virus entry to the central nervous system (WHO, 2013). In animal the initial clinical signs are often nonspecific and may include fearfulness, restlessness, anorexia or an increased appetite, vomiting, diarrhea, a slight fever, dilation of the pupils, hyperreactivity to stimuli and excessive salivation. The first sign of post-vaccinal rabies is usually lameness in the vaccinated leg. Animals often have behavioral and temperament changes, and may become either unusually aggressive or uncharacteristically affectionate (OIE, 2012). Rabies is

fatal and incurable disease once the clinical signs appear (Deressa et al., 2010). However, it can be prevented before the latent symptoms can develop by giving an injection of rabies immune globulin and another injection of rabies vaccine as soon as possible after the bite or exposure to saliva from an infected animal (Yousaf et al., 2012). Essential components of rabies prevention and control include community awareness, responsible pet ownership, routine veterinary care and vaccination, and professional continuing education (Chernet and Nejash, 2016). The community knowledge, attitudes and practices are important both for prevention of human deaths due to rabies and for control of the disease in animals (Dhand et al., 2012). To realize this knowledge, attitudes and practices (KAP) studies have been widely used (Sambo et al., 2014; Serebe et al., 2014; Tiembre et al., 2014; Kabeta et al., 2015; Digafe et al., 2015; Yalamebrat et al., 2016). Even though rabies is endemic disease in Ethiopia, little is known about awareness level of the community and no information were available particular in munesa district despite, the significance of such study in evaluation of community awareness and thereby helping in planning and implementation of rabies control programs.

Therefore, the objective of this study was to assess the community knowledge, attitudes, and practices regarding rabies in Munesa district, Arsi zone, south eastern Ethiopia.

MATERIALS AND METHODS

Study area

The study was conducted from November 2016 to December 2016 to assess the level of knowledge, attitudes and practices towards rabies in Munesa district, Southeastern Ethiopia. Munesa is one of the districts in the Arsi Zone located in the Great Rift Valley. The administrative center of the woreda is Kersa town which is found at distance of 232 km away from Addis Ababa, the capital city of Ethiopia and 57 km from the capital of Arsi Zone, Asella. Munesa district is bordered on the south and west by the Mirab Arsi Zone and Lake Langano, on the northwest by Ziway Dugda, on the north by Tiyo, on the northeast by Digeluna Tijo and on the east by Bekoji.

The altitude of Munesa woreda ranges from 1500 over 4100 m above sea level. The annual average rainfall is 800 to 1200 mm and mostly with clay type of soil and rare case black soil. Vegetation of the area changes with altitude and rainfall ranging from scattered trees and bushes to dense shrubs and bushes. According to CSA (2016) the total population of Munesa is 211,762, of whom 104,628 are males and 107,134 are females. Livestock are the major agricultural resources in the area and has livestock population of 230,300 cattle, 103,000 sheep, 9,390 goat, 27,732 horses, 18,806, donkeys 83,806 poultry, 937 mules, 22,764 canines and 12,460 feline (LHDOMW, 2012).

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Study design and study population

Community based cross-sectional questionnaire survey was conducted to assess the knowledge, attitude and practice about rabies Munesa district. The questionnaire was semi-structured with both open and closed-ended questions and the details of individual participated in the interview were incorporated. Knowledge of the disease, treatment and prevention practices were also included in the questionnaire.

The study population comprises of community of Munesa district in five randomly selected kebele which includes the residents from urban, peri-urban and rural community. The household who live at least 6 months as the permanent resident in the Munesa were included based on their willingness and informed consent. However, the household who live less than 6 months and who are under 15 years were excluded from the study. The questionnaire was first prepared in English and translated to Afaan Oromo for appropriateness and easiness in approaching the study participants. Before the interview begun they were briefed about the purpose of the study and asked for their consent. Only voluntary participants were involved in the study and all the information obtained from the study participants were kept confidential.

For assessing the community knowledge, attitude and practices (KAP) about rabies each respondent were asked a questions regarding cause, sources, mode of transmissions, clinical signs, prevention practices and treatment measures. Furthermore, actions for rabid animal, rabies fatality, feeling if infected by rabies, preferred actions taken for bitten human, immediate action (first aid) for bitten human, time for anti-rabies vaccine in human after exposure, whether rabies is preventable by vaccination of dog and eliminating stray or confining dogs helps to prevent rabies or not were asked. Respondents who answered the questions correctly had got one mark and zero for incorrect or do not know responses. Then, the responses for which respondents give correct answer were counted and scored.

This score was then pooled together and the mean score was computed to determine the overall KAP of respondents. Respondents who scored greater than or equal to the mean value (Mean=10.55, SD=3.574) were grouped to good KAP and coded as 1 whereas, the respondent who scored less than the mean value were grouped to Poor KAP level and coded as 0.

Sample size determination and sampling techniques

The sample size was calculated using the formula given by Arsham (2005). $N = 0.25 / SE^2$ Where N = sample size, S = standard error, 5%. Accordingly, the required sample size was 100. However, to increase the precision and representativeness the sample size was increased to 150. For the selection of the sampling units a multi-stage sampling technique was employed. From the entire study population in the district six kebele (the smallest administrative unit) were selected by simple random sampling methods, namely Adare, Munessa, Gunguma, Khote, and Kersa 01 and Kersa 02. Then the household in the selected kebeles was further selected using a systematic random sampling technique. Finally, from all the eligible respondents in a household, only one was selected randomly for the interview.

However, in the absence of eligible respondent in a given household, a replacement was immediately made by an individual in the next household until required sample size was obtained. Data were collected by face-to-face interview using pre-tested questionnaire.

Before starting data collection the questionnaire was first pre tested on 10 randomly selected individual in district to check for completeness, clarity, reliability, and sociocultural acceptability then after edited as required. The individual used in validation of questionnaire was not included in the main study.

Data management and analysis

The data collected from questionnaire survey were cleaned and checked for its completeness and entered into Microsoft Excel 2010 spread sheet and analysed using the Statistical Package for Social Science (SPSS) Version 20. The descriptive statistics was used for calculating frequency and percentage both dependent and independent variable. Logistic regression used was for calculating the association between independent variables and dependent variable (KAP scores) of community regarding rabies. A 95% confidence interval of the OR and p-values were used to describe statistical significance associations. The association is judged as significant when p -value is less than 0.05.

RESULTS

Socio demographic character of the participants

In this study a total of 150 communities in munesa district were interviewed. Table 1 shows the Socio-demographic information of the study participants. Out of 150 participants, 89 (59.3%) of them were males and 61 (40.7% were females and 34.7, 38.7 and 26.7% of the participants are in age group of 15-30 years, 31-45 years and >45 years old, respectively). Regarding the residence of the respondents, urban, peri-urban and rural residence comprises about 49(32.7%), 45(30%) and 56(37.3%) of total participants, respectively. Concerning the religion of participant's majority was Orthodox 72 (48.0%) and followed by Muslim 53 (35.3%) and Protestant 25 (16.7%). Furthermore, the majority of study participants were married 96 (64.0%) and 69 (46.0%) had irregular average household income per month. Regarding the educational status of respondents, the number and percentage of illiterate, elementary, secondary, college level and university level were 49 (32.7%), 34 (22.7%), 13 (8.7%), 33 (22.0%) and 21 (14.0%), respectively. The frequency and percentages of participants with household size of 1-3, 4-6 and >6 were 58 (38.7%), 55 (36.7%) and 37 (24.7%). Moreover, 44.7% participants were dog owners and 18.7% had experienced dog bite one or more times in their life. Besides, from the whole community members 85.3% responded as they were not trained regarding this disease.

Knowledge of respondents in relation to cause, host range, clinical sign and transmission of rabies

In this study almost all (99.3%) participants had heard about rabies. However, 49 (32.7%) of respondent replied starvation and thirst as the causative agent of rabies. Moreover, more than half of the respondent (56.0%) mentioned as rabies can affect human and other domestic animals regarding source of rabies dog was responded by 54.7% of the participants. 133 (88.7%) knew the transmission of rabies from animal to human. However, only 32(21.3%) knew rabies transmission by

Table 1. Socio-demographic information of the study participants in Munesa district.

Variable		Frequency	Percentage
Gender	Male	89	59.3
	Female	61	40.7
Age in years	15-30 years	52	34.7
	31-45 years	58	38.7
	>45 years	40	26.7
Residence	Urban	49	32.7
	Per-urban	45	30
	Rural	56	37.3
Religion	Muslim	53	35.3
	Orthodox	72	48.0
	Protestant	25	16.7
Marital status	Married	96	64.0
	Unmarried	54	36.0
Education	Illiterate	49	32.7
	Elementary	34	22.7
	Secondary	13	8.7
	college level	33	22.0
	university level	21	14.0
Occupation	Employed	30	20.0
	un-employed	9	6.0
	Housewife	19	12.7
	Farmer	35	23.3
	unskilled worker	14	9.3
	private business	18	12.0
Average household income per month	Student	25	16.7
	No defined income	42	28.0
	irregular income	69	46.0
Household size	regular income	39	26.0
	1-3	58	38.7
	4-6	55	36.7
Dog ownership	>6	37	24.7
	Yes	67	44.7
Ever get training	No	83	55.3
	Yes	22	14.7
Ever bitten by dog	No	128	85.3
	Yes	28	18.7
	No	122	81.3

bite and saliva contact with open wound and 12.7% of them believe as any type of contact (irrespective of the skin condition) with saliva of rabid individual can transmit the virus to human.

Furthermore, rabid animal respiration was replied by 37 (24.7%) of the participants as a means of transmission. The most common sign and symptom mentioned by 8.7,

24.7 and 16.0% were stop eating and drinking, biting and change in behaviour and salivation and paralysis, respectively (Table 2). Regarding the incubation period of rabies, 37.3% of the participant knew as it is less than 40 days. Knowledge of respondents in relation to cause, host range, clinical sign and transmission of rabies are summarized in Table 2.

Table 2. Knowledge of respondents in relation to cause, host range, clinical sign and transmission of rabies in Munesa district, Southeaster Ethiopian.

Variable		Frequency	Percentage
Heard about rabies	Yes	149	99.3
	No	1	0.7
Cause of rabies	Virus	43	28.7
	Starvation and thirst	49	32.7
	Associated with sprit	25	16.7
	Do not know	33	22.0
Species affected by rabies	Dog only	25	16.7
	Dog and human	38	25.3
	Human and other domestic animals	84	56.0
	Do not know	3	2.0
Source of rabies	Dog	82	54.7
	Dog and cat	26	17.3
	Dog and wild canine	32	21.3
	Do not know	10	6.7
Transmit from animal to human	Yes	133	88.7
	No	17	11.3
Means of transmission	bite only	46	30.7
	Contact with Saliva only	19	12.7
	Bite and saliva contact with open wound	32	21.3
	Rabid animal respiration	37	24.7
	Do not know	16	10.7
Sign and symptom in animals	Stop eating and drinking	13	8.7
	Biting and change in behaviour	37	24.7
	Salivation and Paralysis	24	16.0
	All	42	28.0
Incubation period	I do not know	34	22.7
	Immediately	13	8.7
	<40 day	56	37.3
	<90 day	35	23.3
	Do not know	46	30.7

Community attitudes and practices regarding rabies

Out of total participants 70.0 and 18.0% of the participants had observed rabid animal(s) and humans(s), respectively. Furthermore, 81.3% respondents replied killing as the preferred method for rabid animal. Majority (82.0%) of the respondents considered rabies as fatal disease and 30.7% responded as they fear rabies. Regarding the preferred action taken for bitten human 68 (45.3%), 45 (30.0%) and 37 (24.7%) of participants responded post exposure vaccine, traditional treatment and Spiritual healer, respectively. Almost half (49.3%) participants wash the wound with water and soap as immediate action (first aid) for bitten human, whereas, 30.7 and 18.7% tying with cloth apply

herbal extract, respectively. Moreover, 32.7% of the participants knew that anti-rabies vaccine after exposure should be immediately and out of total respondents 68.0% knew as rabies is not easily treatable after onset of clinical signs. 51.3% participants knew as rabies is preventable by vaccination of dogs and majority (90.7%) responded as eliminating stray dogs or confining dog helps to prevent rabies. The community attitudes and practices regarding rabies are summarized in Table 3.

Factors associated with knowledge, attitudes and practices (KAP) towards rabies

In this study the overall knowledge, attitude and practice

Table 3. Community attitudes and practices regarding rabies.

Variable		Frequency	Percentage
Observed rabid animals	Yes	105	70.0
	No	45	30.0
Action for rabid animal	tying	13	8.7
	Killing	122	81.3
	Do nothing	15	10.0
Observed rabid human	Yes	27	18.0
	No	123	82.0
Is rabies fatal	Yes	123	82.0
	No	12	8.0
	don't know	15	10.0
Feeling if infected by rabies	Fear	46	30.7
	Shame	16	10.7
	Surprise	27	18.0
	Sadness and hopelessness	32	21.3
	Nothing	29	19.3
Preferred Action taken for bitten human	Post exposure vaccine	68	45.3
	Traditional treatment	45	30.0
	Spiritual healer	37	24.7
Immediate action (first aid) for bitten human	Wash with water and soap	74	49.3
	Tying with cloth	46	30.7
	Applying herbal extract	28	18.7
	Do nothing	2	1.3
Anti-rabies vaccine in human after exposure	Immediately	49	32.7
	Later	2	1.3
	any time	5	3.3
	Do not know	94	62.7
Easily treatable after onset of clinical signs	Yes	14	9.3
	No	102	68.0
	Do not know	34	22.7
Rabies is preventable by vaccination of dog	Yes	77	51.3
	No	9	6.0
	Do not know	64	42.7
Eliminating stray or confining dogs helps to prevent rabies	Yes	136	90.7
	No	14	9.3

(KAP) study revealed that 57.3% of participants had a good KAP, whereas 42.3% was found to have poor KAP score. Table 4 shows the multivariable logistic regression analysis output of factors associated with knowledge, attitudes and practices (KAP) regarding rabies. Accordingly the higher good KAP score was found to be significantly associated with gender in which higher good score was found in male (69.6%) than female (39.3). Males were about 3.14 times more likely to have higher good KAP score than males (OR=3.14, CI=1.01 -9.79,

$P=0.048$). The residence of respondents was also found to be significantly associated with higher good KAP score in which respondents from urban were 5.5 time more likely to have higher good score than urban residents. Moreover, the odds of higher good KAP score in elementary, secondary, college level and university level were 11.2, 32.8, 15.5 and 24.24 times more likely than illiterate (Table 4). The participant who experience dog bite were 7.37 time more likely to have higher good KAP score than those did not experienced dog bite (OR=7.37,

Table 4. Multivariable logistic regression analysis output of factors associated with knowledge, attitudes and practices (KAP) regarding rabies in Munesa district, southeaster Ethiopia.

Variable		Poor (%)	Good (%)	OR (95% CI)	P- value
Gender	Male	27(30.3)	62(69.6)	3.14(1.01 -9.79)	0.048
	Female	37(60.7)	24(39.3)		
Age (in years)	15-30	24 (46.1)	28(53.9)	Reference	0.412
	31-45	27(46.5)	31(54.4)	1.85(0.48- 7.02)	
	>45	13(32.5)	27(67.5)	3.09(0.57 - 16.59)	
Residence	Urban	10(20.4)	39(79.6)	5.5(1.43-21.13)	0.031
	Peri- urban	17(37.7)	28(62.3)	3.35(0.98-11.39)	
	Rural	37(66)	19(34)	Reference	
Religion	Muslim	23(43.4)	30(56.6)	1.3(0.29-6.0)	0.354
	Orthodox	30(41.6)	42(58.4)	0.581 (0.13-2.45)	
	Protestant	11(44)	14(56)	Reference	
Marital status	Married	42(43.7)	54(56.3)	1.5(0.34-6.94)	0.645
	Unmarried	22(40.7)	32(59.3)		
Education	Illiterate	33(67.3)	16(32.7)	Reference	0.021
	Elementary	13(39.4)	21(63.6)	11.2(2.16-58.27)	
	Secondary	3(23)	10(77)	32.8(2.95-364.35)	
	College level	8(24.2)	25(75.8)	15.5(1.72-139.80)	
	University level	7(33.3)	14(66.7)	24.24(1.78-329.48)	
Occupation	Employed	6(20)	24(80)	2.03 (0.1- 41.364)	0.493
	Un-employed	2(22.2)	7(78.8)	1.28 (0.09-17.59)	
	Housewife	11(57.9)	8(42.1)	4.07(0.33-49.44)	
	Farmer	20(57.1)	15(42.9)	0.51(0.054-4.89)	
	Unskilled worker	5(35.7)	9(64.3)	2.46 (0.217-27.97)	
	Private business	10(55.6)	8(44.4)	0.50(0.052-4.84)	
Average household income per month	Student	10(40)	15(60)	Reference	0.234
	No defined income	21(50)	21(50)	Reference	
	Irregular income	31(44.9)	38(55.1)	1.79(0.37-8.70)	
Household size	Regular income	12(30.7)	27(69.3)	0.29(0.02-3.87)	0.250
	1-3	27(36.2)	31(63.8)	1.06(0.24-4.64)	
	4-6	18(32.7)	37(67.3)	2.64 (0.69-10.08)	
Dog ownership	>6	19(51.3)	18(48.7)	Reference	0.003
	Yes	23(34.3)	44(65.7)	7.53(2.01-28.19)	
Ever bitten by dog	No	41(49.4)	42(50.6)	7.53(2.01-28.19)	0.005
	Yes	6(21.4)	22(88.6)	7.37(1.83-29.61)	
Ever get training	No	58(47.5)	64(52.4)	7.37(1.83-29.61)	0.021
	Yes	1(4.5)	21(95.5)	18.62(1.56-222.47)	
	No	63(49.2)	65(50.8)		

CI=1.83-29.61, $P=0.005$). Moreover, dog owners and participants who were trained about rabies were 7.53 and 18.62 time more likely to have higher good KAP score than none dog owners and untrained participants, respectively (Table 4). Furthermore, insignificantly (0.645) higher good KAP score was recorded in married

(56.3%) participants than unmarried (59.3%). Insignificantly higher good KAP score was also found in age group between 31 and 4 (53.9%) and above 45 years (67.5%) than respondents in age group of 15-30 years (54.4%). Those who were above 45 years are 3.09 times more likely to have higher good KAP score than 15-

30 years participants. The odds of higher good KAP score in employed, un-employed, housewife, farmer, unskilled worker, and those having private business than students were 2.03, 1.28, 4.07, 0.51 2.46 and 0.50, respectively. However, this variation is not statically significant ($p=0.493$). The association household size with KAP score was also not significant ($p=0.250$) despite higher good KAP score in household size of 1-3 (63.8%) and 4-6 (67.3%) than above 6 (48.7%). The odds of higher good KAP score in household size of 1-3 and 4-6 than above 6 were 1.06 and 2.64, respectively. Regarding the association of average household income per month with KAP score multivariable logistic regression analysis output showed statically insignificant association ($p = 0.250$) (Table 4).

DISCUSSION

The result of current study revealed that rabies is an important disease of both human and animals in the study area. All most all (99.3%) had heard about rabies. In line with this finding several scholars from different area of Ethiopia (Digafe et al., 2015; Yalembrat et al., 2016) and other country (Singh and Choudhary, 2005) reported a similar findings. Regarding the causative agent of rabies 32.7% of respondent were found to have misperception which was starvation and thirst. Similar misperception were reported by several scholars from different area of Ethiopia (Guadu et al., 2014; Gebeyaw and Teshome, 2016; Yalembrat et al., 2016). The current finding is lower when compared with the result of study in and around Dessie town, Ethiopia which was 49.6% (Gebeyaw and Teshome, 2016) and the result of study in Debark District, North Gondar, Ethiopia 63.5% (Yalembrat et al., 2016). However, this finding is higher when compared with the study conducted Bahir Dar town which was 24.1% (Guadu et al., 2014). This variation might be associated with difference in awareness of the community between different study areas.

In the current study 88.7% of participants knew the transmission of rabies from animal to human. This finding was in agreement with the result of Yalembrat et al. (2016). However, Guadu et al. (2014) reported a lower result (21.4%) from Bahir Dar town and higher result (71.9%) was also reported in the city of New York, USA (Eidson et al., 2004). The possible reason for this could be due to the availability of different host range, level of awareness and educational status of community. Despite good knowledge of rabies transmission from animal to human, only 21.3% knew rabies transmission by bite and saliva contact with open wound and 12.7% of them believe as any type of contact (irrespective of the skin condition) with saliva of rabid individual can transmit the virus to human. Another important misperception regarding rabies transmission was rabid animal respiration as 24.7% of the participant responded rabid

animal respiration as a transmission means of rabies from animal to human. Thus, the community deserve awareness in these regard as these are serious knowledge deficiency which interfere with rabies prevention and control program.

This study revealed that 37.3% of the participant knew incubation period of rabies as it is less than 40 days. This misperception is also in agreement with the report of several scholars from different area of Ethiopia (Digafe et al., 2015; Kabeta et al., 2015; Yalembrat et al., 2016). This misunderstanding about the incubation period indicates that those who believe this incubation period do not seek post exposure prophylaxis once the perceived incubation period passed. This is serious for rabies infected individuals where mortality is 100% after development of clinical signs. The incubation period varies from 5 days to several years (usually 2 to 3 months; rarely more than 1 year) depending on the amount of virus in the inoculum, the density of motor endplates at the wound site and the proximity of virus entry to the central nervous system (WHO, 2013).

Majority (82.0%) of the respondents considered rabies as fatal disease and 30.7% responded as they fear rabies. Similarly a higher response rate regarding fatality was reported from different area of Ethiopia and other country. 94.5% reported in the study conducted in Bahir Dar town (Guadu et al. (2014). 94.1% was also reported in study conducted in New York, USA (Eidson et al., 2004). Furthermore, 99.0% was reported in Debark district (Yalembrat et al., 2016). However, lower (30.97%) was also from Addis Ababa (Ali et al., 2013). This could be associated with sample size difference and awareness level of the community.

Among immediate action taken for bitten human, almost half (49.3%) participants wash the wound with water and soap as immediate action (first aid), whereas, 30.7 and 18.7% tying with cloth apply herbal extract, respectively. The 49.3% finding in this study is higher compared to the study conducted in Gondar zuria district (30.7%) (Digafe et al., 2015) and in a rural Community of Gujarat, India (31.1%) (Singhand Choudhary, 2005). The variation may be due to the study area and awareness level of the community. This treatment is cheap, readily available and feasible for all to apply. Washing of rabies-infected wounds with soap and water can increase survival by 50% (Radostits et al., 2007).

Regarding the preferred action taken for bitten human 45.3, 30.0 and 24.7% of participants responded post exposure vaccine, traditional treatment and Spiritual healer, respectively. Low level (45.3% of preference for post exposure vaccine was recorded in this study. Similar finding was also recorded in Debark district which was 42.1% preference (Yalembrat et al., 2016). The preference for traditional treatment recorded in this study was low when compared to study conducted in Gondar zuria district, Ethiopia, which reported 62.2% preference for traditional medicine (Digafe et al., 2015) and study in

Debank district which reported 54.8 preference for traditional medicine (Yalemebrat et al., 2016). Furthermore, a higher (84%) reliance of respondents on traditional treatment was also reported from Dabat and Gondar (Jemberu et al., 2013). The preference for traditional practices might be arise from many factors including easy access to traditional medicine, lack of awareness, long duration of treatment. Reliance on traditional medicines with unproven efficacy is very risky and nothing can be done to save one's life after the first symptoms of the disease occur. In our study 32.7% of the participants knew that anti-rabies vaccine after exposure should be immediate. Similarly the study in Bahar Dar town reported 55.7% response for immediate post exposure vaccination (Guadu et al., 2014). The World Health Organization (WHO) also recommends wound washing and vaccination immediately after contact with a suspected rabid animal which can prevent almost 100% of rabies deaths (WHO, 2013).

In the current study the overall knowledge, attitude and practice (KAP) study revealed that 57.3% of participants had a good KAP, whereas 42.3% was found to have poor KAP score. This finding is lower when compared with Study by Guadu et al. (2014) who reported about 64.1% among the community of Bahir Dar town and Yalemebrat et al. (2016) who reported 60.3% in Debank District, North Gondar.

This difference could be due to his difference in sample size and level of awareness of community. Multivariable logistic regression analysis revealed higher good KAP score to be significantly associated with gender in which higher good score was found in male (69.6%) than female (39.3). Males were about 3.14 times more likely to have higher good KAP score than males. The same proportion of statistical difference on KAP score of male (53.4%) and female (10.75%) was reported in Bahirdar town by Guadu et al. (2014), in Addis Ababa (Male, moderate (77.09%) and good (10.55%), female, moderate (73.62%), good (5.08%) (Ali et al., 2013), in Debank District in males (64.6%) in females (54.5%) (Yalemebrat et al., 2016). This difference might be due to increased activity of males in their daily life compared with females and better chance of acquiring correct information about rabies.

The residence of respondents was also found to be significantly associated with higher good KAP score in which respondents from urban were 5.5 time more likely to have higher good score than urban residents. This could be explained by the fact that urban respondents have better information access than rural. Moreover, the odds of higher good KAP score in elementary, secondary, college level and university level were 11.2, 32.8, 15.5 and 24.24 times more likely than illiterate. This finding was also supported by a study conducted in Bahir Dar (Guadu et al., 2014), in Addis Ababa (Ali et al., 2013) and the studies conducted in Flagstaff, Arizona, USA (Andrea and Jesse, 2012). This could be due to the

fact that educated person have better information access and can easily understand the disease.

The other factor significantly ($P=0.005$) associated with KAP score was dog bite experience The participant who experienced dog bite were 7.37 time more likely to have higher good KAP score than those did not experienced dog bite. The possible explanation for this could be that individual who experienced dog bite would seek for information regarding the consequences of dog to save him/or self. Moreover, dog owners and participants who were trained about rabies were 7.53 and 18.62 time more likely to have higher good KAP score than none dog owners and untrained participants, respectively. The statistical significant difference ($p= 0.003$) in KAP score between dog owners and non-dog owners could be attributed to the fact that dog owners has a better chance to know more about dog and dog disease. Furthermore, the statistical significant difference between trained and untrained could be attributed to significance of training in raising the community awareness. This finding was also supported by many scholars who mentioned awareness level as important tool to control rabies (Eshetu et al., 2002; Wudu et al., 2013).

Conclusion

This study revealed that rabies is a well-known and significant disease of both human and animals in the study area. Almost all (99.3%) participants had heard about rabies and 88.7% of them knew its zoonotic significance. 18.0 and 70.0% of the participants had encountered rabid human(s) and animal(s), respectively at least once in their life. Thus, rabies should be prioritized and targeted as a more serious public health burden and animals too. Even though the majority (57.3%) of the participants in this study have good KAP score about rabies there were some knowledge gap observed regarding the cause, transmission incubation period and prevention methods of rabies. This reflects the urgent need for rabies awareness programmes within the community. Increasing community knowledge is particular needed regarding wound washing after animal bite as first aid and seeking post-exposure prophylaxis other than traditional and spiritual healer. This study also demonstrates the need for awareness creation to the community regarding dog vaccination and implementation of dog vaccination with proper management. Above all to realize the available of preventative options, the close collaboration of public health and veterinary sector has a paramount role. Thus there should be strong linkage between all stake holders including local authority.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Socio-demographic profile of individuals who received care from a Brazilian out-patient oncology clinic between 2010 and 2011

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Cancer encompasses more than 100 diseases that increase in frequency in older populations. Causal agents include hereditary factors, as well as the exposure to environmental elements. Socio-demographic profile, as a determinant of exposure to different environmental factors, also affects cancer incidence. In Brazil, between 2010 and 2011, 489.270 new cases of cancer were recorded. In face of these facts, the present survey aimed at characterizing the demographic profile as well as the professional activities of patients with a cancer diagnostic who received care from an out-patient clinic in the city of Guarapuava, state of Parana, Brazil. To this end, 460 medical charts were analyzed from the years 2010 and 2011. The most common types of cancer observed were non-melanoma skin cancer (156 cases, 34%), breast (18.3%), prostate (17.5%), colon and rectum (12.7%), cervical (8%), lungs (5%) and stomach (2.3%). In general, the more relevant risk factors were: being white and female, having more than 60 years of age and exposure to pesticides, sun and tobacco. The average age of cancer patients was above 60, highlighting the continued need for early prevention and diagnostic programs in a country with ageing population.

Key words: Neoplasia, risk factor, demographic survey, epidemiology.

INTRODUCTION

Cancer encompasses more than 100 diseases that share, as a common characteristic, the uncontrolled growth of cells, which rapidly divide invading tissues and organs (Brasil, 2009).

Scientific and technological advances in the fields of cellular and molecular biology, genetics and neuroscience improved our understanding and allowed for the

refinement of theories about the origins of cancer (Figueiredo et al., 2009). Prevailing theories suggest that cancer develops in multiple steps involving hereditary factors and environmentally-derived damage to DNA, which ultimately affect cellular control mechanisms leading to the development of tumors (Teixeira, 2007; Duesberg, 2007).

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Among potential causes of cancer, some have a more direct link to the disease, including environmental risk factors such as ionizing radiation, UV light, alcohol, and tobacco. Hormonal and endogenous factors also increase the risk of cancer, including obesity and the process of aging, as well as exposure to viruses such as human papilloma virus (HPV), Epstein-Barr virus (EBV), hepatitis B virus (HBV) and the retrovirus (HTLV1) (Brasil, 2009; Otto, 2002). Some forms of the disease have well-established links to predisposing factors. For example, lung cancer has long been associated with the use of tobacco, stomach cancer with poor eating habits and *Helicobacter pylori*, and skin cancer with UV exposure, as well as skin, hair and eye color (Guerra et al., 2005; Campos et al., 2011).

From 2010 to 2011, 489.270 new cases of cancer were reported in Brazil. Among these, 236.240 affected males and 253.030 affected females. Non-melanoma skin cancer represented 114 thousand of these new cases, and has been considered the type of cancer with the highest incidence among Brazilians (Brasil, 2009), followed by prostate cancer (52 thousand), breast (49 thousand), colon and rectum (28 thousand), lungs (28 thousand), stomach (21 thousand) and cervical cancer (18 thousand) (Brasil, 2011).

As the number of patients rise in Brazil, it has become clear that socio-economic status increases the risk of developing certain types of cancer. For example, poor individuals are at greater risk of developing stomach and cervical cancers (Guerra et al., 2005). Thus, a greater knowledge of socio-demographic profiles and associated risk factors might provide the subsidies for better nursing interventions at the community level aimed at protecting and reestablishing the health of individuals.

In face of these facts, the present study aims at characterizing the profile of patients diagnosed with cancer in the city of Guarapuava, PR. This study also sought to identify the risk factors to which these patients were exposed.

METHODOLOGY

A descriptive, exploratory and archive-based study was conducted with a quantitative approach (Silva, 2002). The research took place in the outpatient oncology clinic of the Hospital São Vicente de Paulo, in the municipality of Guarapuava-PR. The clinic is considered a High-complexity Assistance Unit (UNACON, from the original Portuguese). Thus, it fulfills the technical, physical and human-resource requirements to diagnose and treat the most prevalent cancer types.

Patients had daily consultations with an oncologist who, after diagnosing and staging the disease, defined specific treatments, e.g., surgical or hormonal intervention, immunotherapy, or chemotherapy. Cases that required radiotherapy were referred to other units. A majority of the consultations benefitted SUS users (the Brazilian public health system), including an average of 900 cancer diagnostics per year. The outpatient clinic has a multidisciplinary team which composed of medical doctors, nurses, technicians, nursing assistants, psychologists, social assistants, nutritionists and service administrators.

The charts of 460 patients registered at the clinic for cancer treatment were analyzed recording the following information: cancer type, patient race, age, education, work, environmental risks (that is, tobacco, alcohol, exposure to pesticides and UV light, as well as other factors found in the charts). The charts of patients with the most common types of cancer were included in the study according to the National Institute of Cancer (INCA) 2010, including non-melanoma skin cancer, prostate, breast, colon and rectum, lung, stomach and cervical cancers. All patients included in the study started treatment between January 1, 2010 and December 31, 2011.

The collected data sets were individually tabulated in Excel using statistical distribution of events, depending on the study variables. Data were presented in tables for discussion and analyses.

The chi-square test and Fisher exact test were used for statistical correlation. Significance was accepted when P value was <0.05. All analyses were performed using SPSS Statistics 19 for Windows (SPSS Inc.).

This project was approved by the Oncology Center of Hospital São Vicente and by the Research Ethics Committee of the Centro-Oeste State University (Process no. 559/2011). Because archive material was used, informed consent forms were not used.

RESULTS

Table 1 shows that non-melanoma skin cancer was the most common type of cancer affecting 32.0% of females (n= 87) and 36.0% of males (n= 69) included in the survey. Among women, breast cancer represented the greatest portion of cases (31.2%; n= 85), whereas, among men, prostate cancer was more relevant (35.1%; n=66). Most of the individuals affected by cancer were white, including 97.0% of the women (n=264) and 96.8% of the men (n= 182). Most cases affected people at an age of 60 or more, including 72.3% of males (n=136) and 40.4% of females (n=110). The largest percentage of patients only had primary school education (22.8% of females and 27.1% of males). Information on work activity was often missing, but when available, it showed a prevalence of farm workers and retirees among men (11.7 and 23.4%, respectively), and of housewives among women (23.5%). Table 2 lists the environmental factors and combination of factors to which cancer patients had been previously exposed. Among cancer patients who were exposed to at least one of the risks surveyed, 30.35% were smokers (n=61) and 16.42% were exposed to the sun (n=33). A separate subtotal shown in Table 2 includes individuals who had no exposure to the risks surveyed 47.5% (n=123) and whose information was lacking 52.5% (n=136).

Table 3 exposes the risk factor, according to the prevalence of each cancer type, as well the patient race. As can be seen, the greater cervix, colon, breast, lungs and rectum cancer rate was found in Caucasian patients that had smoking relation; as for the stomach cancer, it has an increase when alcohol consumption was added to the smoking habits of the Caucasian patients. With regards to skin cancer, a huge prevalence to smoking and sun and pesticides exposure it was also observed in Caucasian people.

Table 1. Distribution of cancer cases according to sex, race, age, education and work activity (Guarapuava, PR, Brazil, 2012).

Parameter	Women		Men	
	N	%	N	%
	272	59	188	41
Cancer type				
Skin	87	32	69	36.74
Breast	85	31.2	00	0.0
Prostate	00	0.0	66	35.1
Colon	16	5.8	13	6.99
Rectum	14	5.14	14	7.45
Cervix	44	16.17	00	0.0
Stomach	10	3.67	17	0.9
Lung	16	5.88	8	4.25
Race				
White	264	97	182	96.8
Black	02	0.80	02	1.2
Mixed	01	0.20	00	0.0
No information	05	0.2	04	0.2
Age range				
20-29	02	0.8	02	1.1
30-39	23	8.4	04	2.1
40-49	59	21.7	17	09.0
50-59	78	28.7	29	15.5
60 or more	110	40.4	136	72.3
Education				
Illiterate	05	1.85	02	1.07
Primary school	62	22.8	51	27.12
High-school	15	5.5	05	2.06
Undergraduate	05	1.85	01	0.54
No information	185	68	129	68.61
Work activity				
Farm worker	16	5.9	22	11.72
Retired	18	6.6	44	23.40
Housewife	64	23.52	00	0.0
No information	157	57.72	108	52.44
Others	17	6.25	14	7.44

DISCUSSION

A high prevalence of skin cancer was observed among patients of both sexes. Exposure to sunlight represents one of the main risk factors concerning this cancer. Thus,

in Brazil where a large white population is exposed to tropical weather, approximately 50% of the population is at risk of developing such condition (Popim et al., 2008). For example, in the state of São Paulo and in the Southern region of the country, the most important risk

Table 2. Proportion of cancer patients exposed to different environmental risk factors (Guarapuava, PR, Brazil, 2012).

Risk factors	N	%
Smoking	61	30.35
Sunlight	33	16.42
Smoking/Alcohol	32	15.92
Smoking/Sunlight	14	6.97
Sunlight exposure/Pesticides	14	6.97
Alcohol	12	5.97
Smoking/Pesticides/Sunlight	09	4.47
Alcohol/Sunlight	08	3.98
Pesticide/Sunlight/Smoking/Alcohol	07	3.48
Smoking/Alcohol/Sunlight	06	2.98
Alcohol/Sunlight/Pesticide	02	0.99
Pesticide	01	0.50
Alcohol/Pesticide	01	0.50
Others	01	0.50
No information	136	52.5
No exposure	123	47.5

factors include sunlight exposure and white skin color (Ferreira et al., 2011).

In the current research, the second most prevalent type of cancer, among women, was breast cancer, a finding that agrees with data from the INCA indicating this form of the disease as the most prevalent for this group, with 52,680 new cases in 2012 (Brasil, 2011). Cervical cancer appeared as the third most frequent type among women in our work. This cancer has well defined risk factors including HPV infection, elevated number of sexual partners and smoking (Guerra et al., 2005; Bittencourt et al., 2004).

Prostate cancer was the second most frequent form of the disease among men. In Brazil, this type of cancer has greater incidence in the Midwest Region followed by the Southern Region. Risk factors have not been conclusively established although studies point to age, hereditary factors and dark skin as potential players in the development of the disease (Medeiros et al., 2011). Colon and rectum cancers appeared as the third most frequent cancers. According to INCA, genetic predisposition to chronic intestinal disease, high-fat diets, low ingestion of fruits and vegetables, use of alcohol and tobacco, all contribute to the development of colon and rectum cancers (Brasil, 2009).

Stomach cancer represented a relatively small fraction of the total number of cases. Other studies point to a higher frequency of this cancer in the Southern Region of Brazil (Brasil, 2011), representing the second highest cause of mortality among cancer patients (Brasil, 2009). A diet that is rich in fruits and vegetables prevents against

stomach cancer, further lending support to the idea that antioxidants such as vitamins C, E and beta-carotene may effectively hamper the development of tumors (Brasil, 2011). Untreated *H. pylori* infections represent the strongest risk factor for stomach cancer accounting for 63% of the cases (Barros et al., 2011).

In Brazil, 2012, according to INCA, 257.870 new cases of cancer occurred among men and 260.640 among women, suggesting, as in our research, that cancer may affect or may be detected more frequently in female individuals (Barros et al., 2011). In general, women have greater awareness of symptoms and physical signs of disease, as well as a greater knowledge of health issues because of their frequent role as family caregivers (Gomes et al., 2003). In addition, men usually have more difficulty in assimilating and adopting preventive and diagnostic measures (Hora et al., 2003).

As the Brazilian population, increasingly ages, chronic diseases come to represent an ever-increasing demand on the health services. Longer life expectancy directly increases the incidence of chronic diseases, especially cancer (Barros et al., 2011; Basilio et al., 2004). This pattern is in line with our survey, where most patients were over 60 years of age, in spite of the fact that this age group accounts for only 4.32% of the overall population (IBGE, 2010).

Another important factor highlighted by this investigation was the low education level of most patients, which further suggests the need for support material and orientation that can be easily understood by these individuals (Magalhães et al., 2008). Previous work

Table 3. Relation between the cancer types characteristics and risks factors exposure of the studied population.

Risk	Greater cervix		Colon		Stomach		Mamma		Skin		Prostate		Lung		Rectum		P value
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Pesticides	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	
Pesticides/Sun	0	0.0	2	.4	0	0.0	0	0.0	10	2.2	0	0.0	1	0.2	1	0.2	
Pesticides/Sun/Smoking/Alcohol	0	0.0	0	0.0	2	0.4	0	0.0	2	0.4	1	0.2	2	0.4	0	0.0	
Alcohol	1	0.2	1	0.2	3	0.7	2	0.4	1	0.2	2	0.4	0	0.0	2	0.4	
Alcohol/Pesticides	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	
Alcohol/Sun	0	0.0	1	0.2	0	0.0	1	0.2	3	0.7	3	0.7	0	0.0	0	0.0	
Alcohol/Sun/Pesticides	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.4	0	0.0	0	0.0	
Smoking	6	1.3	3	0.7	6	1.3	10	2.2	12	2.6	6	1.3	13	2.8	5	1.1	
Smoking/Pesticides/Sun	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	1	0.2	0	0.0	0	0.0	
Smoking/Alcohol	3	0.7	1	0.2	7	1.5	7	1.5	1	0.2	7	1.5	2	0.4	4	0.9	<0.001
Smoking/Alcohol/Sun	0	0.0	0	0.0	2	0.4	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	
Smoking/Sun	0	0.0	1	0.2	1	0.2	4	0.9	5	1.1	2	0.4	0	0.0	1	0.2	
Smoking/Sun/Pesticides	0	0.0	0	0.0	0	0.0	3	0.7	0	0.0	2	0.4	0	0.0	2	0.4	
Smoking/Sun/Alcohol	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	
Without External Risk Factos	15	3.3	12	2.6	2	0.4	43	9.3	16	3.5	25	5.4	3	0.7	7	1.5	
Wood Dust/Smoking	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	
Sun	1	0.2	0	0.0	1	0.2	3	0.7	20	4.3	6	1.3	1	0.2	1	0.2	
Sun/Alcohol/Smoking	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Sun/Smoking/Alcohol	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
No information	17	3.7	8	1.7	2	0.4	11	2.4	85	18.5	9	2.0	1	0.2	3	0.7	
Breed																	
Caucasian	43	9.3	27	5.9	27	5.9	85	18.5	153	33.3	61	13.3	23	5.0	27	5.9	
Ebon	0	0.0	1	0.2	0	0.0	1	.2	0	0.0	2	.4	0	0.0	0	0.0	<0.001
Brown	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
No information	1	0.2	0	0.0	0	0.0	0	0.0	3	0.7	3	0.7	1	0.2	1	.2	

indicates that education is inversely correlated with exposure to risk factors, and positively

correlated with the diagnosis of smaller tumors (Menezes et al., 2002).

A high frequency of smoking patients in our study population was observed. It is estimated that 1/3

of the world's population smokes, in spite of the known risks posed by this habit, which in combination with other factors may increase by eight-fold the risk of cancer and other diseases (Almeida et al., 2006). In fact, if the use of tobacco were completely eliminated, 54% of esophageal cancers would be prevented, as well as 71% of lung and 86% of larynx cancers (Paolo et al., 2014; Barros et al., 2006).

In the present survey, patients were exposed to several risk factors in different combinations. Some studies indicate that 45% of cancer cases among men and 40% among women could be avoided with the reduction or complete elimination of risk factors from daily life (Campos et al., 2011).

The lack of information on interview methods and missing data on patient charts constituted the main limitations faced. However, the set of data included and organized here allows for a deeper understanding of cancer patients in poorer areas of Brazil, including risks factors, and provides a basis for future investigations as well as preventive interventions.

Conclusion

The present survey revealed a high incidence of non-melanoma skin cancer in patients of both sexes, breast and cervical in women, prostate cancer among men among others, such as lung cancer in connection with smoking. The study population was mostly white, older than 60, with low education. It included a high proportion of farm workers exposed to one or more risk factors.

Prevailing cancer types, risk factors, and elderly population being more heavily impacted by the disease were identified. It was concluded to be extremely important to promote preventive measures among the young and adults, including good eating habits, the use of protective equipment among farm workers, reduce use of alcohol and tobacco, periodic exams among women (breast cancer), and men, especially farm workers, who often refuse to perform periodic prostate exams.

The ever-increasing incidence of cancer makes it a matter of public health, requiring incentives and structural support for research, primary prevention and early treatment, which are central to Brazilian health policies.

CONFLICT OF INTEREST

The authors have not declared any conflict of interest.

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Full Length Research Paper

Delivery at home and associated factors among women in child bearing age, who gave birth in the preceding two years in Zala Woreda, southern Ethiopia

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A key intervention to achieve the goal of maternal mortality reduction in deliveries that occur at home is significant. In Ethiopia, the MMR has reduced from 676/100,000 live births in 2011 to 420/100,000 live births in 2013 with a skilled attendant of 23%, whereas 77% deliveries occurred at home without proper medical attention and care during childbirth. Little is known about cultural factors that contribute to home delivery. Therefore, this study aimed to explore the cultural factors and other factors in detail that previous studies did not address in detail and assess prevalence of home delivery and associated factors among child bearing age women who gave birth in the preceding two years in Zala Woreda, Southern Ethiopia. A community based cross sectional study that triangulates quantitative with qualitative approaches was conducted from March 15 to April 10, 2015. Multistage sampling through simple random technique was employed to select 447 study participants. Bivariate and multivariable analyses were carried out to identify factors associated with home delivery. Qualitative data was analyzed thematically and results were triangulated with the quantitative data. Associations were determined by using OR at 95% CI and $p \leq 0.05$. The prevalence of home delivery is found to be 67.6%. The factors that significantly affected home delivery in this study were place of residence (AOR: 5, 95% CI: 2.2, 12), women age at interview (AOR: 2.78, 95% CI: 1.2, 6.5), women's education (AOR: 5.8, 95% CI: 2.86, 11.8), antenatal care (AOR: 3, 95% CI: 1.3, 8.5), time to reach the nearest health facility (AOR = 4.5, 95% CI = 2.2, 9), family size (AOR= 3.9, 95% CI=2,16.77) and attitude of the mother to maternal services (AOR=3.7 95% CI= 2.2, 6). Home delivery is highest in the study area. The most important factors that determine home delivery appear to be women's education status, number of ANC visits, time to reach the nearest health facility and age and attitude of the women towards home delivery. Actions targeting maternal education, encouraging number of ANC visits, making health facilities in accessible distance and conducting behavioral change communication were the crucial areas to tackle in giving birth at home.

Key words: Home delivery, Zala, woreda.

INTRODUCTION

The vast majority of women who deliver outside the health facilities give birth at home, where risks of mortality

are on the increase in the absence of professional attendance. It has been estimated that only 50% of the

women in the world have access to such skilled care in developing countries, however, still most women deliver at home (WHO, 2013; Folashade et al., 2013). Worldwide, an estimated 529,000 maternal and nearly 4 million neonatal deaths (during the first 4 weeks of life) occur annually, 75% of neonatal death is in the first week of life. Approximately, 99% of these deaths are in low and middle income countries, where 43% of births are attended by TBAs, the proportion generally being higher in rural areas (WHO, 2013). These home deliveries conducted by TBAs may be responsible for an increased risk of maternal and perinatal mortality as the TBAs have low educational status and sometimes were not trained in preventing or recognizing complications and promptly referring the patient to an appropriate facility for emergency obstetric care (WHO, 2013; Folashade et al., 2013). In addition, nearly 4 million stillbirths occur annually, and most of them are close to the time of delivery (WHO, UNFPA, WB, 2009). Of the neonatal deaths, nearly 50% occur among children delivered at home. Perinatal mortality (stillbirths and neonatal deaths) is often related to intrapartum complications, and is, thus, higher in countries where highest deliveries are conducted at home environment. It has been estimated that decreasing the proportion of deliveries conducted at home reduces perinatal and maternal deaths by nearly half (WHO, 2013; Folashade et al., 2013, WHO et al., 2009; Sychareun et al., 2009). The five major pregnancy-related complications leading to maternal mortality globally are postpartum hemorrhage (25%), puerperal infections (15%), unsafe abortion (13%), hypertensive disorders of pregnancy (12%) and obstructed labor (8%). About 35% of women in developing countries receive no antenatal care during pregnancy; and 70% receive no postpartum care. In these countries, home deliveries are over 60% taking place largely in rural areas with unskilled attendants (WHO et al., 2008; Mwanakulya et al., 2008). According to study in Malaysia (2009), more than 90% of births occur at home with unhygienic conditions and without assistance of trained birth personnel (Sychareun et al., 2009). In Ethiopia, in 2000/2001, 871 maternal mortality per 100,000 were recorded as the highest rates of maternal mortality in Africa, and then reduced to 676 maternal mortality per 100,000 births in 2010/2011. Ethiopia was one of the six countries which accounted for more than 50% of all maternal deaths in 2012. The proportion of deaths due to postpartum hemorrhage (PPH) that occurred is most likely due to the fact that over 90% of births take place at home, and women with PPH may not arrive at a health facility on time (EDHS, 2011). In Ethiopia, the proportion of births attended by skilled personnel in health institution has increased in a very slow fashion from 2005 to 2011. The

majority of Ethiopian women give birth at home without skilled attendants. Further, as reported in 2011, Ethiopia Demographic and Health Survey (EDHS), the 90% of births at home take place in unhygienic conditions and associated with adverse infant and maternal outcomes. There is no significant difference in proportions of home delivery between EDHS in 2005 and 2011 (Sibley et al., 2009; Central Statistical Agency [Ethiopia] and ICF International, 2012; Mwanakulya, 2008; Ethiopia MDG Report, 2013; Pakistan Demographic and Health Survey, 2006-07). The rate of home delivery in Ethiopia is in the highest bound by sub-Saharan Africa standard (Central Statistical Agency [Ethiopia], ICF International, 2012; Pakistan Demographic and Health Survey, 2006-07). According to health and health related indicators' report, Skilled Birth Attendant (SBA) of Ethiopia was 23% (EFMOH, 2013) and the achievement of Southern Nation Nationalities peoples Region (SNNPR) was 20.6% (EFMOH, Health and Health related indicators, Oct. 2014). In Ethiopia, according to the latest estimate of United Nations, the MMR has declined from 676/100,000 live births in 2011 to 420/100,000 live births in 2013 (UNDP, 2014). Based on 2013 annual review report of the Gamo-Gofa zone health department, despite efforts exerted to reduce giving birth at home, the institutional delivery achievement of Gammo Gofa Zone and Zala Woreda is 22 and 9%, respectively. Home delivery at Gammo Gofa Zone and Zala woreda accounted for more than 80 and 90% respectively (Gamo-Gofa zone, July 2013).

Many studies dictated the socio demographic, socioeconomic and obstetric factors of home delivery. But cultural and traditional factors were not addressed in detail. Therefore, the purpose of this study was to assess prevalence of home delivery and associated factors among women in child bearing age, who gave birth in the preceding two years. This study will be helpful for the relevant stakeholders in the planning and implementation of intervention activities to improve the delivery service utilization through significant reduction of giving birth at home.

METHODOLOGY

Study design and study area

A community based cross-sectional study was conducted in Zala Woreda, Southern Ethiopia from March 15 to April 10, 2015. The study was triangulated with qualitative survey through focus group discussions (FGDs). Zala woreda, which is located 485 km South of Addis Ababa and 278 km from Hawassa, the capital city of Ethiopia and SNNPR respectively. Zala is one of the woredas (districts or third level administrative division) in the Southern Nations,

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Nationalities and Peoples' Region of Ethiopia, part of the Gamo Gofa Zone. Zala woreda is bordered on the Southwest by Uba Debretehay woreda, on the Northwest by Demba Gofa woreda, on the Northeast by Kutcha woreda, on the east by Deramalo woreda and on the Southeast by Kemba woreda. The woreda is divided into 35 kebeles [lowest administrative unit]. It has 34 rural and 1 urban kebeles. The woreda had a population of 74,369 of whom 37,576 are men and 36,793 women (CSA, 2007). The total population is projected to be 91,107 and women of child bearing age is 20,954. (Zala Woreda, 2015). Concerning health facilities distribution, the woreda has 34 health posts, 5 government health centers, 8 private clinics and 1 rural drug vender (Zala Woreda, July, 2013).

Source population

All women in child bearing age (15-49 year) who gave birth in the preceding two years (from March 10, 2013 to April 10, 2015) in Zala Woreda, Southern Ethiopia.

Study population

All women in child bearing age who had given birth at least one birth in the preceding two years prior to data collection in ten selected kebeles of the Woreda.

Inclusion criteria

All women who delivered in the preceding two years regardless of pregnancy outcome and marital status, those who gave birth by the help of traditional birth attendants (trained or not) were included under home delivery. Permanent resident (those who lived at least 6 month and gave birth in the area) as well a mother that had more than one births in the preceding two years, the last birth was included in the study.

Exclusion criteria

Home deliveries with skilled birth attendances, delivery by health extension workers, respondents of FGDs for quantitative survey and women who are mentally not capable of being interviewed.

Sample size and sampling procedure determination

Sample size determination with first objective calculation for the first objective was done based on the following single population proportion formula:

$$N = \frac{\left(\frac{Z_{\alpha/2}}{2}\right)^2 P(1-P)}{d^2}$$

where N, number sample size $Z_{\alpha/2}$; represents the desired level of statistical significance, proportion of home delivery (P). The prevalence is taken from previous study that took place in Banja Woreda, Awi zone, Amhara regional state, Northern Ethiopia, 2013 (P = 84.3%) and d, represents margin of error. Assuming design effect 2, Non response rate 10%, margin error 5%, desired level of statistical significance (α) =0.05 ($Z_{\alpha} = 1.96$) and proportion (P) is 84.3%. Using the above formula and assumptions:

$$N = \frac{1.96^2 0.843(1-0.843)}{(0.05)^2} = 203.4$$

Adding 10% non-response rate, then, the result is 223.7. Using

design effect of 2, the numbers of women recruited for the study were 447. So as to be as accurate as possible, proportion of exposed and non exposed of the following variable with their proportion were used: ANC status, 61.2% (Addisalem and Meaza, 2012; Yifru and Asres, 2014), residence, 55.2% (Amon et al., 2014; Yifru and Asres, 2014), parity 66.2% (Yifru and Asres, 2014; Alemaw, 2014), educational status, 64.4% (Abdella et al., 2012; Yifru and Asres, 2014) and attitude, 66% (Yifru and Asres, 2014; Solomon et al., 2013), whereas with the non-exposed, the proportion is as follows: 79.77, 75.2, 83, 81.89 and 82.9%, respectively. Also, odds of 2.5% and power of 80% was used in order to obtain the final sample size, the final sample size became sample calculated for second objective which was 447. It was calculated using Epi.info 7.1.4.

Sample size for qualitative study

Since determining sample size in qualitative design has no formula, it is systematically based on purpose of the study and data collection technique used. It is important to incorporate different homogeneous sub-groups of population with potentially different views on cultural and traditional aspects of home delivery. The study involved four separate groups, one with women, second with TBAs, third with adult and elderly men and women and the fourth with health workers. Overall, a total of four focus group discussions were conducted. Ten participants in each group except only eight women's group were selected for discussion based on their convenience, accessibility and knowledge of conveying the information.

Sampling technique for quantitative study

Multi-stage sampling technique was employed to select the study participants. The woreda has 35 kebeles (34 rural and 1 urban). Then, ten kebeles (one urban and nine rural) were selected. After stratifying the kebeles based on the place of residence, nine of 34 rural kebeles were selected by simple random sampling through lottery method. Then to obtain 447 study subjects, the existing sampling frame was used through involvement of health extension workers in order to identify eligible mothers and inclusion and exclusion criteria, was prepared and proportional to size allocation was employed and simple random sampling technique through lottery method were applied.

Sampling technique for qualitative study

For qualitative design, homogenous purposive sampling technique was conducted on four groups of population who were expected to convey credible information on cultural and traditional aspects of home delivery. All informants were selected from sampled kebeles and nearby health facilities based on their convenience, accessibility and knowledge of conveying the information. The recruitment of the participants in all groups was assisted by the chairpersons and health extension workers of the ten kebeles and managers of the five health centers. Each kebele selected one discussant from women, TBAs, and elderly men and women for each group. The study participants of women group were selected based on the inclusion and exclusion criteria. Each health center selected two health workers [midwives and/or nurses] from the delivery case team.

Study variables

Dependent variables in this study was home delivery, whereas the

independent variables were socio-demographic and economic factors (age, marital status, education, place of residence, family size, time to the health facility, income and occupation), obstetric factors (gravity, ANC status, duration of labor, previous information on place of delivery, place of previous delivery and plan pregnancy) and socio-cultural-attitude, preference of TBAs, decision making power.

Operational definition

Access to health facility

Refers to the women living not more than an hour from health facility by local means of transportation, or availability of health facility within travel distance of five kilometers (WHO, 2008).

Health facility

This refers to health center and hospital (Tesfaye and Gebi, 2014).

Health extension workers

Health workers in health posts in Ethiopia that have not yet been well evaluated, whether the skills they have or the extent of delivery care they could provide is up to the WHO definitions of SBA (EMOH, May 2007 version 1.0).

Home delivery

Delivering outside health facility (Jared, 2015).

Plan pregnancy

Prior decision to give birth at health facility for last pregnancy (Bereket et al., 2013).

Precipitate labor

Labor culminates in less than three hours (WHO, 2013).

Traditional birth attendants

A birth attendant who initially acquired the ability by delivering babies herself or through apprenticeship with other TBAs (WHO/UNICEF/UNFPA, 2009).

Trained traditional birth attendants

TBAs who have undergone subsequent training and integrated into formal health system (WHO/UNICEF/UNFPA, 2008).

Attitude

Attitude is an evaluative reactions to home delivery that includes beliefs and positive and negative feelings and it guides experiences and decide the effects of experience (Junayde et al., 2014).

Good attitude

Good attitude- women who answers at least three or above five

(≥60%) of the questions.

Bad attitude

Bad attitude - women who answers two and less than five (<60%) of the questions.

Data collection techniques and tools

Quantitative

Data were collected using a pre-tested structured questionnaire developed and adapted from EDHS and other published literatures. English language questionnaire were prepared and then it was translated to local language, Goffigna, before the data collection and again it was translated back to English to check its consistency. Data were collected through face-face interview with study subjects. A total of ten non-employed diploma level health worker data collectors and two degree level data supervisors were recruited for data collection.

Qualitative

Semi-structured open ended and non-directive focus group discussion (FGD) guide was designed in order to triangulate responses obtained by the structured questionnaire on the socio-cultural and traditional practice of home delivery. The discussion in each of four groups was facilitated by principal investigator. Each group constituted ten people except women group which included only eight participants. A total of 38 discussants participated. Before the FGDs, the moderator introduced all participants, explained the general purpose of the study and topic of the discussions. The participants were informed about the tape-recorder and permission to be recorded was requested. Informed verbal consent was obtained from all individuals participating in the discussion.

Data quality assurance

The quality of data were assured by properly designing and pre-testing of the questionnaire on 23 of the study subjects at kebele other than that selected (Shambara kankara). Both the interviewers and supervisors gained and assessed clarity, understandability and completeness of the questionnaire.

Training of the interviewers and supervisors on the objective of the study, how to conduct face to face interview and how to keep confidentiality of the information was conducted. Every day, 10% of the completed questionnaires were reviewed and checked for completeness and relevance by the supervisors and principal investigator and the necessary feedbacks were offered to data collectors in the next morning before the proceeding of the procedure.

Data processing and analysis

Collected questionnaires were checked visually for completeness, coded and entered into EPI info 3.5.1 exported and analyzed in SPSS version 20.0 software package. Frequency run and double data entry on 10% of questionnaires were performed to check data entry errors.

Binary and multiple logistic regressions were run to assess the putative associations of various factors with home delivery. The outcome variable was dichotomous; thus, categorized as yes (coded 1) and no (coded 0). Only the explanatory variables that

resulted in the p -value ≤ 0.25 in the bivariate analysis were included in the multivariable analysis. Enter method of model building was applied. The fitness of the model was checked by Hosmer-Lemeshow goodness of fit test. The assumptions of logistic regression such as meaningful coding, checking multicollinearity presence of linear relationship between logit of dependent and independent variables were checked. The results were presented in the form of tables, texts, figures and summary descriptive and analytic statistics. The strength of association of predictor variables with home delivery were assessed using odds ratio and significance of variables were reported by using 95% confidence interval and p -values ≤ 0.05 .

For qualitative study, prior to analyzing the data, all FGDs were transcribed verbatim in Goffigna and then translated into English by the principal investigator and a research assistant to ensure fidelity. The data were analyzed using thematic manual analysis. Information from the interview consists of the discussants' description and explanation of their cultural and traditional childbirth practices and reason for giving birth at home. Raw notes and tape recordings were used to generate transcripts in the local language, Goffigna. The principal investigator and research assistant translated and transcribed the notes and recordings and read the transcripts many times in order to gain better understanding of the context, and then coding, identification categories and themes were carried out.

Ethical clearance

Ethical clearance was obtained from Institutional Review Board of College of Medicine and Health Sciences, Arba Minch University. Permission to conduct the study was also obtained from the Gamo-Gofa zone health department; Zala Woreda Health Office and respective kebeles. Informed consent was obtained from each study participant.

Each respondent was informed about the purpose of the study that the findings of the study will inform policy makers and other concerned bodies. Complete verbal consent was obtained before involvement of study subjects.

Study participants were also informed that all data obtained from them would be kept confidential by using codes instead of any personal identifier.

RESULTS

Socio demographic characteristics

All 447 women of child bearing age were used for the study and participated with the response rate of 100%. Among the respondents, 159 (35.6%) were within the age range of 25 to 29 years, 396 (88.6%) were house wives, 187 (41.8%) had followed no formal education, 443 (99%) were Gofa ethnic, 333 (74.5%) were protestant and 437 (97.8%) were married. Concerning the educational status of respondents' husband, 135 (30, 2%) could read and write, 249 (47%) were average monthly income earners of less than 250 Ethiopian Birr (EB), with mean and standard deviation of 489.6 ± 32.3 , respectively.

The mean family size is 4.3, where 266 (59.5%) were greater than or equal to five. About 258 (57.7%) of the respondents made decision by themselves concerning

place of delivery (Table 1).

Prevalence and reasons of home delivery

Three hundred and two (67.6%) gave birth at home for their last pregnancy and the rest, 145 (32.4%) at health facility. Among the 302 mothers who gave birth at home, 78 (24.5%) gave birth at home due to preference of TBAs followed by 70 (23.2%) because it was their usual practice (Figure 1 and Table 3).

Obstetric and maternal characteristics of respondents

Among all the 447 respondents, 240 (53.7%) were at the age range of less than or equal to 20 years at their first pregnancy. From 447 respondents, 337 (75.6%) attended ANC, from which 218 (64.7%) followed about four and above visits, 175 (52%) started ANC at the second trimester, 216 (63.8) attended at health post. From all women included in the study, 182 (40.72%) had a history of 2 to 4 pregnancy, while 104 (76.7%) had come across pregnancy problem at their last pregnancy, about 248 (55.5%) planned their last pregnancy (Table 2).

Regarding labor time, 240 (53.7%) respondents' labor lasted for 2 to 5 h. Among the 302 mothers who gave birth at home for their last pregnancy, about 74 (24.5%) that delivered at home, were assisted by TBAs (Table 3).

Home delivery and associated factors

The factors that were found to be associated with home delivery were place of residence, attitude of the mother, educational status of the mother, the time to reach the health facility, family size, age of the mother and number of ANC visits. As compared to urban residents, rural dwellers were 5 times to deliver at home (AOR = 5, 95% CI = 2.2, 12).

Mother's educational status was associated with home delivery. Mothers whose educational status of read and write only were 5.8 times likely to deliver at home as compared to mother who had secondary and above education (AOR = 5.8, 95% CI = 2.86, 11.8). Attitude of the mother was another strong predictor of home delivery, mothers with bad attitude were 3.7 times likely to deliver at home as compared to mothers with good attitude (AOR = 3.7, 95% CI = 2.2, 6.2).

Mothers who had needed more than 2 h to get to the nearest health facility were 4.5 times likely to deliver at home than those who needed less than one hour (AOR = 4.5, 95%CI = 2.2, 9). Mothers from family size of greater than or equal to five were likely four times to give birth at home as compared to family size less than or equal to four (AOR = 3.9, 95%CI = 2, 16.7). Mothers with age greater than or equal to 30 years were 2.8 times likely to

Table 1. Socio-demographic characteristics of the respondents, Zala District, Southern Ethiopia, April 2015 (n=447).

Variables	Category	Frequency	Percent
Age of the Mother	<25	147	32.9
	25-29	159	35.6
	≥30	141	31.5
Occupation of the mother	Government worker	51	11.4
	House wife	396	88.6
Average monthly Income Ethiopian Birr (EB)	<250	210	47
	250-499	92	20.6
	500-750	71	15.9
	>750	74	16.6
Ethnicity	Gofa	443	99
	Gamo	4	1
Religion	Orthodox	89	19.9
	Protestant	33	7.4
	Others	25	5.6
Marital status	Married	437	97.8
	Separated/widowed/divorced	10	2.2
Educational status of the mother	No formal education	187	41.8
	Primary	182	40.7
	Secondary and above	78	17.4
Educational Status of the Father	Cannot read & write	129	28.9
	Read and write only	135	30.2
	Primary	100	22.3
	Secondary and above	83	18.6
Family size	≤4	181	40.5
	≥5	266	59.5
Making final decision of delivery	Mother	258	57.7
	Both (father & mother)	142	31
	Family	47	10.5

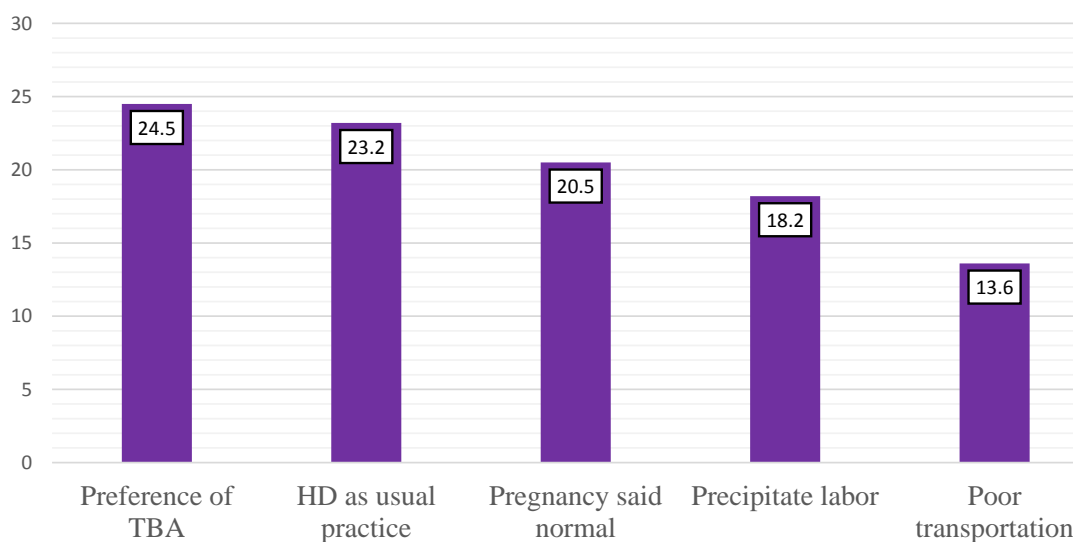
**Figure 1.** Reasons for home delivery among respondents in Zala Woreda, Southern Ethiopia, April 2015. (n= 302).

Table 2. Maternal and obstetric factors of respondents, Zala District, Southern Ethiopia, April 2015. (n= 447).

Variables	Category	Frequency	Percent
Home delivery	Yes	302	67.6
	No	145	32.4
Age of the mother at first pregnancy	≤20	240	53.7
	>20	207	46.3
No of ANC visits (n = 337)	≤2	41	12.2
	3	78	23.3
	≥4	218	64.7
Health facility where ANC follow up (n= 337)	Health post	216	63.80
	Health center	102	30.20
	Hospital	19	6.00
Time when ANC follow up started (n= 337)	First trimester	152	45
	Second trimester	175	52
	Third trimester	10	3
ANC status	Attended	337	75.6
	Not attend	110	24.4
Gravidity	1 pregnancy	103	23.04
	2-4 Pregnancy	182	40.72
	≥5 pregnancy	162	36.24
Labor time	≤1 hour	65	14.5
	2-5hour	240	53.7
	>5hour	142	31.8
Women who faced pregnancy problem of last pregnancy	Yes	104	76.7
	No	343	23.3
Who assisted at home (n= 302)	TBAs	222	73.5
	Relatives	64	21.2
	No one	16	5.3
Plan last pregnancy	Yes	248	55.5
	No	199	44.5

deliver at home as compared to mothers with the age of less than 25 years (AOR = 2.8: 95% CI = 1.2, 6.5). Mothers who followed ANC are about 3 times or less than 6 times likely to give birth at home as compared to mothers who attended ANC about four and above (AOR = 3, 95%CI = 1.3, 8.5) (Table 3).

Thematic analysis

Theme one indicates the preference of TBAs by women because of their assistance of birth at home. Theme two shows cultural and traditional beliefs that hamper home delivery. Theme three dictates problems and barriers related to facility delivery. Theme four indicates problems and attitudes related to facility based services. Some service users disseminate bad message of services they

received from health facility that enhances giving birth at home. Overall, four themes, eight categories and 21 codes were organized (Table 4).

DISCUSSION

Prevalence of home delivery

The study showed the prevalence of home delivery is 67.6% among women of child bearing age who gave birth in the preceding two years prior to data collection which was comparable to the study conducted in Kenya, where 66.7% of women gave birth at home (Bisrat and Negash, 2014). The study had higher prevalence as compared to MDG targets. To ensure reduction of maternal mortality, the international community in general and Ethiopia in

Table 3. Bivariate and multivariable analysis of factors associated with home delivery among respondents, Zala Woreda Southern Ethiopia, April 2015 (n = 447).

Variable	Category	Home Delivery		COR 95%CI	Sig.	AOR 95% CI	Sig.
		Yes	No				
Place of residence							
	Rural	287	115	4.99 (2.6, 9.6)	0.001	5.13(2.2, 12)	0.001
	Urban	15	30	1		1	
Attitude							
	Bad	238	61	5(3.3, 7.9)	0.001	3.74(2.2, 6.2)	0.001
	Good	64	84	1		1	
Mother education							
	No formal education	156	31	9(4.9,16.4)	0.001	5.8(2.86, 11.8)	0.001
	Primary	118	64	3.29(1.89, 5.73)	0.001	2.85(1.45, 5.6)	0.001
	Second. & above	20	50	1		1	
Time to reach health facility							
	Greater than 2 hr.	165	54	6(3.3, 10.9)	0.001	4.5(2.2, 9)	0.001
	1 to 2 hr.	90	22	4.5(2.7, 7.3)	0.001	4(2.23, 7.2)	0.001
	Less than 1 hour	47	69	1		1	
Family Size							
	≥5	207	59	1		1	
	≤4	95	86	3.2(2.12, 4.79)	0.001	3.9(2, 16.7.7)	0.001
Age of the Mother							
	≥30	103	38	1.3(0.77, 2.3)	0.306	2.78(1.2, 6.5)	0.017
	25 – 29	100	59	0.76(0.44, 0.9)	0.04	1.4(0.7, 2.8)	0.32
	<25	99	48	1		1	
Number of ANC visits							
	≤ 2	29	12	2.5(1.2, 5.3)	0.011	3(1.3, 8.5)	0.023
	3	58	20	3(1.7, 5.4)	0.672	6(1.2, 31)	0.029
	≥ 4	106	112	1		1	

particular set a target of SBA 90% in 2015 through the reduction of extent of home delivery less than 10% (MDG Rport, 2014). The prevalence is slightly higher as compared to other findings from Haramaya Woreda, Oromia region, Goba woreda, India, Malawi, Nigeria, Ghana and Tanzania where the magnitude of the prevalence is 58, 53, 31, 29, 40, 48 and 44%, respectively (Folashade et al., 2013; Geeta et al., 2011; Lily et al., 2013; Amon et al., 2014; Daniel and Desalegn, 2014; Haymanot and Agumasie, 2013; Kihulya and Elia, 2015).

The probable reason for the difference may be socio-economic and cultural factors that may vary among the studies. Cultural and traditional factors play a great role that enhances giving birth at home. TBAs are preferred by women for their birth assistance at home. Women belief as delivering a child is something that needs

confidentiality. TBAs are culturally and traditionally trusted as they are more intimate within the community to sense and feel their privacy as mentioned by some of FGD discussants.

"The ... reason they like me is I help them at their home. They believe that delivery is something secret and prestigious. Imagine while a woman gives birth, she experiences a bloody condition which she thinks nobody should see other than her intimate family or me.

Giving birth at health facility means inviting many people to carry her there, where no other transport facility is accessible. How can people carry this bloody mother? And why do they carry her if she had normal pregnancy and delivery? In this case, women feel disgusted and ashamed if they give birth at health facility. So home is the best place for giving birth..." (A 48 year old female

Table 4. Connecting the codes, categories and identifying themes of all four FGDs in relation to perception towards home delivery among women in Zala Woreda, April, 2015 (n=38).

Codes	Categories	Themes
Being comfortable at home and needs assistance by only TBA Giving birth is secrete and prestigious which only TBAs consider this TBAs are trusted by the community Home delivery is habitual process and no need of health facility Women like the approach of TBA because they feel and sense poor living condition Community develop shame if educated people observe their poor living condition	TBA arrive home Treatment approach of TBAs	Preference of TBAs because they give birth at home
Previous generation born at home Health facility is for sick people Complicated delivery is due to punishment of misbehavior Sanctioning and denying service if the facility served adulterated women Influence of culture (<i>Zima</i> culture)	Community perception	Cultural beliefs
Placenta should be buried in the garden Complicated delivery is due to punishment for misbehavior	Pressure from community's culture	
Cheap service of TBAs Formal and informal expenses during referrals	Cost	Facility service problems
Health facility is far from the dwelling Lack of road access	Accessibility	
Bad message from women who seek care from health facility concerning lying position, Some women do not need to be served by male midwives Referred mothers are exposed to surgical procedure	Negative message Bad attitude to facility service	Previous service attitude

TBAs from Melabaysa village).

However, the finding is lower as compared to similar studies conducted in Ethiopia at Kembata-Tembaro zone (84%), Awi zone (84.3%), Munisa woreda (87.7%) and Dodota woreda (81.8%) (Abdella et al., 2012; Fikre and Demissie, 2012; Alemaw et al., 2014; Solomon et al., 2013). This might be due to time gap among the studies. Recently, the local government in line with national

government is implementing the reduction of home delivery in order to achieve the goal of reduction of maternal mortality through promotion of institutional delivery.

Associated factors

Rural residents were 5 times higher chance of delivering at home as compared to urban residents

(AOR = 5, 95% CI = 2.2, 12). The study is in agreement with similar cross-sectional study conducted in Sekela district in North west Ethiopia and Meta-analysis conducted by Hawassa University where rural residents were five to ten times likely to deliver at home, respectively (Yifru and Asres, 2014; Alemayehu and Fekadu, 2012). Another similar studies support this findings (Geeta et al., 201; Lily et al., 2013; Abdella et al., 2012; Daniel and Desalegn, 2014). The higher

proportion of rural dwellers that give birth at home is probably due to inadequate availability of transportation, poor accessibility to health services, the lower chance of being educated, poor living standard as well as cultural beliefs, attitudes, and community preference that favor giving birth at home. Based on the survey from FGD, TBAs are accepted by the community for the reason of their way of approach and treatment they give for the laboring women. They undertake this service based on the societal living standard and way of life in the community.

"Mothers are more interested in my service because they like my approach and treatment. Imagine, our community is living in rural area, poor, having lower living standard, wearing dirty clothes, their home is not clean, they feel ashamed if the health worker attends and looks at this things. This is why they like me than health workers. They feel more comforted if I are with them while they are in labor" (A63- year old TBA from Gaysa village)".

Mothers' education is found to be predictor of home delivery in which mothers with no formal education were about six times more likely to give birth at home as compared to those mothers who had attended secondary education or more (AOR = 5.8, 95% CI = 2.86, 11.8). The finding is comparable with the study conducted in Bahirdar which is in Ethiopia, where mothers with no formal education were more than four times more likely to deliver at home than those educated mothers. Other similar studies conducted in Awi zone Northern Ethiopia, East Wollega zone- Western Ethiopia, Afar regional state, Hawassa University-Ethiopia, Dodota woreda-Oromia region- Ethiopia, India and Tanzania support this finding (Geeta et al., 2011; Amon et al., 2014; Feleke et al., 2012; Yifru and Asres, 2014; Alemaw and Mekonnen, 2014; Tesfaye and Gebi, 2014; Medhanit, 2012). The non-educated women might not have a decision-making power on seeking health services, or have ability to travel outside the home; they are more exposed to family pressure and cultural influences. The time spent to reach the nearest health facility is another significant predictor of home delivery. Women whose residence is 2 or more hours of walking distance to the nearest health facility are 4.5 times more likely to deliver at home as compared to those whose residence is one hour or less to the nearest health facility (AOR = 4.5, 95% CI = 2.2, 9). The study is consistent with findings from Bahirdar- Ethiopia, Arbaminch Zuria- Ethiopia, Kenya, Bangladeshi (Worku et al., 2013; Emily et al., 2014; Gistane et al., 2015; Saraswoti et al., 2012). Long time and farther distance coupled with lack of transportation may reduce access to maternal service (ANC, delivery) utilization and preventing availability of adequate information. Pregnant mother might be disinterested to walk far distance which might influence them to opt for delivery at home. The qualitative study also found consistent explanation.

Transportation problems and distance as well as challenging and difficult roads are the main issues that contribute to home delivery. The location of health facility from the community's dwelling is the main factor as six of the FGD discussants suggested.

"The challenge we face during delivery is transportation problem. Health facilities are located far distance from our dwelling. During labor, we are expected to be carried by the people to health facilities for more than four hours. It needs labor force which is sometimes difficult to get" (A 70 year-old female TBA from Gaysa village).

Mother with the age of 30 years or more were 2.8 times more likely to give birth at home as compared to mother with the age of below 25 years old (AOR = 2.78, 95%CI = 1.2, 6.5). The finding coincides with previous studies. According to study from Munisa woreda Oromia regional state, mothers 35 years old were about 6 times more likely to give birth at home than mothers aged 20 years or lower (Amon et al., 2014). This finding was also in line with studies done in North Gondar Zone, Nigeria, Kenya and sub-Saharan Africa (WHO, 2008; Alemaw, 2014; Cheryl et al., 2013; Alexandra, 2010). The possible explanation for this could be that older woman tended to consider giving birth at home to be not as risky as it has been their usual experience. Besides, older woman belong to a more traditional cohort, thus less likely to be educated and influences them to utilize modern health facilities as compared to younger women. However, disagreement arises with other studies which found that older women may become knowledgeable during successive ANC visits on the benefits of health facility deliveries. Obstetric complications may increase with age as a result older women are less likely to give birth than younger women (Gabrysch and Campbell, 2009; Seifu et al., 2014). Number of ANC visits is found to be a significant predictor of giving birth at home. Women who attended two or less times were about 3 times more likely to deliver at home as compared to 4 or more family members (AOR = 3, 95% CI= 1.3, 8.5). The study is congruent with the finding obtained from Western Ethiopia where women who did not attend ANC were about 6 times more likely to give birth at home as compared to women who attended 4 times and more (Kihulya and Elia, 2015). Similar comparable findings from Oromia regional state, Tanzania, Nigeria and Nepal were found (Syhareun et al., 2009; Geeta et al., 2011; FelekeH et al., 2012; Alemaw et al., 2014; Gistane et al.2015). The possible reason may be women who made lower visits would be less likely to get adequate information and counseling about advantages of delivering at health facility which favors them in experiencing home delivery. Nonetheless, some studies argue that ANC would have an inverse association with home delivery as women who are told their pregnancy is fine may feel encouraged to deliver at home (Envuladu et al., 2009).

Attitude towards maternal service is a significant predictor of home delivery where mothers with bad attitude were 3.7 times more likely to deliver at home as compared to mothers with good attitude (AOR =3.7, 95% CI =2.2, 6.2). This findings fits reports from Sekela district North-West Ethiopia and Bahirdar Ethiopia where mothers with unfavorable attitude were 6 and 4.4 times as likely to deliver at home respectively (Fantu et al., 2012; Alemayehu et al., 2012). More women choose home delivery because of the negative information they get from women who were delivered in the health facility. The embarrassments they face during delivery process prevent them from seeking the service in the health facility, which in turn leads to giving birth at home as suggested by four FGD discussants.

"The ... factor that favors home delivery is the bad message of mothers who previously gave birth at health facility. Delivery process makes mothers expose their secret body parts and makes them to lie in a coach raising or elevating their her legs at supine position and they do not like to be embarrassed" (65 year-old elderly man from Berawiga village).

Women refuse facility delivery for fear of surgical procedure and operation which prevents them from not utilizing the service in health facilities One FGD participant stated:

"I think the main reason that women prefer home delivery is that women believe they would experience a surgical procedure if they attend hospital or health center (A 60 year elderly man from Odashabe village)"

Strength and limitation of the study

The study triangulates both quantitative and qualitative design that widens the scope of the study and one method counterbalance the shortcomings of the other method. Besides, the selection bias is minimized as community based study and probability sampling was applied. All these could increase the accuracy and contribute greater confidence in the generalizability of findings.

However, the cross sectional nature of the study does not allow establishing causality of associations and the results should be interpreted cautiously. Recall bias cannot be ruled out about events that took place further from the period of data collection. Social desirability bias may also be a problem.

Conclusion

This study revealed that the prevalence of home delivery among women of child bearing age who gave birth in the preceding two years prior to data collection seemed to be

higher. Factors that were significantly associated with home delivery include place of residence, age of the mother, the average walking time to reach the nearby health facility, number of ANC visits and family size.

Socio-cultural factors such as attitude of the mother to maternal service utilization was also found to be a significant predictor of home delivery.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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Full Length Research Paper

Assessment of respiratory symptoms and associated factors among solid waste collectors in Yeka Sub City, Addis Ababa, Ethiopia

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Respiratory symptoms are frequently manifested among solid waste collectors. They are suffering from respiratory diseases because of frequent exposure to waste materials containing pathogenic materials and chemicals hazards for human being. Cross-sectional study was carried out to assess prevalence of respiratory symptoms and associated factors among solid waste workers in Yeka sub city, Addis Ababa from March to April, 2016. The sub city has a total of 13 woredas. All woredas had different number of unions organized under small scale enterprises. Thirty eight micro and small enterprise unions from all woredas were selected randomly. Study subjects were taken from selected enterprise consecutively. Observational checklist and structured questionnaire were used to collect data associated with respiratory symptoms. Binary logistic regression was performed to identify the risk factors associated with respiratory symptoms; p-values less than 0.05 were considered statistically significant. The overall prevalence of respiratory symptoms among solid waste collectors in Yeka sub city was 40.7%. Multivariate analysis revealed that respiratory symptoms prevalence was 2 times less likely among individuals use facemask on job (adjusted odd ratio [AOR] 2, 95% confidence interval [CI]: 1.1-4). The prevalence of respiratory symptom was 2.6 times more likely among individuals having sleeping disorder (AOR 2.6, 95% CI: 1.5-4.42). The prevalence of respiratory symptoms was 4.8 times more likely among study subjects who had past illness (AOR 4.8, 95% CI: 3.2-7.22). Respiratory symptoms among solid waste collectors were high. So, individuals participating in collecting solid west should use facemask, while collecting the wastes, municipal should change working hours and individuals who had history of past illness should get health information during enrollment.

Key words: Respiratory symptoms, solid waste, solid waste collectors.

INTRODUCTION

Respiratory symptoms are frequently manifested among solid waste collectors. They are suffering from respiratory diseases because of frequent exposure to health

determinants like pathogens and chemicals as well as vehicle exhaust fumes, noise, extreme temperatures, ultraviolet radiation, large amounts of household and

commercial wastes, which comprised decomposable organic materials (Athanasidou et al., 2010; Jacques et al., 2006).

Solid waste is defined as the solid component of any left over, surplus or unwanted by product from any business or domestic activity. Solid waste management encompasses a very wide range of activities including: collecting municipal garbage and recyclable materials; collecting, sorting, and processing of these materials; composting of green waste; collection and processing of building and demolition, of commercial and industrial waste (Mola, 2005). The waste collected is rarely stored in a plastic or metal container and covered with a lid. Sometimes the waste is placed on the ground directly, thus requiring being shoveled by hand, or it is left in an open carton or basket to be picked by hand.

In developing countries the waste collection activities are carried out in micro and small-scale enterprise, with old equipment and virtually no dust control or worker protection. The waste collector's job involves tedious motion, uncomfortable working positions, deadly hand exertion and manual handling. They wake up in the early morning hours and practicing their activities day after day without rest (Englehardt et al., 2000). They are poor in terms of economy, low grade in education; furthermore, these groups of workers are directly exposed without adequate personal protection to Municipal Solid Waste (MSW) which includes hazardous substances (Jacques et al., 2006).

Few studies conducted globally among solid waste collectors indicated that direct contact with waste could induce dry cough with exercise induced dyspnea, asthma, and Organic Dust Toxic Syndrome (ODTS) because of exposure to infectious microorganisms (Sigsgaard et al., 1990). According to a study conducted in Taiwan; being waste collector was a risk for cough, phlegm, wheezing, dyspnea, and compared with office workers of the same institution (Yang et al., 2001). Moreover, a study showed that waste collectors were prone to asthma, spasm, throat dryness, nasal discharge, and coughing symptoms than in drivers (Issever et al., 2002).

According to a study conducted among solid waste collectors, solid waste collectors are suffering from asthma, chronic coughing, breathing trouble, sinus congestion rash or skin disease (Englehardt et al., 2000). In Palestine, 44.7% of domestic waste collectors have suffered from sore throat, cough, and high temperature (8). Asthma, cold, cough, chronic bronchitis, bronchial asthma, and Upper Respiratory Tract Infection (URTI) were common respiratory ailments among MSW collectors (Ahmad, 2004; Abou-EIWafa et al., 2014).

When we see a study carried out in Egypt, Africa, it underlined shortness of breath as the most frequent

respiratory complaint among MSW collectors. Prevalence of respiratory ailments among MSW collectors was higher compared with service workers (Abou-EIWafa et al., 2014). A study in Tanzania confirmed that the number of waste handlers with complaint of nasal irritation were higher than other workers (Godson, 2008).

In Addis Ababa, Ethiopia most wastes are not segregated at household level, in addition manually loaded into sacks, pushed or pulled through long distances to be loaded into storage containers which are not in close proximity to where the residents are located. However, a study conducted in Ethiopia among city solid waste collectors showed that the problem of occupational injuries is present in a level that needs immediate public health action (Daniel et al., 2014).

Ethiopia is the country with the largest population in Africa, ranking number two from all countries in Africa. There is rising demand for food and other essentials, there has been a rise in the amount of waste being generated daily by each household. These waste serves as a source of infection for individuals who are actively participating in cleaning solid wastes. Majority of people involved in solid waste collection were exposed to occupational hazards and this resulted in increased utilization of health care services. This in turn affects the socioeconomic status of the population (Daniel et al., 2014). However, this problem did not get Minister of Health (MoH) attention so far. Therefore, this study aimed to assess prevalence of respiratory symptoms and associated factors among solid waste workers in Yeka sub city, Addis Ababa.

METHODOLOGY

Study area

The study was done in Addis Ababa, Ethiopia. Addis Ababa is one of the regions and the federal capital of Ethiopia which lies at an altitude of 7,546 feet (2,300 m). It covers a total area of 54,000 hectares. A total of 3,207,697 populations live in ten sub-cities distributed in 116 Woredas. Yeka is one of the ten sub cities of Addis Ababa and has 85.98 km² with 404,336 total populations.

Study design and period

Cross-sectional study was carried out in the study area from March to April, 2016

Sample size

The sample size was determined by employing single population proportion formula; taking magnitude of cough, breathing

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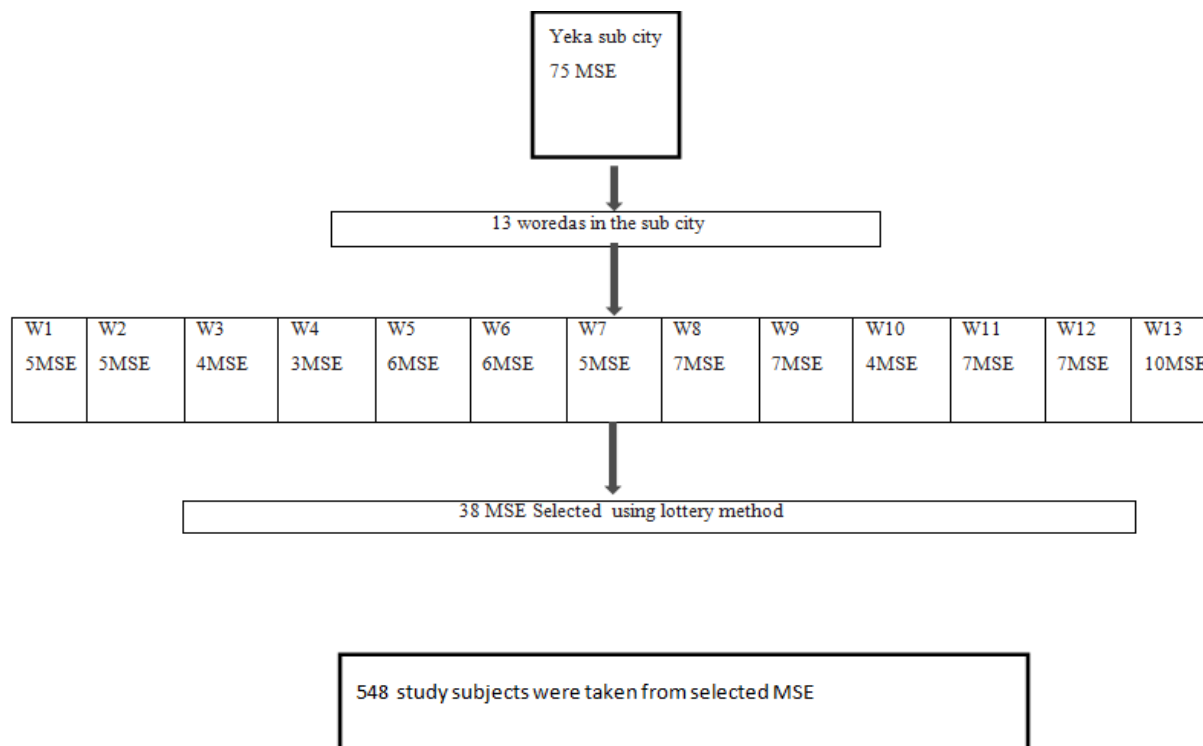


Figure 1. Sampling procedures.

trouble = 29.4% (Englehardt et al., 2000), assuming 5% margin of error and 95% confidence level and 10% for non-response rate. The final sample size was 548.

Sampling procedures

All woredas under the sub city were purposely included in the study. The sub city has a total of 13 woredas. All woredas had different number of unions organized under small scale enterprises. Since it is institution based study, more than 30% need to be included in the study. Thus, 38 micro and small enterprise unions from all woredas were chosen randomly. Study subjects were taken from selected enterprise consecutively (Figure 1).

Data collection tool and procedures

Socio-demographic, occupational safety, behavioral conditions, occupational history, and respiratory illness symptoms data were collected by four environmental health officers using structured questionnaire which was adopted from British medical research council's questionnaire (Tennant and Szuster, 2003). Moreover, observational checklist was used in order to assess personal protective devices availability and utilization. The questionnaire was prepared in English and translated to local language.

Statistical analysis

Data entry and analysis were done using Epi info 3.5.4 and SPSS 21.00 version statistical software respectively. Descriptive statistics such as frequencies, percentages and medians were computed to describe variables of the study. Crude Odds ratio with 95% CI in

bivariate analysis was computed to see the presence of association between respiratory symptoms and associated factors. Multivariate logistic regression analysis was used to observe independent effects of associated factors on the respiratory symptoms by controlling the effect of confounders.

Data quality control

Filled questionnaires were checked for completeness and any incomplete information was excluded from the entry. Coded data was entered into Epi info version 3.5.4 computer software package. After the entry of every questionnaire completed, the soft copy of every questionnaire was cross checked with its hard copy to see for the consistency. Cleaned data was exported to SPSS version 21.0 software package for analysis using stat transfer software package.

Ethics approval and consent to participate

The study was approved by Ethics and Review Committee of School of Public Health Research Ethics Review Board, College of Health Sciences, Addis Ababa University. Letter of support was obtained from Addis Ababa city administration, Yeka sub city municipality. Written consent was obtained from study participants in order to collect data.

RESULTS

Socio-demographic characteristics of participants

Out of the total 518 respondents, 180 (34.7%) were

Table 1. Socio-demographic and working condition characteristics of Yeka sub city solid waste collectors (n=518) April 2016.

Variables	Frequency	Percent
Marital status		
Married	281	54.2
Single	128	24.7
Divorced/Separated	87	16.8
Widowed	22	4.2
Educational level		
Illiterate	205	39.6
Read and write	89	17.2
Primary school	184	35.5
Secondary school and above	40	7.7
Family size		
Two and less family	153	29.5
Three to four family	271	52.3
Five and above	94	18.1
Monthly income		
≤973	306	59.1
>973	212	40.9
Work experience		
≤5years	354	68.3
≥6 years	164	31.7

males and 338 (65.3%) were females with 94.5% response rate. The median age was 32 years. Four hundred and fifty three (87.5%) of participants were in the age group of 18 to 40, 205 (39.6%) of participants were illiterate and about 281 (54.2%) participants were married. About 271 (52.3%) had 3 to 4 family size and mean monthly income of participants was 973 Ethiopian birr ranging from 400 to 2000 birr (Table 1).

Occupational safety factors

Three hundred and five (59.0%) of respondents used some kinds of personal protective equipment such as glove, apron, boot and face mask. Out of these Personal Protective Equipment (PPE) users, only 63 (12.2%) used simple cloth made respiratory facemask out of which 53 (10.2%) use it all the time. Two hundred and forty eight (81.3%) of PPE users reported that they were using it all the time. The majority of PPE users, 192 (63%) purchase PPEs for themselves and 111 (36.4%) were provided by NGOs and only few 2 (0.7%) were provided by government. Two hundred and fifty eight (49.8%) had training about occupational health and safety. Out of these 188 (72.9%) on job training and 53 (20.5%) was

first training and about 227 (88.0%) of these workers were trained by government.

Personal protective equipment availability and utilization

On the time of data collection, personal protective equipment whether it was new or porous tears out. Because, it allows dust and fluid perforate into workers body. Those devices not porous and tear out were identified as new personal protective device. Out of 226 observed gloves on workers on duty, 67 (25.0%), 213(80.0%), 106 (40.0%) and 173 (65.0%) were new, water proof, well dressed and perforated, respectively. Out of the total 63 observed, face mask 31 (49.0%) was perforated. Out of 233 overall clothing observed on workers on duty, 182 (78.0%) well dressed, 156 (67.0%) perforated, 78 (33.5%) new, and 37 (7%) workers used boot whereas others used short shoes (Figure 2).

Working condition and behavioral factors

Three hundred and fifty four (68.3%) had work experience

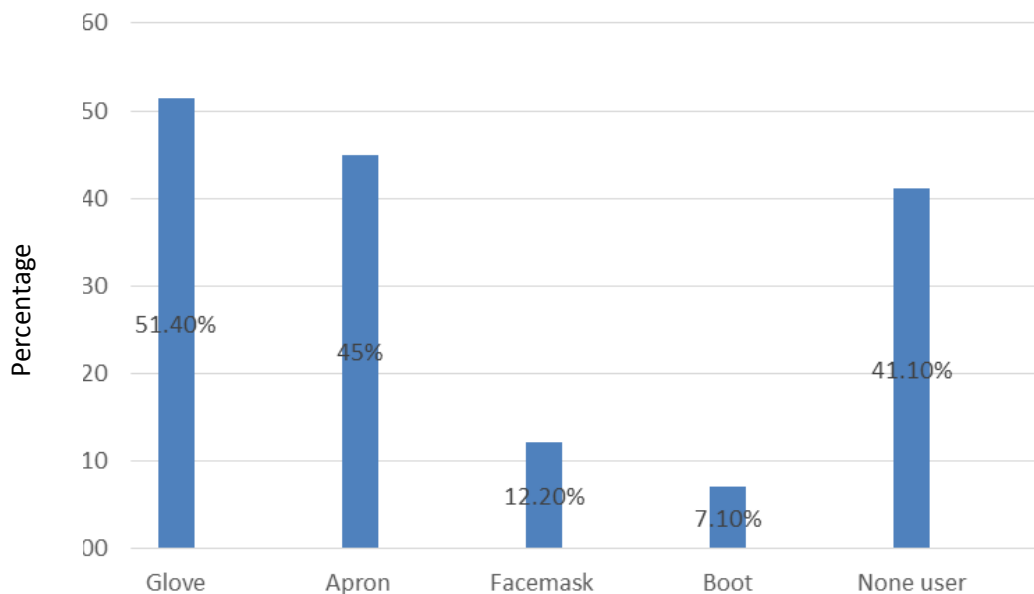


Figure 2. Types of personal protective equipment used by Yeka sub city solid waste collectors.

of five years or less. Forty nine (9.5%) participants were cigarette smokers and around 71 (13.7%) drink alcohol, and 85 (16.4%) had sleeping disorder. Eighty six (16.6%) of participants were not satisfied with the current job (Table 2).

Past illnesses

Participants were reported to have 10.2% bronchitis and asthma, 10.6% other chest trouble before they were employed to this job industry. Few workers reported the presence of heart trouble 6.6%, pneumonia 5.4%, 1.5% pulmonary TB and operation affecting chest, felt by respondents or identified by physicians before and after being employed in solid waste collection (Figure 3).

Prevalence of respiratory symptoms

The overall prevalence of respiratory symptoms among solid waste collectors in Yeka sub city was 40.7% with prevalence of cough 35.7%, wheezing 21.2%, phlegm 44%, chest illness 7.3% and breathlessness 29.2% (Figure 4).

In order to assess the predictor of respiratory symptoms socio-demographic, behavioral, occupational safety and working condition variables on respiratory health symptoms were assessed using logistic regression. All variables that were significant at bivariate level; p value < 0.2 were added to Multivariate analysis.

Multivariate logistic regression analysis revealed that respiratory symptoms prevalence was 2 times less likely

among individuals use facemask on job (adjusted odd ratio [AOR] 2, 95% confidence interval [CI]: 1.1-4). The prevalence of respiratory symptom was 2.6 times more likely among individuals having sleeping disorder (AOR 2.6, 95% CI: 1.5-4.42). The prevalence of respiratory symptoms was 4.8 times more likely among study subjects who had past illness (AOR 4.8, 95% CI: 3.2-7.22), remained significant after adjusting for other socio-demographic, occupational safety and behavioral factors (Table 3).

DISCUSSION

Even though few studies were conducted before among solid waste collectors to assess respiratory symptoms globally, no study was mentioned on the overall (crude) magnitude of respiratory symptoms among solid waste collectors. In this study, the overall prevalence of respiratory symptoms was 40.7% with prevalence of cough 35.7%, wheezing 21.2%, phlegm 44%, chest illness 7.3% and breathlessness 29.2%.

This study revealed that absence of facemask on duty, sleeping disorder and past illnesses were major contributing factors for respiratory symptoms to occur. According to this study, majority of MSW collectors were less adherent to health and safety measures. Thus, giving information about the importance of personal protective measures at the time of enrollment and provision of clean protective device during collection hours might have helped to reduce the exposure to dust and the incidence of respiratory complaints (Abou-EIWafa et al., 2014). Those who never used facemask on duty had 2 times

Table 2. Utilization of PPE and behavioral status of Yeka sub city solid waste collectors April 2016.

Variable	Frequency (n = 518)	Percent
Use of respiratory facemask on duty		
Yes	63	12.2
No	455	87.8
Time facemask used		
All the time	53	10.2
Sometime	10	1.9
First training		
Yes	70	13.5
No	448	86.5
On job training		
Yes	188	36.3
No	330	63.7
Smoking cigarette		
Yes	49	9.5
No	469	90.5
Drinking alcohol		
Yes	71	13.7
No	447	86.3
Chewing chat		
Yes	31	6
No	487	94
Sleeping disorder		
Yes	85	16.4
No	433	83.6
Job satisfaction		
Yes	432	83.4
No	86	16.6
Work experience		
≤5 years	354	68.3
≥6 years	164	31.7
No of working days per week		
≤4 days	38	7.3
5-7 days	480	92.7

higher odds of respiratory symptoms than those who used respiratory facemask after some variables were adjusted. This result was consistent with a study done in Gambia on respiratory symptoms among solid waste collectors in which individuals who never used respiratory protective device significantly associated with the prevalence of respiratory symptoms ($P < 0.05$) (Buba et al., 2014).

Solid waste collectors with past illness had 4.8 times greater odds of respiratory health symptoms than solid waste collectors with non-past illness. This might be because of their socio-economic status. Solid waste collectors recruitment criteria is open for all individuals with low educational background or illiterates are involved. So that municipality pays them low monthly wages

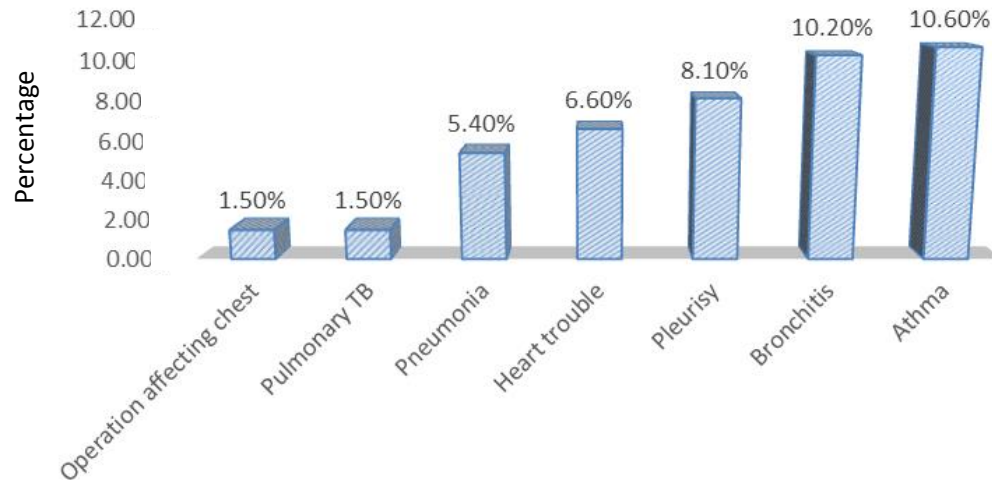


Figure 3. Distribution of past illness.

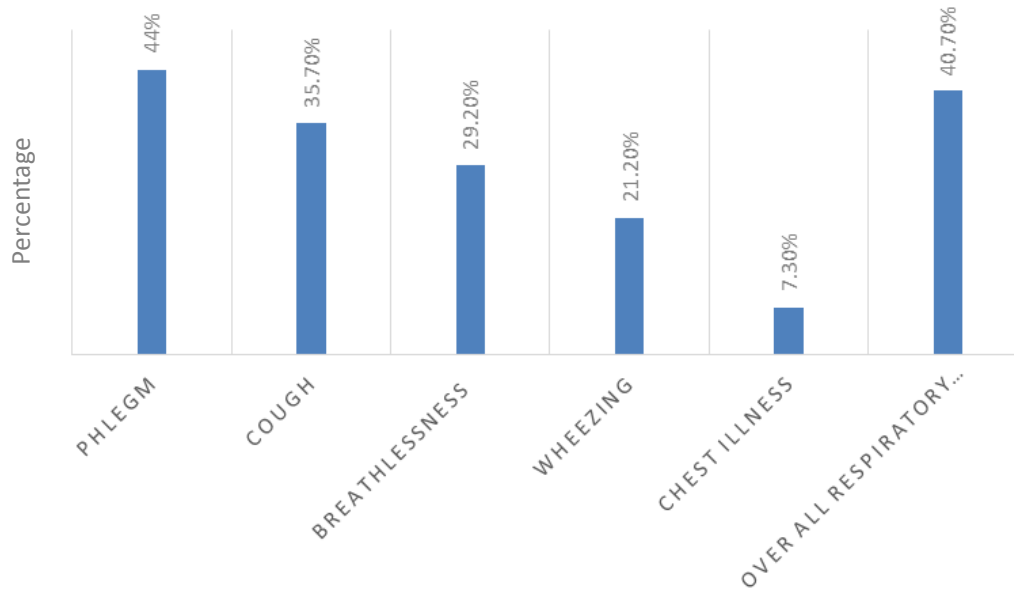


Figure 4. Distribution of respiratory symptom.

according to their educational achievement. They are relatively poor in terms of many and unable to afford the cost of medication and food (which boost their immune system). In addition to this, if the past illness had association with respiratory diseases like bronchitis and asthma make the problem more serious. This finding was inconsistent with a study done in the municipality of Keratsini, a suburb in the port city of Piraeus, Greece (Athanasidou et al., 2010) in which past illness was not significantly associated with respiratory symptoms. This might be because of in the referenced study; number of participants was very small.

Chat chewing, alcohol consumption, smoking and

sleeping disorder were the main psycho-social problems assessed among the workers in this study. Sleeping disorder was significantly associated with respiratory symptoms according to our study. Solid waste collectors with sleeping disorder had 4.2 higher respiratory health symptoms than those with no sleeping disorder. This might be due to an interaction between sleep and respiratory symptoms resulting in permissive effect of sleep on respiratory failure. Similarly, there might be a negative effect of respiratory disease on sleep quality and continuity.

The difference between MSW collectors with normal and those of protecting themselves from respiratory

Table 3. Multivariable models of factors associated with respiratory symptoms among solid waste collectors in Yeka sub city, Addis Ababa, 2016.

Variable	Respiratory symptoms		COR (95 % CI)	AOR
	Yes	No		
Sex				
Male	65	115	1	
Female	146	192	0.743 [0.512-1.079]	0.7 [0.44-1.1]
Age				
18-35	140	201	1	
36-45	60	99	0.87 [0.591-1.281]	0.89 [0.6-1.4]
>45	11	7	2.256 [0.854-5.963]	2.5 [0.82-7.4]
Working days per week				
<=4	20	18	1	
5-7	191	289	0.59 [0.307-1.154]	0.75 [0.36-1.6]
On job occupational safety training				
Yes	95	110	1	
No	116	197	0.682 [0.477-0.975]	0.75 [0.5-1.1]
Use of facemask on job				
Yes	18	45	1	
No	193	262	1.842 [1.034-3.281]	2 [1.1-4]*****
Sleeping disorder				
No	158	275	1	
Yes	53	32	0.347 [0.215-0.561]	2.6 [1.5-4.42]*****
Past illness				
No	91	244	1	
Yes	120	63	5 [3.45-7.5]	4.8 [3.2-7.22] *****

symptoms among all educational categories with impaired pulmonary function tests was statistically significant regarding age, and duration of employment (Abou-ElWafa et al., 2014). In this study, age, work experience and educational status were not statically significant.

Conclusion

In the present study, respiratory symptoms among solid waste collectors were high. Absence of facemask on duty, sleeping disorder and past illness were independent predictors for the prevalence of respiratory symptoms. Therefore, individuals participating in collecting solid west should use facemask while collecting the wastes. Solid waste collectors working time is not appropriate to get healthy rest; it is early morning. So that government should give attention in order to alleviate the prevalence

of respiratory symptoms. Past illness were also one of the factors associated with the prevalence of diseases. So that individuals who ever had history of past illness especially associated with respiratory symptoms should get health information in order to prevent health related problem during enrollment.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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