Original article

Pre-and post-vaccine measles antibody status in infants using serum and oral-fluid testing: an evaluation of routine immunization in Addis Ababa, Ethiopia

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Abstract

Background: Despite the use of measles vaccine, measles incidence in Ethiopia remains a serious public health concern. Progress towards the control of measles requires a national capacity to measure programme effectiveness. This includes evaluation of vaccine effectiveness in infants attending the routine immunization.

Objective: To evaluate the effectiveness of the measles routine immunization activities in Addis Ababa.

Methods: This study evaluated pre- and post-vaccine antibodies in children attending for routine measles immunization in Addis Ababa. Infants who presented to 3 health centres between September-November, 1998 for routine measles vaccination were enrolled in the study. In total 296 infants (median age 9 months) provided blood and oral-fluid samples, of which 230 (77%) returned to provide post vaccine samples (median interval of 15 days). Screening of sera was undertaken using commercial indirect ELISA kits, and of oral fluids using an in-house IgM-capture ELISA.

Results: Pre-vaccination serology showed 1.4% IgM positive, 2.0% IgG positive, and 97.0% seronegative. Post-vaccination seroprevalence of IgM and IgG was 91.3% and 85.0%, respectively, and 92.9% overall. The seroconversion rate was 92.6% (95%CI 88.2-95.7). Based on oral fluid results, 87.3% (95% CI 82.0-91.4) of children showed specific IgM antibody conversion.

Conclusion: These results are in support of the recommended age for measles vaccination in Addis Ababa, and show the merit of oral-fluid IgM screening as a non-invasive alternative to blood for assessing vaccine effectiveness. [*Ethiop.J.Health Dev.* 2003;17(3):149-155]

Introduction

Worldwide, it is estimated that measles kills some 880,000 children annually, a toll more than any other vaccine-preventable disease. The global plan, established by the World Health Organization (WHO) and United Nations Children's Fund (UNICEF), is to cut this burden by two-thirds between 2000 and 2005, and thereafter to prevent 600,000 measles fatalities annually (1). Half of the total deaths are concentrated in three African countries (Congo, Ethiopia and Nigeria) and one Asian country (India). Progress towards the control of measles requires that countries develop national capacity to measure programme effectiveness by which to assess and refine immunization policy. This includes evaluation of vaccine effectiveness in infants attending routine immunization clinics.

The Expanded Programme on Immunization (EPI) in Ethiopia was launched in 1980 (2,3), and offers a single dose of measles vaccine at 9

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months of age. In 1999 the national measles coverage was 53% with uptake ranging from 7-88% (the highest 88% recorded for Tigray region the lowest 7% recorded for Somali region) in the different administrative regions (Source: Department of Family Health, MOH, 2000).

Research has demonstrated oral fluid to yield detectable levels of immunoglobulins (IgG and IgM antibodies) against a wide variety of infections (4-14) using sensitive and specific antibody capture assays. The detection of measles specific IgM antibodies in oral fluid by antibody capture ELISA (MACELISA) has previously been reported in a study of children who received measles vaccine (14). The position of non-invasive antibody testing for measles grows stronger as emphasis on vaccine programme surveillance increases, accompanied by technical developments in oral-fluid assays (13, 14) and favourable evaluations under a variety of settings (14-17).

The aim of this study is to evaluate pre- and post-vaccine antibody in children attending for routine measles immunization in Addis Ababa. Furthermore, we aim to evaluate the use of oral-fluid testing for measles specific IgM as an alternative to serum assays in estimating vaccine response and effectiveness. For this an enhanced measles MACELISA that incorporates an amplification stage is developed.

Methods

Study population: Addis Ababa, the capital of Ethiopia, a population of 2,570,004 (density of 4,847.8/km^2) (18) settled at 2000-2800m altitude above sea level. Administratively there are 6 'Zones' (each divided 4-7 Weredas), and 28 'Weredas' (=district) each with a population of 45,277-153,688. In 1998/99 measles vaccination was given in 7 hospitals, 17 health centres, 9 health clinics, 20 health posts, 104 out reach sites under the Region 14 Health Bureau. The estimated measles vaccination coverage in 1998/99 (1991 E.C.-Ethiopian Julian Calendar) was 86% with variation in the different 'Zones' and 'Weredas'(63-100%). Measles vaccine consumption for the year was 10,250 vials given to 32,548 children aged under one year (Source: Addis Ababa City Government Health Bureau).

Three of 19 Government health centres were selected for the study: one from the centre of the city (Arada), one in the outer city (Akaki), and the third from an area between the centre and outer city (Wereda 25). All infants who presented to these health centres between September-November, 1998 for routine measles vaccination were eligible for enrolment in the study. All the children had received vaccinations of BCG and OPV at birth, and 3 doses of DPT and OPV according to the recommended schedule of the EPI Global Advisory Group (6, 10 and 14 weeks)(19). Informed consent was obtained from guardians by explaining title of the research project, basic information about the disease and objective of the study, information about coordinators of the project and information about how the work was carried out. Permission for this work was obtained from Addis Ababa City Government Health Bureau (No.1370/172) in 29th August 1998.

Sample collection: Blood samples were collected by finger prick using Safety Flow Lancet into Microtainers (Becton Dickinson, Oxford, England). Oral-fluid specimens were collected and processed as described previously (11) by sponge swab collection devices (Oracol: Malvern Medical Developments, Worcester, England) from infants before they received live attenuated measles vaccine (Schwartz strain, SmithKline Beecham Biologicals, Rixensart, Belgium). Mothers were requested to return with their infants two weeks after vaccination for a second oral-fluid and blood sample as recent study demonstrates that the presence of considerable amounts of haemagglutinin-specific antibodies in the serum within the early days (5-10 days) after the onset of rash, which are readily detectable with an ELISA (20). Samples collected were processed at the virology laboratory of the Ethiopian Health and Nutrition Research Institute,

(EHNRI). Specimens were transported on dry ice to the UK for laboratory analysis.

Serum measles IgM/IgG determination: Serum samples were screened for measles virus (MV) specific IgM and IgG by using a commercial ELISA kit (Enzygnost for IgM, and IgG; Behring Diagnostics, Marburg, Germany). In the IgG ELISA optical density (OD) readings of <0.100, >0.200 and between 0.100-0.200 obtained from 1:231 IgG serum dilution considered as negative, positive and equivocal respectively. The limit of the IgG detection of the test is 150 mIU/ml, equivalent to an OD of 0.100. Similarly, in the IgM ELISA OD readings of <0.100, >0.200 and between 0.100-0.200 obtained from 1: 42 IgM dilution were considered as negative, positive and equivocal respectively. Serum screening was undertaken at EHNRI.

Oral-fluid MV IgM detection: MV specific IgM in oral fluid was determined by MACELISA, which was a modification of the FITC/anti-FITC IgG capture ELISA (GACELISA) described previously (13). A description of these modifications follows. Wells of microtitre plates (Maxisorb "U" wells, Life Technologies, Paisley, UK) were coated with 100µl of a 11.2 g/L solution of rabbit anti-human IgM serum (Dako, Ely, UK) diluted 1:3000 (as this dilution factor was found optimal during developmental (optimisation) stage of the assay) in 0.05M carbonate/bicarbonate buffer, pH 9.6. Plates were then incubated with 100 µl undiluted oral fluid samples after blocking with 200 µl of 5% Sol-u-pro (Dynagel Inc., Calumet City, IL). After addition of measles antigen, anti-measles haemagglutinin monoclonal antibody-FITC conjugate (Chemicon Inc., Temicula, CA., USA) diluted 1:3000 (instead of 1:4000 for GACELISA). Anti-FITC horseradish peroxidase conjugate and TMB were then added and the reaction stopped by adding 100 ul of 0.5M HCl. Oral-fluid MV IgM detection was carried out at Central Public Health Laboratory (CPHL), UK.

OD results from the MACELISA were expressed as T/N ratios (test sample OD /negative control OD) in order to have results fall, from negative to strong positive, represents the "dynamic range" of an assay. The receiver operating characteristics (ROC) curve was generated (21) to determine the appropriate cut-off T/N value (set to the maximum sensitivity and specificity relative to serum results). For assays designed for determining immunity in the population, a more appropriate and accurate cut-off can be set using a statistical techniques such as ROC. Relative to serum IgM results (excluding equivocal results), the MACELISA was 93.6% (190/203) sensitive and 93.4% (284/304) specific, using a T/N ratio of 1.14. T/N ratios less than the cutoff value (1.14) were considered negative in the analyses.

Statistical analysis: Analysis was conducted using STATA V7.0 (Stata Corp, College Station, Texas, USA). Comparison between median ages uses the non-parametric Kruskall-Wallace test (with ties). Estimates of the proportions serpositive for either IgM or IgG excludes samples with equivocal results. Overall proportions based on serum specific IgM or IgG results exclude only samples equivocal by both tests. Estimates of seroconversion are derived from the proportion of individuals specific-antibody negative pre-vaccine whose status changes to specific-antibody positive post-vaccination. Proportions seropositive are compared using Fisher's Exact test. Exact binomial confidence intervals are calculated for prevalence estimates.

Results

A total of 296 infants were recruited with median age 9 months (m, range 5-40 m) all providing a blood and an oral-fluid sample. The number and median age of individuals attending Akaki, Arada and Wareda 25 clinics were, 86, 9m, 41, 9m and 169, 10m, respectively (median ages did not differ between clinics: $\chi^2_{(2)}$ 5.235, P=0.073). Of the 296 recruits, 230 (77%) returned to provide post-vaccine samples (median interval of 15 days, range 14-46 days) oral-fluid and blood.

Results of the measles-specific IgG and IgM tests on serum samples from pre- and post-vaccinated children are shown in Table 1. Seroprevalence estimates were made excluding equivocal results. Pre-vaccination, 1.4% of children were IgM seropositive and 2.0% IgG positive. Post-vaccination seroprevalence of IgM and IgG was 91.3% and 85.0%.

Table 1: **Seroprevalence of measles antibody status (IgM and IgG) in the pre- and post-vaccinated children in Addis Ababa, Ethiopia 1998.**

	IgM		IgG	
Results	Pre-vacc.	Post-vacc.	Pre-vacc.	Post-vacc.
Positive	4	199	6	170
Negative	285	19	290	30
Equivocal	6	9	0	28
NT[a]	1	3	0	2
Total	296	230	296	230
Proportion[b]	1.38 %	91.3 %	2.03 %	85.0%

[a] NT = Sample collected but not tested because of insufficient serum
[b] Proportion = Number Positive / Number (Positive + Negative)

Of the 4 pre-vaccination IgM positive samples, 3 were IgG negative (2 aged 9m and 1 age 10m) and one high titre IgG positive (age 9m). All the 4 samples were repeated by Behring serum IgM ELISA and found to remain positive. Of 6 pre-vaccination IgM equivocal results all were IgG negative. Of 6 pre-vaccine sera that were measles-specific IgG positive, 5 had high titres (>900mIU/ml), three of which were aged 9m, one 10m and one 11m. One of the 5 was IgM positive, and one (age 10m) had low level antibody (296mIU/ml) for which the paired post-vaccine sample showed a greater than fourfold rise in titre (ie suggesting this individual had residual maternal antibody).

Of 19 children specific-IgM negative post-vaccination, in pre-vaccination samples 5 were IgG positive and one other was IgM positive. Of 9 post-vaccination IgM equivocal samples, all were IgM and IgG negative pre-vaccine and, post-vaccine, 2 were IgG equivocal and 2 were IgG positive. The time between the pre- and post-sample collection for the 2 IgG positive specimens was 15 and 9 days. Post-vaccine, there were 30 samples negative and 28 equivocal for measles specific-IgG; results which should be interpreted in relation to the short interval (median of 15 days) between vaccination and second sample collection. Of the 30 samples IgG negative post-vaccination, pre-vaccination, none were IgG positive, 1 was IgM positive and 2 had equivocal IgM status.

Overall prevalence and antibody conversion rate for the sera (based on IgG and IgM results) and oral fluid are presented in Table 2. Exact binomial 95% confidence intervals (CI) are shown. There was no significant difference between the three clinics in seroprevalence pre-vaccination (Fisher's Exact P=0.066) or post-vaccination (P=0.752). Compared with serum estimates, oral-fluid prevalence was nearly 4% higher pre-vaccine, and 6% lower post-vaccine, although these differences were not significant (95% confidence intervals on prevalence estimates overlap). The overall antibody conversion rate for serum was 92.6% (200/216), which was higher (but not significantly higher) than for oral-fluid, 87.3% (185/212).

Table 2: **Overall antibody prevalence and conversion rate in vaccine recipients in Addis Ababa, Ethiopia 1998.**

Sample type	Pre-vaccine % (positive/total) 95% CI	Post-vaccine % (positive/total) 95% CI	Antibody conversion % (converters/total) 95% CI
Serum	3.04% (9/296) 1.40%-5.69%	92.9% (208/224) 88.7%-95.9%	92.6% (200/216) 88.2%-95.7%
Oral fluid	6.76% (20/296) 4.18%-10.2%	86.9% (199/229) 81.8%-91.0%	87.3% (185/212) 82.0%-91.4%

Discussion

Pre- and post-vaccination status of childrenBI: Assessment of vaccine recipient children (median age 9 months) at three representative vaccine clinics in the city of Addis Ababa, showed an absence of measles-specific IgM and IgG antibody in 99% and 98% of serum samples, respectively. Considering either antibody class, the data suggest that 97% (95% CI 94-98%) of the children attending for routine (9 months of age) measles vaccination would respond to vaccine. Following measles vaccination the seroconversion rate (based on either antibody class) was 93% (95% CI 88-96). Children attending for routine measles vaccination had a median age of 9m; only 5% were less than 9m and 10% were 1 year or above. Together these results indicate a highly successful routine immunization programme. The present seroconversion rate study confirms vaccinating children at age 9 months in the Ethiopia setting is in accordance to the WHO recommendation (22) and previous mathematical model studies made for developing countries (23-25).

A full assessment of whether or not the present age at immunization is optimal should consider the prevalence of residual maternal antibodies and proportion with evidence of recent infection in samples from infants attending for routine vaccination. In this study, of 15 samples that were positive or equivocal for serum measles-specific antibody prior to vaccination, only 1 appeared to indicate the presence of residual maternal antibody (low specific-IgG titre with subsequent four fold rise post-vaccination). In contrast there were 8 pre-vaccine serum samples specific-IgM positive and/or high specific-IgG titre positive, indicative of recent infection (6 aged 9m, and 1 each aged 10 and 11m). These results suggest that at the routine target vaccination age a negligible proportion of infants have residual maternal antibody, but a small but significant proportion (8/296=2.7%) have been exposed to measles virus. This is, at least, an indication of the need to discourage any delay in bringing children for measles vaccination beyond the appointed age.

The present study was primarily designed to investigate the development of measles virus specific IgM antibodies with an average interval of 15 days between receiving vaccination and the collection of second samples. Consequently the results yield a high proportion of serologically negative and equivocal IgG results post-vaccination, compared to IgM data, as IgM antibodies are produced initially followed by IgG. Taking IgM serological data alone yields a serconversion estimate of 90%, only marginally lower than that based on IgG and IgM results.

Serum/oral fluid comparison: The detection of oral fluid specific IgM for measles virus by antibody captures ELISA in pre- and post-vaccinated infants has been previously described (14). The present work a new MACELISA test is described that employs a FITC/anti-FITC amplification system (26) to enhance the sensitivity of the oral fluid assay to a level comparable to that of the corresponding 'gold standard' serum testing using a commercial kit. Using this amplification system, adequately sensitive and specific measles and rubella virus specific IgG oral fluid assay methods have been developed (12, 13). The IgM assay developed in this study

demonstrated 93.6% sensitivity and 93.4% specificity, which is comparable to the results of 91% sensitivity and 95% specificity found in a previous oral-fluid testing study (14). Based on oral-fluid samples screened using the MACELISA, an estimate of specific antibody conversion of 87% (82-91) was obtained. Although lower than the overall serconversion rate obtained by Behring ELISA, the result is not significantly lower. With such performance the oral-fluid testing method (MACELISA) would be of use for measuring measles antibody prevalence in pre- and post-vaccine infants.

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Original article

The potential role of the private sector in expanding postabortion care in Addis Ababa, Amhara and Oromia regions of Ethiopia

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Abstract

Background: Unsafe abortion is a major contributor of maternal mortality and morbidity in Ethiopia. High disease burden and underdeveloped infrastructure entail involvement of all partners in responding to health needs in the country. The private sector has apparently not been exploited to the fullest extent so far.

Objective: To assess the potential of private facilities in expanding access to postabortion care (PAC).

Methods: A cross-sectional study of private health facilities in Addis Ababa, Amhara and Oromia was conducted in 2001-2, using a pretested questionnaire and a checklist.

Results: We assessed 88, 31 and 32 facilities in Addis Ababa, Amhara and Oromia, respectively. Treatment was provided by 44%, 52% and 63% of the eligible facilities in Addis Ababa, Amhara and Oromia, respectively. Manual vacuum aspiration (MVA) was used in treating 61% of Addis Ababa patients whereas sharp curettage was used in over 80% of those in Amhara and Oromia. About 80% of women did not get postabortion family planning methods. Patient-provider interaction was generally satisfactory. High-level disinfection (HLD) of non-autoclavable instruments needed improvement. All medium and above clinics have at least one GP and many have nurse/midwives. The vast majority of facilities not giving the service would like to provide comprehensive PAC if staff are trained and equipment made available in the market.

Conclusion: Private health facilities can contribute substantially if given the necessary guidance and support with proper monitoring and evaluation. [*Ethiop.J.Health Dev.* 2003;17(3):157-165]

Introduction

Factors related to pregnancy and childbirth contribute to the death of nearly 600,000 women annually throughout the world (1). Of these, 99% occur in developing countries, unsafe abortion being a major cause. In many developing countries, unsafe abortion is the cause for one in every four maternal deaths, and in some countries as high as 50% (1).

In Ethiopia, maternal mortality ratio (MMR) estimates range between 500 and 1,400 per 100,000 live births (2, 3, 4). One out of every seven women in Ethiopia dies due to pregnancy related causes with more than 50% resulting from unsafe abortion, thus making Ethiopian women at the highest reproductive risk in the world (3). Both community and hospital based studies in Addis Ababa attest to this dire situation, with rates of 25-35% deaths due to unsafe abortion (5, 6). Investigators in other parts of the country have reported higher figures of 27% to 41% (7, 8).

Ethiopia is among 25% of the countries in the world where abortion is restricted by law (9). On the other hand, family planning services continue to be poor, with recent contraceptive prevalence rates (CPR) less than 20% (10,11). Low CPR has been shown to be a contributing factor to unwanted pregnancy often resulting in

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unsafe abortion (12, 13). This might explain the observation that nearly 92% of abortions in an Ethiopian setting were attributed to induced abortion (6).

The situation thus calls for interventions from several angles. Efforts should be made at increasing the Contraceptive prevalence rate (CPR) and expanding prompt and effective maternal health services, including postabortion care (PAC).

The Ethiopian Health Policy states strengthening health services to mothers and children as a priority (14). The Ministry of Health (MOH) has clearly indicated its intentions to expand and strengthen sexual and reproductive health services (15), with PAC as a key component. While the number of health facilities, particularly health centers (HCs) and health posts, has increased substantially, lack of skilled staff, equipment and supplies has limited the benefits (16). The Ethiopian Government, having recognized these gaps, has included other partners in the provision of health care. The Health Sector Development Program II (2002/03-2004/05) upholds the participation of the private sector (17). Such encouragement of the private sector fits well into the global trend of public-private partnership (18-20). Nigerian and Kenyan initiatives have shown encouraging results in this regard (21,22). The advantages of such partnership in Ethiopia, in view of the substantial number of private health facilities (11), cannot be overemphasized.

In order to determine the potential of private health facilities in contributing towards an improved access to PAC, we made a situation assessment in Addis Ababa, Amhara and Oromia, which are currently Ipas focus regions (Fig. 1). In this paper we present the findings of the survey.

Objectives of the assessment

1. To study the situation of PAC services in private health facilities.
2. To assess the potential of the private health sector in expanding PAC.

Methods

Since the organization and distribution of private health facilities in Addis Ababa differs from the less urban sites in Amhara and Oromia, different sampling strategies were employed.

1. Addis Ababa: A two-stage sampling was employed. The 6 zones were the first stage units of which 3 were selected. Since the number of private clinics in each zone varied widely, sampling was made with probability proportionate to size. Out of approximately 226 private facilities capable of doing uterine evaluation (UE) at the time of the study, 31.4% (71) were included. Besides, 17 lower level clinics were also assessed to see what the non-eligible ones do when faced with cases of incomplete abortion. Data was collected from June to August 2001, using a pre-tested questionnaire with both open and closed-ended questions and walkthrough of the facilities guided by a checklist. Sections of the survey instrument consisted of General Information, Abortion Care Clinical Services, Equipment and Supplies, Training Level of Staff in PAC, Postabortion Family Planning, and Service Statistics. Data collectors were Ob/Gyn specialists who interviewed providers and made walkthrough of the facilities. Any PAC provider or other knowledgeable person present in the facility at the time of visit was interviewed, failing which repeat visits would be paid. There was neither patient interview nor observation of uterine evacuation procedures.

2. Amhara and Oromia: Since the number of potentially eligible private health facilities was relatively lower in the 2 other regions (48 in Amhara, 126 in Oromia) and due to logistic factors in terms of time and money, convenience sampling, having the disadvantage of introducing bias, was employed. The assessment in the 2 regions was carried out using the same instruments as in Addis Ababa, from April to June 2002.

3. Definition of PAC:
Defined briefly, PAC includes emergency treatment of abortion complications, counseling on family planning combined with provision of contraceptive methods, access to the reproductive health care system, and linkage to community based services.

Results

Study facilities: Table 1 shows the number and proportion of private health facilities assessed. Out of 88 health institutions assessed in Addis Ababa, 71 (81%) were of medium and above level, thus being capable for treating cases of incomplete abortion. The remaining 17 were lower level. Comparable numbers of 31 and 32 clinics were assessed in Amhara and Oromia, respectively, with relatively fewer higher clinics in both.

Table 1: **Category and number of private health facilities assessed by region, 2001/2.**

Category* of health facilities	Number and % by region			*Total*
	Addis Ababa	Amhara	Oromia	
General hospital	4 (4.5)	-	-	4
Maternal and child health center	4 (4.5)	-	-	4
Gyn/obs clinics	2 (2.3)	-	2 (6.3)	4
Higher clinics	32 (36.4)	3 (9.7)	6 (18.8)	41
Medium clinics	29 (33.0)	28 (90.3)	24 (75.0)	81
Lower clinics	17 (19.3)	-	-	17
Total	**88 (100.0)**	**31 (100.00)**	**32 (100.0)**	**151**

Brief note on categories:

1. **General hospitals** have ≥ 20 beds, have physicians, nurses and other auxiliary staff, and give 24-hr service in major disciplines of medicine including Gyn/Obs.
2. **MCH Centers** are mainly outpatient, but could have a few beds, usually have Gyn/Obs specialist and nurses and cater for mothers and children.
3. **Gyn/Obs clinics** are equivalent to MCH centers but exclusively for women
4. **Higher clinics** have few beds, are run by specialists and/or have few GPs, have nursing staff, and are permitted to do UE.
5. **Medium clinics** have a GP or health officer responsible for clinical services, usually has a couple of nurses and other auxiliary staff, and are capable of doing emergency UE.
6. **Lower clinics** are run by nurses or other midlevel providers, are expected to stabilize patients with abortion complications and refer to higher level; they are not permitted to do UE.

Access to postabortion care: Out of the 71 eligible private facilities in Addis Ababa, nearly 44% (31) are providing emergency UE. All the 17 lower level clinics are limited to referring patients. On the other hand, about 52% (16/31) of the private clinics in Amhara and 63% (20/32) of those in Oromia are providing emergency UE. All the private hospitals and maternal and child health (MCH)/Ob/Gyn centers in the 3 regions treat incomplete abortion cases, whereas about 40% of higher and medium clinics in Addis Ababa do so. All the higher-level clinics in Amhara and nearly 80% of the ones in Oromia provide UE. Of the medium clinics that have at least one medical doctor, 46% and 50% actually do UE in Amhara and Oromia, respectively. When asked if they were interested in providing UE, nearly all of the respondents in clinics that are capable but not giving the emergency service expressed interest to do so if staff were trained and equipment were made available in the market.

Method of uterine evacuation: We looked at the number of patients that were treated for incomplete abortion over the one-year period preceding the day of visit to each health facility. Table 2 shows that manual vacuum aspiration (MVA) technique was employed more frequently (61%) than sharp curettage (31%) to treat 2184 patients in Addis Ababa private facilities. Seventy-four percent of the

Table 2: **Method of UE in Addis Ababa, Amhara and Oromia private health facilities, over a one-year period (2001/2).**

Region	Total number of patients in 1 yr	Number (%) of patients by method of UE	
		Sharp curettage	MVA
Addis Ababa	2184	852 (39.0)	1332 (61.0)
Amhara	477	398 (83.4)	79 (16.6)
Oromia	521	422 (81.0)	99 (19.0)
Total	**3182**	**1672 (52.5)**	**1510 (45.5)**

MVA procedures were done by 2 of the 4 MCH centers. In contrast, less than 17% (79/477) and Oromia were treated using MVA, respectively.

Staffing and staff training: In Addis Ababa, 80% (25/31) of those facilities providing emergency UE had one Gyn/Obs specialist either full time or part time. This is in sharp contrast to Amhara and Oromia clinics where only 37.5% (6/16) and 45% (9/20) of such facilities have these specialists. Luckily, all medium and higher clinics have at least one GP who could provide UE. Nurses and midwives were not found to be primary providers of emergency UE in the facilities assessed. A closer look at the primary UE providers (those who actually do the evacuation) shows a rather low level of training in PAC in all the 3 regions. (Table 3). MVA and postabortion family planning (PAFP) were selected as indicators of training since they may not be covered adequately in pre-service curricula.

Table 3: **Training status of UE providers in selected components of PAC, in Addis Ababa, Amhara and Oromia, 2001/02.**

Region	Number of primary* providers	*Area of training*			
		MVA		PAFP	
		Number	(%)	Number	(%)
Addis Ababa	38	14	(36.8)	11	(28.9)
Amhara	28	6	(21.4)	12	(42.9)
Oromia	33	9	(27.2)	12	(36.4)
Total	**99**	**29**	**(29.3)**	**35**	**(35.4)**

Primary providers are those that actually do the UE procedure.

Postabortion family planning(PAFP): About 52%, 100% and 25% of private health facilities providing UE also run regular family planning programs in Addis Ababa, Amhara and Oromia, respectively. Of the 31 facilities doing UE in Addis Ababa, only 1 medium and 1 higher clinics, and 5 hospitals or specialty clinics actually provided PAFP methods frequently or always. In Amhara, 5 medium and 1 higher clinics provided a method, while in Oromia only 3 (2 medium and 1 higher) facilities did so. Although all health facilities reported conducting postabortion family planning counseling (PAFPC), very few actually provide FP methods. Less than 21% (99/477) of the patients in Amhara and about 11% (57/521) of those in Oromia received an FP method.

Quality of postabortion services: We looked into the major components of quality of care. Pain control medications were given by just over 70%, 81% and 50% of the private facilities in Addis Ababa, Amhara and Oromia, respectively. The average waiting time before procedure was 1.25 hours in all 3 regions. None of the clinics had written protocols on UE

procedures, nor did they have standard logbooks.

Patient-provider interaction was generally reported to be high in all 3 regions, with the exclusion of asking for consent where only 58%, 23% and 40% of the patients were asked in Addis Ababa, Amhara and Oromia, respectively.

Over 90% of the private health care providers in Addis Ababa wear pairs of gloves for bimanual exam and evacuation procedures, while the rates are 70% for Amhara and 85% for Oromia. Sterilization of instruments using autoclave was up to standards, but when it comes to high-level disinfection (HLD), deficiency was observed. Reusable instruments were first rinsed in water and soap or detergent such as savlon, with no proper use of the widely available chlorine solution, locally known as 'Berekina'.

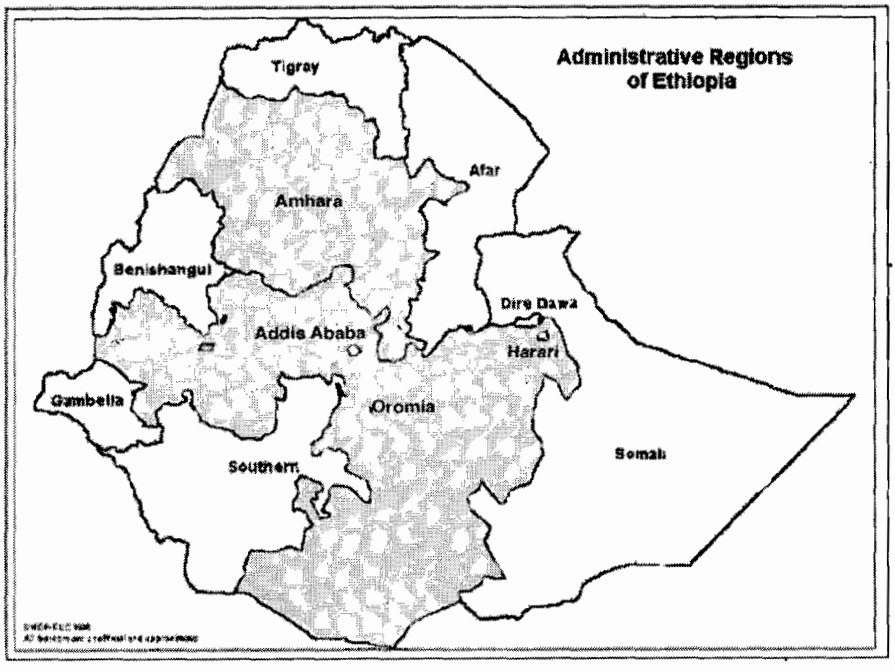

Figure 1: **Map of Ethiopia showing the study regions (shaded)**

Discussion

The significance of the contribution of private health facilities in the expansion of access to postabortion care in the three regions assessed cannot be overemphasized, especially in the face of the high burden of consequences of unsafe abortion on the health sector (23).

In Addis Ababa, all the public hospitals studied are providing UE while none of the HCs were doing so (24). This contrasts with the private sector where all the private hospitals and 31% of private clinics are providing the service. The situation in Amhara and Oromia is better since 52% and 63% of the private facilities assessed are providing UE. In terms of staffing, HCs and most private medium and above level clinics have health care workers capable of providing emergency UE. However, if both groups of public and private health facilities continue

referring patients, hospitals could be congested, efficiency compromised, and lives lost.

Emergency UE can be done with MVA or sharp curettage. However, according to studies done elsewhere and in Ethiopia, the supremacy of manual vacuum aspiration (MVA) over sharp curettage in terms of safety and effectiveness, in the treatment of incomplete abortion during the first trimester, has been well established (1,25-28). Our findings indicate that MVA is used by a few private health facilities. This is similar to reports of public sector studies in Ethiopia and South Africa (24,29). In the case of Addis Ababa, however, 2 MCH centers actually did 70% of the MVA procedure, the remaining 30% being done by 29 other facilities. This could be attributed to the presence of senior and highly skilled providers who have had the training in MVA technique. The use of MVA in Addis Ababa private health facilities sharply contrasts with that of the public sector, which is only 5% (24). The main reasons for not using MVA in the remaining private clinics were lack of trained staff and unavailability of MVA equipment in the market. Thus, the potential for making the technique much more widely available through the private sector is real, provided concrete action is taken towards this.

On the other hand, the use of MVA in private clinics in Amhara and Oromia regions was much lower as compared to Addis Ababa. Such a scenario is not unexpected since there is a tendency for concentration of highly seasoned professionals in Addis Ababa. The pattern of use of MVA in the public health facilities was minimal in all the three regions (24).

The vast majority of patients in all 3 regions go home without getting any family planning method. In view of the very low contraceptive prevalence rate in Ethiopia (10, 11), one may not find the low postabortion contraception surprising. But, it has to be looked from the perspective of a woman coming with a life threatening emergency and going back carrying the risk of recurrence due to another unwanted pregnancy, even during the following 2 weeks. PAFP has been proven to decrease the likelihood of repeat abortion that results from unwanted pregnancy (30). The lack of integration of PAC with other reproductive health services perpetuates the problem of unsafe abortion. Interestingly, 100% of providers doing emergency UE claimed to counsel women and advice them on where to get contraceptive methods. But, this is not a guarantee at all, and the best way to assure would have been giving the method chosen by the woman on the spot.

As might be expected, the major contributor to a rather weak or absent PAC is the lack of trained providers. While the majority of those trained in PAC in private clinics are concentrated in Addis Ababa, only few have been trained in the other regions. Besides, the exclusion of nurses and midwives from providing emergency UE services has further accentuated the problem. A lot remains to be done in this regard. The situation is not much different in the public sector (24). Training combined with availability and accessibility of equipment in the market are essential steps that need to be considered. Capacity building of private providers has proven useful in obstetric emergencies in Nigeria and Kenya (21,22) and we have all the reason to expect similar outcomes in Ethiopia.

An average of 75 minutes waiting time for a woman with incomplete abortion before getting UE treatment is too long for an emergency situation, although shorter than in public facilities (24). The procedure should be done within a few minutes in order to have a smoother post-procedure course. A patient coming to a health facility with a life-threatening condition such as incomplete abortion needs a supportive environment. Luckily, most private providers reported good interaction with their patients. This is in contrast to the public facilities in which fewer were having good communication. The use of pain control medication during UE procedure was reasonably high in private clinics as compared to public providers, the latter

complaining of shortage of drugs. One may not be surprised, as the general trend for private providers is to keep their clients satisfied (19). The study shows that the key element of getting consent of the patient before any procedure is deficient in the private clinics as is true for the public sector (24). The explanation could be attitude of providers that whatever procedure they do is in the best interest of the patient, thus obviating the need for consent. This is against standard clinical practice in which the provider is required to get patient's consent before any procedure.

Non-autoclavable instruments need to undergo high-level disinfection (HLD), with the observation of appropriate steps. However, equipment like MVA and accessories, were almost universally rinsed in soap and water immediately after procedure, thus showing a possible deficiency in the training of staff. The recommended steps are, in brief: decontamination with 0.5% chlorine solution (locally known as Berekina) for 10 minutes immediately after use, cleaning with liquid soap and water, and HLD with 0.5% chlorine for 20 minutes, and rinsed with sterile (boiled and cooled) water (31). The instruments should then be used immediately or stored in a sterile container for a maximum of one week. A strength that came out in this assessment was the employment of proper sterilization techniques using autoclave. Some 30% or more of the providers wore sterile gloves only on one hand while doing bimanual pelvic examination. This was under the perceived or real pretext of shortage of supplies. Hence, infection prevention requires revisiting.

Record keeping and reporting were either absent or very poorly done at best. An example is one big private health facility that is renowned for its PAC services that did not keep records. The poor recording may be a result of keeping the number of patients served deliberately low for various reasons. However, the most palatable reasons are lack of training and shortage of staff.

A discussion of quality of care is incomplete without considering referral. Although 45% of Addis Ababa private facilities assessed claimed to provide transportation to patients, it is not known how many of the patients actually reached the appropriate center in time. The situation could be worse as we go to rural areas where transportation is even much scarcer. Thus, the referral system in place is probably not responding to actual needs, in turn calling for making the service available closer to the community.

Conclusion and recommendations

This study has shown that the private sector can substantially improve access to quality postabortion care. The majority of facilities assessed have expressed interest in improving their service to patients with incomplete abortion if providers get training and equipment is made available in the market. Thus, efforts should be made to exploit the good will of the private facilities capable and legally eligible to do UE in alleviating the burden of abortion-related morbidity and mortality. Making policy changes to allow nurses and midwives to do emergency UE as midlevel providers needs to be considered. The status of HLD requires serious intervention through training and strong supervision by the respective health authorities in order to minimize if not eliminate any risk of transmitting infection.

The study has a gap of not having the views and experiences of patients that could have helped in substantiating claims of providers. Also, actual UE procedures were not observed. Therefore, future studies need to include patient exit interviews and procedure observation for a more complete picture, especially with respect to the quality of care.

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Original article

Fertility awareness and post-abortion pregnancy intention in Addis Ababa, Ethiopia

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Abstract

Background: Abortion related complications are known to be among the leading causes of maternal mortality and disabilities in developing countries.

Objectives: The aim of the study was to assess the knowledge of post-abortion patients, regarding return of fertility and pregnancy intentions.

Methods: Cross sectional study was undertaken in four government hospitals in Addis Ababa, Ethiopia from November 2001 to February 2002. Four hundred post-abortion cases were interviewed at the point of their discharge to get information on their fertility awareness and future pregnancy intentions.

Results: Seventeen percent of the respondents who reported that the pregnancies were unwanted admitted some kind of interference with the pregnancy. Thirty six percent reported that they were assisted at clinics for inducing the abortion. Overall about 82% of them reported not having a plan to become pregnant in three months period following the abortion. Seventy three percent of them were not able to tell the time at which they could become pregnant if involved in sexual intercourse after the present abortion.

Conclusion: This study revealed the urgent demand for quality services that should include education and provision of family planning counseling and methods. [*Ethiop.J.Health Dev.* 2003;17(3):167-174]

Introduction

Each year above half a million maternal deaths occur due to preventable pregnancy related complications. The developing world is disproportionately more affected than the developed. From the direct causes of maternal deaths, complications of abortion stand their accounting for 13% of the overall causes of maternal deaths (1,2). Abortion is known to cause serious short term and long-time negative health consequences including death (3). Studies done in Ethiopia have shown that abortion is a major public health problem being the most common cause of maternal mortality and morbidity (4-14). It was reported that significant hospital resources in the country are wasted on care for abortion.

A recent nationwide study on abortion related complications has shown that an estimated number of 17 patients are seen in hospitals for postabortion complications in a month (4). According to this study, complications due to abortion were also reported from low-level facilities, which do not provide postabortion care services. From a community based large-scale survey in Addis Ababa, maternal mortality in the city was estimated to be 566 per 100,000 live births and abortion was major contributor to the deaths (5). Taddesse et al indicated that the frequency of abortion per delivery to be 317.8/1000, and induced abortion consumed significant resources due to higher rate of complications (6). Studies done in

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different hospitals out of Addis Ababa have also shown that abortion is a major health problem encountered (7-12).

Few community-based studies have also reflected the same reality. Out of 489 giving previous history of pregnancy in Addis Ababa, 113 (23%) had live births, 4 (0.8%) had stillbirths, 10 (2.0%) had spontaneous abortions, and 362 (74%) had illicit abortions (13). Another study showed that lifetime history of abortion in a northern rural community of Ethiopia to be 20.8% (14), with mean number of abortion per woman being 1.8 ranging from 1 to 9. In most of the cases, reasons given for the unwanted pregnancies culminating in induced abortions were economic, being on education and too close or too many pregnancies or deliveries.

Unsafe abortion in Ethiopia, like in many other African countries, is characterized by inadequate provider skills, hazardous techniques and unsanitary facilities. Either the woman herself or unskilled provider attempts termination by inserting foreign bodies or instruments or by the woman ingesting modern or traditional medicines (15). Studies have indicated that abortions take place at homes of the patient or the inducers and also in health facilities. Those who admit interference usually use plastic tubes, metallic instruments, different medication used orally, vaginally or intravenously for induction (6, 10-12). Studies have reported that health workers varying from physicians to traditional birth attendants were involved in induction (6,11).

According to different studies on women seeking treatment for abortion complications, few of them used any of the modern contraceptive methods despite adequate knowledge of availability of family planning services (6, 10, 16). There is no data on the level of fertility awareness of women in reproductive age group in general and women experiencing abortion in particular in Ethiopia. But findings from other countries indicate that women are often unaware of the timing of fertility return after abortion could be as early as two weeks and often confuse it with postpartum period (17).

The main aim of this study was to assess the knowledge of postabortion patients regarding how soon fertility could return after abortion and to assess their future pregnancy plan after the last abortion. To assess the pattern of abortion overtime, the study also looked at the socio-demographic characteristics of the patients, underlying causes for abortion and settings under which unsafe abortion took place. The study is believed to provide information that will enable planners to design services that minimize lost opportunities.

Methods

This was a cross-sectional study on abortion in four government hospitals (Tikur Anbessa, Zauditu Memorial, Gandhi Memorial and Yekatit 12) in Addis Ababa. All hospitals providing postabortion care, but Saint Paul, which was under renovation at the time of the study were included in the study.

To achieve the maximum sample, the sample size was calculated based on an assumption that 50% of the abortion cases seek postabortion service. Using single proportion formula with marginal error of 5% and adding 10% for non-response, 422 patients were required. Consecutive cases were interviewed until the required sample was obtained just before discharge from respective hospitals for a period of four months, namely November 2001 to February 2002. According to WHO classification of abortion (18), only those who admitted interference (certainly induced abortion category), were categorized as induced abortion in this study otherwise they were taken as spontaneous. Cases with severe illness who were unable to participate during the study period were not included in the study.

Five twelve-grade complete non-health professional female interviewers were recruited for data collection. Training on data collection was given for one week and the questionnaire

was pre-tested. The questionnaire had two major sections: (i) *Socio-demographic* comprising of age, marital status, educational status and occupational status, and (ii) *Reproductive history and family planning background*: previous pregnancy, deliveries, abortion, FP knowledge and practice, knowledge on how soon fertility returns and plan for next pregnancy. Ethical clearance was obtained from the Research Ethics Committee of Faculty of Medicine, Addis Ababa University. Verbal consent was obtained from each patient for participation in the study. Privacy and confidentiality were ensured during the exit interview.

SPSS version 10 was used for data entry, cleaning and analysis. Frequencies, percentages, means (SD), odds ratios and 95% confidence intervals were used to present the findings.

Results

Four hundred and one (95%) postabortion cases (193 (48.1%) from Gandhi Memorial Hospital, 82(20.4%) from Tikur Anbessa Hospital, 71(17.7%) from Yekatit 12 and 55(13.7%) from Zauditu Memorial Hospital) were interviewed during the data collection period. Data was not available for 21 (5%) cases.

Age of cases ranged from 15 to 47 years with a mean± SD of 26.4 ± 6.42 years, over half 225 (56.1%) of them were aged between 20-29 years (Table1). Sixty-nine (17.2%) admitted interfering with the pregnancy. The mean age of cases with spontaneous abortion (27.07 ± 6.42) was significantly higher (p<00.5) than that of induced abortion cases (23.09 ± 4.91). As shown in Table 1, about 286 (71%) were married, and 281 (70%) attended formal education varying from primary to tertiary level. Two hundred fifty eight (64.3%) were unemployed, 24 (5.9%) were daily laborers and 12 (3.0%) were students.

Table 1: **Socio-demographic characteristics of postabortion patients in Government Hospitals, Addis Ababa, 2002**

Variables (n=401)	Number	Percent
Age		
15-19	55	13.7
20-24	121	30.2
25-29	104	25.9
30-34	57	14.2
35+	64	16.0
Marital Status		
Married	286	71.3
Single	98	24.4
Cohabiting	4	1.0
Separated, divorced and widowed	13	3.1
Occupation		
Employed	76	18.9
Private business	31	7.7
Unemployed	258	64.3
Student	12	3.0
Daily laborer and housemaid	24	5.9
Education		
No education	118	29.4
Read and write	2	0.5
Primary	116	28.9
Secondary	143	35.7
Beyond secondary	22	5.5
Ethnic group		
Amhara	186	46.4
Oromo	94	23.4
Gurage	74	18.5
Tigray	28	7.0
Others	19	4.7
Religion		
Orthodox	315	78.6
Muslim	54	13.5
Protestant	30	7.0
Catholic	2	0.5

Almost 70% of the respondents were at least pregnant once before the current pregnancy (Table 2). Maximum number of pregnancy was 15 (with median pregnancy =2) and the number of deliveries ranged from 1 to 14 (with median delivery =1). Table 2 also shows that 116 (29.0%) of the respondents gave history of previous abortion, which was experienced once in 84 (72.4%), twice in

19(16.4%), three times in 11(9.5%) and four and above times in 2 (1.7%). One hundred fifty six (38.9%) respondents reported that the current pregnancy, which ended in abortion, was unwanted. As indicated in the same table, over three quarter of the cases reported that the current pregnancy terminated spontaneously, while the rest admitted interference with pregnancy. Three hundred ten (77.3%) of the respondents knew at least one contraceptive method. Ever use of contraceptives was 53.4%, of whom 31 (44.9%) admitted interference and 183 (55.1%) with spontaneous abortion.

Table 2: **Reproductive history of post-abortion patients in Government Hospitals, Addis Ababa, 2002**

Variables (n=401)	Number	Percent
Previous pregnancy*		
None	121	30.2
1-4	199	49.6
5-7	59	14.7
8-10	17	4.2
11 and above	5	1.2
Delivery		
None	159	39.7
1	89	22.2
2-4	117	29.2
5-7	28	7.1
8-10	6	1.5
11 and above	2	0.5
Previous abortion		
Yes	116	29.0
No	285	71.0
Current pregnancy wanted		
Yes	245	61.1
No	156	38.9
Current pregnancy induced		
Yes	69	17.2
No	332	82.8
Knew at least one contraceptive method		
Yes	310	77.3
No	91	22.7
Ever use of contraceptives		
Yes	214	53.4
No	187	46.6

* Current pregnancy not included

Among those whose last pregnancy was unwanted, poor knowledge of contraceptives and forgetting to take contraceptives regularly were given as main reasons by more than 80% of the respondents, only 18% responded that partner pressure as contributing factor Major reasons given for resorting to unsafe abortion by the 69 cases who admitted interference were economic 27(34%), not being married 17 (25.8%) and to complete education in 15 (22.7%). The pregnancies were interfered at inducers' houses, health institutions and patients' houses in 31 (44.9%), 25 (36.2%) and 11 (15.9%) respectively. Materials used were metal in 28 (40.6%), different medications in 20 (29.0%) and plastics in 16 (23.2%) of the cases. Induction was assisted by health workers

varying from physicians to traditional birth attendants in 58 (84.1%) of the cases.

Analysis of induced abortion by socio-demographic variables and status of previous and current pregnancy revealed that induction was higher among young women below the age of 25 years (Table 4). Induced abortion decreases as age increases, and found to be more in those who were single (OR=11.86, 95%CI=6.27-22.94) compared with married women, literate compared to illiterate women, unwanted pregnancy compared with wanted pregnancy and no previous history of abortion (OR=3.17, 95%CI=1.47-7.13) compared to those having history of abortion. When adjusted, the variables age, marital status and whether the pregnancy is wanted or not remained significantly associated with induced abortion (Table 4).

Table 4: **Induced abortion in post-abortion patients by socio-demographic variables and reproductive history, Addis Ababa, 2002**

Variables (n=401)	Induced abortion		OR (95% CI)	Adj. OR (95% CI)
	Yes	No		
Age				
14-19	15	40	1	1
20-24	33	88	1.00(0.47, 2.21)	0.55(0.13, 2.33)
25-29	14	90	0.41(0.17, 1.02)	0.22(0.06, 0.77)
30+	7	114	0.16(0.05, 0.47)	0.21(0.06, 0.79)
Marital status				
Married	18	268	1	1
Single#	51	64	11.86(6.27, 22.94)	7.33(3.21, 16.76)
Education				
Literate	53	230	1	1
Illiterate	16	102	0.68(0.35, 1.28)	0.54(0.20, 1.43)
Occupation				
Employed	16	91	1	1
Unemployed@	53	241	1.25(0.66, 2.47)	0.57(0.21, 1.57)
Religion				
Christian	60	287	1	1
Others	9	45	0.96(0.39, 2.14)	1.18(0.37, 3.79)
Ethnic group				
Amhara*	38	148	1.52(0.88, 2.66)	1.98(0.54, 7.32)
Oromo*	16	78	0.98(0.50,1.87)	2.19(0.54, 8.95)
Gurage*	8	66	0.53(0.21, 1.18)	0.35(0.07, 1.60)
Knowledge of contraceptives				
Yes**	52	258	1	1
No	17	74	1.14(0.58, 2.15)	1.32(0.47, 3.71)
Current pregnancy				
Unwanted	66	90	1	1
Wanted	3	242	0.02(0.00, 0.05)	0.02(0.00, 0.06)
Previous abortion				
No	60	225	1	1
Yes	9	107	0.32(0.13, 0.67)	0.54(0.19, 1.52)
Parity				
Less than 4	66	299	1	1
Greater than 4	3	33	0.41(0.08, 1.38)	0.97(0.18, 5.28)

* compared to other ethnic groups
** Know at least one method
# Single includes cohabiting, divorced separated and widowed
@ No formal employment and regular income

When asked on how soon they could become pregnant again if involved in sexual intercourse 107(26.7%) said soon which is within two weeks after the abortion, 125(31.2%) in one month time, 66(16.4%) above one month while 92(22.9%) said do not

know (Table 5). Regarding future pregnancy plan, only 73(18.2%) responded that they want to become pregnant in the coming three months.

Table 5: **Fertility awareness and pregnancy intentions of post-abortion patients in government Hospitals, Addis Ababa, 2002**

Variables (n=401)	Number	Percent
Fertility return after abortion		
Soon (with in two weeks)	107	26.7
One month	125	31.2
Two-three months	41	10.2
Above for months	25	6.2
Don't know	92	22.9
No response	11	2.7
Future pregnancy plan		
Never	127	31.7
Within three months	73	18.2
Three months to two years	70	17.5
Above tow years	89	22.2
Not sure	39	9.7
No response	3	0.7

Discussion

The study has shown that most cases of induced abortion were observed among young women below the age of 25 years. Mean age of abortion is lower than those reported from Peru and Egypt (19,20) but similar to other findings from Ethiopia (7,8).

History of previous abortion was reported by about 29% of the cases, which is higher when compared to other studies from Ethiopia (14), but lower than the study from Egypt (20). In this study, though 39% reported current pregnancy was unwanted, only 17% admitted that the pregnancy was interfered. WHO classification of abortion puts the group who admitted interference in the certainly induced abortion category while those who said current pregnancy was unwanted but denied interference in the category of possibly induced abortion (18). Therefore, the number of interference with current pregnancy may be higher than stated in the study. In general this is a sensitive area that respondents do not want to disclose. Due to this fact results from different studies show varying number of proportions between spontaneous and induced abortions (7,11,12,20).

be higher than stated in the study. In general this is a sensitive area that respondents do not want to disclose. Due to this fact results from different studies show varying number of proportions between spontaneous and induced abortions (7,11,12,20).

Similar to the current findings, Hassen F (21) reported contraceptive misuse or poor knowledge as main cause for the unwanted pregnancies. The main reasons for resorting to unsafe abortions were not different from the work of previous investigators (10,21,22,23).

The fact that 84%, were assisted by health professionals and 36.2% of the induction took place in health institutions, could be due to the flourishing of private clinics and management in below the standard settings. According to Tadesse et al (6) and Madebo et al (12), health workers undertook the inductions in 35.3% and 55% respectively. In the study by Taddesse et al (6), the share of health institutions as a place of induction was only 5%. Materials used for the inductions, in this study were not different from those reported in several studies (6,10,11,12).

Need for family planning was well reflected since 81.8% of the cases did not have the intention to get pregnant at least in the first three months following abortion. This could be inflated figure as there could be a tendency to report not to have a baby by the patients due to the experiences they may have had during the current abortion. But the fact that great majority of them reported delay in getting pregnant shows that postabortion setting is an important opportunity to provide postabortion family planning counseling and initiate family planning methods.

Seventy three percent of the women also were not able to tell when they could become pregnant again if they are involved in sexual intercourse after discharge. Generally, a woman's fertility returns within two weeks following abortion of the first trimester. Many

women are unaware of this fact and confuse with postpartum period where return to fertility is more delayed (17). Majority of the patients responded wrongly to the timing of fertility return after the current abortion. This indicates that the information provision is not adequate and significant number of cases could again become pregnant and possibly end up in unsafe abortion.

In conclusion the study has indicated that unsafe abortion is still a big problem, in hospitals and that there is an urgent demand for quality services that should include education and provision of family planning counseling and methods.

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Original article

Obstructed Labour in Adigrat Zonal Hospital, Tigray Region, Ethiopia

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Abstract

Background: Obstructed labour is a common cause of maternal and pernatal morbidity and mortality in developing countries. There are few data from Ethiopia, although the problem is believed to be common.

Objective: To describe the frequency, causes, complications and treatment outcome of mothers with obstructed labour.

Methods: a retrospective (April 1, 1993 – March 30, 2001) review of delivery registration books, operation theatre books and patients records.

Results: Of 5,980 hospital deliveries during the study period 195(3.3%) were admitted for obstructed labour. Only 14.1% of all cases had received antenatal care, and the majority (88%) came from rural areas. Mean duration of labour was 45.4 hours for cases of obstructed labour. The most common cause of obstruction was cephalopelvic disproportion (64.9%) followed by malposition/malpresentation (32.5%). Caesarean section was performed in 88 of the 195 cases (46.1%), craniotomy in 31(16.2%), instrumental delivery in 27 (14.1%), hysterectomy in 28(14.6%) and repair of ruptured uterus in 17(8.9%). Maternal and neonatal fatality rates were 3.7% and 55.5% respectively. Serious complication increased with parity.

Conclusion: The incidence and complications of obstructed labour are remarkably high. To improve the situation better access to optimal antenatal and intrapartal care, together with early referral of high-risk patients must be facilitated. [*Ethiop.J.Health Dev.* 2003;17(3):175-180]

Introduction

Obstructed labour results from failure of descent of the fetal presenting part in the birth canal for mechanical reasons, in spite of good uterine constructions, and it leads to various maternal and/or fetal complications (1-3). This common obstetric health problems in developing countries is generally caused by either faults in the passage (maternal pelvis) or the passenger (the fetus). The passage can be the cause when it has an abnormal shape or size, and the passenger can be the cause if abnormally large, presenting abnormally, malpositioned or congenitally abnormal (3-6).

The incidence of obstructed labour varies in different countries and centers. To our knowledge there is only one recent report from Ethiopia, from Jimma, which reported 7% of all hospital deliveries had by obstructed labour (1). Several studies from other developing countries found an incidence ranging from 2 to 8% of all hospital deliveries (3-5,7-9).

Together with haemorrhage, infection and hypertensive disorders of pregnancy, obstructed labour is a major cause of maternal and prenatal mortality in developing countries (3,5,10-16). In Ethiopia it is the main contributor to maternal mortality (17,18). Genital fistula, stress incontinence, pelvic inflammatory diseases, secondary ammenorrhea, secondary infertility, pelvic organ prolapse, and ruptured uterus are among its complications (19-24).

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Maternal and prenatal mortality and morbidity associated with obstructed labour are almost totally prevented in the developed world because of the good nutritional status, wide health converge, adequate transportation and communication system, availability of trained health personnel, optimal antenatal and intrapartum care and other related factors (3,11,25,26).

Depending on the causes of obstructed labour and the level (station) of the presenting part, different modes of management are practiced, namely, total or subtotal abdominal hysterectomy, forceps or vacuum delivery, evisceration, decapitation, symphysiotomy and caesarian section. Well-trained health professionals are needed to reduce the associated mortality and morbidity once this problem has already developed (2).

Except for the recent study from Jimma there are few reports about this issue in Ethiopia. More studies are needed to know its incidence and associated mortality and morbidity. Based on these findings preventive strategies can be formulated. The major objectives of this study are thus to describe the frequency, cause, complication and treatment outcome of obstructed labour in a period of eight years in Adigrat Zonal hospital and to recommend prevention strategies.

Methods

Adigrat Zonal Hospital is located in the town of Adigrat which is found in the northern part of the country, about 1000 kms away from the capital city of Addis Ababa. Obstetric patients are admitted to the maternity ward which has only 13 beds. During the study period one gynecologist/obstetrician and one pediatrician were working in the hospital.

Patient records, delivery room registers and operating theater books were reviewed retrospectively to gather information about patients admitted for obstructed labour from April, 1, 1993 through March 30, 2001. A uniform questionnaire was used to collect information about age, parity, antenatal care, causes complications, treatment and maternal and neonatal out come. Classification was according to standard definitions. Obstructed labour is defined as failure of descent of the fetal presenting part for mechanical reasons in sprite of adequate uterine contractions, and not managed timely. Mothers were said to have antenatal care when they visited a health institution at least once during the pregnancy. A patient with at least one previous delivery past 28 completed weeks of pregnancy is classified as multigravida, and grandmultipara when the number of previous similar deliveries was at least five. Perinatal mortality refers to a still birth or neonatal death within one week of life. The EPI-INFO Version 6 statistical package was used to analyze the data.

Results

Between April 1, 1993 and March 30, 2001, 195 cases of obstructed labour were admitted to the labour ward of Adigrat Zonal Hospital. During the same period there were 5,980 hospital deliveries, and 525 mothers had caesarean section for various indications. Thus 3.3% hospital deliveries presented with obstructed labour. Four patients had incomplete or lost records and were not included in further analysis.

The majority of cases (88%) came from rural areas, and only 14.1% (27) had attended ANC at least once. Distribution by age and parity is shown in Table 1. Age ranged from 16 to 46 years (mean 28.8±7.6); and 11% were teenagers. Parity ranged from 0-15. Of multigravid mothers, 24.1% were grand multipara. The n=mean duration of labour was 45.4 hours (±21.7, range 20-144).

Causes of obstructed labour by parity are shown in Table 2. Cephalopelvic disproportion was identified as a cause in 124 patients (64.9%), and malpresentation/ malpositition in 62 (32.5%). Malpresentation alone was found in 50 patients (26.2%): breech in 4.2%, shoulder in 18.3% and brown in 3.7%. Twelve cases were caused by malposition alone: 5

Table 1: **Age and parity of patients with obstructed labour in Adigrat Hospital, 1993-2001**

Age (years)	Parity 0	1-4	≥5	Total (%)
<20	18	3	-	21 (11)
20-24	19	14	-	33 (17.3)
25-29	10	36	7	53 (27.7)
30-34	5	17	6	28 (14.7)
35-39	1	18	12	31 (16.2)
≥40	2	2	21	25 (13.1)
Total (%)	55 (28.8)	20 (47.1)	46 (24.1)	191 (100)

(2.6%) were mento posterior 4 (2.1%) were persistent occupito posterior and 3 (1.5%) were deep transverse arrest.

The different modes of management were: caesarean section 88 cases (46.1%), craniotomy 31 (16.2%), forceps 18 (9.4%), vacuum 9 (4.7%), repair of ruptured uterus 17 (8.9%), total abdominal hysterectomy 16 (8.4%), subtotal abdominal hysterectomy 10 (5.2%), and caesarean hysterectomy 2 (1%). The indications for hysterectomy were ruptured uterus in 26 cases (92.9%) and extended tear during caesarean section in 2 (7.1%0. Of the total 525 cases requiring caesarean section during the study period, 88 (16.8%) were done for obstructed labour.

Table 2: **The causes of obstructed labour in Adigrat Zonal Hospital, 1993-2001.**

Causes	Parity 0	1-4	≥5	Total (%)
CPD	35 (18.3)	69 (36.1)	20 (10.5)	124 (64.9)
Malpresentation/malposition	20 (10.5)	18 (9.4)	24 (12.6)	62 (32.5)
Fetal congenital abnormality	0	2 (1)	2 (1)	4 (2.1)
Myoma	0	1 (0.5)	0	1 (0.5)
Total (%)	55 (28.8)	90 (47.1)	46 (24.1)	191 (100)

Table 3 shows the maternal and fetal complications associated with obstructed labour. One hundred nine cases (27.8%) had serious maternal or neonatal complications. Chorioamnionitis was the commonest cause of maternal sepsis (9.4%), followed by puerperal sepsis (8.4%), peritonitis (1%) and septic shock (1%). The mean weight of the neonates was 3250 (±429) grams (range 2000-4800). Five minute Apgar score at birth was 0 (still birth) in 96 neonates (50.3%), 1-3 in 36 (18.8%), 4-6 in 29 (15.2%), and 7-10 in 30 (15.7%). Maternal death rate was 3.7%, and 106 (55.5%) neonates died within seven days of life or were still born.

The proportion of patients with maternal or fetal complications did not differ significantly by urban/rural residence, or history of antenatal care. Fetal death, ruptured uterus, and ruptured bladder increased with parity, as shown in Table 4.

Table 3: **Maternal and fetal complications of obstructed labour, in Adigrat zonal Hospital, 1993-2001**

Complication	Number (%)
Maternal:	
Maternal sepsis	38 (19.9)
Vesico vaginal fistula	17 (8.9)
Recto vaginal fistula	2 (1)
Post partal haemorrhage	9 (4.7)
Ruptured uterus	43 (22.5)
Ruptured bladder	11 (5.8)
Hysterectomy	28 (14.7)
Maternal death	7 (3.7)
Fetal:	
Fetal asphyxia	65 (34)
Fetal birth injury	14 (7.3)
Still birth	96 (50.3)
Neonatal death within 7 days	10 (5.2)

Table 4: **Maternal and fetal complications by parity, Adigrat zonal Hospital, 1993-2001**

Complications	Parity			
	0	1-4	≥5	P-value
Fetal death (%)	40	47.8	67.4	<0.05
Ruptured uterus (%)	1.8	21.1	50	<0.001
Ruptured bladder (%)	0	3.3	17.4	
Total N	55 (28.8)	90 (47.1)	46 (24.1)	191 (100)

Discussion

In our study, obstructed labour accounted for 3.3% hospital deliveries, within the range reported for other countries; but lower than a recent study in Jimma Hospital, Ethiopia, which was 7%. (1,3-5,7-9). Our hospital-based data may underestimate the actual incidence because only limited numbers of pregnant women deliver in the hospital in our area, and many rural communities have limited access to care.

The causes of obstructed labour in all patients taken together in this study are consistent with earlier reports which found CPD to be the commonest cause followed by malpresentation and malposition (3-6). In grand multipara, however, malpresentation was more common than CPD. The lax abdomen following repeated pregnancies may predispose grand multiparous women to malposition and malpresentation.

Various authors have reported that obstructed labour is one of the major causes of perinatal and maternal mortality (10-16). Our study similarly shows both high maternal death rates (3.3%) and perinatal death rates (55.5%). In addition to death, injury to the mother and fetus has been reported by different authors (19-25), and our findings are consistent with these studies. Major complications of obstructed labour in the study hospital are vesico-vaginal fistula, rectovaginal fistula, ruptured uterus, ruptured bladder, perinatal asphyxia and fetal birth injury.

Earlier reports show the incidence of this problem to be high in developing countries where mothers had low ANC coverage, came from remote areas, and spent long time in labour. Most of our patients came from rural areas, had very low antenatal coverage and spent much time in labour. We found that neither residence nor ANC were significantly associated with the development of complications, once the problem developed. Duration of labour was the most important factor which was significantly associated with maternal and perinatal morbidity and mortality. The fact that grand multipara were more commonly associated with ruptured uterus and ruptured bladder may be either due to the relatively prolonged duration of labour or fibrosed and thinned out uterine myometruim from repeated pregnancies.

Even in a population where feto-pelvic disproportion is common, obstructed labour can be totally prevented if there is optimal obstetric care (25,26). Prevention of this catastrophic obstetric health problem is a key factor in the overall effort to reduce maternal and perinatal mortality. Good nutrition is essential for the development of normal pelvis (the passage) but it takes long time to attain this goal (3). However at the short term by providing optimal obstetric care to the community the incidence of obstructed labour can be reduced. In addition its prompt management is also important to minimize the associated maternal and perinatal morbidity.

An important potential intervention for prevention of obstructed labour in our area is ANC. In this study, overall coverage during the 8-year study period was only 14%, which is much lower than current coverage in Tigray Region which is 35% (27). The number of cases it too low for a sub-group analysis by year, but it is reasonable to assume that early reognition and referral of high-risk mothers

cound lead to fewer complications. The other crucial factor for the prevention of the complications of obstructed labour in this study is the duration of labour. Prompt diagnosis, early referral and availability of transport system may reduce the duration of labour and associated complications.

We recommend a comprehensive study to look into the problem of obstructed labour, and also improving managerial and technical procedures in handling obstructed labour cases in the health system.

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Original article

Premenstrual syndrom: prevalence and effect on academic and social performances of students in Jimma University, Ethiopia

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Abstract

Background: Premenstrual syndrome (PMS) is a serious problem affecting a woman's health. It affects educated women more that non-educated women. Although it has been widely studied in many countries, little, if any, is known about PMS in Ethiopia.

Objective: the main aim of the study was to determine the prevalence of PMS and its effect on the academic and social performances of students of Jimma University (JU).

Methods: A cross-sectional survey was conducted among 242 randomly selected female students of JU in Jan. 2002. A structured and pretested self-administered questionnaire was employed for data collection. The criteria proposed by the *Diagnostic and statistical manual of mental disorders* (DSM-IV) were used to diagnose PMS.

Results: The age of participants ranged from 17 to 38 years, with mean & median age of 20.3 & 20 years, respectively. Almost all (99.6%) had at least one premenstrual (PM) symptom in many of the menstrual cycles in the last 12 months. The prevalence of PMS or premenstrual dysphoric disorder (according to DSM-IV) was 27%. About 14% of the study participants frequently missed classes and 15% missed examinations or scored a lower grade at least once because of PM symptoms. Both were significantly associated with severity of symptoms ($p<0.005$). More first year students were affected by PMS than students of other class-years ($p<0.05$).

Conclusion: Our study revealed a high prevalence and negative impact of PMS on students of Jimma University. Therefore, health education, appropriate medical treatment and counseling services, as part and parcel of the overall health service, should be availed and provided to affected women. Further study is also recommended to precisely determine the prevalence of PMS using prospective methods. [*Ethiop.J.Health Dev.* 17(3):181-188]

Introduction

Premenstrual molimina, abdominal bloating and breast soreness are symptoms that are usually considered as signs of normal menstrual cycles. These symptoms may become sever and accompanied by other symptoms resulting in premenstrual syndrome (PMS).

PMS is one of the unresolved problems in spite of the fact that it has been the subject of extensive discussion and study for many years.

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The first published description of the "premenstrual tension" syndrome was by Frank in 1931. Since the original description of PMS by Frank, approximately 150 symptoms have been included in the list of possible menstrual complaints by Moos. Probably, the first report on the prevalence was in 1997 by Ruble. It was described to occur in 15-100% of women of reproductive age, with 5-10% reporting sever symtpomatology at some point in their lives with impaired social interrelationships and disrupted lives. (1). Later studies and reviews in many countries also reported similar findings (2,3).

The definition of PMS has been elusive because this condition is characterized by a wide variety

of symptoms, most of which are unmeasurable by objective standards. Dalton defined PMS as "the recurrence of symptoms in the premenstruum but complete absence of symptoms in the postmenstruum" (1), while Sutherland and Stewart defined it as any combination of emotional or physical signs and symptoms that occur cyclically prior to menstruation and then regress or disappear during or after menstruation (4).

Making the diagnosis of PMS has been problematic, since its specific etiology is unknown and there is no objective marker which can quantitate the existence or the severity of symptomatology or even the objective response to therapy. The *diagnostic and statistical manual of mental disorders* (DSM-IV) classified PMS as a mental disorder and termed it the 'premenstrual dysphoric disorder'. Our study utilized the diagnostic criteria proposed by DSM-IV to diagnose PMS (5).

PMS usually begins with menarche. It may vary in intensity, but does not resolve spontaneously, and may fade with pregnancy, oral contraceptives, menopause or inhibition of ovulation. Symptoms may also correlate with parity (3).

PMS is related to high suicide and accident rates, employment and school absentee rates, poor academic performance and acute psychiatric problems (6,7).

PMS is one of the factors that make women more susceptible than men to depression, particularly during periods of rapid fluctuation of gonadal hormones, such as premenstrually, postpartum and the climacteric (8).

Studies in different countries indicated that PM symptoms are more common and more sever among high-level educated women than non-educated women with a possible association of stress with PMS (9,10,11).

To the authors' knowledge, there is no published data on PMS in Ethiopia; at least one using standardized diagnostic criteria. This fact prompted us to conduct a baseline survey on this serious problem affecting women health, particularly of the university students who are among the promising group to the country's development. Therefore, this survey was aimed at determining the prevalence of PMS and its academic and social effects on female students of Jimma University.

Methods

A cross-sectional survey was conducted in Jimma University (JU), Jimma town, South-western Ethiopia in Jan. 2002. A sample of 242 female students was drawn from a total of 654 regular female students who enrolled to JU in the 2001/02 academic year. Proportional number of students was taken from all faculties, schools and class years. Then the study subjects were selected by systematic random sampling from each class according to alphabetical name lists. The assumptions made for sample size calculation were: a 95% confidence interval (two-sided), and expected prevalence of 50% (of PMS) to get the maximum sample size and a 5% margin error. Correction factor was applied to determine the final sample size. A structured and pretested self-administered questionnaire was employed for data collection. Data facilitators explained the meanings of terms that were found difficult by the study participants. The aim of the study was explained to each respondent. Respondents were not compelled; rather voluntary response was sought for participation. The questionnaire contains such variables as background information, gynecologic and obstetric history and questions pertaining to the presence and severity of premenstrual symptoms in the last 12 months. The later we taken from the list of symptoms in the diagnostic criteria for PMS/premenstrual dysphoric disorder of the DSM-IV and used the same criteria to diagnose PMS/premenstrual dysphoric disorder (5). Symptoms were classified as minor, moderate, sever, or extreme based on subjective reporting by the study participants. All subjects who reported their symptoms as sever or extreme were classified

to have PMS/premenstrual dysphoric disorder according to DSM-IV. Data were checked for completeness, encoded using SPSS/PC version 11.0 statistical package, summarized and analysed using descriptive statistics and the chi-square test was used to determine significance of associations.

Results

A total of 242 female students of JU enrolled into the study. The response rate was 100%. Table 1 shows the distribution of participants by faculty/school and class-year.

Table 1: **Distribution of study subjects by faculty and class year, Ju, Jan .2002**

Faculty/ school and class-year	No. (%) (n=242)
Health Sciences*	
I	19(7.9)
II	26(10.7)
Total	45(18.6)
Natural Science**	37(15.3)
Medicine	
II	6(2.5)
III	4(1.7)
IV	13(5.4)
V	5(2.1)
VI	5(2.1)
Total	33(13.6)
Social Science+	27(11.2)
Business	
II	5(2.1)
III	6(2.5)
IV	14(5.8)
Total	25(10.3)
Post basic++	
I	7(2.9)
II	9(3.7)
III	5(2.1)
Total	21(8.7)
Agriculture (diploma)	
I	15(6.2)
II	6(2.5)
Total	21(8.7)
Agriculture (Degree)	
I	9(3.7)
II	8(3.3)
Total	17(7.0)
Engineering	
II	4(1.7)
III	8(3.3)
V	4(1.7)
Total	16(6.6)

* Diploma program students in nursing, pharmacy, medical laboratory technology & environmental health.

** 1st year students who would pursue their studies in medicine, engineering or education from second semester onwards according to their choice & 1st semester results

+1st year students who would pursue their studies in business or education from second semester onwards according to their choice & 1st semester results

++Post-basic students were diploma graduates in nursing, medical laboratory technology &environmental health. After service, they joined nursing, medical laboratory technology, environmental health & public health programs to earn baccalaureate degrees after being trained for 2½ years in each area.

The age of the study participants ranged from 17 to 38 years, with mean and median age of 20.3 & 20 years, respectively. Majority of the study participants were single (92%), their menarche was at an age between 13 and 16 (74%), the usual menstrual cycle between 21 and 35 days (86%), and menstrual duration was not more than 8 days (93%). Only 9(3.7%) used oral contraceptives and only 10(4.1%) gave birth to one or more children (Table 2).

Table 2: **Background, gynecologic and obstetric characteristics of study participants, JU, Jan. 2002**

Characteristics	No (%) (n=242)
Age	
17-19	111(45.9)
20-22	97(40.1)
23-25	23(9.5)
26 and above	11(4.5)
Marital status	
Single	222(91.7)
Married	17(7.0)
Divorced	3(1.3)
Menarche	
<13 years	34 (14.0)
13-16	180(74.4)
>16	28(11.6)
Menstrual cycle	
<21 days	12(5.0)
21-35 days	209(86.3)
>35	21(8.7)
Menstrual duration	
<8 days	226 (93.4)
≥8 days	16 (6.6)
Menstrual flow	
Minimal	47(19.4)
Moderate	169(69.8)
Heavy	26(10.8)
Oral contraceptive use	
Yes	9(3.7)
No	233(96.3)
Parity	
0	232(95.9)
≥1	10(4.1)

Except one student, 241 (99.59%) reportedly had at least one premenstrual (PM) symptom in many of the menstrual cycles in the last 12 months. The most commonly reported physical premenstrual (PM) symptoms were: easy fatigability affecting 170(70.2%), appetite change in 150(61.9%), sleep change in 14(60.3%). The commonest pschobehavioral PM symptom reported by 17(73.1%) of the study subjects was decreased interest in the

usual activities like studies, lectures, friends, hobbies etc. Other most commonly reported psychobehavioral symptoms were: depressed mood by 145(59.9%), becoming easily upset by 127(52.5%) and irritability by 120(49.6%).

Ninety-six students (39.8%) reported their symptoms as minor, 80(33.2%) as moderate, 53(22%) as sever interfering daily activities and 12(5%) as extreme hindering participation in any activity (Fig.). Sixty-five (27%) of the study subjects fulfilled the diagnostic criteria for PMS/premenstrual dysphoric disorder (according to DSM-IV).

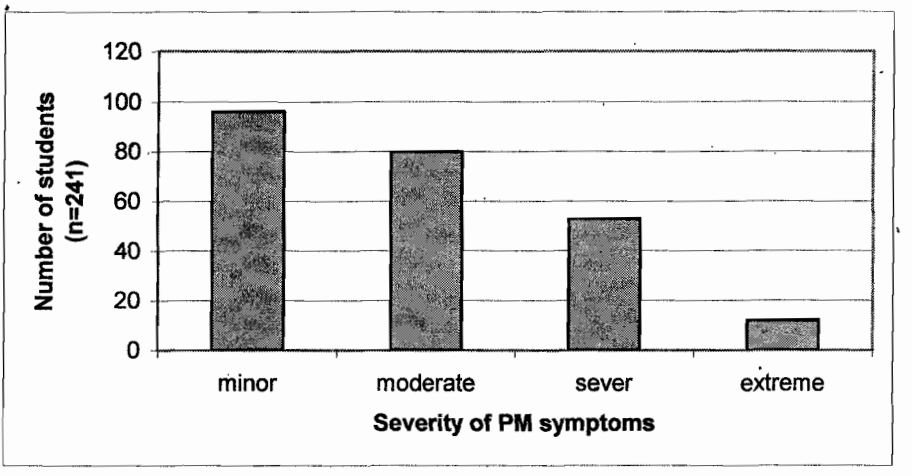

Figure 1: **Degree of severity of premenstrual symptoms reported by female students of JU, Jan. 2002**

About 14% (34 students) frequently missed classes because of PM symptoms, and 14.9% (36 students) missed examination or scored a lower grade at least once, both were significantly associated with severity of PM symptoms (P<0.005) (Table 3). Grade point average (GPA) was incompletely reported; therefore its association with PMS was not performed.

Table 3: **Relationship between severity of PM symptoms and different variables reported by female students of JU, Jan 2002**

Variable	Severity of PM symptoms (n=241)				P-value
	minor	moderate	sever	Extreme	
	No (%)	No (%)	No (%)	No (%)	
Frequent class missing					
Yes	0(0.0)	0(0.0)	25(10.4)	9(3.7)	P<0.005
No	96(39.8)	80(33.2)	28(11.6)	3(1.2)	
Exam-missing/low grade scoring					
Yes	0(0.0)	7(2.9)	23(9.5)	6(2.5)	P<0.005
No	96(39.8)	73(30.3)	30(12.4)	6(2.5)	
Remedy usage for PM symptoms					
Yes	8(3.3)	41(17.0)	32(13.3)	10(4.1)	P<0.005
No	88(36.5)	39(16.2)	21(8.7)	2(0.8)	
Treatment seeking for PM symptoms					
Yes	6(2.5)	13(5.4)	16(6.6)	4(1.7)	P<0.005
No	90(37.3)	67(27.8)	37(15.4)	8(3.3)	

PM symptoms first appeared within 2 years of menarche in 54.8% of the study subjects, while in the remaining 45.2% onset was after 2 years of menarche.

Sixty-six women (27.4%) reported that their symptoms became more sever during examination times or other stressors, and 54.8% didn't relate them to anything and the remaining 17.8% didn't know when.

Regarding remedy usage, 91(37.8%) students used remedies to relieve their symptoms. Forty-one (17%) used 'antipains', 2(0.8%) used oral contraceptives. Hot shower, hot drinks or herbal medicines were used by 17(7.1%), whereas 31 women (12.9%) didn't get any relieving remedy although they tried various modalities.

Thirty-nine (16.2%) sought treatment for their symptoms. 'Antipains' were prescribed to 22 students (56.4%) and oral contraceptives to 6(15.4%). Two of those who sought treatment were not prescribed 'medicines' and the remaining 9 students (23.1%) didn't remember what. Statistically significant association was found between severity of PM symptoms and remedy usage ($P<0.005$) as well as treatment seeking ($P<0.005$) (Table 3).

PMS varied significantly among faculties/schools. It was highest among natural science students (12/65). PMS also varied significantly among class years ($P<0.05$), first year students constituted the highest number of cases of PMS (30/65) (Table 4).

Table 4: **Severity of PM symptoms in relation to faculty, class year and age, Ju, Jan. 2002**

Variable	Severity of PM symptoms (n=241)			
	minor	moderate	sever	extreme
	No (%)	No (%)	No (%)	No (%)
Faculty school*				
Health sciences	19(7.9)	18(7.5)	6(2.5)	2(0.8)
Natural science	13(5.4)	12(5.0)	10(4.1)	2(0.8)
Medicine	15(6.2)	10(4.1)	8(3.3)	0(0.0)
Social science	19(7.9)	0(0.0)	7(2.9)	1(0.4)
Business	7(2.9)	10(4.1)	4(1.7)	4(1.7)
Post basic	7(2.9)	12 (5.0)	2(0.8)	0(0.0)
Agriculture (Dip)	4(1.7)	7(2.9)	9(3.7)	1(0.4)
Agriculture (Deg)	8(3.3)	3(1.2)	4(1.7)	2(0.8)
Engineering	4(1.7)	8(3.3)	3(1.2)	0(0.0)
Class-year**				
I	54(22.4)	30(12.4)	25(10.4)	5(2.1)
II	24(10.0)	26(10.8)	12(5.0)	2(0.8)
III	8(3.3)	6(2.5)	7(2.9)	2(0.8)
IV	8(3.3)	11(4.6)	5(2.1)	3(1.2)
V	1(0.4)	5(2.1)	2(0.8)	0(0.0)
VI	1(0.4)	2(0.8)	2(0.8)	0(0.0)
Age ***				
17-19	47(19.5)	29(12.0)	25(10.4)	10(4.1)
20-22	38(15.8)	32(13.3)	24(10.0)	2(0.8)
23-25	6(2.5)	13(5.4)	4(1.7)	0(0.0)
26 and above	5(2.1)	6(2.5)	0(0.0)	0(0.0)

* $P<0.005$
** $P<0.05$
***$P<0.005$

The age group 17 to 19 years had the largest number of cases of PMS (35/65), followed by the group 20 to 22 years (26/65) ($P<0.005$) (Table 5).

Most women with PMS were nulliparous (61/65). Similarly, most women with PMS were not using oral contraceptives (60/65), although the associations were not statistically significant in both cases ($P>0.1$).

Discussion

In our study the prevalence of PM symptoms was found to be 99.6%. This figure is higher than that reported in many studies and reviews which reported 90-95% prevalence (2,3). Cleckner et al obtained a 100% prevalence of at least one PM symptom of minimal severity among US adolescents (12).

The above reports were in the general female population of reproductive age group. Our result is in agreement with the studies conducted in Niger and Mexico in which higher prevalence of PM symptoms and higher level of education were associated (9,10).

The commonest psychobehavioral PM symptom was decreased interest in the usual activities affecting 177(73.1%) and the commonest in the physical symptom group was easy fatigability affecting 170(70.2%). The commonest physical symptoms reported by other studies were breast soreness and abdominal bloating (9,11,12), which were reportedly present in 50.5% & 36.4% of our study subjects, respectively. Irritability was cited as the commonest symptom in the study by Warner et al (11), which in our study stood sixth and affected 49.6%. Food craving was the commonest symptom among US adolescents (12), which occurred in 6.2% of our study subjects.

Overall, psychobehavioral symptoms were more common than physical symptoms McMaster et al found similar results among educated professional women than domestic workers in Zimbabwe (13).

PM symptoms first appeared within two years of menarche in 54.8% of the students; this is in accordance with a review that stated their occurrence with menarche (3). About 40% rated their symptoms as minor, 33.2% as moderate, 22% as sever and 5% as extreme, and 27% fulfilled the diagnostic criteria for PMS/premenstrual dysphoric disorder (according to DSM-IV). This is much higher than many reviews, which reported in the range of 5-10% (1,2,3). In the study conducted among US adolescents, 73% considered at least one PM symptom as sever and 56% as extreme (12). As it was discussed earlier, this higher prevalence of PMS in our study than many of the studies in the general population may be related to higher degree of stress that university students may face (9,10,11). Cenac et al reported prevalence of 43% in literate Niger women in contrast to 21% in illiterate women (9). Note that their report was based only on subjective reporting of symptoms rather than using the DSM criteria.

There were statistically significant variations of PMS with faculty/school ($p<0.005$) and class-year ($p<0.05$). Nearly half of the cases of PMS were among first year students (30/65), and first year natural science students constituted the highest number of cases of PMS (12/65). Most of these first-year students were in the age group of 17 to 19, which may be the reason why the largest number of cases of PMS was observed in this age group (35/65). First-year students were probably at much more academic stress as they didn't choose their future field of study and work hard to get their career.

No specific symptom group was indicative of sever PM symptoms. Except suicide ideation; all the other symptoms, alone or in the presence of other symptoms were reported as minor, moderate, and as sever or extreme in the presence of additional symptoms, while the former was uniformly reported as either sever or extreme.

Those students with sever or extreme symptoms frequently missed classes or missed

examinations or scored a lower grade at least once. Because some students didn't report their grades, the association between grade and PMS could not be performed.

Remedy usage and treatment seeking were related to severity of PM symptoms. However, majority of students with PMS didn't seek treatment (45/65), either because they might be fearful to seeking treatment for menstrual and related problems due to cultural or other reasons (13), or treatment facility was not readily available.

The commonly used remedy was 'Antipain'. In a survey that was carried out in the US, 'painkillers' were the most commonly used (14). 'Antipains' were also found to be the most commonly prescribed to those who sought treatment. The same medicines were the most commonly prescribed in the aforementioned US survey (14).

Oral contraceptives were used by and prescribed to only 2(0.8%) & 6(15.4%), respectively. Oral contraceptives are probably considered by many women solely as one of the family planning methods without other benefits. Therefore, they seem to be reluctant to use them for PM symptoms even when prescribed by a physician, although our study design didn't allow reaching at a conclusion on this point.

Warner & Bancroft found significant association between oral contraceptive use and lower prevalence of PM symptoms (11). Such association was not obtained in our study, probably because of the relatively few students who used oral contraceptives (3.7%), as they were not sexually active or were using other contraceptive methods.

Warner & Bancroft also reported lower prevalence of PM symptoms among parous women (11), but we didn't find such association, probably because many of the students were nulliparous (95.9%).

In conclusion, the prevalence of PM symptoms in general and PMS/ premenstrual dysphoric disorder in particular was very high among JU students. The commonest physical PM symptom was easy fatigability and the commonest psycho behavioral symptom was loss of interest in the usual activities. Overall, psycho behavioral symptoms were more common than physical symptoms among JU students. Sever symptoms had negative impact on academic and social performances of the students. Therefore, health education, appropriate medical treatment and counseling services, as part and parcel of the overall health service, should be availed and persistently provided to affected women. Further study is also recommended to precisely determine the prevalence of PM symptoms and PMS using prospective methods. Other more comprehensive studies are required before recommending academic privileges to female university students, particularly in regard to first year students.

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Original article

Agroecological comparison of levels and correlates of nutritional status of women

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Abstract

Background: Observation and focus group discussions during the first round survey indicated that women in the lowlands areas are more malnourished compared to the women in the highlands. Additional analysis was needed to verify the observation.

Objectives: To compare the levels and determinants of nutritional status of women living in lowland and highland areas in Limu wereda of Hadiya Zone, southern Region.

Methods: Information on potential factors influencing nutritional status were gathered in two rounds from 450 mothers in three randomly selected peasant associations.

Results: Women living in the lowlands are more malnourished compared to women living in the highlands (31.0% in the lowlands and 19.1% in the highlands; Odds ratio=1.62; 95% CI 1.1-2.4). Household size, agricultural production, age and parity were found to be similar among the two groups of women. However, religion, ethnicity, livestock holding (more in the lowland), land ownership (greater in the lowlands), education (more literate in the highlands) and types of illness (more malaria in the lowlands) were found to be significantly different among the two groups of women. The logistic regression analysis indicated that only agricultural production, sickness and education were associated with maternal malnutrition in the studied area.

Conclusion: Creating mechanisms and opportunities to increase agricultural production (in both low land and high land) and women's education as well as providing better access to health care, particularly, in the low lands are recommended to improve the situation. [*Ethiop.J.H. .'th Dev.* 2003;17(3):189-196]

Introduction

Several studies have indicated that malnourished mothers are more vulnerable to diseases, encounter more miscarriages, give birth to underweight children whose survival is at risk. Malnourished mothers also have reduce lactation performance contributing to the increased risk of child mortality and morbidity (1, 2).

Malnutrition is widespread among women in developing countries. The limited studies conducted regarding women's nutritional status in Ethiopia confirm that the situation is not different from many developing countries. For example, a study is Sidamo zone indicated that 16% of the women were severely malnourished (3). A study conducted in south-Western Ethiopia also indicated that 19.4% of the women were below BMI cut-off points of 18.5 (4). Another study undertaken in Hadiya zone in 1995 indicated that nearly 90% of pregnant women were below the recommended anthropometric standards (5). Another survey in southern Ethiopia showed malnutrition rates of 33.2% in North Omo, 32.0% in Haidya, 20.9% in Gurage and 17.7% in Kenbata Zones (6). The recent Demography and Health Survey indicated that 30.1% of the women in Ethiopia are malnourished (7).

A recent survey by SERA (Strengthening Emergency Response Abilities) project indicated that Limu woreda is one of the densely populated (351persons/km) woredas in Ethiopia (14). Land scarcity is one of the major problems in the woreda (as a result of the high

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density of the population) particularly in the midland (0.8 hectare) and highlands (0.52 hectare). Although the land holding status is relatively better in the lowlands (0.91 hectare) the soil is less productive. As a result of population pressure and subsequent environmental degradation and recurrent drought households in Limu woreda have been food insecure for many years. Drought and Disaster Prevention Commission designates Limu woreda as drought prone woreda.

Identification of the community-specific determinants of malnutrition is of paramount importance in designing targeted interventions. With this aim in mind, a study on levels and correlates of maternal malnutrition was conducted in Limu woreda of Hadiya zone in two rounds. The first round survey was conducted between December 2001 to January 2002 and the second round survey was conducted between August to September 2002.

During the first survey (December 2001 to January 2002), it was felt that malnutrition rate is significantly higher in lowlands compared to that of highlands. Analysis was done to verify these observations and identify factors that have contributed to high malnutrition rate in the lowlands (if the observations are true).

Methods

The study employed cross-sectional design. Hadiya zone was selected on the basis of the available information on the magnitude of maternal malnutrition (6). One peasant association from the lowland (out of 24 PAs), one PA from the midland (out of 27) and one peasant association from the highland (out of 9 PAs) were randomly selected. The sample size for the study was calculated using Epi Info, 2000. Using, 32% prevalence rate of malnutrition (from the previous study), 95% confidence level, 6% worst acceptable, and design effect of 2, the minimum sample size required was about 462. In total, 474 mothers were actually included in the study (158, 156 and 160 systematically selected women from a PA each in lowland, midland and highland respectively).

As mentioned earlier, during the first round data collection, it was felt that mothers in the lowland are more malnourished compared to mothers in the highland. Analysis was done to verify this observational assumption and this article presents the results of the analysis. As this is a post-data collection exercise, the only option to examine the adequacy of the sample is to retrospectively estimate the power of the study using the results obtained and the sample size used. The prevalence in the highlands is about 19%, and the prevalence in the lowland is about 31% (a difference of about 12%). The sample size is about 150 in each group. Using $\alpha = 0.05$, the 12% difference in prevalence and the sample size used will yield a power of more than 80% (15), a power usually recommended to be used.

A structured questionnaire was administered to pregnant women, lactating women and women who are not pregnant or lactating but who have children less than 5 years by trained enumerators. Some of the areas covered in the questionnaire included: demographic information, food beliefs, food taboos, staple crop production over the year, livestock holding, land holding, sickness over the year preceding the survey and types of sickness. Staple crop production over the year was converted to kcal by using Food Composition Table for Ethiopia (16) and finally to kcal/person/day. Livestock holding was converted to estimated value in birr by multiplying each livestock owned by respective market prices at the time of the survey.

Height of women was measured to the nearest 0.1 cm using a wooden board. Weight of women was measured on digital weighing scales to the nearest 0.1 kg. Standard procedures of height and weight measurements were followed (17). Scales were regularly calibrated and standardization of measurers was done.

Body Mass Index (BMI), the ratio of weight to height square, was used to assess nutritional status of the mothers. Although BMI underestimates the malnutrition rate of pregnant

women, pregnant women were included in the analysis because the main aim of this article is to compare nutritional status between women living in the lowlands and women living in the highlands. As long as the proportion of pregnant women is similar in the two groups (which is the case in this study) inclusion of pregnant women in the analysis, does not affect the findings.

Results

Table 1 shows some household characteristics of the two groups of women. There is marked difference in ethnic composition ($p<0.05$). Most of the women in lowlands are from Silte ethnic group while most of the women in the highlands are from Hadiya ethnic group. The difference in religion is also marked ($p<0.05$). Most of the women in the lowlands are Muslims while most of the women in highland are Christians. Although there is some variation in household size, the difference was not significant as such. Land ownership is significantly different ($p<0.001$). More households in the lowlands have greater than 0.75 hectare (average for the entire studied households) compared to households in the lowlands. Similarly, estimated average value of livestock holding is significantly different ($p<0.05$). More households have livestock valued greater than the average (1637 birr) in the lowlands compared to that of the highlands. Estimated production of staple crops (kcal/person/day) over the year preceding the survey, however was not statistically different.

Table 1: **Household characteristics of the studies women by agroecology**

Characteristics	Low land	High land	Significance
Religion			
Christian	13(8.5%)	128(82.1%)	
Muslim	140(91.5%)	28(17.9%)	P<0.001
Ethnicity			
Hadiya	68(44.4%)	151(98.1%)	
Silte	85(55.6%)	3(1.9%)	P<0.001
Household size			
3 and below	27(17.4%)	19(12.2%)	
4-6	67(43.2%)	81(51.9%)	
>7	61(39.4%)	56(35.9%)	Ns
Land ownership (hectare)			
<0.75 (average)	63(40.6%)	104(66.2%)	
>0.75	92(59.4%)	53(33.8%)	P<0.001
Liverstock (estimated value)			
<1637 birr (average)	78(50.3%)	100(63.7%)	
>1637 birr	77(49.7%)	57(36.3%)	0<0.05
Production (kcal/person/day)			
<1549 (average)	73(47.1%0	64(41.0%)	
>1549	82(52.9%)	92(59.0%)	Ns

The situation regarding some of the maternal characteristics are presented in Table 2. Age, Parity and pregnancy/lactation status were not different among women living in the lowlands and highlands. However, education level is significantly different among the two groups of women ($p<0.05$). Significantly more women in the highlands went to school compared to women in the lowlands.

Table 2: **maternal characteristics of the studied women by agroecology**

Characteristics	Low land	High land	Significance
Age			
<25	57(36.8%)	52(33.3%)	
25-35	80(51.6%)	88(56.4%)	Ns
>35	18(11.6%)	16(10.3%)	
Parity			
2 and below	38(24.7%)	36(23.1%)	
3-6	77(50.0%)	88(56.4%)	
>7	39(25.3%)	32(20.5%)	NS
Pregnancy/lactating status			
Lactating	108(68.8%)	107(67.7%)	
Pregnant	29(18.5%)	27(17.1%)	
Neither of the two	20(17.7%)	24(15.2%)	NS
Education			
Unable to read or write	112(76.7%)	81(52.6%)	
Able to read or write	43(23.3%)	73(47.4%)	P<0.01

Proportions of women who reported that they had at least one episode of illness over the year and the types of sickness are presented in Table 3. The proportion of women reporting at least one sickness over the year is similar among the two groups. However, there is a significant difference in the types of sickness among the two groups. Markedly more women were sick due to malaria in the lowlands compared to women in the highlands ($p<0.01$). In the contrary, more women were sick due to other diseases (typhoid, injury, asthma, gastritis, hypertension, eye sickness and the like) in the highlands compared to women in the lowlands.

Table 3: **Diseases situation among the two groups**

Characteristics		Residence	N(%)	Significance
At least one episode over the past year		Low land	86(54.4)	NS
		High land	90(55.9)	
Specific diseases	Malaria	Low land	33(38.4)	
		High land	6(6.7)	P<0.01
	ARI	Low land	19(22.1)	
		High land	21(23.3)	NS
	Other	Low land	34(39.5)	
		High land	63(70.0)	P<0.05

Nutritional status of women by agro-ecology in Limu woreda, Hadiya zone is presented in Table 4. As shown in the Table, the prevalence of maternal malnutrition is significantly higher than the prevalence of maternal malnutrition in the highlands. The malnutrition risk associated with living in the lowlands is almost one and half times higher compared to the risk associated with living in the highlands.

Table 4: **Nutritional status by agro-ecology**

Category	Low land (n=155)	Highland (n=157)
Severe (BMI<16.0)	1.9%	0.6%
Moderate (Bmi 16.0-17.0)	5.8%	1.9%
Mild	23.2%	16.6%
Total malnourished	31.0%	19.1%
Normal	69.0%	80.9%
Odds ratio=1.62 (95% CI 1.1-2.4)		

In order to examine the association of the studied household and maternal characteristics to maternal malnutrition, logistic regression analysis was done. As shown in Table 5, among the household characteristics, religion, ethnicity, household size, land holding and livestock holding are not associated with malnutrition in the study area.

However estimated production (kcal/person/day) of staple crops was found to be significantly associated with malnutrition (OR=2.8; 95% CI 1.6-4.6). Among the maternal characteristics shown in Table 6, age and parity were not associated with malnutrition Education (OR=1.6; 95% CI 1.2-4.5) and sickness (OR=1.5; 95% CI 1.1-2.3) were however associated with malnutrition.

Table 5: **Net odds of maternal malnutrition by selected household characteristics in Limu woreda of Hadiya zone**

Characteristics	Total women (high land + lowland) N=319 OR (95% CI)
Household size	
3 and below	1
4-6	0.8(0.1-1.2)
>7	0.9(0.3-3.4)
Production (Kcal/person.day)	
>1549 (average)	1
<1549	2.8(1.6-4.6)
Ethnicity	
Hadiya	1
Silte	0.5(0.2-1.4)
Religion	
Christian	1
Muslim	0.6(0.3-1.7)
Land	
<0.75 (average)	1.8(0.8-3.2)
>0.75	1
Livestock (estimated value in birr)	
<1637	1.2(0.6-1.8)
>1637	1

Table 6: **Net odds of maternal malnutrition by selected maternal characteristics in Limu woreda of Hadiya zone**

Characteristics	Total women (high land + low land) N=319 OR (95% CI)
Age	
<25	1
25-35	0.3(0.1-1.5)
>35	0.4(0.1-1.6)
Parity	
2 and below	1
3-6	1.3(0.2-3.2)
>7	1.4(0.3-3.2)
Education	
Illiterate	1
Literate	1.6(1.2-4.5)
Sickness over the year	
No	1
Yes	1.5(1.1-2.3)

Discussion

Comparisons of nutritional status unequivocally confirmed that women in the lowlands are more malnourished than women in the highlands.

As pregnant women are also included in the analysis, the actual malnutrition rate could be slightly more than what is reported here (BMI underestimates malnutrition rate of pregnant women). Even without taking the underestimation in to consideration, the prevalence of maternal malnutrition observed in both localities is significantly more than the rate of maternal malnutrition observed in some Sub-Saharan Africa. For example the Ugandan DHS, 1995 (18) showed that only about 10% of the Ugandan women were malnourished during the survey. The prevalence of malnutrition in the lowlands is similar with the national prevalence rate indicated by the Ethiopian Demographic and Health Survey (30.1%) conducted in 2000 (7).

As the rural population depends largely on the agricultural production for their food needs, it is only logical to assume that food production is the prime determinant of nutritional status. As shown in logistic analysis, estimated staple crop production is strongly associated with maternal malnutrition in the area. Since there was no significant difference in agricultural production of staple crops between the two groups of households, it can be assumed that the impact of staple food production on maternal nutrition in lowlands and highlands is similar.

Studies have shown that education can play a significant role in determining the nutritional status of women. Education plays a significant role by influencing behaviors, attitudes and practices towards appropriate feeding and care. It also plays a role by promoting women's involvement in income control and decision making.

The logistic regression analysis indicated that educational status is associated with maternal malnutrition. As the educational level of the women in the lowlands was significantly lower compared to the educational level of the women in the highlands (shown by bivariate analysis) it can be assumed that the low level of educational background could have played some role in increasing malnutrition rate in lowlands.

In the framework of determinants of malnutrition developed by UNICEF, disease is

considered as one of the immediate causes of malnutrition. Disease affects nutritional status by reducing appetite and dietary intake. It also affects by reducing absorption and by increasing nutrient loss. Diseases, such as malaria, which is significantly more prevalent in the lowlands affects nutritional status by anyone of these mechanisms. The contributions of malaria to maternal malnutrition in malaria endemic areas is more pronounced because malaria recurs several times and the chances of being infected and re-infected is high.

In this study, there was no difference in the proportion of women reporting at least one episode of illness over the last one year. However, the types of illness were significantly different among the two groups of women. As expected more women were sick due to malaria in the lowlands compared to women in the highlands. Sickness over the year preceding the survey was included in the logistic model and showed significant association with maternal malnutrition. Although, the proportion of women reporting at least one episode over the year is similar between the two groups, it is possible to assume that the type of illness 'malaria' appears to have contributed to the high level of malnutrition in the lowlands.

In conclusion, among the studied variables, staple crop production, education and sickness were found to be associated with malnutrition in the area. As estimated staple crop production was similar among the two groups of women, the effect on maternal malnutrition can be considered similar, therefore strengthened efforts to increase crop production in both the lowlands and highlands is recommended. Education was significantly different among the groups and most likely played a role in increasing the malnutrition rate in the lowlands, and therefore strengthened efforts to improve women's education in the lowlands is recommended. In addition, malaria which was mentioned by more women in the lowlands compared to that of the women in the highland appears to have contributed to the increased level of malnutrition in the lowlands and strengthened malaria control efforts are recommended in the lowlands.

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Original article

The reliability of blood film examination for malaria at the peripheral health unit

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Abstract

Background: Malaria is a common and serious problem in Ethiopia. Blood film examination is the best tool for diagnosing malaria where feasible.

Objective: To assess the reliability of blood film examination at the primary health care level.

Method: Two specimens were taken from all suspected patients in five health center and one hospital in north Gondar zone in Ethiopia. One to be stained and read by the *operational readers*, the other to be sent unstained to the reference reader.

Result: Out of 3625 patients whose blood film was sent, 44% were females and 28% were positive for malaria. The peak age was 15-29. The proportion of *P. falciparum* and *P. vivax* was 64.6% and 35.6%. The specificity and positive predictive values were low and the overall chance corrected agreement (kappa score) of the operational and reference reader was less than 0.53.

Conclusion and recommendation: The agreement and species identification of the operational and reference readers were low. Continuous retraining and supervision are indispensable.
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Background

Malaria has been recognized as causing a lot of human calamities (1). More than 65% of the population of Ethiopia living in 75% of the country is at risk of malaria (2). Gondar is one of the malaria risk areas in the country most of the district's population is at risk. Malaria undermines the health and welfare of families, endangers the survival and education of children, debilitates the active population and impoverishes individuals and countries (3, 4). There were repeated epidemics in the Ethiopia. The 1958 malaria epidemic caused around 3,000,000 cases and 150, 000 deaths have been reported, most of it in the Northwestern part of the country (5,6).

Clinical assessment is the approach to the diagnosis of malaria in remote areas with less facilities (7), especially during the epidemic season. Delegating management of febrile cases to be treated as malaria by less trained persons, in areas where trained health worker is not available is appropriate (2-4,7,8).

There are laboratory techniques that are using antigens of the malaria parasite as reagent. These are highly sensitive specific and with high predictive value. Such tests are used in some countries in Africa and other parts of the world, but are not widely available, since they are expensive (9,10).

However, in unstable malaria where there is seasonal variation, presumptive treatment of uncomplicated fever with anti-malarial drugs may result in potentially high proportion of misdiagnosis and consequent mismanagement during the low malaria transmission seasons (3,7).

In addition, when the recommended treatment for *P. falciparum* and *P. vivax* is different, blood film is very important to differentiate the species and give appropriate treatment to patients (4). There are at least 7 centres in

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Gondar Administrative Zone where blood film examination facilities are routinely available. We have observed that many patients are being managed as malaria cases in spite of a negative blood film result (11). That may be due to over suspiciousness of health workers or the perceived poor quality of laboratory findings. Therefore, the purpose of the study was to see the reliability of the blood film reading at the primary level and recommend a possible solution for identified deficiencies.

Methods

Study area: The study was conducted in North Gondar Administrative Zone. North Gondar is one of the zones in Amhara Regional State with an area of 53176 Km^2, divided into 18 Woredas and 546 Kebeles. It has more than 2.8 million population. The area exposed to malaria is 75%, number of malarious Kebeles are 346; population at risk is 64 %. The health service geographical coverage is around 35%; malaria was among the 10 top diseases in the outpatient departments of the health institutions in the zone in 2001-2002.

All the health centres and the two hospitals in the Zone have the facility to routinely do blood film. Among these health institutions, one hospital and five health centers were selected, based on accessibility and patient load. These are Gondar, Tseda, Kolladebe, Dabat and Aykel Health Centres, and GCMS hospital. Because the areas are known for epidemic malaria, the specimens were taken at two non-malaria epidemic seasons (January and August) and two malaria epidemic seasons (May- June and September – October).

Specimen collection: Patients from the out-patient departments of the health institutions were sent for blood film examination.

In each health institutions, 2 specimens, were taken from all suspected patients. One to be stained and read by the laboratory technician at the respective health institution (operational readers) and the other to be sent unstained. All positive and negative slides, or if the negative slides are more than 1.5 times the positive slides, 1.5 times the positive slides at each health institution in the particular month seen by the operational readers were collected, coded and given to the reference readers who were blinded to the readings of the operational readers. The readings of the technicians were documented in a form prepared for the survey. Unstained blood films prepared by the operational readers were also sent to be stained and read by the reference readers. A total of 1000 stained slides positive for malaria and another1355 negative slides were selected. The negative slides were selected randomly from the list of negative. The negative and positive slides were mixed and given to the reference readers for re-examination. A total of 4710 slides (2355 slides read by operational readers and 2355 unstained slides) were read and examined for malaria parasites by the reference readers.

The reference readers examined and returned the results of 2345 of the slides read by the operational readers, and 2332 of the slides they stained and read. Ten (0.42%) slides from the stained ones and 23(0.98%) of unstained were lost.

The staining technique used by both the operational readers and reference readers was Giemsa staining method (12,13).

Analysis: All the findings including the demographic data were documented on the prepared form. Analysis was made using Epi Info 2000 statistical package. Proportions and percentages were compared, and positive predictive value (PPV), negative predictive value (NPV), specificity, sensitivity, uncorrected and chance corrected agreement (Kappa score) were calculated.

Operational Definitions

Operational reader: is a laboratory worker who is either a malaria microscopist who has worked for more than 10 years or formally trained after high school as laboratory technician, awarded a diploma and working

mainly in the peripheral health centers, at least for a year.

Reference reader: is a laboratory technologist with bachelor degree or equivalent; worked for more than 15 years, and assigned at Gondar College of Medical Sciences as instructor in the field during the study period.

Reference Reader1= The reference reader rereads the slide prepared, stained and read by operational reader.
Reference Reader2= The reference reader reads the slides stained by the reference readers themselves.

Results
During the four-month study period there were 3625 patients whose blood film was sent for malaria diagnosis in the study health institutions. Among these, 1000 (28%) were positive for malaria. The positivity rate varies from 7% to 49% in the different health institutions. Of the patients who gave blood specimen 1595(44%) were females the rest were males (Table 1).

The age and sex distribution of patients whose slides were read were slightly different from the total population. Many of the patients were in the age group below five and between 15-29 years (Table 2). The positivity rate varies with seasons and between health institutions. It was high during the malaria epidemic season and low in the non-epidemic season.

Comparison was made between results obtained from operational readers and the reference reader. From slides stained and read by operational readers initially, overall specificity and positive predictive value are 73.7% and 58.1 % respectively. Agreement between the operational readers and the reference was 75%. But the chance corrected agreement or kappa score was 0.47 (Table 3).

Results of slides prepared by operational readers and stained and read by reference readers compared with those of operational readers' of the same patients, show the uncorrected agreement was 77% and the chance corrected agreement was 0.53 (Table 3).

Table 1: **Reference population by sex, and study period, in selected health institutions, North Gondar, 2001.**

Health institution	January		May-June		August		Sept.-Oct.		Sub total		Total			
	M	F	M	F	M	F	M	F	M	F	No	%	No pos	% pos
GCMS Hosp*	90	90	57	61	81	73	80	81	308	305	613	17	44	7
GONDAR	105	95	103	77	112	90	109	91	429	353	782	22	127	16
TSEDA	56	51	121	79	0	0	194	126	371	256	627	17	307	49
KOLADUBA	111	119	52	66	135	90	170	207	468	482	950	26	322	34
CHILGA	47	36	54	28	141	33	88	25	330	122	452	12	165	37
DABAT	13	17	32	14	19	16	60	31	124	77	201	6	35	17
Total	422	408	419	325	488	301	701	561	2030	1595	3625	100	1000	28
Sex %	43	57	60	40	56	44	65	35	60	40				

*GCMS Hosp = Gondar College of Medical Sciences Hospital

Table 2: **Age and sex distribution of the study population, North Gondar, 2001.**

Age group	Sex				Total	
	Female		Male			
	No	%	No	%	No	%
0-5	154	44	199	56	353	15
6-9	58	40	88	60	146	6.2
10-14	85	42.5	115	57.5	200	8.5
15-19	176	43	229	57	405	17.2
20-29	221	36	392	64	613	26.0
30-39	153	49	161	51	314	13.3
40-49	53	34	101	66	154	6.5
50-64	42	42	59	58	101	4.3
65+	9	29	22	71	31	1.3
Unknown age	17	68	8	32	25	1.1
Unknown sex					13	0.6
Grand total	968	41	1374	59	2355	100

Table 3: **Agreement of readers on detecting malaria parasites in selected North Gondar-zone health institutions based on slides stained at the peripheral health institution, 2001**

OR*	Malaria Parasites								
	RRI**								
	Positive	Negative	Total	Sensitivity	Specificity	PPV****	NPV*****	Agreement	Kappa
Positive	579	417	996	78.5%	73.7%	58.1%	88%	75%	0.47
Negative	159	1166	1325						
Total	738	1583	2321						
OR		RR2							
Positive	718	273	991	73.6%	79.5%	72.5%	80.4%	77%	0.53
Negative	258	1058	1316						
Total	976	1331	2307						

*OR = Operational Reader **RR1 = Reference Reader1 ***RR2 = Reference Reader2
****PPV = Positive Predictive Value *****NPV = Negative Predictive Value

Of the 1000 positive for malaria the identified species were *P. vivax* 356 (35.6 %) and *P. alciparum* 644 (64.4 %). Of all the positive 390(39%) were females 608 (60.8 %) were males and 2(0.2%) were unknown sex.

Observation was also made on agreement of species identification on slides stained by operational readers, the uncorrected agreement was 69%, kappa score 0.41. When the reading of operational readers was compared with the reading of the reference readers as the slide, which the references readers stained, the agreement was 70% with kappa score of 0.51 (Table 4).

Table 4: **Agreement of readers on identifying malaria species at the study sites staining done separately, North Gondar, 2001**

Op. reader	Ref. Reader1 Negative	*P. falciparum*	P.Vivax	Total	Agreement	Kappa
Negative	1166	140	19	1325	69%	0.41
P. falciparum	254	350	37	641		
P.vivax	163	106	86	355		
Total	1583	596	144	2321		
Op. reader	**Negative**	**P.falciparum**	**RR2 P. vivax**	**Total**	**Agreement**	**Kappa**
Negative	1058	218	40	1316	70%	0.51
P.fa;co[ari,	168	442	28	638		
P.vivax	105	126	122	353		
Total	1331	786	190	2307		

OR = Op. reader = Operational Reader RR1 = Ref. reader1 = Reference Reader1 RR2 = Reference Reader2

When we see the specificity and positive predictive value of the test at each health institution it was least at Aykel Health Centre (64%, 38%) borderline at Gondar Health Centre (69%, 37%) and better at GCMS (93%, 60%). The sensitivity and negative predictive value of this test was least at Tseda health Centre 73.3 and 78% respectively (Table ..).

Table 5: **Blood film reading agreement of laboratory technicians for malaria parasite, by health institution North Gondar, 2001**

Health Institution	Op. reader	Ref. Reader1 Positive	Negative	Total	Sensitivity %	Specificity %	PPV %	NPV %	Agreement %	Kappa
GCMS	Positive	26	17	43	89.6	93	60	99	93	0.70
	Negative	3	228	231						
	Total	29	245	274						
Gondar	Positive	47	80	127	67.1	37	69	89	69	0.38
	Negative	23	181	204						
	Total	70	261	331						
Tseda	Positive	238	69	307	77.3	78	78	78	78	0.56
	Negative	70	243	313						
	Total	308	312	620						
Kolladeba	Positive	186	135	321	93.4	65	58	87	72	0.45
	Negative	37	248	285						
	Total	223	383	606						
Aykel	Positive	62	101	163	70.5	64	38	87	66	0.28
	Negative	26	181	207						
	Total	88	282	370						
Dabat	Positive	20	15	35	87.0	88	57	97	87	0.61
	Negative	3	105	108						
	Total	23	120	143						

Discussion

The positivity rate for malaria parasite varies among different health institutions. In some of them it is as low as 7%, in others as high as 49%. This variability is mainly related to the variability in the prevalence of malaria in different areas of the zone. The skills of the different health workers may also contribute for this variation.

As observed, in our findings, the specificity and positive predictive value of the test is not-satisfactory (though it is better in some than others). This implies that there are fairly good number of false positive patients (as high as 63 % of the positive) who are exposed to unnecessary treatment.

But the most important and worrisome findings are the low sensitivity and negative predictive value of this test at various health institutions. This tells us there were many false negative cases (as high as 22% of negatives), whose correct diagnosis was missed that might lead to delayed treatment for malaria, development of serious complications and death or exposure to unnecessary treatment with other drugs (4,15).

The overall chance corrected agreement between the operational and the reference readers were found to be low, it would have been better had it been at least 0.70(15). In fact much lower than the cross checking result of the slides from the sector malaria laboratories by the head quarter laboratory in the 70s. At that time the Kappa score, PPV, and NPV were 0.97, 99% and 97%, respectively (16).

In areas where there is unstable malaria, the need for blood film in severe and complicated cases is obvious. Moreover, this investigation has a significant role in the diagnosis of uncomplicated malaria, especially to confirm epidemics, diagnose sporadic cases during non-epidemic seasons, when *P. vivax* is a major problem and the recommended treatment is different from that of *P. falciparum*, and last but not least when resistance is suspected (2,4,14). However, if the test done is not fairly reproducible, it is difficult to rely on it. Therefore, physicians will continue to treat based on clinical impression despite the laboratory result (11).

Hence, improving the skills of laboratory workers to detect malaria parasites is an urgent need. Enhancing the agreement level and the reliability of the technicians is desirable and achievable. Slides from the peripheral laboratories where diagnosis of malaria is made should be sent to a reference centre for verification and quality control. Central laboratories should participate in this type of relevant quality assurance scheme (10,17-19). Refresher courses, workshops and seminars in the field of laboratory technology are lacking in the Region (20).

Conclusion . and recommendations: The agreements of readings of the blood film specimens by peripheral and reference technicians were very low. For maintaining and raising the skill of the laboratory technicians continuous retraining and supervision, with quality control schemes are indispensable.

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Original article

A community based study on knowledge, attitude and practice (KAP) on HIV/AIDS in Gambella town, Western Ethiopia

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Abstract

Background: HIV/AIDS is the major public health problem in our country. Studies need to be conducted to assess the behavioral risk factors of its transmission and prevention.

Objectives: To assess knowledge, attitude and practice of HIV/AIDS in the study population.

Methods: Community based cross-sectional study was done to assess the knowledge, attitude and practice on HIV/AIDS among individuals aged 15 years and above in Gambella town in November, 2000. Structured questionnaire was used to collect data.

Results: A total of 359 individuals were interviewed among whom 53.8% were males. Fifty-five percent of them were between 20 and 30 years of age. Majority of the study population were government employee. Sixty six percent were married while 25% were single. Oromos (32.9%), Agnuaks (21.4%), Amharas (16.7%) and Nuers (12.5%) were the major ethnic groups in the study population. About ninety six percent of the interviewed population reported to have heard about HIV/AIDS for whom the main source of information was the mass media (82.8%). The majority reported unprotected sex (79.7%) and unsafe blood transfusion (64.2%) as common ways of HIV transmission. About eighty six percent and 80% agreed on screening before marriage and voluntary testing respectively. Eighty six percent practiced sex at a mean age of first sexual contact of 16.6 and 18.4 years of females and males, respectively. Among those who had sexual contact with non-regular partner in the last one year, 39.6% did not use condoms. Males had higher rate of STDs as compared to females (21.1% and 12.2% respectively). Males were also observed to have significantly higher frequencies of sexual contact with non-regular partner in the last one year ($p=0.00$).

Conclusions: The findings of the study showed that sexual practice often begun as early as eleven years of age with the mean of age 16 and 18 years for females and males, respectively. The respondents were observed to have adequate knowledge although risky behavior is prevailing. Therefore, we recommend that health education should target elementary school children and those children who are not at school as early as the age of ten years. The knowledge of mother to child transmission in the region is limited. Hence, emphasis also needs to be given to improve the knowledge on mother to child transmission of HIV. Information dissemination should also be designed in such a way to bring about behavioral change. Regular assessment on the impact of the intervention should also be done. [*Ethiop. J.Health Dev.*2003;17(3):205-213]

Introduction

Many years have passed since the HIV epidemic has been a threat to mankind around the world. It has been increasing at an alarming rate since the first cases were reported in the early 1980s. Its transmission in developed world had been highly attributed to homosexuality and drug abuse while heterosexual transmission plays a major role in developing countries. Industrialized countries have achieved significant result in the

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prevention and control of the disease mainly through behavioral changes.

By the end of 2001, the total number of population living with HIV/AIDS was estimated to be 40 million. About 5 million people were infected in the year 2001 only. The number of people living with the virus in Sub-Saharan Africa during the same period was about 28.5 million, which is around seventy percent of the total making the region the most seriously affected area in the world. The same region accounted for seventy percent of the total HIV/AIDS deaths in 2001 (1).

Ethiopia is one of the most seriously affected countries in the world. In 1999, it was estimated that one of every 13 adults was infected. While this ratio showed the overall situation of the country, that of the urban areas was one out of every six adults. By the year 2002, 2.6 million people were infected. The HIV prevalence of women in antenatal clinics in urban areas of Ethiopia was estimated to be 14.9% by the same year. In some towns of the country like Bahir dar, this figure was about 20.8 percent (2) Recently, the prevalence of HIV infection of the country is 6.6% (3).

In between years 1996-2000, out of a total of 672 clinically suspected cases in Gambella Hospital, 328 were found to be HIV seropositive. The majority of cases were in 25-29 years age (hospital records). The seroprevalence rate of HIV infection among pregnant women has increased from 12.8 in 1997 to 19% in 1999 (4,5). This may show that there is either lack of knowledge or behavioral change. A number of studies on KAP HIV/AIDS were done in our country. According to the behavioral surveillance survey (BSS) in 2002, about 98% of the study population were aware of HIV/AIDS. Almost all groups know at least one prevention method. The study showed that significant proportion of the population were at increased risk of HIV infection despite high level of knowledge (3). Similar observations were also found in other studies (6,12). Awareness of HIV/AIDS among workers in the informal sector in Addis Ababa was found to be 96.3%. This study also revealed that there was a 34.1% of misconception rate on the ways of transmission of HIV/AIDS (7). The KAP study that was done in 1997 on high school students showed that the students have good knowledge about HIV/AIDS although found to have risky sexual behavior (8,16,17).

Different factors interact in complex manner to acquired and spread HIV infection. Its complexity makes the control and prevention of the epidemic difficult. Hence, it is vital to understand the nature of the epidemic in various location and consider the effect of social, economical, cultural and behavioral risks. Behavioral data is of paramount importance to set various points of public health intervention and it also helps to identify who is at risk. Such kind of information is also useful for efficient use of resources in the fight against epidemic. There are several studies on knowledge, attitude and practice of various population groups towards HIV/AIDS in the world. Encouraging results were found to show the baseline risk behavior and also to follow the progression of such factors.

This community-based study, thus, was conducted to assess the knowledge, attitude and practice of people residing in Gambella town on HIV/AIDS. This will definitely help to identify risky behavior that may need urgent and prompt public heath intervention in the region.

Methods

The study was conducted in Gambella town 777Kms south east of Addis Ababa. It is characterized by hot and humid climate. The total population of the town is estimated to be 20,000, according to the 1994 census. Although the people share common cultures and similar living standards, the native population practice polygamy and inheritance of one's late brother or relative's wife is a common practice.

A cross sectional study was conducted to access the knowledge, attitude and practice of the study population on HIV/AIDS. The study was conducted from November to December, 2000. The source population included all people residing in Gambella town aged fifteen years and above. This was estimated to be 11,000(55%of the population).

Required sample size was 372. The town was conveniently divided into 20 villages based on the house-to house polio campaign map of the town, that was conducted at the same time. Three hundred seventy two households were selected randomly from all villages using proportionate sampling depending on the number of households in each village. From each household one individual was selected using the lottery method when more than one eligible was obtained in a household. Data collectors were health assistants and nurses who were trained for one day. The questionnaire was translated in to Amharic and administered. Variables included socio-demographic characteristics and various factors related to knowledge, attitude and practice such as methods of transmission and prevention and the like. Translators were used for some study subjects who did not understand Amharic. Data was collected by going house to house. Each individual was asked for consent after which he/she was interviewed using the questionnaire. Epi info statistical software version 6 was used for data entry and analysis. Chi-square (X^2) test was used to calculate significant differences among proportions of categorical variables. P-values less than 0.05 were considered significant.

Result

Three hundred fifty nine (96%) participated in the interview. One hundred ninety three (53.8%) of them were males. The lowest age for both sexes was 15 years while highest ages for females and males, reported respectively, were 55 and 63. The mean age for females and males was 25.9 and 28.6 years, respectively. The majority were between 20 and 30 years of age. Majorities of them were government employees by occupation to be followed by students while the rest were merchants, farmers and NGO employees. This could, however, be explained by the selected study age group and place (towns) (Table 1). Most of the subjects were married (66.3%) while 25.3% of them were single (i.e, never married). Oromos constitute the higher proportion followed by Agnuaks, Amharas and "Nuers" which constitute 21.4%, 16.7% and 12.5% respectively. Fifty eight percent of the study subjects were above six grades and 14.2% were illiterates.

Only 4.5% of the participants reported that they didn't hear about HIV/AIDS (Table 2). For those who have heard of HIV/AIDS, the main source of information was found to be mass media (82.8%). The commonly reported ways of transmission were unprotected sex (79.8%)and unsafe transfusion (64.2%).

Only 0.9% reported to know that HIV is transmitted from mother to child. Faithfulness to partner, condom use and abstinence were reported to be ways of prevention by the majority of respondents (78.2, 76.5 and 64%, respectively). About 57% of the subjects knew that unprotected sex with any body can transmit HIV and 83.8% believed that even healthy looking individuals could transmit the virus. Common traditional practices such as tattoos, uvuloctomy, circumcision, tooth extraction were reported to predispose to HIV infection by the majority (65%-82.5%). Nearly 82% believed that HIV/AIDS is not curable. Seventy six percent of the participants knew that polygamy increases the risk of HIV transmission. More than sixty percent of the participants have good knowledge about the impact of HIV/AIDS (Table2).

Table 1: **Socio-demographic characteristics of the study population, Gambella town, Nov. 2000 (N=359)**

Characteristics	Frequency	Percent
Age group (years)		
<20	56	21.8
20-30	198	55.1
31-45	101	28.1
>45	4	1.1
Sex		
Male	193	53.8
Female	166	46.2
Occupation		
Gov. employee	119	33.1
Student	76	21.2
Merchant	52	14.5
NGO employee	6	1.8
Farmer	32	8
Others	74	21.5
Marital Status		
Married	238	66.3
Single	92	25.3
Divorced	15	4.2
Widowed	14	4.1
Literacy status		
Illiterate	51	14.2
Read and write	28	7.8
Gr. 1-6	72	20.1
Gr. 7-12	158	44
>12	50	13.9
Ethnicity		
Oromo	118	21.4
Agnuak	78	3.1
Amhara	60	12.5
Nuer	45	32.9
Tigre	20	16.7
Kambata	11	7.8
Others	27	5.6

Nearly 80% of both sexes agreed that sexual intercourse should not be committed before marriage. This was also true for 94.4% of those who have heard of HIV/AIDS while only 2.5% of those with no information about HIV/AIDS had the same reply. Eighty-seven of the subjects didn't accept having sex with multiple sexual partners.

Most of them (71.2%) preferred to get condom from the hospital while it was only 22% that have chosen bar or shop as a source of condom. About eighty five percent of females and 96.4% of males supported testing for HIV before marriage while the over all rate was 91.4%. The proportion of respondents having positive attitude towards screening before were 68%, 82%, 94%, 97.5% and 96% among the illiterates, those who can read & write, grades 1-6, grades 7-12 and above 12 respectively.

Table 2: **Knowledge on HIV/AIDS in the study population, Gambella town, Nov. 2000 (N=359)**

Knowledge	Frequency	Percentage
General knowledge		
Heard about AIDS	342	95.3
Healthy looking individuals	301	83.8
Can transmit HIV is curable	43	12
Polygamy increases the risk of HIV infection	274	76.3
Knowledge on Transmission		
Un protected sex	286	79.7
Unsafe blood transfusion	233	64.9
Sharing of needles	46	12.8
Mother to child Transmission	3	0.9
Knowledge on prevention		
Abstinence	230	64
Use of condom	274	76.3
Faithfulness to sexual Partner	281	78.3
No prevention	13	3.6
Traditional practices predisposing to HIV		
Tattoos	234	65.7
Tooth extraction	296	82.5
Tonsillectomy	279	77.8
Circumcision	278	77.4

Table 3 shows that about 80% agreed with voluntary testing for HIV. This agreement was observed to increase with increasing literacy status. Eighty-nine percent of the study participants preferred to be counseled by physicians. Isolation of people living with HIV/AIDS was opposed by 56.7% but supported by 37.7%. About 86% practiced sex with a mean age of first sexual contract at 16.6 and 18.4 years for females and males respectively. The lowest age of first sexual contact was 11 years for both sexes.

Table 3: **Knowledge on HIV/AIDS in the study population, Gambella town, Nov. 2000**

Attitude and practice	Yes	No	Do not know	Total
Attitude (N=359)				
Agree with sex before marriage	288 (80.4)	53 (14.8)	18 (4.7)	359 (100)
Agree with screening before marriage	328 (91.4)	12 (3.3)	19 (5.3)	359 (100)
Agree with isolation of PLHA	133 (37.2)	203 (56.7)	23 (6.10)	359 (100)
Agree with voluntary testing	286 (79.4)	57 (15.9)	16 (4.3)	359 (100)
Practice				
sexually active	308 (86.1)	51 (13.9)	0	359 (100)
Non-regular sexual partner in the last one year	58 (18.8)	241 (78.2)	9 (2.9)	308 (100)
used condoms	107 (34.7)	191 (620	10 (3.3)	308 (100)
Had STD	52 (16.9)	248 (80.5)	8 (2.6)	308 (100)
Was treated for STD	49 (94.3)	2 (3.8)	1 (1.9)	52 (100)

Fifty percent of males and 18% of females reported to have used condoms one or more times. Generally speaking failure to use condom decreases with increasing literacy status. Condom use was computed against marital status and it was found that 39% of the single and 23.2% of the married ones used it. The prevalence of condom use among the Nuers, Amharas, Agnuaks & Oromos was almost comparable. Among those who had casual sex in the last one year, 39.6% did not use condoms. Sex with non-regular partners was practiced by 27.3% of males, 9.5% of females, 42.3% of singles and 13.6% of the married ones in the last one-year. As well 24.5% of merchants, 19.1% of students, 17.4% of government employees and 18.5% of farmers practiced similarly in the same period.

Males reported sexually transmitted diseases more frequently than females (21.1% and 12.2%, respectively), genital discharges being the major symptom (85.9%). The rate of sexually transmitted diseases was also computed for different occupation and was found to be 22.4%, 21.1% 12.7%, and 7.1% for merchants, government employee, students & farmers, respectively. STDs were also reported by 17.3% of the singles and 16.6% of the married ones (Table 4). When the rate of STD was computed across different ethnic groups the highest prevalence was seen among the Oromos and Amharas to be followed by Agnuaks and Nuers. Nearly 4% of those who had STD reported not to be treated. Among those who had been treated, 75.5% reported to have got their treatment from the hospital.

Table 4: **Practice related to HIV/AIDS in the study population by sex, Gambella town, Nov. 2000**

Variables	Sex		Total	X^2	P-value
	Female	Male			
Non regular sexual partner in the last one year	No. %	No. %	No. %		
Yes	14 (9.5)	44 (23.3)	58 (18.8)	14.8	0.0007*
No	127 (86.4)	114 (11)	241 (78.3)		
I do not know	6 (4.1)	3 (1.9)	9 (2.9)		
Total	147 (100)	161 (100)	308(100)		
Use of condom					
Yes	27 (18.4)	80 (49.7)	107 (34.7)	29.4	0.00000*
No	112 (76.2)	79 (49.1)	191 (62)		
I do not know	8 (5.4)	2 (1.2)	10 (3.3)		
Total	147 (100)	161 (100)	308 (100)		
STD in the past					
Yes	18 (12.2)	34 (21.1)	52 (16.9)	2.9	0.087*
No	121 (82.3)	127 (78.9)	248 (80.1)		
I do not know	8 (5.4)	0	8 (3)		
Total	147 (100)	161 (100)	308 (100)		
Screening before marriage					
Yes	142 (85.5)	186 (96.4)	328 (91.4)	5.98	0.014*
No	10 (6)	2 (1)	12 (3.3)		
I do not know	14 (8.5)	5 (2.6)	19 (5.3)		
Total	166 (100)	193 (100)	359 (100)		
Sex before marriage					
Yes	135 (81.3)	154 (79.8)	289 (80.5)	0.48	0.488*
No	21 (12.7)	31 (16.1)	52 (14.5)		
I do not know	10 (6)	8 (4.1)	18 (5)		
Total	166 (100)	193 (100)	359 (100		

* Significant; P<0.05

Discussion

Many studies have been done in different parts of Ethiopia on HIV/AIDS among diversified social groups. There was also a KAP study on HIV/AIDS done in Gambella on some population groups such as high school students, commercial sex workers, soldiers and prisoners in 1997 (unpublished). Therefore this is the first community-based study done on general population in the town to assess the knowledge, attitude and practice of the population on HIV/AIDS. The study has tried to enroll those who are 15 years of age and above with the assumption that wider range of sexually active segment of the population were targeted. This study showed that 95.5% of the population have heard about HIV/AIDS which is similar to that obtained three years back in a study done in the same town among the risk groups. Similar observation was seen in studies from Awassa (8,9). The major source of information was the mass media (82%). This was also true in the study done on senior high school students in Addis Ababa in 1990 (10). In both studies schools and health institutions did not seem to play significant role as compared to the mass media. Considering the low access of the population to the mass media, especially in rural areas of the region, promotional services need to be extended to schools and health institutions in order to attain a better level of awareness related to the disease. Considerable

proportions of the respondents were able to correctly reply the common ways of transmission and prevention of the disease. This is comparable to studies done elsewhere in the country (11,12). However, the finding that only 0.9% knew mother to child transmission indicates that there is little attention given to it during health education campaigns. Inspite of the wide practice prevailing in the region, the majority said that polygamy increases the risk of HIV infection.

Generally, the respondents seem to have favorable attitude on prevention of the diseases. Majority of both sexes approved screening before marriage though the male approval was found to be significantly higher ($p<0.05$). This is almost comparable to the finding of a study done in Addis Ababa in the year 2000 (13). This indicates the existence of favorable social atmosphere for voluntary testing. Similarly large proportion of both sexes had negative attitude to sex before marriage, which is comparable to the study done in 1997 that showed higher percentage of female's disapproval on sex before marriage (8).

The reason why the majority prefer to get condom from the hospital rather than bars could be a biased reply for the word "bar" that may have a negative social implication. Although the proportion of respondents who opposed isolation of HIV/AIDS patients is higher than who supported (58% and 37%), it still indicates a strong prejudice and social discrimination, which is consistent with the study done in Gondar rural community in 1995 (11).

The mean age of first sexual contract for females and males obtained in our study (16.6 and 18.4 years) is comparable to two other studies (10,12,14,15). The observed early sexual contact among females in this study is mainly attributed to the prevailing culture that allows an early marriage in the region. This study showed that the earliest age of sexual contact was 11 years, which was similar to a study in Addis Ababa in 2001 (16). There is a difference between the proportion of people using condom (34.7%) and that who know about condom as a preventive method of HIV transmission (76.5%) which is comparable to the results found in students in Gondar (17). This indicates the dissociation between knowledge and using condom. This may be due to the reason that most of the respondents were married (66.3%). Marriage was the commonest reason for not using condom. It could also be due to the reluctance of individuals to apply their knowledge (18).

It was observed that males tend to have significantly higher frequency of sexual contact with casual partner in the last one year and at the same time they use condom more frequently than females. Although the dissociation between knowledge and use of condom mentioned above exists, it is encouraging to observe a parallel relationship between use of condom and sex with casual partner when it is grouped by gender. However, it is also important to note that 39.6% of the respondents committed unprotected sex with sexual partners, which contradicts with the observed adequate knowledge. Males had higher rate of sexually transmitted disease as compared to females although no significant difference was observed. This may be due to the fact that most STDs are a symptomatic among the females.

The discrepancy between the high rate of condom usage and higher rate of STDs in males than females may be because of failure to use condom consistently and appropriately. Only few individuals with STD failed to be treated. It has been found that literacy status has a positive impact on the attitude towards use of condom and screening before marriage ($P<0.05$) of the trend = 0.002, 0.004 respectively). In general, since the study is conducted in a town, it may not represent the general population in the region. Moreover due to the sensitive nature of the inquiries made, it could have some limitations in eliciting genuine responses.

Conclusion and Recommendation

Most of the respondents reported that they heard of HIV/AIDS. The main source of information was found to be the mass media, which is not accessible to every segment of the society particularly in rural areas. This gap should be filled by dissemination of information using schools and health institution wherever they are available for they seem to play unsatisfactory role in our study. Furthermore, health education can also be disseminated at social gatherings like local meetings and religious ceremonies. As sexual practice started as early as 11 yrs of age, health education about HIV/AIDS should be started in earlier ages at home and elementary school to lay the background of HIV prevention in what is called window of hope (19). Knowledge on transmission of HIV/AIDS from mother to child was seen to be very low. Therefore, due attention should be given to improve the knowledge of the society about such transmission in order to reduce the magnitude of infection among children. The study has shown that safe sex practices are less practiced as compared with the observed level of knowledge on prevention and transmission. Hence, appropriate health education should be given in a way to bring behavioral change targeting at individual risk behavior. Prejudice and social discrimination of people living with HIV/AIDS was seen to prevail at a higher rate therefore the community should get continuous and appropriate information to accept and give care to the people living with HIV/AIDS. Screening before marriage and voluntary testing appeared to be acceptable by the society and should be considered as major intervention areas in the health service package and should be encouraged. It is also vital to understand the behavior of the population so as to draw effective intervention strategies (17).

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Original article

Sanitary Survey in Gondar Town

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Abstract

Background: The health and well being of population is directly affected by extremely low coverage of water supply and sanitation.

Objectives: This study aims to assess the environmental sanitation status of Gondar town.

Methods: A cross-sectional study was conducted on the basis of the administrative structure of the town. The town was stratified into high density and low-density areas from which households were selected randomly from each stratum. A structured questionnaire was used for the household survey.

Results: There is a relatively high risk of exposure to poor environmental conditions in high population than low population density area. The association between educational status and income with availability of latrine was statistically significant, the literates and the economically better-off have a better sanitary facility. Excreta disposal facilities are generally inadequate and poorly maintained. The per capita water consumption was 12 liters/day, which is very low when compared to 30-40 liters per day for urban residents, as per the WHO standard.

Conclusion and recommendation: This study found that the sanitary status of the town to be poor. Thus, the municipality should give priority attention to improve the sanitary conditions in the town.
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Introduction

The health and well being of population is directly affected by the coverage of water supply and sanitation (1). The impact of poor environmental conditions on the transmission of communicable disease is well established. High incidence of childhood diarrhea, helimenthiasis, trachoma and high mortality rates are associated with poor sanitation and water supply (2-6). Excreta contain a wide variety of human pathogens and removal of these pathogens from the immediate environment, has a dramatic impact on health (7). Ethiopia is among the few countries were such problems have clearly manifested (1,8). Health is highly influenced water and sanitation related diseases.

Gondar town is located in the northwestern part of Ethiopia and its varied landscape, dominantly covered with ragged hills and plateau formations, imparts variable temperatures largely favoring a wide range of illnesses. Gondar is an old town which is not properly planned, zoned, and has no sufficient sanitation facilities. Alike most towns in Ethiopia, the population size is rapidly increasing, which is about 112,000(8). The existing environmental condition compounded with the poor hygiene behavior of the community has caused the expected improvement to be unchanged for a long time. On the other hand, environmental problems have worsened from time to time. The purpose of this study is to assess the sanitation status in Gondar town.

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Methods

A cross-sectional study was conducted from February to March 1999 in Gondar town. The town is divided into 20 "Kebeles", each of which is divided into a number of "Ketenas" which represent the lowest administrative urban units. The basic administrative structure of the town and the population size was estimated based on 1994 Population and Housing Census. There was marked division between population densities of different "Kebeles" with in the town. Population density was therefore viewed as a key variable to stratify the population for

sampling in order to get a fairly representative study subjects. High population density in reference to "Kebeles" was assumed that with a size above the median population, and low population density was chosen below the median population among the study "Kebeles". "Ketenas" within "Kebeles'" were assumed to have relatively similar size. Population density was taken in order to detect the magnitude of the problem associated with congestion, overcrowding of houses, overloading of drainage, solid wastes, high risk of transmission of infections and accidents, scarcity of water and sharing spaces.

The median population density was chosen as a reference point to separate high and low density "Kebeles". A stratified multistage sampling design was adapted to select the study subjects. Five "Kebeles" from each high and low density areas were randomly selected in the first stage. Twenty eight out of 48 "Ketenas" from high-density "Kebeles" and 20 out of 30 "Ketenas" from low-density areas were also randomly selected in the second stage. Finally, a systematic sampling method for the selection of households was applied for each chosen "Ketenas", the numbers of which were proportional to population size. Sample size was calculated for a single proportion assuming 30% sanitation coverage.

A structured pre-tested questionnaire was prepared to collect information on socio-demographic factors, latrine solid waste management, and drinking water supply. Per capita water consumption was estimated based on the frequency of water collection, the commonly used container used for water collection, and household size Fifteen enumerators were trained for data collection. Head of each household were interviewed. Two supervisors (sanitarians), one for each density category, were trained for co-coordination and data quality management. The dimensions of the housing units were measured using a metered tape measure. Data was then entered, edited and analyzed using EPI- info version 6 statistical package.

Results

There were a total of 1516 households during the study period. Of these, 985 (65%) were in the high density Kebeles and 531 (35%) were in the low density Kebeles. Respondents interviewed at the households' level were 771(51.9%) male and 745(49.1%) female. Eight hundred sixty eight (57.3%) of the respondents were found to be literate and seven hundred seventy two (50.9%) of the households had latrines (Table 1).

Table 1: **Distribution of latrines availability, by educational status, monthly income (Birr), and population density in Gondar town, March, 1999 (n=1516)**

Characteristics	Latrine availability		Total	X^2 (p-value)
	Yes No (%)	No No (%)	No (%)	
Educational status				
Literate	509 (58.6)	359 (41.4)	868 (57.3)	48.39 (P<0.001)
Illiterate	263 (40.6)	385 (59.4)	648 (42.7)	
Monthly income (ETB)				
< 100	137 (27.9)	354 (72.1)	491 (32.4)	244.34 (p<0.001)
101-300	282 (48.9)	295 (51.1)	577 (38.0)	
> 300	353 (78.8)	95 (21.2)	448 (29.6)	
Population density				
High	461 (46.8)	524 (53.2)	985 (65.0)	19.11 (p<0.001)
Low	311 (58.6)	220 (41.4)	531 (35.0)	

There was a statistically significant association between higher educational status and latrine availability (X^2=48.4; p<0.001). Four hundred ninety one (32.4%) of the households were getting a monthly income of less than100 Birr. There is also a statistically significant association between income and availability of latrine (p<0.001). An average area of a housing unit was 34.96 square meters with a mean of 5.20 persons and 2 rooms per housing unit. Only 758 (50 %) of households had kitchen.

Four hundred ninety nine (64%) of the latrines were privately constructed; others were by governmental, non governmental organization (NGO) and communities. About 80% of the latrines one of the traditional type (Table 2). An average of 18 users shared one pit latrine. Seven hundred seventy two households (50.9%) had latrines and 23 (3%) had facilities for urination. Eighty seven (11.3%), of the children did not use latrines, because of fear of falling in through the squatting hole and

Table2: **Ownership and type of latrines in Gondar town households, March, 1999, (n=772)**

Characteristics		Latrine availability	
		No	%
Latrine ownership	Individual	499	64.6
	Communal	251	32.5
	Public	22	2.9
Type of latrine	Traditional	611	79.1
	VIP	90	11.7
	Water-flush	71	9.2

darkness. The main reasons for not having latrine are high cost and lack of space (Table3). Seven hundred sixty nine (50.7%) of the households were disposing solid waste in the open field. Others used private pit, *Kebele's* selected site and municipal collection containers. One thousand four hundred thirty one respondents (94%) washed their hands after toilet. Of these, eight hundred fifty three (59.6%) of the respondents washed without soap, while 579(40.4%) washed with soap.

Table 3: **Reasons for not having Latrine, Gondar town, March, 1999 (n=744)**

Reasons	Number	%
Too costy	356	47.8
No space	294	39.6
Not necessary	10	1.3
Others	84	11.3

Majority, 1449 (95.6%), of the households were using safe and municipal piped water. Eight hundred fourty six (55.8%) of the households fetched water outside their housing compounds using public distribution points. The average consumption of water per capita per day was 12 liters. Eight hundred ninety nine (81 %) of the households were complain about scarcity of water and 150 (13.5%) complain about turbidity of water during the rainy seasons. Only 60 (4%) of the households were using home based water treatment facilities like boiling, chlorination and filtration.

Discussion

The study was able to indicate the condition of environmental sanitation in Gondar town mainly in relation to water supply, housing, sanitation and hygienic practices. The situation in most cases was very poor. This may be due to socio-economical, cultural, and related knowledge barriers inherent in the study area.

The high converge of safe water supply can be linked to the reasonable accessibility of municipal water supply facilities. The per capita consumption of water in the study area was low (12 liters) compared to other urban areas of Ethiopia (1). Inability to pay for water, poor health awareness, and the poor level of personal hygiene might explain lesser amount

of water consumption. Diarrhea, poor personal hygiene and eye problems, are common health problems in the study area. Personal and Environmental hygiene is very low where water is not adequately used (5).

The availability of excreta disposal facilities in 50.9% of the households is grossly inadequate, and is characterized by poor maintenance. That is not different from the 1994 population and housing census results for Gondar, which was about 50% (8). These figures were evident for the low priorities in the implementation of urban sanitation related developments. Free land space is not available for private and communal latrine construction in highly crowded Kebeles.

The main source of municipal solid waste is domestic refuse. Because of lack of space for storing and collecting wastes and possibly low awareness on how to handle the refuse, especially in high-density areas, the household vicinities were found to be full of solid wastes scattered all over. The condition is, therefore, likely to present a high risk for the continued transmission of communicable diseases despite the efforts made by the municipality to alleviate the existing solid waste management problems.

In conclusion, the results of this study showed the extent of the sanitary problems of the town. Hygienic practices were not observed in accordance with established norms for keeping hygiene and sanitation better. Crowding and mismanagement of the urban land have been the contributing factors for the worsening of the provision of health services in general, and the urban sanitation in particular. The poor sanitation conditions in many urban centers of Ethiopia is largely contributed by the negligence of sanitation developments by responsible agencies. Based on the findings the following were recommended:

- Communal water standpipes should be provided for low-income households in order to improve accessibility and adequateness of water supply.
- Proper and adequate public latrines should be constructed at selected areas to improve accessibility and use.
- More municipal refuse containers for secondary waste storage have to be established to ensure proper waste collection.
- Policy makers should continue their efforts in addressing the proper management of urban sanitation.

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Original article

Sustainability of Drinking Water Supply Projects in Rural of North Gondar, Ethiopia

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Abstract

Background: Safe water supply coverage in the rural areas of Ethiopia is very marginal. The coverage still remains very low because of limited progress in water supply activities in these areas. Factors affecting the continued use of the outcome of water supply projects in the background of limited resources are not well studied.

Objectives: To assess the utilization, functionality, community participation and sustainability of water projects.

Methods: A cross-sectional descriptive study was conducted in 11 randomly selected Peasant Associations located in North Gondar using a pre-tested structured questionnaire in a total of 768 house holds in the months of December 2001 to January 2002. Six focus group discussions and 114 physical site observations were conducted to check the interaction and linkages within the hierarchies of project management and of water supply projects.

Results: Four hundred forty two (57.6%) households were using protected water sources. The average frequency of water collection was 2.04 times per day with the mean per capita water consumption of 6.68 liters per day. The duration of waiting time needed to collect water at the water points was positively associated with the respondents complains about the non-functionality of water points. Community participation as defined in terms of some kind of contribution to small-scale drinking water development was more associated with spring protections than hand dug well protection. Results from observational checklists showed that 77% of the protected springs and 52% of the hand-dug wells used to be none-functional at least once from the time when their service was commissioned. Only 30.0% of the visited small-scale water projects had guards, some form of fences, cloth washing stands, and animal water troughs that are positive efforts to the advantages of maximizing community services. While the existence of Water Committee and labor contribution were identified as strengths, lack of built in trust and poor coordination were cited as weakness in the focus group discussions.

Conclusion and Recommendation: Available water projects were not effectively used because of the existing user high demand in one hand, and frequent non- functioning schemes and poor project coordination on the other hand. Enhancing community participation in sustaining the functions of water supply projects and strengthening the technical and resource capacity of Woreda Water Desks are strongly recommended to sustain the community water services. [*Ethiop.J.Health Dev.* 2003;(3):221-229]

Introduction

Water supply projects have impacts on people's lives, which extend far beyond the expected improvements to health and reduction in time spent collecting water. Involving community members in evaluation of their own projects brings new insights into both the wider impacts of interventions and the factors contributing to the long-term sustainability of water supply system (1). Sustainable development requires that people have access to safe drinking water supply services. At the beginning of 2000, 1.1 billion

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(17%) people of the world's population were without access to improved water. The majority of these people live in Asia & Africa (2). Ethiopia is considered to have one of the poorest drinking water supply indicators. National drinking water supply coverage is estimated at 33.2%. For urban areas the coverage for safe water is 83.5%, where as for rural areas this is 24,7% (3).

The administrative structures to rural areas are often limited to address the environmental health needs. Sustainability is expected to be achieved by building a partnership with communities that should lead towards improving the beneficiary's problem- solving capacities (4).

Some reports from Ethiopia as well other as developing countries showed that insufficient and inappropriate technology account for the failure of some of the projects (5). Insufficient water facilities, poor physical structures, low reliability of the services and facility designs, distance and the time needed to collect water, and low awareness about their uses are some factors affecting the continued functioning and utilization of water supply schemes (6,7). Although several water supply projects were constructed in Gondar area, the majority of them are reported to be non-functional at present affecting a significant proportion of users. However, studies on factors affecting the sustainability of water supply schemes through the WHO recommended indicators were not studied in the area (6). The present study was, therefore, initiated to assess the factors affecting drinking water supply utilization, type and degree of community participation and functioning of water supply projects on the background of limited resources for developing such community services.

Methods

A descriptive community based cross sectional study design complemented by focus group discussion and field observation in the rural setting of North Gondar was conducted in the months of December 2001 to January 2002. The study area has a population of 2, 391, 545 with male to female ratio of 1:0.97. Urban and rural population accounted 270,937 (11.3%), 2,120,608 (88.7%), respectively. North Gondar has varied landscapes predominately covered with rugged hills and plateau formation determining the presence of different ecological settings characterized by different climatic conditions (8).

All villages having a total of 228 water supply schemes represented the sampling frame for this study. The villages were stratified by two broad types of implementing organizations: non-governmental (UN Capital Development Fund, Ethiopian Orthodox Church, Ethiopian Red Cross Society & UNICEF/"Wereda" Integrated Basic Services) and governmental (Ministry of Health, Ministry of Water Resources, and Gondar College of Medical Sciences). One from each stratum with the highest number of out puts was identified in order to randomly select a total of 11 villages possessing some kind of water supply schemes.

The required sample size was obtained using a conservative estimate of 50% of community participation level, 5% of margin of error, and 95% confidence of certainty. Assuming a design effect of 2 the minimum sample size required for the study was 768 households that were selected using a systematic random sampling method from the selected villages.

A pre-tested structured questionnaire was used for the quantitative survey. The questionnaire included information on demographic and socio economical characteristics of the respondents and functioning, utilization, and participation in water supply facilities. Field observations using structured checklists were administered in 114 (50%) of projects. Data for the observation included mainly distance, service duration, and protection mechanism. A total of 6 focus group discussions (FGDs) were managed to collect qualitative data using a semi structured questionnaire guide, note taking and record taping. Four FGDs were arranged at grass root

level for males and females separately, and 2 FGDs at project management level. Each FGD consisted of 6-8 participants with the same socio-economic background. The principal investigator in quite and private locations moderated FGDs. Summaries of FGDs were transcribed. The container used for water collection and the time needed to collect water was standardized through calibration of known volume and walking distances, respectively. A stopwatch was used to measure the time spent to wait and collect water during site observation. Each of the data collectors had fixed their average time by watching at least one woman while collecting water from their respected areas of houses to water source and back to their house. Ten 12th grade trained female enumerators supervised by two sanitarians collected the data. The field data quality was checked through intensive supervision, daily meetings and discussions to ensure the completeness and consistency of the collected data.

Proxies for the measurement of functioning, utilization, and participation were used to assess factors affecting sustainability (6, 9). **Functioning** is referred to the proper physical state of water supply projects in relation to their present working conditions at the time of survey. It also included the benefits in reference to the physical structures as measured in terms of distance, type of technology, and sanitary protection systems. **Utilization** is referred to the extent of social and health benefits as measured mainly by the proportion of users and per capita consumption. **Sustainability** is the continued service of water supply projects over time to serve their own purposes. Proxies of sustainability are those factors affecting functioning, utilization, and community participation.

Data were entered, cleaned and analyzed using EPI-INFO version 6 & SPSS version 10 statistical packages. Odds ratio with 95% CI & multi variate logistic regression analysis were employed to assess the significance and associations between variables.

Results

A total of 768 female house hold respondents were interviewed. The distribution of socio-demographic, socio- economic and some selected characteristics of respondents are shown in Table 1. The mean (SD) age of respondents was 37.09 (13.52). Six hundred ninety eight (90.9%) respondents were illiterate. Most, 632 (82.3%), were married.

Table 1: **Distribution of respondents by socio-demographic variables in North Gondar, January 2002 (n=768)**

Variables	No.	%
Age (years)		
15 – 19	23	3.0
20 –24	106	13.8
25 –29	113	14.7
30 – 34	112	14.6
35 –39	90	11.7
40 – 44	96	12.5
45 –49	55	7.2
50 +	173	22.5
Mean ± SD	**37.09 ±**	**13.52**
Religion		
Christian	760	99.0
Muslim	8	1.0
Ethnicity		
Amhara	729	94.9
Kemant	39	5.1
Education		
Illiterate	698	90.8
Only read Or/and write	15	2.0
Grade 6 and below	40	5.2
Above grade 6	15	2.0
Marital status		
Married	632	82.3
Unmarried	7	0.9
Divorced	49	6.4
Widowed	80	10.4
Occupational status		
Farmer	150	19.5
House wife	618	80.5
Husband's educational status *		
Illiterate	365	57.8
Grade 6 and below	53	40.0
Above grade 6	14	2.2

* (n=632)

Use of protected water sources was accounted to 442 (57.6%) households. Mean family size's was 5.3 ranged from 1 to 12 persons with an estimated mean family income of 60.72 Birr per month (Table 2). The study showed that water per capita utilization had a significant association with the family size (OR=8.56, 95% CI (1.56, 77.91)).

Table 2: Distribution of respondents by family size, family income and type of projects in North Gondar, January 2002, (n=768)

Variables	Number	Percent
Family size (number)		
1-4	289	37.6
5-8	430	56.0
9 and above	49	6.4
	Mean ± SD	**5.31 ± 2.06**
Family income (Birr per month)		
49 and below	382	49.7
50 – 99	292	38.0
100 and above	94	12.3
	Mean ± SD	**60.72 ± 55.29**
Protected water sources		
Yes	442	57.6
No	326	42.4

The majority, 359 (81.2%), took more than 15 minutes for a round trip to collect drinking water. Two hundred seventy three (61%) respondents collected water two times per day. The mean (SD) water per capita consumption was 6.68 (4.36) liters per day. Three hundred fifty seven (80.8%) of the respondents used about 8 liters and less water per capita per day and only 10 (2.3%) were found to collect more than 20 liters per capita per day (Table 3). Complaints of respondents about projects functionality had significant association with time taken to fetch water at the water source point (OR=0.18, 95% CI (0.08, 0.39) (Table 4)).

Table 3: **Characteristics of water utilization in North Gondar, January 2002. (n=442)**

Variables	Number	Percent	Mean ± SD
Time for collecting water (minutes)			
15 and less	83	18.8	
16 – 30	287	64.9	
30 and above	72	16.3	20.51 ± **7.89**
Water collection frequency per day			
Once	83	18.8	
Twice	273	61.8	
3 times and above	86	19.4	2.04 ± **0.69**
Per capita consumption (liters)			
8 and less	357	80.8	
9 –19	75	16.9	
20 and above	10	2.3	6.68 ± **4.36**

Table 4: **Respondents complaint about functionality condition of water supply projects associated with time waiting at the water source point, duration of service and financial contribution in North Gondar, January 2002. (n=442)**

Variables	Conditions of functioning		OR (95% CI)
	Functioning (n=390)	**Not Functioning (n=52)**	
Time waiting at the water Source to collect water (minutes)			
≤ 5	180	43	0.18(0.08,0.39)
≥ 6	210	9	1.00
Cash contribution for water use (n=339)			
Yes	280	43	2.96(0.76,9.76)
No	11	5	1.00
Service duration of The projects (in years) (n=768)			
< 5	387	53	1.46(0.03,13.40)
≥ 5	5	1	1.00

*Those who contributed money were only 339

Three hundred thirty nine (76.7%) respondents out of all users of protected water sources have made contributions either in cash or in kind needed for water developments. The distribution of participation in contribution by development stage is: 273(80.5%), 41(12.1%), 11(3.24%), 8(2.4%), and 6(1.8%) in construction only, construction and coordination, construction and planning, planning only, and maintenance, respectively. The types of contributions are indicated in Fig 1. After controlling possible confounding variables, contribution made by respondents had significant association with the waiting time duration needed to collect water at the water source points (OR=0.39, 95%CI(0.31,0.96)) (Table 5). The majority of none contributors 50(48%) claimed that participation was not the work of females, assuming the task of working with small-scale water supply systems is the job of males. More community participation was observed for spring protection than hand dug wells development ($p<0.05$).

Table 5: **Contribution of respondents to the water supply projects associated with selected variables in North Gondar, January 2002 (n=442)**

Back ground Characteristics	**Presence of Any contribution**		**Crude OR (95% CL)**	**ADJ. OR (95% CL)**
	Yes n=339	**No** n=103		
Time for collecting water in minutes				
≤ 15	65	18	1.12(0.61,2.09)	0.87(0.49,2.26)
≥ 16	274	85	1.00	1.00
Time waiting at the water point in minutes				
≤ 5	155	63	1.00	1.00
≥ 6	184	40	**0.53(0.33,0.86)**	**0.39(0.31,0.96)**
Water frequency (per day)				
Once	61	21	1.00	1.00
Twice	278	82	0.86(0.48,1.55)	0.66(0.64,2.02)
Service duration of the project (in years)				
<5	1	5	0.06 (0,0.67)	0.49 (0,0.15)
≥ 5	340	100	1.00	1.00
Water per capita (in liters/day)				
≥ 20	6	4	0.45(0.10,2.20)	0.15 (0.70,9.46)
<20	333	99	1.00	1.00

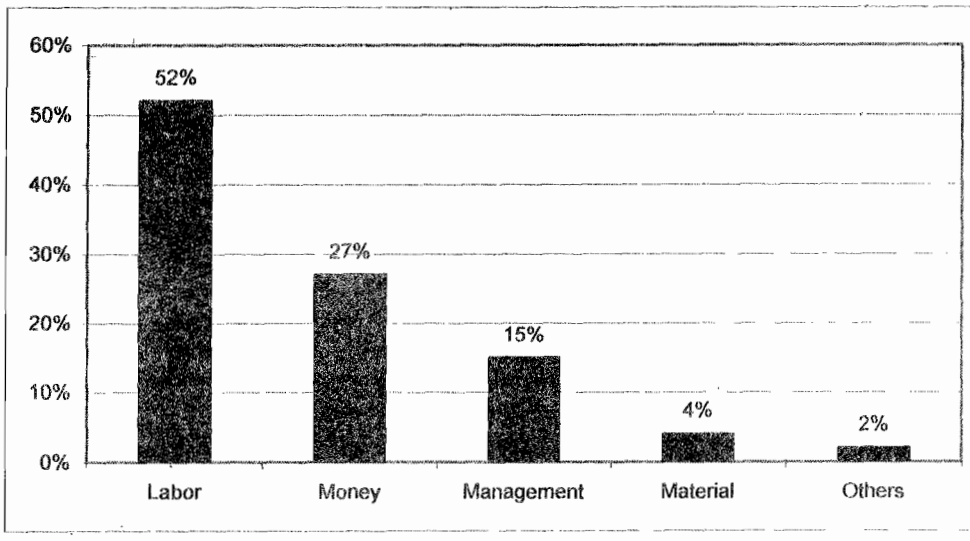

Figure 1: **Distribution of respondents by their types of contribution of the development of the water projects in the rural setting of North Gondar, January 2002 (n=442)**

Among the none users of the protected water sources, 326(42.5%), reasons for not using the schemes were identified as: complaints on system breakage, long distance, inability to pay service fee, lengthy waiting time for water collection by 48.2%, 22.1%, 10.4%, and 7.1%, respectively. Others complained about the quality of water and guards.

As a solution for the continued use of protected water sources, respondents suggested: regular maintenance, increasing the number of protected water sources, improving user's participation by 33%, 29%, and 10% of the households, respectively. Others suggested the need to have guards and trained personnel to undertake maintenance works, increasing the capacity of water sources through spring collection boxes and faucets.

The findings from focus group discussions were organized by analyzing strengths, weaknesses opportunities and threats (SWOT). Water Committee formation, active participation and capacity building were identified as strengths. Insufficient community partnership with the management, lack of adequate skills of financial management for water sources, and the absence of gender sensitivity were discussed as weaknesses. Some of the opportunities were accessing to safe water for better health, bringing community awareness on hygiene through latrine demonstration, understanding the need of water source attendants and fencing, and reducing the problem of water leeches. Insufficient water during dry season from developed water sources, poor coordination between stakeholders and local government, and the growth of eucalyptus trees around water sources were identified as the threats.

Discussion

The very low coverage of drinking water supply in rural areas of Ethiopia has existed for decades (10). Many other developing nations around the globe share this experience (11) Ignorance, poverty coupled with lack of strong community commitment still continues to degrade the immediate environment contributing decisively to the sustained transmission of communicable diseases.

community commitment still continues to degrade the immediate environment contributing decisively to the sustained transmission of communicable diseases.

The time taken to fetch water from protected sources greater than 15 minutes in this study was higher than that of the findings in Lesotho, in Zambia, and else where in Ethiopia (12). It exceeded the guide line value recommended time by WHO (13), which is set at 15 minutes of walking distance, equivalent to a distance of about one kilometer. Thus children and mothers, who are the common water attendants, spend much time on water collection in the rural settings of Ethiopia. This is believed to affect spare times required for other household affairs that may impact the health of the family as a whole (7)

The amount of water per capita consumption, about 8 liters and less used by the majority, was significantly different from WHO guide line value set at least 20 liters per capita per day (9). This study revealed that consumption is inversely related to the duration of time to collect water, distance to the water points, increased family size, and the ability to pay service fees. Inadequate drinking water adversely affects personal hygiene, clean food preparation, and housing sanitation, hence favoring the transmission of water borne and water washed communicable diseases.

Community's better participation in protected spring development than in hand dug wells can be possibly explained by the difference in approaches used by stakeholders for community mobilization. The high volume and type of work for spring protection which is more labor intensive in the study area is more likely to require more participation. However, it is not possible to rule out if the weakness came from the stakeholders' participatory approach related to wells, which is also as important as the other water point. The frequent hand dug well service interruption due to pump failure might also discourage the community to consider the partnership.

Community participation in its various forms consisting mainly of labor, cash, service, kind, and advice contributions is critical and decisive for developing and using water supply projects (14). The high rate of participation in the study area, about 77%, is very encouraging entry point to sustain the community service. The result revealed that community members understand reasons for their participation aimed at efficiency, building a sense of ownership and capacity building for purpose of sustainability (12). The local government inputs geared towards sustaining the effort is another management dimension that requires supports for improving its documentation and maintenance capacity in terms of spare parts and tools from respective stakeholders.

The extent of community involvement can be indirectly assessed through identifying negative factors involved in initiating the motives to participate. The fact that frequent brakeage of water systems, hard to reach to water points, inadequateness of water sources, and much time required to collect water discourages the use of protected water requires close attention to address the issue of sustainability for developmental works to ensure "whether or not something continues to work over time" (15).

The issue of Sustainability without addressing this concern will lead to poor community participation, and often forcefully breaking the system in order to access the water for their intended use. Spring protections with adequate yield and continued run offs during the night time and day time when not used by humans, creates extra opportunity to serve this purpose. This study indicated, although not significant proportion, that 19.2% of the observed water points had animal troughs and washing stands.

Field observations had given a chance to observe both the negative and positive factors related to water use and physical features of the water schemes. The presence of fences and guards in 29.8% of water points is a positive participatory response from the beneficiaries reflecting their desire to sustain the technology.

Negative attitudes are related to the mishandling of water sources like poor site clearing and not replacing or maintaining damaged water faucets.

In the focus group discussions, issues were raised by the governmental and non-governmental organization was the issue of the completed projects handover. It was also very recently that the Water and Mining Energy Offices (WMEO) took the responsibility of to be handed over water supply projects. Unfortunately the water desk agents at the "Wereda" level representing WMEO were not yet skillful and resourceful to manage and maintain the existing projects. Lack of tools and spare parts are some of the observed problems. "Wereda" management also lacked the effort to maintain Water Committee capacity to reproduce and manage the local financial sources required to ensure the continued service of water points.

In conclusion, various factors are interacting to maintain the intended objectives of any water supply projects. The utilization of water sources mainly depended on their functionality; this in turn depends on the magnitude and type of community participation, the whole purpose focused to sustain the continued use of water supply projects. Considering the modest water service fee, distance from water points, involving community at all stages of water development, and building adequate skill and capacity to maintain water sources are essential factors to sustain the water system. Strengthening the technical and management capacity of "Wereda" Water Desks, improving the coordination at all levels of management, and maintaining community participation are recommended for future action.

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Original article

Assessment of drug utilization from prescribers and dispensers perspectives in selected towns of Amhara region, Ethiopia

Teferra Abula, Gizachew Ashagrie

Abstract

Background: Access to essential drugs and up-to-date information related to drugs are critical for optimal provision of health care, particularly in developing countries. However, the situation of drug utilization in Ethiopia is less than optimum and the scarcity of information about it has prompted the undertaking of this study.

Objective: To assess the views of health professionals concerning the utilization of drugs in hospitals and retail drug outlets in some selected towns of north west Ethiopia.

Methods: Structured questionnaires consisting of open- and close- ended questions on the availability, marketing and usage of drugs and related information were prepared and distributed to drug- prescribers and drug-dispensers.

Forty Physicians and 20 drug-dispensers have responded to the questionnaires and their responses were analyzed.

Results: The results demonstrated that availability of essential drugs and accessibility to up-to-date drug information was low. Cephalosporins were the most demanded but hardly available drugs. The view of most health professionals towards the usage of drugs was appropriate but the application of the code of Ethics by some drug dispensers, while dispensing and marketing pharmaceuticals was found to be unacceptable.

Conclusion: Improving the availability of and accessibility to essential drugs as well as alternative drugs and up-to-date drug information with an application of the professional code of Ethics particularly in pharmacy profession are found to be crucial for optimal and rational phamacotherapy.
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Introduction

Drug utilization has been defined as the marketing, distribution and use of drugs in a society with special emphasis on the resulting medical, social and economic consequences (1).

Availability of an appropriate selection and regular supply of affordable drugs that are efficacious, safe and of good quality, is a prerequisite for any operative health care system. Drug availability, however, does not ensure rational prescribing, dispensing or appropriate patient use. Developing countries confront a lot of problems in their efforts to ensure the availability and rational use of safe and effective drugs (2).

The compilation and adoption of an essential drugs list has been found to significantly improve the availability and rational use of essential drugs in many developing countries (3,4). Ethiopia adopted a list of Essential drugs in 1987 as part of the National drug Policy that specifies national pharmaceutical goals in order to overcome the problems mentioned above (5). Nevertheless, there are still shortages of basic essential drugs and irrational use of drugs (irrational prescribing, irrational dispensing and inappropriate use by patients) in Ethiopia (6).

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Considering the distribution of the health service budget including drug budget, which is skewed in favor of the urban centers of Ethiopia (6), the situation in drug distribution and marketing in the rural areas is expected to be worse. Added to this, irrational use of drugs would complicate the shortage of drugs in the country compounded with low budgetary expenditure.

It has been described that most people have no confidence in a health care system which can not deliver medicines(7); and not surprisingly, from the huge contribution of drugs to global reductions in mortality and morbidity, making drugs available should be given top priority in the health agenda of every country. The importance of providing basic information about drugs to physicians, other health professionals and the community has been reported for the rational use of drugs (8).

In this regard, information about the availability of essential drugs, marketing of drugs and access to basic information about drugs in the health care system of Ethiopia is scanty. The objective of this study was to assess the views of prescribers (physician) and dispensers about drug utilization in selected towns of Amhara region, Ethiopia.

Subjects and Methods

This is a referral hospital -and private pharmacy-based survey conducted between October to December 2001 in selected towns of the Amhara region, the second largest region (in terms of population) in Ethiopia. The selected towns were Bahir Dar, Dessie, and Gondar; all of them have both hospital and pharmacy services as they are relatively large towns (with more than 100 000 inhabitants). The selected towns have one referral hospital each and majority of physicians working in these hospitals. According to the information obtained from the hospital administration offices of the respective hospitals, the total number of physicians was 46 out of which 40 responded within the given time (48hours). The reasons for failure to respond are not known. Other potential prescribers such as nurses were not included in this study because physicians mainly do prescribing in the referral hospitals.

The physicians of the referral hospitals and the pharmacy workers (dispensers) of 20 private pharmacies in the selected towns were the subjects of this study.

The referral hospitals and pharmacies are supposed to render health services of high standard and are assumed to provide accurate and reliable information which is required for our study. We attempted to reach the maximum possible number of physicians working in the referral hospitals and dispensers of the private pharmacies (one responsible person from each pharmacy).

All pharmacies of the selected towns were included in the study.

The hospital directors of the referral hospitals and the responsible worker (dispenser) of the private pharmacies were informed about the purpose of the study which was conducted after securing their permission and co-operation.

Structured questionnaires consisting open- and close-ended questions about the distribution and use of drugs and related information were distributed to physicians, and their responses were obtained after 48 hours. The physicians were also asked to list down scarcely available but very essential drugs or class of drugs. Forty physicians responded by filling the questionnaires appropriately.

Similarly, structured questionnaires consisting of open and close-ended questions about the distribution, marketing and dispensing practices were administered to pharmacy workers (dispensers) at the time of the visit. All pharmacy workers co-operated to give information. In most Pharmacies we found only one dispenser.

Data were analyzed by using EPI INFO 2000 statistical Package.

Statistical significance of the price differences between the imported and locally manufactured pharmaceuticals was tested by Wilcoxon signed rank sum test with level of significance of 0.05.

Results

The response of 40 physicians to various questions related to drugs and pharmacotherapy is shown in table 1.

Table 1: **Response of physicians about matters related to drugs (n=40), selected towns of Amhara region, 2001**

Response	Number	Percent
Availability of essential drugs:		
Yes	6	15
No	34	85
Access to up-to-date drug information :		
Yes	8	20
No	32	80
Follow standard treatment guidelines:		
Yes	36	90
No	4	10
Consider Price of drugs while prescribing:		
Yes	35	87.5
No	5	12.5
Compliance of patients to treatment regimens:		
Very good	2	5
Good	18	45
Moderate	17	42.5
Bad	3	7.5
Success of Pharmacotherapy:		
Successful in >70% of Patients	14	35
Successful in 50-70%of patients	23	57.5
Successful in < 50% of patients	3	7.5
Preferred drugs:		
Locally manufactured	1	2.5
Imported	17	42.5
No difference	22	55

Thirty four (85%) physicians were with the opinion that essential drugs were not available most of the time; and almost the same number of physicians also mentioned poor access to up-to-date information about drugs.

About Eighty seven percent of the physicians do consider the price of drugs while prescribing and 90 percent of the physicians follow standard treatment guidelines, when available.

When asked to estimate the compliance of patients to the treatment regimens, the majority of the physicians rated the compliance of their patients with the therapeutic regimens as good or moderate.

More than half of the respondents replied that there was no difference between locally manufactured and imported drugs in terms of efficacy and safety. A considerable percentage (42.5%) of physicians, however said that imported drugs are preferable to domestic products.

The majority of the physicians agree that most patients benefit from pharmaco-therapy.

The response of physicians to list down highly demanded but hardly available drugs or class of drugs is shown in table 2.

Table 2: **Top-15 highly demanded but hardly available class of drugs or individual drugs (freq=192), selected towns of Amhara region, 2001**

Class of drugs or drug	N	%
Cephalosporins	28	(14.6)
Antineoplastic drugs	18	(9.4)
Dopamine	15	(7.8)
ACE inhibitors	14	(7.3)
Rifampicin and pyrazinamide	12	(6.3)
Insulins	11	(5.7)
Ureidopenicillins	10	(5.2)
phenytoin	10	(5.2)
Opioid analgesics	10	(5.2)
Quinolones	9	(4.7)
Antifungals	8	(4.2)
Glucose 40%	8	(4.2)
Antiretroviral drugs	7	(3.6)
Clarithromycin,	6	(3.1)
Metronidazole, IV	5	(2.6)
Others	21	(10.9)

ACE= Angiotensin Converting Enzyme
IV= Intravenous

Cephalosporins were the most frequently mentioned hardly available drugs followed by anti-neoplastic drugs, dopamine, angiotensin converting enzyme, rifampicin, insulin, etc. in that order. For example, 28 out of 40 physicians listed down cephalosporins to be scarcely available.

Table 3 shows the response of drug dispensers (14 pharmacists and 6 health assistants) in 20 private pharmacies(one person from each pharmacy).

Table: 3: **Response of dispensers about drug-related information (n=20), selected towns of Amahara region, 2001**

Response	n	%
Source of drugs:		
Pharmid + Private importers	20	100
Other source	0	0
Request for partial dose of POM:		
Reject the request	12	60
Dispense partial dose	8	40
Access to up-to-date drug information	4	20
Yes	16	80
No		
Source of drug information:		
Inserted leaflets	13	65
Books and inserted leaflets	7	35
Referring patients to Physicians:		
Yes	20	100
No	0	0

POM = Prescription-Only-Medicine

All drug dispensers said that they purchase drugs from pharmid (government organization) and private importers and used to refer patients to physicians when the condition demands.

When asked what measure do they take if a customer can not afford to buy a full dose of a prescription- only medications, 40% of the dispensers said that they dispense partial dose(s) by instructing the customer to collect the remaining dose(s) in some future time. The remaining 60% of the dispensers said that they reject the request of the customer in such cases. Eighty percent of the dispensers said that they don't get up-to-date information about drugs and most of them are limited only to inserted leaflets as source of drug information.

The price of some selected pharmaceuticals (imported or locally manufactured) such as paracetamol, ampicillin, chloramphenicaol, co-trimoxazole, mebendazole, tetracycline, procaine penicillin, aluminium hydroxide plus magnesium trisilicate and aspirin is shown in table 4.

Table: 4: **Prices of selected imported and/or locally produced drugs, selected towns of Amhara region, 2001**

Drug	Price* of imported product in Birr			Price* of local product in Birr		
	n	x ± SD	Range	n	x ± SD	Range
Paracetamol 500mg Tab*	9	0.315±0.195	0.09-0.55	20	0.091 ± 0.022	0.03-0.15
Ampicillin 500 mg Cap	8	0.971±0.308	0.55-1.53	20	0.563 ± 0.059	0.46-0.75
Chloramphenicol 250mg Cap				20	0.23 ± 0.034	0.15-0.3
Co-trimoxazole 480mg Tab	12	0.65 ± 0.821	0.11-3.29	14	0.192 ± 0.077	0.12-0.5
Mebendazole 100 mg Tab.	10	0.181 ±0.112	0.04-0.5	12	0.153 ± 0.054	0.1-0.5
Tetracycline 250mg Cap				20	0.152 ±0.025	0.1-0.2
Procaine penicillin 4mill. IU with water for injection, vial				9	3.667 ± 0.262	3.22-4.25
Aluminum hydroxide plus Magnesium trisilicate susp. 200ml.bottle.	13	13.55 ± 0.7	12.5-15.0			
Aspirin 325 mg Tab*	11	0.256 ± 0.144	0.05-05	20	0.082 ± 0.028	0.03-0.5

* Prices are for each tablet, capsule, vial, or bottle
* Statistically significant difference between imported and locally manufactured drug items ($P < 0.05$)

The prices of imported pharmaceuticals were greater than those of the locally manufactured items of the same dosage form and strength. The difference was statistically significant ($P<0.05$) in the case of paracetamol and aspirin. Wider range of prices was observed among both imported and locally manufactured items.

Discussion

The study attempted to examine the views of drug prescribers and drug dispensers about drug utilization (distribution, marketing and use of drugs).

The study revealed that the availability of essential drugs and access to up-to date information are low. The shortage of basic essential drugs in Ethiopia which has been reported some ten years ago (6, 9) has not yet been improved. Since drugs and up-to-date information about drugs are key elements of therapeutics, their shortage would obviously compromise the quality of health care.

It has been pointed out that apart from compiling a list of essential drugs, one must seek means to provide an efficient supply of drugs, correct prescribing procedures and better understanding of patient compliance (10). The whole idea of the essential drugs list for developing country should mean securing the availability of them.

The compliance of patients with therapeutic regimens as estimated subjectively by the physicians in this study was in good conformity with the previous reports which were partly based on objective methods (11,12). It is gratifying to note that most physicians don't overestimate the compliance of patients, do consider the price of drugs while prescribing and follow standard treatment guidelines, all of which contribute to promotion of rational drug use and utilization.

Providing antibiotic cost information to prescribers enabled them to select less expensive antibiotics and found to provide additional economic advantage for the patient (13). Because some patients can not afford to buy a full dose of an expensive drug, and fail to comply with the clinical prescription, providing cost information of drugs for prescribers enables to select affordable drugs.

The views of drug dispensers about drug utilization are appropriate in some aspects and

inappropriate in others. The fact that a health assistant used to dispense drugs in the absence of the qualified pharmacist in some pharmacies makes the rationale for restriction of pharmacy license to pharmacists meaningless. A considerable percentage (40%) of drug dispensers said that they dispense even a partial dose of prescription-only-medication which is inappropriate professional practice.

These drug dispensers said that they usually advise the patients to collect the remaining dose(s) in some other time. Because some patients stop taking even medications at their hands when they feel a sort of improvement from the ailments (11), dispensing partial dose means inviting the patients for noncompliance to clinical prescriptions with all consequences of non-compliance.

Up-to-date drug information is not accessible to the majority of drug-dispensers (80%) and most of them particularly health assistants use inserted package leaflets as a main source of drug information. Inserted package leaflets may contain manipulated information about a particular drug as they are prepared by drug companies and thus are subject to bias. Although a workshop on rational drug use in Ethiopia proposed strategies to provide objective and unbiased information to prescribers, dispensers and the community some ten years ago (6), no change has yet been seen. Periodical upgrading of the pharmaceutical knowledge of the professionals is important for proper selection, procurement, storage, and dispensing of drugs as well as instructing the patients and the community about the proper use of drugs.

The average prices of locally produced drugs are relatively lower than those of imported ones with the same dosage form and strength. The complaint of some local drug manufacturers not to cope up with market competition of imported pharmaceuticals because they are cheaper (personal communication with a representative of one local drug company), seems unreasonable. Wider price variations observed among imported drug items may be explained by variability in the source of drugs. Drug retail margins of different drug retail outlets lacks uniformity even for the product of the same source, probably a reflection of varied commercial interest. The availability and appropriate use of carefully selected low-cost pharmaceuticals has been described to substantially reduce a huge burden of illness in developing countries (14). In this line, prescribing and dispensing of low-priced generic products rather than brand drug products has been pointed out to have significant aspect of health care cost reduction (15,16). Because more than half of the physicians included in this study noted that locally produced drugs are equivalent to imported drugs, importing of the expensive drugs is not economical. In this regard, import substitution in the pharmaceutical industry is one important option for the drug policy of the country.

In conclusion, accessibility to both essential drugs and up-to-date information about drugs, which are essential for the provision of optimal health care, was found to be low and calls for an urgent response by the concerned authorities and policy makers.

Since the efficacy and safety of locally produced drugs were found to be comparable to the imported ones but are relatively cheaper than the latter, the performance of local producers should be given due attention. There appears to be a reluctance to conduct professional and ethical dispensing practices in some pharmacies and drug shops for which training programs for the dispensers about their ethical obligations and supervisory visits for the improvement of dispensing skills and application of code of Ethics are recommended.

Finally, large scale studies are required to investigate national trends in drug utilization and reach at a strong conclusion.

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Brief communication

Gender perspective in health: does it matter in tuberculosis control?

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Introduction

Gender refers to women's and men's roles and responsibilities that are socially determined. Gender is related to how we are perceived and expected to think and act as women and men because of the way society is organized, not because of biological differences (1). Sex is genetic/physiological or biological characterristics of a person which indicates whether one is female or male (1).

These gender divisions shape the lives of both women and men in fundamental ways. As individuals with particular identities and as members of the society they are shaped and reshaped by their femaleness or their maleness. In one sense then, both women and men are constrained by their membership of particular gender group. But these variations represent more than just a difference. In most societies they are also used to justify major inequalities with those in the category female having less access than those in the category male to a wide variety of economic and social resources like obvious inequality in the distribution of income and wealth, around the world, women make up about 70% of those who are poor (2), unequal situation in the labour market, less favorable treatment in most social security systems, many have no access to independent income and those who do earn their own wage receive on average around three quarters of the comparable male salary (2).

As well as material discrimination, women's lives are also affected by the cultural Devaluation of femaleness that is a significant element of every day thinking in so may societies (3). This cultural discrimination is expressed by low status within the household, the relatively low value placed on women and girls by individual families and by society as a whole. Women still outnumber men by two to one among the world's illiterate people and girls constitute the majority of the children without access to primary school (2). Women's access to political and economic power is not also balanced with their number and contributions as citizens and in some countries these gender inequalities in power continue to be reflected in the discriminatory nature of the law.

Sex, Gender and Health

Patterns of health and illness in women and men show marked differences. Men and women experience different health risks that stem from their biological differences as well as their different social economic and cultural roles (4). Most obviously women as a group tend to have longer life expectancy than men in the same socio-economic circumstances. Yet despite their greater longevity women in most communities report more illness and distress than men (5). The precise details of this excess in female morbidity and the factors behind it vary in different social contexts (5).

Women's advantage in relation to life expectancy is partly biological in origin. Economic development and social changes that remove some of the major risks to women's health such as introduction of birth control technologies improvements in living standards and the introduction maternity services also led to a significant improvement in life expectancy. Thus a range of social factors combined to

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enhance women's inherent biological advantage.

For men, the emergence of the male breadwinner in industrial economies required men to take on life threatening jobs in much greater number than women. As a result, male deaths from occupational causes have historically been higher than those among females and that. At the same time men's increase access to resources and their growing freedom from religious and other constraints led many to take up potentially dangerous substances and these new habits came to be defined as inherently 'masculine'.

These factors contributed to reduce life expectancy among men. The net effect if socio-economic conditions favour longer life expectancy among female. However, in African countries men outlive women, possibly because of the harsh living conditions and the marginalization of women (6,7).

In India and Pakistan the two sexes have almost equal life expectancy (1). In these societies there is an excess of female deaths both in childhood and in childbearing years and most can be attributed to the material and cultural discrimination against girls and women (8). Therefore, these are societies in which the biological advantage of the women is entirely cancelled out by their social disadvantage.

The female preponderance in morbidity is difficult to interpret, but three contributing factors are suggested: (a) Women's greater longevity is itself a cause of their higher rates of morbidity. (b) Women are more likely than men to suffer health problems connected with their reproductive system. Their capacity to conceive and bear children as well as the desire to control fertility brings them to the health care system more often than men. (c) Studies from many parts of the world show that women are more likely than men to report symptoms of mental distress (5).

Therefore, being a male or being female has a major effect on an individual's health and well-being. The combination of their biological sex and gendered nature of their cultural economic and social lives will put individuals at risk of developing some health problems while protecting them from others.

The course of a disease may be different in women and men because of differential response to illness between men and women; differential societal response, to male and female sickness; and difference in accessing health care. This paper tries to illustrate the relevance of a gender perspective in health in general and particular in the control tuberculosis. This is imperative to do because information and research on this particular area is grossly lacking in Ethiopia.

Gender and Tuberculosis Control

Varying biological factors between the sexes influence susceptibility and immunity to diseases. Gender roles and relations influence the degree of exposure to infection and access to disease prevention and control resources shared by both sexes, they may have different manifestations or natural histories or differ in the severity of their consequences in women and men:

- overall there are twice as many male cases of TB as female cases (9).
- more smear positive male tuberculosis patients are diagnosed (10).
- TB is the single leading cause of deaths among women of reproductive age, accounting for 9% of the deaths worldwide; compared with war 4%, HIV 3% and heart disease 3% (11,12).
- progression from infection to disease is as much as 130% high in women and case fatality rates are 27-41% higher among girls and young women (13).

Despite such disparities in the epidemiology of TB between the two sexes, gender was not an issue in tuberculosis control until recently.

Inter-disciplinary research and control programs have begun to give attention to it in the last few years.

The social consequences of TB are found to be severe for women to the extent of, rejection by husband, rejection by in-laws, reduced chances of marriage (16,17,18). However, the concerns of men when diagnosed of tuberculosis were different. Male patients worry about the economic losses more than consequences (17,18).

Women in Vietnam with pulmonary TB are diagnosed on average 2 weeks later than men because of delays from the health care provider. Men were offered sputum examination more often than women (19). In the same area, a mean delay from onset of cough to first visit of a hospital was significantly longer among women than men (20). Barriers to compliance to treatment also appear different for men and women in Vietnam (21).

There are very limited studies dealing with the social aspects tuberculosis in Ethiopia. Two studies in northern Ethiopia show the stigma related with the diagnosis of tuberculosis is severe to the extent of divorce and reduced chance to getting married it a girl is known to have TB (22,23).

Gender Analysis of TB

Gender analysis in health is concerned with asking how and why inequity occurs in health and explains the differential constraint experienced by women and men in accessing health care (15).

The gender perspective facilitates a more contextualized understanding of differences between women and men in relation to: the rate of and vulnerability to infection, differences in access to and use of available health care resources, differences in the effect of the social meanings, especially stigmatization, of infectious diseases, the effects of disease on women as primary health care providers in their homes, and key dimensions of structural differences based on factors such as age and social status.

Stigma associated with TB seems to have a greater impact on women than on men and often places them in an economically or socially precarious position. Because the health and welfare of children is closely liked to that of their mothers, TB in women can have serious repercussions for families and households (13).

The first international research workshop on Gender and TB, was convened by the Nordic School of Public Health, in May 1998. Key issues were presented and discussed and the book produced from the workshop represent a resource for setting the agenda for future research on the subject (14). The conceptual framework which was developed based on discussion at this workshop is a useful guide for gender analysis of tuberculosis. It includes various steps from the infection of individuals and populations with *M tuberculosis* to the development of disease and its cure. It also indicates the possible gender related questions that can be asked at the different levels, from acquiring the infection to cure and to the period after cure (14).

Effective TB control cannot be achieved so long as the disease is considered in isolation from the social process that maintain it, create the condition facilitating its spread and act as barriers to care. Insights into the economic and social burdens incurred with a diagnosis of TB are essential to understand why many patients especially the most disadvantaged are unable to seek health care and unable to comply with treatment regimens (24).

Conclusion

Socio- economic and cultural factors play important roles in determining overall gender differences in rates of infection and progression to disease; and access to case detection and successful treatment of TB. Therefore, tuberculosis control and research programs need to be gender sensitive and take the necessary measures in all their efforts.

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