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Telephone: 157701 or 518999 ext.7, FAX: (251-1) 517701

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SOME ASPECTS OF MALARIA PREVALENCE, VECTOR INFECTIVITY AND DDT RESISTANCE STUDIES IN GAMBELLA REGION, SOUTHERN WESTERN ETHIOPIA

**Wondatir Nigatu, BSc¹, Beyene Petros, D.Sc², Mesfin Lulu, BSc¹,
Nessguse Adugna, MSc¹, Robert Wrtz, PhD¹, Dejene Tilahun, Sen.Ent.Tech.¹**

ABSTRACT: Prevalence of *Plasmodium falciparum* and *Plasmodium vivax* in the human population, infectivity and DDT resistance of *Anopheles* mosquitoes were studied on samples collected during the peak malaria season of 1990 from Gambella, South West Ethiopia. Mosquito vectors collected were assorted into species and their infectivity with malaria parasites was determined by the enzyme-linked immunosorbent assay (ELISA). In the human population out of a total of 821 individuals examined from nine villages, 4.1% (34) were found to be positive for malaria parasites. Of the 34 positive individuals 5.9% (2) were positive for *Plasmodium vivax* and 94.1% (32) for *Plasmodium falciparum*. Although relatively high positivity rates for malaria were observed in 1-4 and 5-14 age groups, the difference in the rates of positivity was not statistically significant for the whole population ($P = 0.5077$). However, a significant difference in parasite prevalence was detected between the nine localities ($P < 0.05$). Compared to that of 1989, the overall malaria prevalence rate in the human population significantly decreased in 1990 ($P < 0.05$). Insecticide susceptibility studies revealed the presence of DDT resistant *Anopheles gambiae* s.l. mosquitoes in Itang. Furthermore, a strong evidence would suspect the vectorial status of *A. pharoensis* was obtained by detecting salivary gland sporozoite antigens of *P. vivax* in the head region of two mosquitoes. Sporozoite rates of 0.76% (*P. falciparum*) for *A. gambiae* s.l. and 0.47% (*P. vivax*) for *A. pharoensis* were determined. [Ethiop. J. Health Dev. 1994;8(1):1]

INTRODUCTION

Ethiopia has three geoclimatic zones that have characteristic malaria endemicities (1). The "kolla" or the hot zone below 1500m altitude has seasonal or perennial malaria transmission depending on local conditions with moderate to high endemicity. This roughly constitutes 46% of the territory. The "woina dega" or temperate zone (46% of the territory) is between 1500m and 2500m altitude and has malaria transmission characterized by sporadic outbreaks of unstable malaria resulting from sudden climatic changes such as heavy rains or floods. The "dega" or cold zone (8% of the territory) which is found above 2500m altitude is free of malaria transmission.

On this basis, at present, about 75% of Ethiopia is considered to be either malarious or potentially malarious with about 64% of the population at risk of infection (2). Previous studies have shown that the malaria situation in Gambella is characteristically hyper-endemic with stable malaria transmission along the Baro River basin (3, 4). However, the appearance of drug resistant *P. falciparum* (5), insecticide resistant *A. gambiae* s.l. and the high influx of people from non-malarious regions of the country (resettlers from the highlands of Tigray, Wollo, Shoa, etc.), with the concomitant agricultural expansion programs, would be expected to influence the epidemiology of malaria transmission in the area.

Lack of adequate understanding of the epidemiology of malaria transmission has remained to be one of the major impediments to malaria control in Ethiopia. The present study attempts to provide an additional information on the vectors responsible for malaria transmission and on malaria parasite prevalence in the human population in Gambella. It is hoped that it would assist the planning of intervention strategies against malaria in the Gambella region.

¹National Research Institute of Health, P.O.Box 1242, AA

²Dept. of Biology, MU P.O.Box 1176, Addis Ababa

³Dept. of Entomology, Walter Reed Army Institute of Research, Washington D.C. 20307-5100, USA

METHODS

STUDY AREA

Gambella, situated at 6° N, 35° E, is a tropical lowland in South West Ethiopia. Its altitude is in the range of 500 to 600m above sea level. The wet season extends from late April to mid November and the dry season is between late November and early April (3). The area is traversed mainly by the Baro, Alwero, Gillo and Akobo rivers flowing with highly varying volumes of water at different times of the year. Nine localities, namely, Gambella town, Abobo (Tegnei), Chobo, Perbongo, Ukuna,

Uballa, Pegnudo, Finkio (Baro Abol) and Itang with relatively stable populations were selected for the study. Out of these sites. Parasitological investigations were not conducted in Gambella town, Abobo (Tegnei) and Itang. Since some resettlement villages were closed and others had very few inhabitants, during the study period, it was necessary to limit the study to the nine localities. The population of the region comprises the indigenous Anuak, Neur and Mesango nilotic nationalities and the Hametic-Semitic settlers that have immigrated from the highlands. The region is one of the areas in the country where the control of malaria is operational by the National Organization for the Control of Malaria and other Vector-borne Diseases (NOCMVD).

STUDY POPULATION

Based on the list of inhabitants obtained from NOCMVD centers, 10% of the residents were randomly selected from each locality. A short questionnaire was filled by asking the study subjects. It included Demographic information such as name, age, sex, place of residence, duration of stay and previous residence.

PARASITOLOGICAL STUDY

Thick and thin blood films were collected from each of the study subjects. The slides were air dried and stained for 30 minutes in 3% Giemsa solution within 18 hours of collection and were later examined at a field station in Gambella. All positives and a random selection of 10% of the negatives were re-examined by another senior microscopist in Addis Ababa at the National Research Institute of Health (NRIH).

ENTOMOLOGICAL STUDY

Mosquito collections were made from indoor resting sites in the morning hours (6:00-9:00 A.M.), and by using human baits stationed indoors and outdoors in the evening hours (5:00-8:00 P.M.) through aspirators. Indoor collections were kept and treated separately from those obtained outdoors. All mosquitoes collected were identified to the species level based on morphological descriptions (6, 7). Sporozoite detection in mosquitoes: Parasitic mosquitoes were stored in a desiccator in silica gel vials and transported to the NRIH laboratory for further analysis. Mosquitoes of the indoor-resting collections (IRC) and the human bait-capture collections were assayed using the sandwich enzyme linked immunosorbent assays (ELISA) for the detection of *P. falciparum* and *P. vivax* circumsporozoite (CS) proteins. The ELISA protocol followed was essentially that developed by several workers (8,9) and later-on standardized as kit by Wirtz (10). In brief, *P. falciparum* and *P. vivax* anti-sporozoite monoclonal bodies were adsorbed to Immulon 2 (Dynatech Laboratories, U.S.A.) microtiter plates. After overnight incubation at room temperature (20-23°C) a blocking buffer (10gm albumin bovine fraction V, 5gm Casein, 0.1gm Thimerosal in PBS) W18; added and incubated for another one hour at room temperature. Following aspiration of the blocking buffer, the head-thorax or abdomen mosquito triturates were added to the wells. The plates were then incubated for one hour at room temperature and washed twice with phosphate buffered saline-Tween 20 (PBS-TW 20) and horse peroxidase labelled anti-sporozoite monoclonal antibody added and incubated for two hours followed by washing three times with PBS-TW20. Finally, ABTS [2, 2'-azino-bis-(3-ethylbenzthiazoline-6-sulphonic acid)], a peroxidase substrate (Sigma Co. St. Louis, MO,) was added to the wells. The absorbance values were then read using a Multi-Scan Spectrophotometric (Dynatech Laboratories, U.S.A.) ELISA plate reader at 405nm. Values greater than the mean plus three standard deviation of the seven negative controls of male mosquitoes were considered positive. Positive controls that consisted of recombinant R32 peptide of *P. falciparum* CS protein and a synthetic *P. vivax* CS peptide were used as described by Wirtz et al. (10).

Insecticide susceptibility studies: The specimens for this study were collected from Itang during the months of September and October from 1988 to 1990. Blood-fed indoor resting *A. gambiae* s.l. were exposed to 4% DDT impregnated paper using the standard WHO test-kit (11). Twenty mosquitoes per test-kit were exposed for one, two and four hours. Another group of twenty were exposed to oil impregnated paper for an equal period of time and used as controls. Each of these tests was carried out in duplicates. The mortality values obtained from the three exposure periods were recorded.

Table 1. Prevalence of *Plasmodium vivax* and *P. falciparum* by Age (Gambella, October-November, 1990)

Age group (groups)	Precent			
	No. pos./No. Exam	<i>P. vivax</i>	<i>P. falciparum</i>	Total
1-4	9/159	1.3	4.4	5.7
5-14	13/266	0	4.9	4.9
15-49	10/329	0	3.0	3.0
≥	2/67	0	3.0	3.0
Total	34/821	0.24	3.9	4.1

Table 2. prevalence of *P. vivax* and *P. falciparum* by Locality (Gambella, October-November, 1990)

No	Locality	No. pos. No.Exam.	Percent positive		
			<i>P. Vivax</i>	<i>P. falcp</i>	Total
1	Uballa 27	1/50	0	2.0	2.0
2	Uballa 28	6/100	0	6.0	6.0
3	Chobo 9	3/118	0	2.5	2.5
4	Chobo	1/50	0	2.0	2.0
5	Perbongo 10	0/80	0	0	0
6	Prebongo 19	3/92	0	3.3	3.3
7	Ukuna 22	7/81	0	8.6	8.6
8	Ukuna 24	4/50	0	8.0	8.0
9	Baro Abol (Finkio)	9/200	0	3.5	4.5
	Total	34/821	1.0	3.9	4.1

Table 3. Infectivity of the Common Endophilic Anopheline Mosquitoes Assayed by Using Santi-circumsporozoite Monoclonal Antibodies Against *P. falciparum* and *P. vivax*. (Gambella, October-November, 1990)

Collection area	A.z	A. ph	A.g	A.n	A.c.	A.z	A. ph	A.g	A.n	A.c.
				**						
Gambella town	-	-	2(140)	-	-	-	-	0(140)	-	-
Abobo (Tegnei)	-	-	0(2)	-	-	-	-	0(2)	-	-
Chobo	0(1)	0(3)	-	-	-	0(1)	0(3)	-	-	-
Perbongo	0(1)	0(2)	0(32)	0(9)	0(1)	0(1)	0(2)	0(23)	0(9)	0(1)
Ukuna	-	0(1)	0(2)	0(1)	-	-	0(1)	0(2)	0(1)	-
Pegnudo	-	-	0(6)	-	0(1)	-	-	0(6)	-	0(1)
Baro Abol (Finko)	0(4)	0(424)		*** 0(6)	0(4)	0(4)	2(424)	0(79)	0(6)	0(4)
Total	0(5)	0(428)	2(246)	0(16)	0(6)	0(5)	2(428)	0(264)	0(16)	0(6)
% of mosquitos infected	0	0	0.76	0	0	0	0.47	0	0	0

Table 4. Infectivity of the Common Outdoor human-bait Collected Anopheline Mosquitoes Assayed using Anti-circumsporozoite Monoclonal Antibodies Against *P. falciparum* and *P. vivax*. (Gambella, October-November, 1990)

Collection area	ELIAS (. falciparum)								ELESA (P.vivax)							
	**z	A.ph	A.g	A.n	A.c	A.s	A.pa	A.f	A.z	A.ph	A.g	A.n	A.c	A.s	A.pa	A.f
Gambella town	0(4)	0(15)	0(1)	-	-	-	-	-	0(4)	0(15)	0(1)	-	-	-	-	-
Abobo (Tignei)	-	0(6)	-	0(2)	-	-	-	-	-	0(6)	-	0(2)	-	-	-	-
Chobo	-	0(11)	-	-	0(33)	0(4)	-	-	-	0(11)	-	-	0(33)	0(4)	-	-
Pegnudo	0(7)	0(12)	0(1)	0(2)	0(2)	-	-	-	0(41)	0(132)	0(3)	0(2)	0(2)	-	-	-
Ukuna	0(35)	0(18)	0(1)	-	0(10)	-	0(15)	0(4)	0(35)	0(18)	0(1)	-	0(10)	-	0(15)	0(4)
Uballa	0(3)	0(40)	-	-	-	0(26)	-	0(3)	0(3)	0(40)	-	-	-	0(26)	-	0(3)
Pegnudo	0(70)	0(21)	0(1)	-	-	-	-	-	0(70)	0(21)	0(1)	-	-	-	-	-
Baro Abol (finkio)	-	0(87)	0(1)	-	0(7)	0(1)	-	-	-	0(87)	0(1)	-	0(7)	0(1)	-	-
Itang	0(34)	0(132)	0(2)	0(3)	-	-	-	-	0(34)	0(132)	0(2)	0(3)	-	-	-	-
Total	0(187)	0(462)	0(9)	0(7)	0(52)	0(31)	0(15)	0(7)	0(187)	0(462)	0(9)	0(7)	0(52)	0(31)	0(15)	0(7)
% of mosquitos infected	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

** A.z. (Anopheles ziemanni), A.Ph. (A. pharoensis). A.g. (A. gambiae s.l). A.n. (A.nili) A.c. A. Acoustani, a.s. (A. squamosus).

A.Pa (A.paludis) or A.f. (A. funestus)

N.B. Figures in parentheses are the number of mosquitos

Table 5. Result of the DDT Susceptibility Tests (1990)

CONE	EXP	NO. EXPOSED		NO. DEAD	% MORTALITY
			1988		
DDT 4%	1 HR	99		21	21.2
Control		79		0	0
DDT 4%	2 hrs	40		18	45
CONTROL		40		0	0
DDT 4%	4hrs	60		30	50
CONTROL		40		0	0
			1989		
DDT 4%	1hr	97		0	0
CONTROL		90		0	0
DDT 4%	2hrs	77		0	0
CONTROL		75		0	0
DDT 4%	4hrs	120		0	0
CONTROL		60			
			1990		
DDT 4%	1hrs	140		14	10
CONTROL		60		0	0
DDT 4%	2hrs	100		11	11
CONTROL		60		0	0
DDT 45%	4hrs	160		24	15
CONTROL		60		0	0

- = concentraion of insecticide (DDT)
- = exposure preiod

RESULTS

The prevalence of *P. vivax* and *P. falciparum* by age is shown in Table 1. Out of a total of 821 individuals examined, from nine villages, 4.1% (34) were found to be positive for malaria parasites. Of the 34 positive individuals 5.9% (2) were positive for *P. vivax* and 94.5% (32) were positive for *P. faldparum*. *P. vivax* was detected only in the 1-4 year age- group; *P. faldparum* was diagnosed from all age groups, with the highest (4.9-%) prevalence rate in the 5-14 year age-group, amd the lowest (3.0%) prevalence in the age-group above 15 years. However, the difference was not statistically significant ($P = 0.5077$).

The prevalence rates of *P. vivax* and *P. falciparum* in the nine villages are presented in Table 2. *P. vivax* was found only in Finkio village while *P. falciparum* was detected in the eight localities with the highest prevalence (8.6%) in Ukuna 22.

A comparison of malaria prevalence between 1989 and 1990 is shown in Figure 1. The data suggested that as compared with the year 1989, the overall malaria prevalence decreased by 3.3 fold in 1990. The reduction in prevalence was greatest in the age-group 30-34 (10.1 fold) followed by the age-group 40-44 (7.7 fold). The lowest was in the 45-49 (1.03 fold) md 35-39 (1.6 fold) age-groups. Among children and in those aged 50 years and above, the reduction in prevalence ranged from 2.7 to 3.9 fold while the decrease the 15-29 age-group was 4.9 fold.

The epidemic mosquitoes assayed for the detection of CS proteins included: 6 *A. ziemanni*, 430 *A. pharoensis*, 264 *A. gambiae* s.l., 16 *A. nili* and 6 *A. coustani*. Of these, only 0.76% (2) *A. gambiae* s.l. and 0.47% (2) *A. pharoensis* were found positive for *P. falicparum* and *P. vivax*, respectively (Table 3).

The infected *A. gambiae* s.l. were collected from the town of Gambella while the infected *A. pharoensis* was from Finkio. Of the two infected *A. gambiae* s.l. the infection in one mosquito was located in the head-thorax region and that of the second mosquito was abdominal. The infections in *A. pharoensis* were both located at the head-thorax region.

None of the outdoor human-bait collected mosquitoes were found positive for the two malaria parasites assayed (T1ble 4). Similarly, indoor human-bait collected *A. pharoensis* mosquitoes from Finkio were also found negative.

The result of DDT susceptibility tests on *A. gambiae* s.l. for the years 1988 to 1990 is presented in Table S. The mortality values for one, two and four hours exposure periods showed values below the 80% susceptibility threshold, indicating the presence of DDT resistant *A. gambiae* s.l. in the study area with the highest level of resistance recorded for 1989.

DISCUSSION

The higher rate of parasite positivity in children aged between 1-4 years could be the result of relatively low acquisition of immunity. The parasite positivity rate in the older children (5-14 age-group) was also relatively high, because of the partial immunity these children of the resettled population have developed over about 5 years of stay in the region. Differences in prevalence between the nine localities could be attributed to factors such as the presence of convenient breeding sites for mosquitoes. For instance, the higher prevalence in Ukuna can be explained by the proximity of the Seri River, and of marshy areas in Uballa 28 and Finkio.

The overall reduction in the prevalence of malaria in 1990 when compared to that of 1989 could be explained by the insecticidal pressure due to "Actellic" spraying (Personal communication, Gambella region NOCMVD office) that drastically reduced the indoor-resting anopheline population in 1990. This measure was undertaken following the 1989 severe malaria epidemic which could not be contained as a result of DDT resistance observed in the area (13). Except in the age-group above 35 years old, the majority of whom were indigenous and showed a lower reduction in prevalence rate, the pattern of prevalence reduction in all age-groups was relatively high. The lower reduction in prevalence in the indigenous population where more than 95% did not take antimalarial drugs for treatment or prophylaxis, is most probably the result of stable malaria in the region. This observation is similar to other in populations of holo or hyper-endemic areas of the world (12). The higher reduction in prevalence of infection in the age-groups that constituted the resettled population could be due to increasing immune status as they stayed longer in the region and the intensive drug usage (about 98%) for treatment and prophylactic purposes. Previous investigations suggested that the species responsible for malaria transmission in Gambella were *A. gambiae* s.l., *A. funestus* and *A. nili* (3, 14, 15). The role of *A. pharoensis* was not clear (4). Our findings were partly in conformity with that reported earlier (16). This study has provided evidence that reinforces the report of Fissehay et al. (17) incriminating *A. pharoensis* as a malaria vector species specifically carrying *P. vivax*.

Over the past 19 years the ecological changes that took place in Gambella as a result of increased activities such as agricultural development projects and the resettlement programs appear to have created a conducive environment for the breeding of *A. pharoensis*. A preferred breeding environment in the form of abundant rice farm and marshy areas produced by the over flooding Baro river may account for the large population of *A. pharoensis*. This has been proved by the collection of a large number of this species in Finkio. The connection between the presence of *P. vivax* patients in Finkio only and the infection of the two *A. pharoensis* in this village with *P. vivax* may be explained by this fact. For *A. gambiae* s.l. which is known as an efficient vector of *P. falciparum*, such breeding places are not conducive (2).

On the basis of this investigation it also appeared that only the indoor-resting mosquitoes constituted important vectors while the outdoor avid biters did not. This could be explained by the fact that the outdoor human bait collected vector mosquitoes are by and large newly emerged teneral adults that have not previously fed on human blood to pick parasites.

Since 1959, DDT spraying at a dosage of 2g./m² was carried out twice yearly first as a pilot control programme and then as an active control operation (18). Although we do not have the DDT susceptibility test data for other areas of the Gambella region, the present finding indicated the presence of DDT resistance of *A. gambiae* s.l. in Itang. This may be explained by the fact that, after 1986 DDT-spraying was widely used in vast areas of the region due to the increasing activities of resettlement and agricultural development schemes which may have resulted in the occurrence of resistant strains within a short period. For a better understanding of the specific epidemiology of malaria and its consequences in the local population of Gambella, similar follow-up studies should be carried out.

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**FERTILITY AND CONTRACEPTIVE USE IN RURAL DALLE,
SOUTHERN ETHIOPIA
Betemariam Berhanu, MSc'.**

ABSTRACT: This study was based on data from the 1992 Family Planning Expansion Project base-line survey conducted by the Family Guidance Association of Ethiopia. The findings indicated that the study population was characterized by a persistence of high fertility and an extremely low level of contraceptive use. The mean number of children ever born to women aged 45-49 was about 8, while the total marital fertility rate (TMFR) was around 11 births per woman. The analysis also suggested that the study women had a strong preference for a large family. On the other hand, only 4.1% of the 664 eligible women reported having used some contraceptive methods at the time of the survey. Thus, it is recommended that methods of reducing the observed high fertility be introduced so as to alleviate the socio-economic problems that it poses. [Ethiop. J. Health Dev. 1994;(8)1:11-21]

INTRODUCTION

Information on levels of fertility and contraceptive use in Ethiopia is incomplete. Few studies, however, give an insight into the fertility behavior of the Ethiopian women or a segment of them (1-7). These studies, unfortunately, fail to provide adequate information on the reproductive performance and contraceptive use of women in different regions and subregions of the country, particularly in its rural areas. Generally, the level of fertility in Ethiopia is high and the use of contraceptive is negligible (2, 3).

The main objective of this study is, therefore, to give a direct evidence on the current level of fertility and contraceptive use in rural areas of Dalle Province, Southern Ethiopia.

THE STUDY AREA

Dalle is a province in the Siadmo Administrative Region, of Southern Ethiopia, covering an area of 1411.4 square kilometers.

As of mid-1992, Dalle had a population of 320,380; out of which 161,923 were males and 158,457 were females (8). With an average density of 227 persons per square kilometer, the province is among the most densely populated ones in Ethiopia. About 94% of the population of Dalle live in rural areas and depend on subsistence farming for their livelihood. The main economic activities in Dalle are maize production, enset and coffee plantation and livestock keeping. Chat and banana are also produced in the area. Most of the coffee, chat and bananas are for marketing.

Although basic demographic indicators for Dalle could not be obtained, available evidence for the rural Sidamo show that infant and child mortality rates are above 1000 and 140 per 1000 births, respectively, and the average age at first marriage for girls is around 17 years (9).

Dalle has one hospital and health center both situated in Yirgalem, the capital, of the province, and five clinics, distributed in rural areas (8). There are 48 elementary, 6 junior secondary and one secondary schools in Dalle (8). Dalle has seventy six Peasants' Associations (PA'S) and nine Urban Dwellers' Associations.

METHODS

The source of data for this study was the Family Planning Expansion pilot project base-line survey, conducted by the Family Guidance Association of Ethiopia (FGAE) in rural Dalle in July 1992 (9).

A sample of 664 currently married women of age 15 to 49 years and living with their husbands along with their spouses was drawn using a stratified systematic sampling. As the sampling frames were obtained, from each domain one PA was randomly selected. From each of the selected four PA's, a systematic sample of the respondents was selected. The details of the sampling procedure was discussed elsewhere(10). The present study is confined only to the 664 currently married women, because fertility and contraception is most conveniently studied among such women (II). The size of the sample was comparable to other similar studies in Ethiopia (7, 12, 13) and elsewhere (11, 14,15, 16).

The level of achieved or life-time fertility was measured by the mean number of children ever-born to a woman. The mean number of children ever-born to women aged 45-49 years gives an estimate of the completed fertility by the end of their reproductive period (17).

Although the mean number of children ever born is a good measure of life-time fertility, it fails to show the pattern of family- building in a population. Parity progression ratios (PPRs), the proportions among the women who have had at least some specified number of births, and who go on having one more birth, are recommended as good indicators of family building patterns (18). These ratios do show a sequential nature of family building; that is, a woman can have a second child if she has already had one, a third if she has already had two and so on. Since PPRS for younger women were too small and hence might not show the true picture of their final fertility, the ratios were calculated only for those aged 20 years or more. Age specific marital fertility rates (ASMFRs) and total marital fertility rate (TMFR) were used to measure current fertility (19). The mean number of additional children desired per woman was used as a measure of preferred family size (20). The indices presented here might be more meaningful measures of fertility because of the following considerations: (i) marriage is universal in the study area and most births take place within wedlock (10); and (ii) if marriage dissolution occurs either by divorce or death of a husband, there is a high probability of remarriage unless the woman is old (personal communication).

Probing questions were also included in the questionnaire to reduce possible errors in the data, particularly those on fertility. Besides, the general magnitude of levels of fertility and contraceptive use obtained here appeared to be acceptable compared to those from other similar surveys (2, 3, 20, 21).

RESULTS AND DISCUSSION

Characteristics of the Respondent Women Of the 664 respondent women, slightly less than half were between 25-34 years of age, a third were under age 25, and about a quarter aged 35 years or more. The average age of the women was 29 years (Table 1). Ethnically, about 98% were Sidama; Amharas and Gurages constituted 1.2% and 0.6% of the respondents, respectively. About 50% of these women were protestants and a quarter of them were followers of indigenous religions while the rest were Moslems, Catholics and Orthodox Christians. (Table 1).

Occupationally, all of the study women were engaged in housework (Table 1). However , women in this area were also reported to cultivate some food crops around their homes and to be doing some petty trades to generate income for their families (10). Only 20% of the respondents could read and write; this figure was higher than the literacy rate for rural Sidamo (9%) and rural Ethiopia (11%) reported in 1984 (9). The incidence of marital instability appeared to be relatively high among the study group as nearly one-third of them had been married more than once.

Finally, about a third of the respondents had lost at least one child, while over two-thirds had not experienced any child death. The average number of child death was 0.51 (Table 1).

Achieved Fertility

Mean Number of Children Ever Born

The mean number of children ever born to the women was 4.75; while for those aged 45-49 years it was 8.04 (Table 2). The latter figure, which is the completed fertility of the study women, was higher than the 6.6 reported for the whole of Ethiopia (2, 3) and other developing countries, where it ranged from 5.3 to 7.9 (20,

21). The mean numbers of children ever born to the study women in all age groups were substantially higher than those previously found in Ethiopia (2, 3) and other developing countries (20, 21). Among the women aged 25-29 years, for example, the mean was in excess of four children; and among those aged 20-24 years, it was around three. The mean increased consistently with the age of the women, and reached its peak at the age group 40-45 (Table 2). Thus, the above results suggested that the study population was abnormally high in its fertility.

Parity Progression Ratios (PPRs)

With few exceptions at younger age groups, the PPRs showed an increasing pattern with the age of the respondents. However, they decreased as parity of the women increased (Table 3). The PPRs revealed that a substantially high proportion of women in the younger age groups (i.e 20-24 and 25-29) become mothers. For example, about 95% and 98% of the women aged 20-24 and 25-29 years, respectively, had at least one child at the time of the survey. Moreover, nearly 82% and 94% of the women aged 20-24 and 25-29 years, respectively, continued to have at least one or more children after having at least one child. The proportions among the older women who stopped at lower number of children were very low (Table 3).

Table 1. Percentage Distribution of Respondents by Some Background Variables, Rural Dalle, 1992.

Variable	%	Variable	%
Age		Occupation	
15-24	34.2	House Wife	
25-34	44.8		
35-49	22.0	Literacy Status	
		Illiterate	80
Ethnicity		Literate	20
Sidama	98.0		
Amhara	1.2	Marital Stability	
Gurage	0.6	Married Only once	67
		Married more than once	33
Religion			
Protestant	49.4	Child Death	
Catgikuc	8.9	0	69.4
Orthodox	5.1	1	17.9
Moslem	11.6	2	7.2
Indigenous	25.0	3+	4.4
		Total	100(664)

Table 2. Mean Number of Children Ever Born (MNCEB) per Woman by five Years Age-group, Rural Dale, 1992

Age-group	N	MNCEB
15-19	58	1.03
20-24	172	2.80
25-29	179	4.53
30-34	109	6.43
35-39	83	7.22
40-44	35	7.63
45-49	28	8.04
TOTAL	664	4.75

The pattern observed among the younger women is true in a population where marriages start very early and where modern birth control practices are absent or negligible (3). The overall pattern that a substantially high proportion of women went on to higher order of births confirmed the earlier suggestion that the study population was characterized by a persistence of high fertility. With the aid of the PPRs for the women aged 40-44 and 45-49 years, the manner in which different family sizes were distributed among the study group was examined in Table

The number of women having one, two, three or four children was higher among those aged 45-49 years than those aged 40-44. But the number of women with five, six, seven or eight children was lower in the former than in the latter age group (Table 4). Assefa (3) also found similar results in Central Ethiopia.

Table 3. Parity Progression Ratios (PPRs) per 1000 Women, Rural Dalle, 1992

PPRs	Age Group					
	20-24	25-29	30-34	35-39	40-44	45-49
A(0)	959	978	1000	1000	1000	1000
A(1)	818	937	991	988	986	994
A(2)	674	890	972	976	980	946
A(3)	582	822	951	962	968	923
A(4)	472	758	871	896	938	917
A(5)	412	62	831	868	871	886
A(6)	400	589	739	886	852	864
A(7)		432	648	704	800	812
A(8)			600	658	750	769

Table 4. Distribution of 1000 currently Married Women Aged 40-44 and 45-49 by Number of Children. Rural Dalle, 1992.

No. of Children	No. of Women With			
	At least i Children		Exactly i Children	
(i)	40-44	45-49	40-44	45-49
0	1000	1000	0	0
1	1000	1000	14	36
2	986	964	20	52
3	966	912	31	70
4	935	842	58	70
5	877	772	113	88
6	764	684	113	93
7	651	591	130	106
8	521	485	130	112

Current Fertility

The ASMFRs (per a thousand currently married women) ranged from as low as 36 for those aged 45-49 to a peak of 453 for women aged 20-24 years. The ASMFRs were markedly high in all age groups, except in the last two, (i.e 40-44 & 45-49), indicating a considerable high fertility pattern over a broad age range. The first five age groups were the key marital fertility groups which contributed more than 90% of the total births. Such a pattern of marital fertility having peak at early ages (20-24) was also observed in the whole of Ethiopia (3) and other developing countries (19, 20). The total marital fertility rate (TMFR) for all women estimated from these ASMFRs was 10.80 births per woman. Exclusion of the youngest (15-19) and the oldest (45-49) age groups (Table 5) reduced the TMFR by about 2.2 births; while exclusion of the youngest age group only reduced it by two births.

The TMFR is difficult to interpret particularly in the context of rapidly changing marriage patterns (19). It could, however, be said that this synthetic measure, constructed from the fertility of different cohorts at successive ages, is extraordinarily high. Indeed, the TMFR was substantially higher than the average completed family size (8.04) of the study women. This discrepancy between the two measures might be attributed, among other things, to recall-lapse usually associated with retrospective data (17, 19, 20). In general, the pattern of marital fertility presented here could be considered natural. Comparison of the reported age pattern of marital fertility with the Coale- Trussell (22) natural fertility model schedule showed that the rates presented here were slightly lower than those of the model schedule at all ages, except at the two oldest age groups (40-44 & 45-49), where the differences were higher by 2.4% and 50% than those of the model in the former and latter age groups, respectively.

The deviations of the reported ASMFRs From those of the Coale- Trussell model might be due to misplacement or under-reporting of births (17). It might also be due to real differences in the pattern of marital fertility between the study population and those from which the Coale- Trussell model schedule was derived.

Variations in the patterns as well as levels of marital fertility have been reported even among populations where there are no or little deliberate birth control practices (23, 24). It was, thus, concluded that the Coale-Trussell model schedule may not be the best for describing the pattern of marital fertility for developing

countries and another schedules (Robinson model schedule) was recommended to be used as a bench mark of natural fertility (24).

For a further comparison of the age pattern of marital fertility presented here with a schedule of natural fertility, indices were computed by setting the ASMFR for ages 20-24 at 1 and expressing the ASMFR for each subsequent age group as a ratio of that rate. This was done for the reported ASMFRs as well as for both the Coale- Trussell and Robinson model schedules (Figure 1).

Knodel (25) argued that the most important feature that distinguishes the age pattern of natural marital fertility from controlled fertility is the rate at which marital fertility rates decrease as age increases. The age pattern of marital fertility shown in Figure 1 has a convex shape with fertility declining most sharply after the age group 35-39. Evidence from western European countries, however , revealed a gradual transition of the age pattern of marital fertility to a concave shape as fertility declines sharper at progressively younger ages (25) Moreover, the rate of decline with age did not seem much more rapid than that of the Coale- Trussell mode schedule. The curve of the marital fertility also closely approximated the pattern of the Coale- Trussell natural fertility model and there was no sign of fertility control with age.

Thus, the profile of the marital fertility schedule that the study population exhibited (Figure 1) suggested that a pattern of natural fertility has continued to prevail in this area. In addition, the reported age pattern of marital fertility appeared to be in close agreement with the Coale- Trussell rather than with the Robinson model schedule. Similar results wre found in some African and Asian countries (19).

Desired Fertility

The mean number of additional children desired by the study women was four (Table 6). The mean, however, decreased as age of the women increased, ranging from 4.85 in the 15- 19 age group to 3.25 in the 45-49. The mean also declined as the number of living children increased. Among the women who had no living children, for example, the mean was around five; while among those with at least four living children, it was 3.5 (Table 6). The desired fertility indices obtained here were higher than those found in most of developing countries (20).

Considering the fact that the mean number of children ever born to these women was 4.75 (Table 2), it would mean that the study women desired to have a family of size eight or more before they reached menopause. The study group may, thus, be characterized as a natural fertility population.

Table 5. Age- Specific Maritals Fertility Rates Per Woman, Rural Dalle, 1992

Age Group	Marital Fertility Rates	
	Age-Specific	Cumulatives
15-19	0.397	1.985
20-24	0.453	4.250
25-29	0.419	6.345
30-34	0.394	8.315
35-39	0.289	9.760
40-44	0.171	10.615
45-49	0.036	10.795
TMFR (15-49) 10.80		
TMFR (20-49) 8.81		
TMFR (20-44) 8.63		

TABLE 6. Number of Additional Children Desired by Age Group and Number of Living Children, Rular Dalle, 1992.

Age Group Mean No. of Additional Children Desired	
15.10	4.85
20.24	4.15
25.29	4.07
30.34	3.50
35.39	3.43
40.44	3.28
45.49	3.25
No. of Living Children	
0	4.96
1	4.79
2	4.69
3	3.83
4+	3.54
Total	4.00

Contraceptive Knowledge

The study women had varying knowledge about the different contraceptive methods, and a larger proportion (28.3%) of them were familiar with oral contraceptives (Pills). Overall, about 33% of these women were aware of at least one contraceptive method (Table 7). The relatively high knowledge of contraceptives in such a remote area might be due to the impact of the out-reach Family Planning service by the Yirgalem Health Center . However, the level of knowledge of contraceptives obtained here was substantially lower than the corresponding national figure (62%) and much lower when compared with 93.6% in Urban Ethiopia (2). This substantial difference might suggest the need for diffusing family planning programs in the study area. The result that Pill was a relatively better known birth control method was consistent with earlier studies in Ethiopia (2).

Contraceptive Use

Although the knowledge of contraceptives in the study area seemed to be relatively wide-spread, in practice only 28 Women(4.2%) of the eligible women had ever used some methods of contraceptive some time in the past and 27(4.1%) reported having used some methods at the time of the survey (Table 7). Among the twenty seven current users, twenty were using Pill and six were using Traditional methods. While female sterilization was practiced by only one woman, use of other methods was reported by none. The finding that Pill was a more frequently used birth control method was in line with that found for the whole of Ethiopia (2).

The reported ever use rate of contraceptives was comparable with the corresponding rate for rural Ethiopia (4.2%) and lower than that for Sidama women (7.1 %) in 1990; but the current use rate was slightly higher than that of rural Ethiopia (2.6%) and the Sidama women (3.1 %) (2) .Both the ever use and current use rates were, however, considerably low compared with that of urban Ethiopia in 1990 (26.2% & 24.5%) respectively (2) and other developing countries. In 1987, for instance, the ever use rates of contraceptives for Africa, and Asia averaged, respectively, 30% and 37%; and the current use rates were 10%, and 23% in that order (211 The result that the use of contraceptives was very low in the study area both by African and world standards is probably unexpected given the relatively high level of knowledge. This might, however, be attributed, among other things, to the fact that the out-reach service family planning program of the Yirgalem Health Center has been initiated only quite recently and hence the service is not yet strong enough to raise the current rate of contraceptive use. It might also be attributed to the limited capacity of the existing health institutions, in Dalle Province, in providing FP services.

Table 7. **Distribution of Respondents by knowledge and Current Use of Contraceptive Methods, Rural Dalle, 1992.**

Method	Knowledge %	Ever Use %	Current use %
Pill	28.5(189)	71.4 (20)	71.4 (20)
IUD	5.3(35)	-	-
Injectable	14.0(93)	-	-
Foam/Jelly/Diaphragm	3.6(24)	-	-
Condom	9.0(60)	-	-
Female Sterilization	5.3(35)	4.0 (1)	4.0 (1)
Male Sterilization	1.1(7)	-	-
Traditional	10.0(66)	25.0 (7)	22.2 (6)
Total	32.8(218)	4.2 (28)	4.1 (27)n

Note : 1. Figures in Brackets are number of women,

2. Traditional includes: Sexual and Periodic Abstinence, and withdrawal

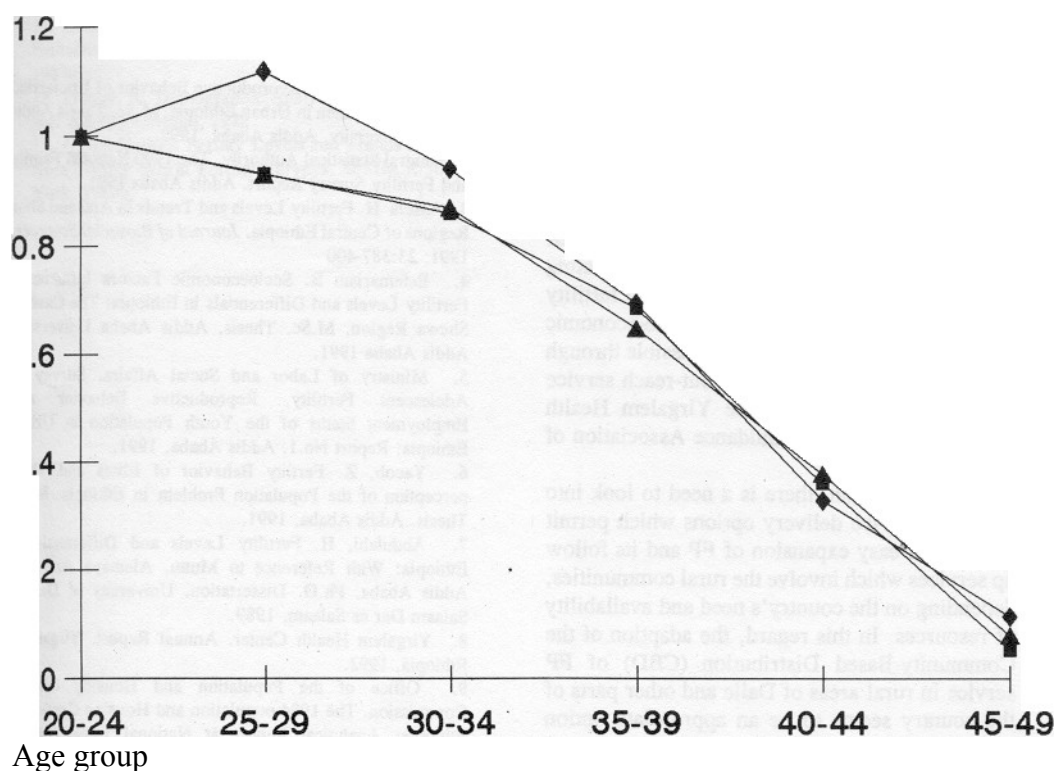


Figure 1. Age Patterns of Marital Fertility (20- 24 = 1) "Fertility and Contraceptive in Dalle"

CONCLUSION

This study addressed itself to assess the current status of fertility and contraceptive use in rural areas of Dalle Province, Southern Ethiopia. The results revealed that the study population was characterized by a persistence of a very high level of fertility and an extremely low level of contraceptive use. There was also a big gap between contraceptive knowledge and use. as is well known, high fertility has severe consequences on the socio-economic development of a country .It also affects the general well-being of the population, particularly the health of mothers and children. .Therefore, concerted efforts should be made to greatly increase the number of contraceptive users, by educating and motivating the public, in order to reduce this high fertility and thereby to alleviate the socio-economic problems it poses. This may be possible through strengthening the on-going FP out-reach service programs, conducted by the Yirgalem Health Center and the Family Guidance Association of Ethiopia.

In addition, there is a need to look into other FP service delivery options which permit a wide and easy expansion of FP and its follow up services which involve the rural communities, depending on the country's need and availability of resources. In this regard, the adaption of the Community-Based Distribution (CBD) of FP service in rural areas of Dalle and other parts of the country seems to be an appropriate option given the present situation.

Finally, this study, unlike the others in the country, considered predominantly one ethnic group, which has its own beliefs and outlooks regarding reproduction and contraception. This fact might probably explain some of the differences from observations made in other parts of Ethiopia. More detailed and systematic studies that examine reproductive norms and behaviour of women in Dalle province, in particular, and in Sidamo region, in general, may give a better picture of the fertility behaviour of the Sidama women.

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A REVIEW OF THE ACADEMIC PERFORMANCE OF MEDICAL STUDENTS IN GONDAR

Melake Berhan Dagnew, MD, BSc, MPH', Melake Damena, BSc MPH'

ABSTRACT: Academic performance result measured in CGPA and ESLCE score of medical students of Gondar College of Medical Sciences was reviewed. Out of 900 students admitted from 1979 to 1987, only 530 (58.9%) graduated. The reported attrition rate was 41.1%. Poor correlation ($r = 0.32$) was detected between ESLCE result and final CGPA. Difference in academic performance between males and females was observed during the early phases of medical education. The validity of the ESLCE result as a sole admission criteria is discussed. [Ethiop. J. Health Dev. 1994; 8(1):23-28]

INTRODUCTION

The fundamental goal of medical education is to produce competent medical practitioners who are equipped with a spectrum of medical knowledge and able to apply them in problem solving, be it at an individual, family or community levels.

In Ethiopia, there is a serious concern among medical educators and policy makers about the poor quality of medical education. Among the various factors affecting the quality of medical education, the selection criteria used to admit students is an area that deserves serious attention.

For many years students have been admitted to medical schools on the basis of their Ethiopian School Leaving Certificate Examination (ESLCE) results. The examination is prepared centrally and is controlled at the 'national level. Selection is done by a Committee set by the Commission for Higher Education. In the country there are three medical schools with a yearly intake of about 150 students. Admission is highly competitive.

Although different views are expressed, there is concern among medical educators that the ESLCE may not select those who are best suited for the practice of medicine in Ethiopia.

Thus, the purpose of this study is first to find out whether the ESLCE is a good predictor of academic performance or not. Second, to know if there is gender difference in academic performance and third, to assess the trend in attrition rate among medical students. Such information is useful in improving the learning process.

STUDY POPULATION AND METHODS

Examination records and ESLCE results of the medical students who graduated from Gondar College of Medical Sciences (GCMS) from 1983 to 1993 were reviewed. Medical study at the GCMS lasts for six years including internship. The 1st year is Preparatory; the 2nd and the 3rd years are Preclinical; the 4th and the 5th years are Clinical. In this study, academic results of Internship grades were not included.

Academic achievement at the GCMS uses numerical gradings and is measured by Cumulative Grade point average (CGPA). The CGPA is determined as follows: Each hour of "A" yields four grade points; each hour of "B" yields three grade points; each hour of "C" yields two grade points; each hour of "D" yields one grade point and each hour of "F" yields no credit and no grade point. The total grade points are divided by the number of credit hours. A student must achieve a CGPA of 2.00 and above to graduate from the medical school

¹Department of Community Health
Gondar College of Medical Sciences
P.O. box 196

A CGPA of 3.25 to 3.74 means distinction and a CGPA of 3.75 or above is great distinction (1).

Yearly grades of each student were collected; procedures such as mean, standard deviation and correlation were analysed using EPI INFO Version 5.01 computer software. Correlation was measured through Pearson Product moment correlation coefficient (r). The ESLCE score which is the only admission criteria to the medical school was correlated with academic performance (CGPA). To avoid bias, the correlation coefficient for each year was added and a mean taken in addition; for comparison of groups of students, such as males and females, the ordinary t-test was used. Out of the 530 students who graduated, data were collected from 510. The rest (20 students) were excluded because of incomplete records .

RESULTS

From 1978/79 to 1986/87 a total of 900 students were admitted; out of these 530(58.9%) graduated. The percentage of females among the graduates was 11 % .The overall attrition rate was 41.1%. The highest attrition rate (54.1%) was observed among those admitted in 1982/83 (Table 1); the percentage of females dismissed for academic reasons was higher than that of males (Table 2). In the result, a gender difference in academic performance was noted; males performed better than females in the preparatory and preclinical years. However, performance between males and females was the same in the Clinical Years. The result also showed that the mean performance of females increased from CGPA of 2.33 in the preparatory to 2.49 in the Clinical Years (Table 3).

Moreover, correlation of low magnitude was detected between ESLCE score and medical school performance. Correlation in particular between ESLCE and clinical performance was very low ($r = 0.23$, $SD \pm 0.22$) (Table 4). The result also showed high positive correlation ($r = 0.73$, $SD \pm 0.05$) between Clinical and Preclinical performances but, correlation between clinical and preparatory performances was moderate ($r = 0.42$, $SD \pm 0.13$). Table 5 shows students an average with ESLCE grade point of 2.8 performed academically better than those who scored 3.2 and 3.4

Table: 1. Attrition Rate of Medical Students by Year of Admission.

Year of Admission	No. Admitted	Academic Dismissals, Dropouts & Withdrawals	Attrition Rate %
1978/79	88	28	31.8
1979/80	116	54	46.6
1980/81	110	46	41.8
1981/82	92	42	45.6
1982/83	98	53	54.1
1983/84	108	35	32.4
1984/85	113	49	43.4
1985/86	89	25	28.1
1986/87	86	38	44.2
Total	900	370	41.1

Table 2. Comparison of Attrition Rates Between male and Female Admitted Medical Students

Academic status						
	Male		female		Total	
	No	%	No	%	No	%
Academic dismissal	221	28.2	42	36.2	263	29.2
Withdrawal	25	3.2	7	6.0	32	3.6
Dropouts	66	8.4	9	7.8	75	8.3
Graduates	472	60.2	58	50.0	530	58.9
Total	784	100.0	116	100.0	900	100.0

Dagnew and Damena: A review of the academic performance of medical students

Table 3. Comparison of performance Scores Between Males and Females in Different Phases of Medical Education

	Preparatory		Preclinical		Clinical		Final Result	
Sex	X	SD	X	SD	X	SD	X	SD
Male	2.47	0.42	2.57	0.50	2.55	0.39	2.55	0.38
Female	2.33	0.34	2.40	0.42	2.49	0.34	2.46	0.33
P-Value	P< 0.05	-	P< 0.05	-	P< 0.05	-	P< 0.05	-

Males = 152

Females = 58

Table 4. mean Correlation Coefficient Between ESLCE Score and Academic Performance

Phases of Medical Education	ESLCE Performance	
	r	SD
Preparatory	0.46	0.16
Preclinical	0.29	0.16
Clinical	0.23	0.22
Final Result	0.32	0.21

Table 5. Comparison Between ESLCE AND Final GPA

Predictor	Performance of medical graduates		
ESLCE Score	No. Students	X Final GPA Same Students	SD
4.0	28	2.29	0.50
3.8	80	2.55	0.38
3.6	99	2.56	0.34
3.4	89	2.49	0.39
3.2	79	2.48	0.34
3.0	67	2.48	0.35
2.8	60	2.54	0.36
2.6	8	2.35	0.28

DISCUSSION

The study addresses the basic concern of those involved in medical education particularly the low correlation between clinical(including community health) performance and ESLCE is not uncommon. Similar results were reported from studies done in the Sudan and Saudi Arabia (2.3).

The weak positive association between ESLCE result and academic performance in the medical school indicates that the ESLCE may not a good predictor of performance. The fact. that students with 2.8 grade point on ESLCE performed better than those who scored 3.2 and 3.4 supports such an observation. Moreover, the attrition rate (41.1 %) underlines the problems of the ESLCE score as an admission criterion. Normally, an appropriate selection criterion must be able to select students who have the greatest. Potential of finishing their studies within the prescribed time (4).

In our opinion the admission policy practised in Ethiopia poses a significant problem. Although further study is needed, the use of the ESLCE result as a sole criterion for admission might also prevent potential students from studying medicine. A study done at the VCMS showed 86% of the medical students came from urban areas (5). Eventhough there are differing views, we suggest admission be based on multiple criteria such as interview, progressive assessment result during secondary school, and entrance examination. The interview needs to take into account place of origin, sex and other socially relevant characteristics such as empathy and position towards rural practice. This is true because medical competence is multidimensional whereby written, oral and practical tests are used to measure performance in cognitive, psychomotor and attitude

domains. The high attrition rate reported in the study deserves particular attention since it reflects the amount of wastage in terms of social investment. The reasons for the high attrition rate (Table 1) might be attributed to the characteristics of the student, teacher, the learning environment, the teaching-learning situation, the method used to assess students, admission procedures, and soon in order to improve the situation, (there is a need to bring changes in the entire educational system. In our study, gender difference in academic performance was seen during the Preparatory and Preclinical years. This finding is similar to that of a study done in the Su

(2). However, it is different from that of Saudi Arabia where female students excelled males in the Clinical Years (3). Although further study is needed, the difference in academic performance might be caused by social and psychological factors. Female students might have problems of adaptation and integration in the new educational environment. Moreover, previous study has shown that female students report more feelings of isolation and discomfort than their male peers (6). In our setup, female medical students are fewing, they are shy; this prevents effective interaction with students and faculty members. In our opinion there is a need to support female students during the early phase of medical education. Moreover, further study to identify adjustment problems is suggested.

Finally, the study recommends a full discussion of possible changes in the admission policy. Furthermore, the validity of the CGP A as an instrument for measuring academic performance in a medical school should also be investigated.

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SURVEY OF INTESTINAL PARASITES IN BURE AREA, ILLUBABOR, SOUTH WESTERN ETHIOPIA

Hailu Yeneneh, MD, MSc¹

ABSTRACT: Population census and survey of intestinal parasites were conducted in October 1987 in Bure area, Illubabor. Altogether, there were 1063 households comprising 4119 residents, of whom 86.3% (3,555) were indigenous and 13.7% (564) were newly arrived settlers. Four villages among nine were taken randomly, and all individuals living in a 10% sample of households picked by systematic sampling underwent investigation for intestinal parasites. Of these, 8.5% (301) indigenous and 13.7% (77) settlers provided stool specimens which were collected, processed and examined by the formol-ether-concentration technique. Positive rates for one or more parasites turned out to be 82.7% and 67.5 % among the former and latter respectively, the difference being statistically significant ($P < 0.05$). Both population groups combined, *Ascaris lumbricoides*, hookworms, and *Entameba coli* were the predominant parasites. Multiple infection was common comprising 48.2 % in the indigenous and 53.8% in the settler population groups. Preventive and control measures are suggested. [Ethiop. J. Health Dev. 1994;8(1):29-35]

INTRODUCTION

Intestinal parasites are generally taken as indicators of poor socioeconomic and sanitary conditions (1). This has been indicated by several studies carried out in Ethiopia (2, 3, 4, 5, 6). Movement of settler populations from dispersed farmsteads in their places of origin in the north and central regions of Ethiopia to the new settlements into crowded villages in the west and southwest may have an impact on the epidemiology of diseases, including intestinal parasites (7). There have been relatively few studies in settlement areas (7, 8). The purpose of this survey was to establish the prevalence of intestinal parasites among indigenous and settler populations and examine the difference. Treatment of those with overt clinical manifestations of parasitic infections has also been considered.

METHODS

Bure town is 696km. west of Addis Ababa and is situated in the western pan of Illubabor at an elevation of 1700 meters above sea level. The study area comprises four villages in this town (fig. 1). There is rain during most of the year, yet it has sparse forests despite the abundant rainfall since it is highly cultivated. The population consists of indigenous residents and settlers who came from the northern regions of Ethiopia (Wello, Tigray), about three years prior to the study. All are engaged in farming. The sources of water for home consumption are unprotected springs, rivers and streams. Open field defecation and careless disposal of garbage are widely practised.

The study was cross-sectional and exploratory in nature with no hypothesis a priori. It was carried out in an area where an integrated settlement of new comers was implemented among the indigenous line villages with Bure town as their center, since it has a health station with facilities for examination and treatment of subjects when necessary, were considered. Accessibility by four-wheel drive vehicles was the criterion for inclusion of the villages. Four of the nine villages were randomly selected. All houses in the four villages were numbered and censused. The total number of houses in each village was used as a sampling frame and each household as a sampling unit. A sample of the households was selected by systematic sampling and all members of the household in the selected houses were included in the study.

Individuals in the selected households were told that they would undergo physical examination following a brief medical history, and a small quantity of stool would be examined for intestinal parasites. They were informed that they were free to reject participating in the study. However, there was a very high compliance.

¹National Research Institute of Health
P.O.Box 1242, Addis Ababa, Ethiopia

At the time of registration, individuals were also given paper cup containers for bringing stool specimen on the morning of investigation at Bure Health Station. A small quantity of stool was then preserved in screw-capped vials containing 10% formalin. The specimens were then transported to the laboratory of the Institute of Pathobiology, Addis Ababa University, where they were processed and examined using Ritchie's method (9), by a senior and experienced medical laboratory technologist. However, direct stool examination was performed in the field for few individuals who had complaints and/or findings suggestive of heavy parasitic infection. Those who were found positive were given appropriate treatment in collaboration with Bure Health Station.

The outcome variables of interest were positivity for and the rates of multiple infections with intestinal parasites. The independent variables were age, and whether an individual is a settler or indigenous. Characteristics like occupation, income, marital status, and literacy were not considered because we dealt with fairly homogeneous rural peasant populations. With respect to these variables confounding factors are: living in the same environment and sharing sources of water. However, differences were still anticipated on the basis of the remaining characteristics.

Statistical analysis was made using EPINFO Version 5(10) Bivariate analyses were found to be sufficient in assessing relationships between variables. in this descriptive study.

RESULTS

Population: The age and sex distributions of the total and sample populations in the study area are presented in Table I. Out of 4119 people in the area, 86.3% (3555) were indigenous and 13.7%(564), settlers. The 0-14 age group examined for intestinal parasites among the indigenous population outnumbers that of the settlers. This is because all children under three years of age were taken as indigenous since they were born in the study area. It was difficult, sometimes impossible, to obtain stool specimens from very young children and few non-complying adults.

Parasitological Examination: Tables 2 and 3 show the parasite positivity rates of indigenous and settler populations respectively. Of the indigenous population examined, 82.7% (249/301) had positive results for one or more intestinal parasites, whereas the rate was 67.5%(52/77) among the settlers. The difference is statistically significant ($P < 0.005$), the indigenous population having more intestinal parasitism. Age was not found to be a significant factor in determining positivity for intestinal parasites ($P > 0.05$), in both the indigenous and settler populations.

Among the indigenous peoples *Ascaris lumbricoides* is the most common, 31.8%, followed by hookworms, 25.5%, *Entamoeba coli*, 21% and *Trichuris trichiura*, 13.9%.

There were fewer cases of *Entamoeba histolytica*, *Iodoamoeba*, *Trichostrongylus* and *Strongyloides* species (Table 2). In the settlers, the most common intestinal parasite was *Entamoeba coli*, 39.4%, followed by hookworms, 24.2% , *A.lumbricoides* 23.2% , and *T.trichiura*, 9.1 % .*Strongyloides*, *Trichostrongylus*, *Iodoamoeba* and *E. Histolytica* were least prevalent (Table 3).

Table 4 shows the number of people in each age group with either single or multiple infections. Among the indigenous population with positive stool results, 51.8% (129/249) had single parasite infections, while 48.2 % (120/249) had multiple infections. Among the settlers, the rates were reversed, i.e., 53.8 %(28/52) had multiple infections and 46.2 % (24/52) single infections. However, these differences between the two population groups are not statistically significant ($P > 0.05$). Again, age was not found to be significantly associated with single or multiple infections ($P > 0.05$). Among those with multiple infections, most had two parasites and few had three or more. The common parasite combination was *Ascaris lumbricoides* and hookworms in the indigenous and *Entamoeba coli*, *A.lumbricoides* and hookworms in the indigenous and *Entamoeba coli*, *A. lumbricoides* and hookworms in the settlers.

Table 1: Age and Sex Distribution of Base and Sample Population in Bure Area Illubabor, Ethiopia 1987.

Age group	Indigenous					Settlers				
	Base Population			Examined Popn.		Base Population			Examined Popn.	
	Male	Female	Total	No.	%	Male	Female	Total	No.	%
0-4	304	320	624	38	6.1	14	13	27	3	11.1
5-9	316	300	616	67	10.9	46	40	86	16	18.6
10-14	223	217	440	34	7.7	36	32	68	8	11.8
15-44	564	635	1199	100	8.3	132	147	279	34	12.2
45-46	173	245	418	47	11.2	50	25	75	14	18.7
65+	131	127	258	15	4.7	20	9	29	2	6.9
Total	1711	1844	1555	301	8.5	298	266	564	77	13.7

Table 2: Results of Stool Examination Among Indigenous Population, Bure Area Illubabor, Ethiopia 1987

Age Group	No. exam	No.	Pos.%	Parasites							
				Al	Tr	Hk	St	Eh	Ec	Ib	Ts
0-4	38	28	(73.7)	18	3	10	-	3	14	2	-
5-9	67	52	(77.6)	33	16	21	2	3	18	1	2
10-14	34	34	(100)	20	8	17	-	3	11	-	-
15-44	100	84	(84)	36	20	36	1	3	28	2	1
45-64	47	38	(80.)	19	9	18	3	4	14	0	3
65+	15	13	(86.7)	9	3	7	-	-	4	-	-
Total	301	249	(82.7)	135	53	108	6	16	89	5	6

Al = Ascaris lumbricoides, Tr= Trichuris trichiura, HK = Hookworm species

St = Strongyloides species, Eh = E. Histolytica, Ec = Entameba coli

Ib = Iodoamoeba species, Ts = Trichostrongylus

Table 3. Results of Stool Examination Among Settlers, Bure Area Illubabor, Ethiopia, 1987.

Age group	No. exam	No.	Pos. %	Parasites							
				Al	Tr	Hk	St	Eh	Ec	Ib	Ts
0-4	3	2	(66.7)	2	2	2	1	-	2	-	1
5-9	16	11	(68.8)	4	1	7	-	1	7	-	-
10-14	8	6	(75)	4	1	4	-	-	3	-	-
15-44	34	21	(61.8)	8	3	6	-	-	18	1	-
45-64	14	11	(78.6)	4	2	4	-	-	8	-	-
65+	2	1	(50.0)	1	-	1	1	-	1	-	1
Total	77	52	(67.5)	23	9	24	2	1	39	1	2

Al = Ascoris lumbricoides, Tr = Trichuris trichiura Hk = Hookworm species

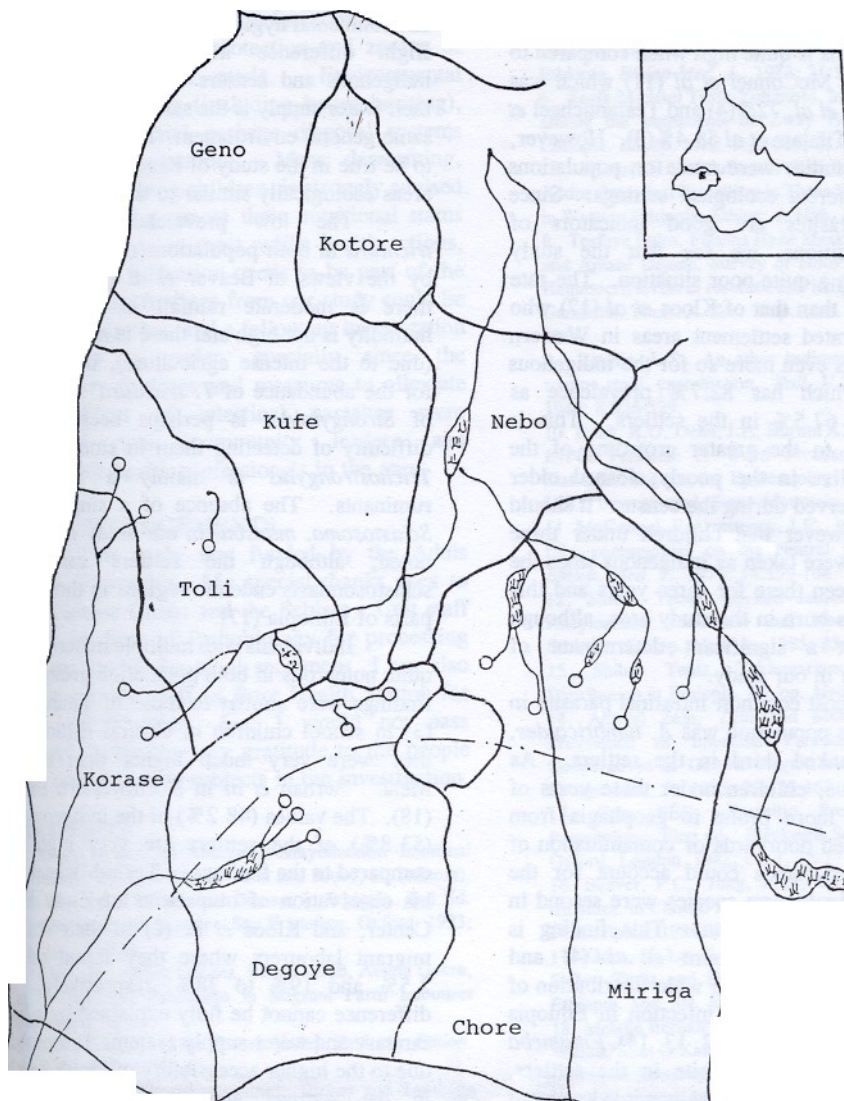
St = Stronguloides species, Eh = E histolytica. Ec = Entameba coli

Ib = Iodoamoeba species, Ts = Trichostrongylus

Table 4. Proportion of Individuals With Single and Multiple Infections, Bure Area Illubabor, Ethiopia, 1987.

Age	No ..Pos.	Single infection		Multiple * infection		No. pos	Single infection		Multiple* infection	
		No	%	No	%		No	%	No	%
0-4	28	15	(53.6)	13	(46.4)	2	1	(50)	1	(50)
5-9	52	27	(51.9)	25	(48.1)	11	6	(54.5)	5	(45.4)
10-14	34	17	(50)	17	(50)	6	2	(33.3)	4	(66.7)
15-44	84	49	(58.3)	35	(41.7)	21	11	(52.4)	10	(47.6)
45-64	38	15	(39.5)	23	(60.5)	11	4	(36.4)	7	(53.6)
65+	13	6	(46.2)	7	(53.8)	1	-	-	1	(100.0)
Total	249	129	(51.8)	120	(48.2)	52	24	(46.2)	28	(53.8)

* Two or more parasites



DISCUSSION

In this survey we see that the prevalence of intestinal parasites for the indigenous and settler populations combined is 79.6% (301/378). This is quite high when compared to the finding of McConnel et al (11) which was 66%, Seyoum et al, 72%(4) and Tesfamichael et al 56.7%(5), Tilahun et al 58.4%(3). However, most of the studies were made on populations mostly in different ecological settings. Since intestinal parasites are good indicators of sanitary conditions, we see that the study villages are in a quite poor situation. The rate is also higher than that of Kloos et al (17) who studied integrated settlement areas in Western Ethiopia. It is even more so for the indigenous population which has 82.7% prevalence as compared to 67.5 % in the settlers. This is probably due to the greater crowding of the people who live in the poorly cleaned older houses as observed during the census. It should be noted, however that children under three years of age were taken as indigenous since the settlers had been there for three years and this age group was born in the study area, although age was not a significant determinant of infection rates in our study.

The most common intestinal parasite in the indigenous population was *A. lumbricoides*, whereas it ranked third in the settlers. As indicated above, children under three years of age who are more prone to geophagia from parasite-infested dooryards or contamination of food by soiled hands could account for the difference. Hookworm species were second in both groups of population. This finding is similar to that of .Seyoum et al (4) and McConnel et al (11). The wide distribution of ascariasis and hookworm infection in Ethiopia has

been reported earlier (12, 13, 14). *Entameba coli* was the leading parasite in the settler, which may not be surprising since it is known to be the most widely spread intestinal parasite non-pathogenic to man (15). However, one cannot easily rule out the possibility of confusing this parasite with *E. histolytica* since they share a lot of morphological characteristics, in spite of the fact that stool examination was performed by an experienced laboratory technician. Nevertheless, it does speak for poor environmental hygiene and refuse disposal. The slight difference in parasites among the indigenous and settlers is temporary, because their water supply is the same and they share the same general environment. This has been found to be true in the study of Kloos et al (7) done in areas ecologically similar to these.

The low prevalence of *Trichuris trichiura* in both populations may be explained by the views of Beaver et al (16): "although there is moderate rainfall in the area, the humidity is not high and there is no dense shade (due to the intense agriculture), both required for the abundance of *T. trichiura*". The rarity of *Strongyloides* is perhaps because of the difficulty of detecting them in stool specimen. *Trichostrongylus* is mainly a parasite of ruminants. The absence of a single case of *Schistosoma mansoni* in our study needs to be noted, although the settlers came from schistosomiasis endemic regions in the northern parts of Ethiopia (17).

Individuals with multiple infections were quite numerous in both population groups. Our findings were similar to those of Tilahun et al (3) in school children in Central Ethiopia; but they were very much higher than those of Melake Berhan et al in Northwestern Ethiopia (18). The values (48.2%) of the indigenous and (53.8%) of the settlers are very high when compared to the findings of Tesfa-Michael (5) in his observation of outpatients of Zway Health Center, and Kloos et al (2) in their study of migrant labourers where they found rates of 2.5% and 19% to 38%, respectively. The difference cannot be fully explained by a better sanitary and water supply system. It is probably due to the higher accessibility of health facilities in the settings where their studies were conducted, which enabled populations to get a better chance of deworming. However, further investigation is again needed to substantiate this.

Both the indigenous and settler populations have high infection rates with intestinal parasites, a large number having multiple infections. This indicates the poor water supply and sanitation facilities prevailing in the area. Spring protection and zoning of rivers have to be made. Environmental sanitation activities (including better housing), proper latrines and garbage disposal systems need greater attention. Mass deworming, especially of young children, is strongly advised since it would promote their nutritional status and growth. As in most public health actions, giving health education needs to be part of the package. The findings from our study could be used as a baseline, and a follow up investigation would be in order, specially since the preliminary findings and measures to alleviate the problem of intestinal parasites were discussed with community leaders and responsible health professionals in the area.

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INTESTINAL PARASITISM AMONG JIREN ELEMENTARY AND JUNIOR SECONDARY SCHOOL STUDENTS IN SOUTH-WESTERN ETmOPIA

Girmay BaDe MD¹., Challi Jira BSc¹. MPH., Taddese Mala BSc, M. Camm. H¹.

ABSTRACT: A cross-sectional survey on intestinal parasites was conducted in Jiren Elementary & Junior Secondary School, Jimma. A total of 301 stool specimens were collected by systematic random sampling from a total of 1626 population. The stools were examined for ova and parasites by direct saline suspension (wet mount) method. The result showed high prevalence rate of parasitic infection (68.4%). A total of 10 species were identified among which *Ascaris lumbricoides* was the leading (52.2%) followed by *Triclluris trichiura* (18.6%), while *Schistosoma mansoni* was the least (0.3 %). No statistically significant difference was seen in the prevalence rate of intestinal parasites by sex, ($p > 0.01$). However, there is significant association between water source for drinking and parasitoses, ($p < 0.01$), where, unprotected source of water favouring infection of all infected. Most of the infected children (92.2%) were asymptomatic. It is suggested that affective PHC strategies, such as health education in schools, expansion of school health services and chemotherapy with broad spectrum anti- helminthics should be (implimented). [Ethiop. i. Health Dev. 1994;8(1):37-41]

INTRODUCTION

Intestinal parasites are present throughout the world in varying degrees of prevalence and tend to be most prevalent in developing countries. This is due to ecological and socioeconomic factors and differences in human behaviour and sanitation. Particularly in the tropics and subtropics, overpopulation, deficient sanitary facilities and absent of potable water are the causes (1).

Similarly in Ethiopia, (one of the developing countries) intestinal parasitism is widespread largely due to poverty, poor sanitation and ignorance of health promotion practices (2). Helminthiasis is the second most common cause of out-patient morbidity in Ethiopia, next to dysenteries and gastroenteritis (2). *Ascaris lumbricoides* tend to have the leading prevalence in many studies usually followed by *Trichuris trichiura* (3,4,5,6). The Keffa region was found to have the highest rate of *Ascaris lumbricoides* in Ethiopia (3.7). Similarly highest rates were seen for *Trichuris trichiura*, Hookworm and *Strongloides stercoralis* (3). The principal aim of the present study was to determine the prevalence of intestinal parasitism among students of Jiren Elementary and Junior Secondary School with emphasis on its relationship to the source of drinking water and pattern of symptomatology.

METHODS

Across-sectional survey to determine the prevalence of intestinal parasitism was conducted among children attending Jiren Elementary and Junior Secondary School in Jima, in November 1990. A sample of 305 students were selected using systematic random sampling techniques from a total population of 1626. Stool specimens were taken from 301 of the students included in the study population and examined by laboratory technicians. A direct saline suspension ("wet mount") technique was used. Types of ova, cysts and trophozoites were recorded. Each student was interviewed for the source of drinking water in his/her home and the means of excreta disposal system. Moreover, individuals with positive stool examination were enquired for symptoms suggestive of intestinal parasitism using questionnaire. In order to prevent bias, they were not informed about the result of their stool examination until enquiry on symptomatology was made. Recording of sign and symptoms was done by intern medical students. Mainly descriptive statistics was used in data analysis. The association between infection by a parasite and source of water was tested by chi-square method and difference was accepted at a probability level of 1%.

¹Jimma Institute of Health Sciences
P.O.Box 745 Jimma

RESULTS

Out of the 305 samples students, 301 submitted stool specimens making a 98.7% coverage.

The overall prevalence rate of intestinal parasites was 68.4% (with 95% confidence interval of 66.0-70.8%). A total of 10 species were identified (Table 1). *Ascaris lumbricoides* was the most prevalent, 157 (52.2%). *Trichuris trichiura* was second, 56 (18.6%), while *Schistosoma mansoni* was the least, 1 (0.3%). Hundred and six (75.7%) of the 140 children aged 5-9 were positive for parasites, the comparative values for age groups 10-14 and 15- 19 were 97 (62.2%) and 3 (60.0%) respectively. The majority of males, 111 (71.2%) were found to have one or more parasites and the infection rate for females was 95 (65.5%), however, there was no statistical difference by sex, $\chi^2 = 1.107$ ($P > 0.01$). (Table 2) Further analysis of the results showed that of the infected students 113 (54.8%), 77 (37.4%), 14 (6.8%) and 2 (1.0%) had one, two three and four species of parasites respectively. Grossly, 31.0 % of the students had multiple parasites.

The sources of water for drinking were pipe 125 (41.5%), unprotected wells 82 (27.2%), protected wells 60 (19.9%), unprotected spring 27 (9.0%), protected spring 2 (7.0%) and river 5 (1.7%). There was a significant association between parasitism and the sources of water supply, children with unprotected source of water in their home having higher risk of acquiring intestinal parasitoses, $\chi^2 = 9.4$ ($P < 0.01$). Nevertheless it was insignificant when *Ascaris lumbricoides* and *Trichuris trichiura* were excluded from the test, $\chi^2 = 1.92$ ($P > 0.01$). From all surveyed 245 (81.4%) had reported availability of latrine facilities in their homes. "

During the survey only 16 (7.8%) of those with positive stool examinations were symptomatic (table 2). Among the symptoms the most common was abdominal cramp 15 (7.3%). The other signs and symptoms were mucoid and/or bloody diarrhea 6 (2.9%), watery diarrhea 1 (0.5%), nausea and/or vomiting 2 (1.0%) and anorexia 1 (0.5%) table 2).

Among the symptomatic children those with only one symptom were 11 (68.8%), while 4 (25.0%) and 1 (6.2%) had 2 and 3 symptoms respectively. One student with negative stool for ova and parasite was found to have bloody and mucoid diarrhea; however there were many motile bacteria with abundant leucocytes ("pus cells") in the stool perhaps an indication of bacterial infection.

DISCUSSION

Even though a less sensitive method was used in this study, some comparisons were made with other studies done in Ethiopia using standard methods of detecting parasitism. So, this limitation should not be disregarded where comparisons are considered.

As is expected in a developing country, the overall prevalence rate of parasitism (68.4%) was generally very high. However, this was lower than the value for a rural elementary school in Gute (8). The finding was higher than that of the elementary & Junior high schools in Wonji-Shoa Sugar Estate (4). When the point prevalence rate of *A. lumbricoides* (52.2%) was taken alone it was found to be similar to the results in Akaki town (5) although it was lower than the value for the Keffa region (3, 7) and that of the elementary school in Gute (8). Other studies done elsewhere in Ethiopia showed lower rates for *A. lumbricoides* (4, 5, 6). In general the higher prevalence rate can be explained by the inadequate potable water source, lower level of sanitation, poor excreta disposal system and personal hygiene which are common problems of developing countries.

The insignificant difference in intestinal parasitoses by sex was similar to that the settlement village in Sidamo (9), but was in contrast with the cases among the students in Wonji-Shoa Sugar Estate (4) and farming cooperatives in Gondar (1) where a higher rate was evident among males.

When the prevalence rate of each species was considered *A. lumbricoides* was the leading followed by *T. trichiura*. A similar pattern was seen in different studies (3,4,5,6). The prevalence rate of *S. mansoni* was 0.3%, markedly lower than the value for the Keffa region reported by Shibiru (3). It was also lower when

compared to other studies (4,5). This could be partly explained by the less sensitive laboratory technique used in this study.

Eventhough greater proportion of students (81.4%) professed to have latrine facilities in their homes, the proper usage and utility is still questionable, especially by the children.

The significant association of unprotected water source to intestinal parasitoses could be due to the higher rates of *A. lumbricoides* and *T. trichiura*. Therefore, the role of poor personal hygiene, absence of footwear, swimming and bathing in rivers should not be underestimated.

The pattern of responses symptomatology in respondents was in no way different from the findings of other studies (1,6) which indicated that most of the subjects (92.2%) were asymptomatic eventhough they were infected with one or more parasites. However, some severe illnesses can occur particularly in heavy infections. These include intestinal obstruction, pulmonary symptoms during the migration through the lungs, anaemia caused by hookworm and Portal hypertension plus ascites in schistosomiasis.

The prevalence rate of hookworm (10.3%) was markedly high and its impact on health; needs great considerable n. Anaemia caused by this worm may sometimes markedly affect the health of the patient to the extent of facilitating death, especially when associated with other diseases. This is important particularly in the tropics where there is high prevalence of malaria and other causes of anaemia such as nutritional deficiencies.

In conclusion, the high prevalence rate of intestinal parasitism found in this study -eventhually draws consideration as a significant health problem to be tackled through the principles of primary health care; thus, effecting the components of the PHC strategy. For example, proper sanitation, safe water supply and provision of essential drugs are recommended. Besides, health education programmes should be incorporated as part of the routine teaching activities in schools. In addition, expansion of school health services and wide spread use of broad -spectrum anti- helminthic drugs need great attention.

Table 1. Number of Male & Female Students Positive for One or More parasite (s)

Parasite species	Male	Female	Total (both sexes)
	N= 156	N= 145	N= 301
<i>Ascaris Inmbricoides</i>	8(51.9)*	76(52.4)	157(52.2)
<i>Trichuris trichiura</i>	25(16.0)	3(21.4)	56(18.6)
Hookworm SP	22(14.1)	9(6.2)	31(10.3)
<i>Strongloides stercoralis</i>	5(3.2)	4(2.8)	9(3.0)
<i>Entrobilus vermicularis</i>	1(0.6)	1(0.7)	2(0.7)
<i>Hymnolepis nana</i>	5(3.2)	3(2.1)	8(2.7)
<i>Hymnolepis diminuta</i>	- -	3(2.1)	3(1.0)
<i>Schistosma mansoni</i>	1(0.6)	-	1(0.3)
<i>Ertamolbes histolytica</i>	17(0.9)	21(14.5)	38(12.6)
<i>Giardia lambilia</i>	3(1.9)	8(5.5)	11(3.7)
Total	111(71.2)	95(65.5)	206(68.4)

N.B. Figures in parenthesis are percentages
Total positive for one or more parasite species

Table 2. Signs & Symptoms to Those Children Found Positive for One or More Parasites.

Signs & symptoms	Number (percent)
	N = 206
Abdominal pain	15(7.3)
Mucoid and/or bloody diarrhea	6(2.9)
Nausea and/or vomiting	2(1.0)
Watery diarrhea	1(0.5)
Anorexia	1(0.5)
Total	16(7.8)

* Total children with one or more signs and symptoms.

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PSYCHOSOCIAL AND EDUCATIONAL PROFILE OF STUDENTS WITH DISABILITIES IN ADDIS ABABA UNIVERSITY

Tirussew Teferra PhD'

ABSTRACT: The study was undertaken to investigate the profile of the psychosocial and educational adjustment of students with disability in relation to Addis Ababa University settings. It examines the conditions and effects of the immediate ecosocial factors (physical and social) on the educational and psychosocial adjustment of the subjects. It also attempts to suggest adjustment promotive strategies from an ecological perspective. The subjects covered in the study were students with visual disabilities (non-visuals) and students with motor disabilities (leg paralysis, arm paralysis, broken ribs, impairment of feet and folded hands). A questionnaire was employed for collecting data. The findings of the study disclosed that both groups have encountered social, educational and physical barriers implying similar tendency on adjustment profile. However, chi-square (X^2) test results revealed the existence of statistically significant dissociation in modes of adjustment in relation to certain variables. [Ethiop. J. Health Dev. 1994;8(1):43-61]

INTRODUCTION

The hardest burden to bear for the person with disability is not merely the disability itself but the stereotypes and the negative attitudes society attaches to disability as well as environmental limitations which undermine capabilities of the person concerned. A major feature of the current trend of rehabilitation is the change in the conceptualization of handicap. Handicap is no longer considered as a factor of "within the individual" but as the effect of the interaction of both biological deficits and environmental resources. Therefore issues of coping with and adjusting to disability cannot be validly considered without examining concrete social and environmental problems. How handicapping a disability is, depends to a great extent upon the characteristics of the person's environment (1,2).

Contextualism plays an important role in the consideration of the significance of symptomatology (3,4). Earlier it was elaborated (5) that no phenomenon should be considered without reference to the organism and the situation in which it appears. Analytical convenience and pragmatic necessity may prompt us to treat various organismic and environmental features as independent entities. However, unless theoretical formulations and praxis are rooted in the notion that a person environment system is a unity, explanation will remain incomplete and therapy and research will be markedly reduced in effectiveness (4).

In the same vein, for a person with disability, the consequence of underrating the significance of environmental influence in causal attribution is severe, for it hinders the realizations that circumstances can enormously increase or reduce the extent of the handicap (2). Research, as well as common experience, has shown that if the cause of difficulties is ascribed to the person, the locus of challenge becomes the person; if the cause is seen to be environmentally created, then the attention is directed toward altering conditions in the environment (6). This is perhaps most crucial in the sense that environmental characteristics and personal characteristics must be inter-defined. In isolation, they have no meaning for health and pathology (4). Actually, a problem which on the first appraisal, may seem purely personal often reveals a social base. It involves socio-psychological factors that underlie the way disability as a value loss is perceived and reacted to by other people (7,2). Indeed, the health status of a person is influenced not only by the environmental factors but also by a variety of personal attributes including genetic heritage and psychological disposition (8). The tendency to view disability as a medical issue, and considering it as if the problem lies exclusively within the individual

and not in society is no longer acceptable. In this model, the problem is seen as arising from the individual and solutions consist of attempting to change the individual through medication, surgery and other treatments (9). In short, the problem of causal attribution, especially with respect to whether the cause of something is attributed to the person or to the environment critically affects treatment decisions.

In the present conceptual framework, biological deficit constitutes a necessary but not sufficient condition for a handicap. The greater the environmental resources, the less the individual's disability is likely to result in handicap (10). Thus, physical handicaps can be reduced by eliminating architectural barriers; interpersonal handicaps, by overcoming devaluing social attitudes; educational handicaps, by providing educational and training facilities; economic handicaps, by extending work opportunities; and emotional handicaps, by enhancing family and group support (2). The attitudinal change required is very critical. The negative attitude towards persons with disabilities, causing children to be hidden from sight, deprived of normal social contact, distorting their normal development, constitutes the much graver handicap than the impairments themselves (11).

The basic motivations for affection, acceptance, and approval exist whether the child is retarded or intelligent, whether the body is beautiful or a caricature, whether the movements are graceful or awkward and uncoordinated, whether speech is melodious or guttural (12). Thus, the child with disability like any other child, can be comfortable and secure when he/she feels that he/she is accepted, appreciated, and liked. he/she will be equally uneasy and insecure when he/she is rejected and undermined.

The situation of persons with disabilities in Ethiopia is severe and tragic. Disabling factors like diseases, malnutrition, civil wars, and periodic episode of draught and famine have brought a phenomenal increase in the number of persons with disability. Among the millions of people (about 1.5 million) suffering from various degrees of disabilities only very few are beneficiaries of the services rendered by the government and non-governmental organizations (13). For instance, according to the report given by the Ministry of Education (14) not more than 1600 handicapped children have the opportunity to attend school be it in special schools or in an integrated system. According to WHO's conservative estimation (which is 1 in 10 children is born with, or acquires physical or mental impairment) only 0.1% of the suspected school-aged children with disability have the chance to attend school. The vast majority are engaged in either begging and receiving alms or vegetate in the home, being non-productive and constituting the poorest of the poor in the society.

Persons with disabilities are by and large under-represented in the educational system, that is, in primary, secondary and post-secondary education in the country. Furthermore, evidences suggest that the special schools are over-crowded, understaffed and ill equipped. In the integrated system there is no systematic professional back-up support indicating that the situations even here do not permit the possible optimal development of the child with disability. However, studies in special education and/or rehabilitation reveal that among the various modes of educational deliveries, the integrated approach in the regular school set-up is found to be more pedagogically sound and psychologically agreeable than the traditional institution based education (15, 16).

A key issue with respect to integration is the relation between physical and social aspects. It is sometimes assumed that being taught in the same building or room also means contact and interaction. But both everyday observations and research findings show that this is not always so. If integration is to be beyond the superficiality of being together, persons with disabilities and non-disabled person must be given opportunities to develop a reciprocal relationship (17). The quality of integrated education is evaluated in terms of ensuring students with disabilities full participation and a sense of achievement in the groups with whom they receive education, thus enabling them to achieve increasing independence, participate in decision making about choices of educational programs and thereby learn the skill of self advocacy (18,19). Indeed, the educational system itself will benefit from making the necessary modifications to accommodate the need of students with disabilities (16). Wherever students with disabilities are being educated alongside non-disabled students those responsible for educational provision must develop a clearly stated plan which

specifies the steps to be taken and the precise resources which will be required to ensure that the special needs of the individual will be fully met. Placing a student with a disability in an integrated setting is only the first step but not an end in itself {1,19,20). The receptiveness of the educational system, teachers' personal attitudes, routines and teaching habits are often very real obstacles to major changes. In such cases, the educational convenience of students should be given priority over administrative convenience in service system decisions (21).

This study aims to shed some light on the situation of students with disabilities in the Addis Ababa University and addresses a range of interdependent concerns including psychological, social, educational and disability related services within the University.

METHODS

The universe of observation for this study should have been all campuses of Addis Ababa University (MU). However, for practical reasons such as human, material and time constraints the study was limited to the main campus "Sidist Kilo". Incidentally, the author of the article has come to know that most of the target groups, that is, students with disabilities, are found in the main campus. Therefore, the result obtained from this study is believed to adequately reflect the general situation in AAU.

Coming in contact with the knowledge and experiences of students with disabilities, since they are the ones experiencing the full impact of the problem, is important in discovering ways of rendering them services. In view of this, a questionnaire consisting of closed and open-ended questions was prepared to be completed by students with disabilities. At the time of data collection, it was not possible to know the number of subjects enrolled in 1987/88 academic year. This made it difficult to draw a sample and determine the number of copies of questionnaire to be distributed. Accidental sampling where the judgement of the researcher takes the place of random selection was employed. Therefore, it was decided to limit the study to students with obvious disabilities (easily detectable physical defects or disorders) and to distribute the questionnaires in their dormitories with the help of the Dean of Students Office and the proctors. Through employing this procedure, 70 students were identified and copies of the questionnaire were distributed. Among the questionnaires distributed, 51 (73%) were completed and returned for analysis, out of which 34 (67%) of the respondents were found to be students with visual disabilities and 17, (33%) students with motor disabilities. Percentage and chi-square test ($df=2$) results were employed for data analysis and interpretation.

RESULTS

Background

Students with Motor Disabilities

The age of the respondents ranges from 17 to 30 years and incidentally, they were all males. A good number (65%) were within the age range of 19 to 20 years. The types of motor disabilities they have include leg paralysis, impairment of feet, broken ribs and folded hands. As reported by the subjects, the causes for their disabilities were mainly ascribed to accidents (41 %) or poliomyelitis (12%) and the remaining 47% were uncertain about the etiologies.

Regarding their educational background, 18% disclosed that they had attended special schools while 82% did not. With respect to their current educational level in the University, 42% were in the Freshman Program, while others were pursuing their studies in six different academic departments, namely History, Sociology and Social Administration, Library Science, Management and Public Administration, Philosophy and Political Science and International Relations. Fifty percent of the respondents indicated that they were assigned to the respective departments on the basis of their choice while the remaining were not assigned as such. As reported by the subjects, the academic achievement of the students shows the following profile in terms of Cumulative Grade Point Average: 1.75-1.90 (9%), 2.0-2.50 (55%) and 2.70-3.0 (24%) of the respondents did not respond to this item.

Students with Visual Disability

In this context, visual disability refers only to those who are completely blind. The age of the subjects covered ranges from 17 to 30 years. The breakdown of the age range is as follows: 50% (21-25 years), 38% (17-20 years) and 12% (26-30 years). Furthermore, it was noted that only 9% of the subjects were females. Though few members of the group were unsure about the etiologies of their disabilities, others identified the following as causes: Small-pox (28%), measles (16%), cowpox (12%), cataract (8%), trachoma (4%), glaucoma (4%) and allergy (4%). Moreover, 24% of the respondents disclosed the prevalence of visual impairment within members of their families.

In relation to the questions asked regarding educational background, 85% stated that they had the opportunity to attend special schools; 15% did not. The academic units to which the respondents belong in the University includes the Freshman Program (24%) and the following departments: History (21 %), Foreign Languages and Literature (12%), Ethiopian Languages and Literature (6%), Sociology and Social Administration (15%) and Law (24%). Though 54% of the respondents reported that they were assigned to the various academic departments on the basis of their choice, there are complaints by non-visuals about academic units which are still closed to blind students. The reason why some departments are closed to students with disabilities is not clear on the part of students.

Finally, based on the demographical characteristics gathered, the following general observations were made:

- (a) like in primary and secondary education, students with disabilities tend to be under-represented in proportion to the population of handicapped students,
- (b) among the students with disabilities, females are Under-represented in terms of the number of male students with disability
- (c) students with motor disabilities seem to have a broader chance for joining different academic departments than students with visual disabilities
- (d) almost half of the subjects were assigned to departments where they did not choose. Although all students are faced with limited choice based on their entry results and on the standards imposed by the institutions to which they apply, those with disabilities should not be limited in their choices based solely on the fact that they have a disability (16). As a matter of course, special consideration and flexibility in admission procedure need to be entertained for the group;
- (e) the academic status of students with disabilities seems to be encouraging despite the inconveniences they encounter during departmental placement (1) In general, most of the causes for disability as reported by the subjects seem to be preventable if primary prophylaxis such as health education, child care programs, personal and environmental hygiene, broad coverage of immunization, and awareness raising of the public against disabling cultural practices and prejudices are introduced.

The Educational State of Students with Disabilities

In this part of the study, attempt is made to examine the educational conditions of students with disabilities, focusing on the degree of educational satisfaction, invariability of educational benefit, the nature of special attention provided, special arrangement made in the classroom, specific educational problems encountered, and the subjects academic achievement.

Evidences suggest the existence of similarity in modes of adjustment between students with motor disabilities and visual disabilities in terms of the degree of educational satisfaction achieved and the satisfaction gained from the special attention given to them in the learning-teaching processes. The chi-square test results for the two variables were $\chi^2 = 2.503$ and $\chi^2 = 5.230$, respectively. These findings entail that the profile on the degree of satisfaction on the two variables is more or less similar for the two groups. It is also important to note that 60% of the subjects expressed satisfaction in their education while 26% of them reported their dissatisfaction in varying degrees (Table 1). With respect to the special attention given to the subjects in the learning-teaching processes, 51% of the respondents were dissatisfied while 44% indicated their satisfaction.

Regarding the satisfaction gained from the special arrangements made to accommodate the needs of students with disabilities, a response which reveals significant dissociation between the two groups was obtained. That is, the computed value of $X^2 = 7.112$ (significant at 0.05 level) was found. The finding in Table 1 shows that 70% of the students with motor disabilities reported their satisfaction, whereas 56% of students with visual disabilities indicated their dissatisfaction. Among those who expressed their dissatisfaction 32% were very dissatisfied. It is also important to note that only 6% of those with motor disabilities were very dissatisfied. This in turn reflects the variability in adjustment profile which in one way or another is related to the special need of students with disabilities. Therefore, there is dire need to develop 'richer and more diverse responses in the physical as well as social environment to accommodate those whose degree of disability and accompanying behaviours have hitherto fallen outside the parameters of our usual daily experiences (16,22).

Furthermore, in order to explore and find out whether or not students with disabilities equally benefit and enjoy the academic scenario of the University like the non-disabled students, issues pertaining to invariability of educational benefit, prevalence of frustrating academic competition and the state of academic dismissal were raised (Table 2). Seventy six percent (76%) of the respondents with visual disabilities confirmed the existence of variability in the benefit gained from the learning-teaching process among students with disabilities and their non-disabled counterparts. On the other hand, 65% of the students with motor disabilities indicated the invariability of educational benefit, while 30% of the group expressed their disagreement to the assertion. The chi-square test result reveals a highly significant dissociation, that is, $X^2 = 25.134$, (significant at 0.01 level) between the students with visual; and motor disabilities. To verify this instancy, refer to the proportion of the degree of satisfaction as indicated in the options "very strongly disagree" and "strongly agree" in the histogram (Figure 1), note also the general trend of profile in educational benefit between the two groups).

The pattern or mode of learning varies from individual to individual; this is very true even among persons with similar disabilities. The learning style of a person with disability can be different from the non-disabled as far as the particularities of the internal learning conditions are concerned. In the educational context, many teachers continue to offer programs assuming that everyone can operate best through printed matter (but what about those with visual disabilities, those with less obvious learning difficulties, those with motor impairment who can read but not manipulate pages?). Others may think that learning occurs best through listening to an instructor (what about those who have hearing problems?). There is also an assumption that everyone is treated equally and fairly if given the same amount of time for examinations or to prepare and submit assignments using precisely the same presentation criteria (16) .Clearly, our increased understanding of variability in preferred learning and teaching, understanding of appropriate learning modalities of students with variable functional abilities, is challenging us to become more flexible and insightful in our pedagogical practices (23).

In relation to the issue on the nature of frustrating academic competition in campus, 63% of students with motor disabilities and 50% of students with visual disabilities ascertained that the competitive academic atmosphere is more frustrating for them than for the non- disabled students. However, the chi-square test result suggests that there is statistically significant dissimilarity that is, $X^2 = 10.143$ (significant at 0.01 level) between the two disabled groups. The variability may be attributed to the varying degree of the response on the other end of the continuum which is 41 % and 6% for the respective groups (Table 2). In another subsequent item a substantial number of the subjects, 89% of the students with visual disabilities, 71% of the students with motor disabilities, reported the absence of special educational provisions as one of the major reasons for the academic dismissal of most the students with disabilities. On the same item, chi-square test result reveals the existence of significant variation in the nature of provision, That is, $\chi^2 = 6.597$ (significant at 0.05 level) between the two groups. Moreover, in an open-ended item the subjects pointed out that feelings of loneliness and inferiority and worry about life in general were among the contributing factors for the academic failure of students with disabilities.

Furthermore, subjects were asked to report specific educational problems that they have encountered in their studies at the University. Very few (10%) of the respondents indicated that some of the courses are

challenging. According to them the reasons for the challenge are attributed to the following factors; lack of adequate educational background, shortage of textbooks and reference materials (written in braille or recorded cassettes), poor instruction, and the nature of the chi-square (some courses require fieldwork and a lot of reading).

The subjects were also asked to evaluate their academic status in terms of "above average", "average" and "below average", in comparison with their classmates. Most of the respondents (from 82% -88%) in the respective group evaluated themselves as academically average. This opinion more or less reflects the Cumulative Grade Point Average reported by the subjects which was presented in the foregoing discussion. The availability of an effective support service offered to students with disabilities greatly determines their prospects for academic success. The key to increasing successful integration experiences is recognizing the need to facilitate teaching and learning techniques which consider every student. This is the pedagogical challenge facing educators when teaching students with mixed abilities and special functional capabilities together. There is no justifiable reason for denying anyone the opportunity to benefit from the learning-teaching processes. Education is the most important prerequisite for self-determination for people with disabilities the same way it is true for the non-disabled person (22).

Interpersonal Relations of Students with Disabilities

The state of interpersonal relations and communications of students with disabilities were explored using the following parameters: instructor-student , student-student , stigmatization, feeling of alienation, dating, and the attitude of the students towards life in the Addis Ababa University and life in general. Instructor-Student and Student-Student Relations A question to find out the nature of interaction between the instructors and students with disabilities was considered (Table 4). 74% of the students with motor disabilities expressed their disagreement to the assertion that courtesy and respect lack when instructors communicate with them. On the other hand, 56% of the students with visual disabilities confirmed that curtest respect lack when instructors communicate with them. Chi-square test result also reveals statistically significant dissimilarity in the nature of instructor-student relationship ($\chi^2 = 14.538$, significant at 0.01 level) between the two groups. It appears that the unrelatedness in the modes of interpersonal relationships may be attributed to the responses of the subjects to the last option of the item, that is, "very strongly disagree", which is 47% by the motorically disabled and 6% by the non-visuals (Table 4). In addition, subjects were also asked to identify the frequency of contact (in terms of time frame) they had with their instructors after class. The breakdown of the response obtained from both groups includes, never (53%), rarely (22%), sometimes (1.2%), and did not respond (3%). This entails the existence of a limited instructor-student contact and communication. An understanding about the assets and liabilities of the learner on the part of the instructors makes the student feel at ease and comfortable not only while communicating with the instructor but also in the classroom interaction. In an open-ended item one of the students with visual disabilities from the College of Social Sciences explained the severity and disabling nature of instructor-student relations as follows:

" As it is in most cases known in any academic endeavour, the relation of instructors with their students should be reflected as a father and a son. This helps students to be successful in their academic life. But, the situation is contrary for the blind students of this campus. That is some instructors are biased on the existence of blind students in this campus. Particularly my department instructors (the name of the department omitted) can be taken as good examples for such unwanted shortcoming. So, administrative measures' or a piece of advice should be given to such instructors."

In relation to the same issue Garwood (24) quoting the prominent psychologist and educator, Carl Rogers, on his view of education states:

Better courses, better coverage, better teaching machines will never resolve our dilemma in a basic way. Only persons acting like persons in their relationships with their students can even begin to make a dent on this most urgent problem of modern education.

In fact a warm and an understanding interpersonal teacher-student relationship enriches and promotes the learning-teaching processes, It is particularly critical to work effectively with students of different abilities and satisfy their special educational needs.

Furthermore, in order to get an insight into the nature of interpersonal relations (in terms of social distance and intimacy) among students with disabilities and the non-disabled students, a question on considerateness was raised to students with disabilities: In this study considerateness of the non-disabled students towards students with disabilities was evaluated in terms of the readiness of non-disabled students to correct defects (like inappropriate dressing, sitting and walking; and volunteering to give assistance whenever the need arises). Accordingly, 68% of students with motor disabilities and 27% of students with visual disabilities which constitute 40% of the total subjects, affirmed the considerateness of non-disabled students. However, 36% of the students with motor disabilities and 62% of students with visual disabilities which make 48 % of the total respondents were negative to the assertion mentioned (Table 4, note the degree of disagreement). A comparative study of the overall affirmative and negative responses indicates more or less similar percentages and apparently the chi-square test result suggests a similar profile ($\chi^2 = 5.11$) between the two groups with regard to considerateness of non-disabled students.

In another complementary item, subjects were asked to pin point their three intimate friends from the campus and rank-order them from 1 to 3. They were further required to identify those with disabilities; 88% of the students with motor disabilities and 44 % of the students with visual disabilities reported that their friends were all non-disabled students. Furthermore, 18% of the students with visual disabilities disclosed that all, ranking from the first to the third were students of similar disabilities. According to the finding of this study, for most students with motor disabilities friendship is not disability-based, which gives an insight about the horizon of their social experience should that it is relatively broader than that of the other group. This, indeed, is very encouraging for it enables both the students with disabilities and the non-disabled students to share their experiences and learn a lot about each others personality qualities. On the other hand, establishing friendship among the same disability group may have a self-limiting effect on the development of interpersonal relations as well as the interdependence of individuals with different functional capabilities.

In order to find out more about the nature of relations between students with disabilities and the non-disabled students in the campus, an issue pertaining to disability-based stigmatization was raised. In this item, the subjects were asked to state whether they were addressed by others using explicitly or implicitly their impairments as 'epileptic', 'crippled' or 'blind' or not. A substantial number (88%) of the students with motor disabilities indicated that they have never experienced such labelling, while 65% of the students with visual disabilities disclosed the prevalence of disability-based stigmatization in varying degrees of incidence (Table 5). Studies indicate that the usage of dehumanizing terms and phrases have psychologically adverse effects on the adjustment of the person with disability. Despite continuing efforts to enhance human potential, the probability remains that negative or unfavourable attitudes continue to exist as a social- psychological obstacle. The key idea of some approaches to counteract negative impressions engendered by labels is to expose the public to information, semantic formulations (employing humanizing terms), and experiences that will provide a broader set of positive expectations (2).

Alienation and Dating

Among the students with motor disabilities, 53% revealed that they had encountered a feeling of loneliness or isolation in varying degrees while 47% confirmed the absence of such a feeling. On the same issue, 62% of respondents with visual disabilities expressed the presence of a feeling of loneliness, while 38% had never experienced such a feeling. As far as the overall response of the subjects is concerned, 59% of the total respondents seemed to have experienced such an undesirable feeling of separation from others. Moreover, the chi-square test result indicates the existence of similarity ($\chi^2 = 5.073$) in the profile of the feeling of alienation between the two groups (Table 6).

As to the issue of dating, 50% of the students with motor disabilities disclosed that they had not encountered any problem pertaining to dating, while 65% of the students with visual disabilities confirmed the existence

of a problem in relation to dating. An inspection of Table 6 shows that 54% of the respondents had encountered problems regarding dating. As far as problems related to dating is concerned, the chi-square test result reveals association of such traits ($X^2 = 4.855$) between the two groups. Actually, problems related to dating should not be considered as unique to students with disabilities, though the intensity of the problem in comparison with the non-disabled may be expected to be greater .

Life in Addis Ababa University and Success in Life

A review of Table 7 conveys that 71 % of the students with motor disabilities confirmed the satisfaction of life in AA U , while 56% of the students with visual disabilities disclosed their dissatisfaction of life in AAU in varying degrees. The chi-square test result also shows statistically significant dissociation ($X^2 = 11.188$, significant at 0.01 level) between the two groups depicting variation in the profile of satisfaction of life in AAU (Figure 2, note also the varying degree (pattern) of satisfaction of among the subjects in the histogram).

In addition, an attempt was made to explore the state of confidence of students with disabilities about success in life in general. The data obtained in Table 8 shows that 65% of the students with motor disabilities affirmed the absence of any doubt of succeeding in life. On the other hand, 50% of the students with visual disabilities expressed their doubt about success in life. Moreover, chi-square test result indicates a highly significant dissimilarity ($X^2 = 29.903$, significant at 0.01 level) between the two groups. The feeling of insecurity towards success in life may have been induced through unfavourable psychosocial factors such as neglect and lack of acceptance, and encouragement surrounding individuals with disabilities. Students with disabilities in post secondary settings need the opportunity to excel, without the additional frustration of an inappropriate environment. The surroundings must reinforce their self-confidence which can be made possible through the receptiveness of others, and the willingness to accept students with disabilities as full members of the community .For too many students with disabilities, the frustration and self-doubt which can and will occur when physical, social and emotional barriers impede the progress of their studies, leads to disappointment (22,25)

Special Facilities and Services in Addis Ababa University

In order to study the conditions of the facilities and services rendered to accommodate the special needs of students with disabilities in AAU, some items focusing on dormitory, library and the dining-hall provisions were treated.

The Dormitory

Regarding the dormitory service, 88% of the total respondents indicated their satisfaction in varying degrees. However, 24% of the students disclosed their dissatisfaction with respect to the type of service given in the dormitory .In a question related to the accessibility of the toilet facilities, 92% of the total subjects evaluated the accessibility from good to fair. But, it is worth noting that 24% of the students with motor disabilities described the toilet facilities to be poorly equipped or difficult for access (Table 10).

In an open-ended item, the subjects, particularly those with severe motor disabilities pointed out the need for physical adaptation and adjustment if they are to use the toilet facilities. It is not only that, but also physical and architectural barriers (pathways, buildings etc.) which hinder the accessibility in the campus need to be adjusted or eliminated. One of the respondents, in narrating the hurdles and the inconveniences that he encountered states:

"If you are really interested in solving our problems the special care should cover all aspects of life of the individual, not only while attending classes also concerning the dormitory specially the use of bathroom. I myself, for example, have never washed my body in this campus since I have joined The University and never to do so under such condition. It is not comfortable for us at all."

At least the Office of the Dean of Students should look closely into the difficulties encountered by students with disabilities and attempt to make sure that all facilities in the campus are easily accessible to all students.

The Library

In the same vein, an attempt was also made to find out whether a special support service was offered in the library to students with disabilities. All, except one of the students with visual disabilities reported the availability of a special reading-room for the usually disabled them, however, most of them disclosed their satisfaction in the service rendered in the special reading-room. On the other hand, 88 % of the subjects with motor disabilities reported the non-existence of a special support service as far as their group was concerned (Table 11).

Accordingly, most of the subjects expressed the need for such services. In relation to this issue, one of the respondents had the following to say:

"... 'crippled' students mostly have problems to sit and stay reading in the library for a long time because of the nature of their disabilities. Some have spinal problem which does not allow them to sit on chairs and work for a long time. They rather prefer to work or study lying on their beds. So it is better to device a mechanism so that the students can borrow the necessary reference materials specially those reserved in the circulation-desk. So that they are allowed to check-them out from the library and read lying on their beds."

The Dining Hall

With regard to queuing up for meals in the dining hall, a good number of the subjects, that is 71% of the students with motor disabilities and 85% of the subjects with visual disabilities affirmed that they had never experienced any difficulty (Table 12). Except equipping them from queuing, there is no special consideration made for these students in the dining hall. However, subjects especially those with motor disabilities had certain complaints regarding the meal served in the cafeteria. They pointed out that the quality was poor and the quantity of the meal served insufficient when compared to the extra energy they discharge, specially those with prosthetics, orthotics and wheelchair drivers. One of them argued as follows:

"... 'crippled' specially who use walking sticks are always doing hard jobs with their walking difficulty, they need meals better than the present quality, which can provide them vitality and energy. "

Among others, the prospects for academic success depends upon the provision of effective support service which is very critical particularly for students with disabilities. The nature of special facilities available and the services provided to students with disabilities affect not only their academic achievement but also the pattern of their personality adjustment. Therefore, specific issues raised by the subjects need to be addressed by the university and the university should attempt to cater for the special educational needs of students with disability and avoid the prevalent disparity.

CONCLUSION

Primarily, it is of paramount importance to develop an awareness about the existence of students with disabilities in the university from the time of admission to the period of exit. Such knowledge and understanding helps the University administration as well as the instructors to determine the type of facilities and support services which should be available for students with special educational needs. This study was limited only to those students with motor and visual disabilities, though the presence of students with other handicapping conditions such as behavioural, lingual and aural are considerable in the University. They were not included in the study merely because their disabilities were not as easily detectable as that of the subjects of this study. Consequently, they were not accessible for this research. The result of the study on the two groups revealed the existence of similarity as well as statistically significant variability in the profile of educational and psychosocial adjustment between them. Furthermore, the range of dominant challenges encountered by each group were more or less identified and possible interventions were suggested respectively. It is the contention of the author that the finding of this study can serve as a baseline for the Addis Ababa University to take subsequent measures and related policy decisions to circumvent those barriers, and consider the opportunities that can facilitate and promote the education of students with disabilities.

Furthermore, it is hoped that the article can stimulate and generate discussion regarding the state of the teaching-learning processes of students with disabilities not only in post secondary setting but also at other educational settings wherever an integrated education (where students with disabilities attend school with the non-disabled) is introduced.

Table 1. **On the Degree of Educational Satisfaction (1), Special Attention (2), and Classroom Arrangements(3)**

Opinion															
Disability	VS		MS		SS		DS		MD		VD		MR		
	FR	%	FR	%	FR	%	FR	%	FR	%	FR	%	FR	%	
Motor (1)	5	29	4	24	2	12	2	12	-	-	2	12	2	12	
Visual (1)	7	29	8	24	4	12	1	3	-	-	8	24	6	18	
Total	12	24	12	24	6	12	3	6	-	-	10	20	8	16	
Motor (2)	3	18	5	30	-	-	4	24	-	-	2	12	3	18	
Visual (2)	3	9	5	15	6	18	6	18	1	3	13	38	-	-	
Total	6	12	10	20	6	12	10	20	1	2	15	29	3	6	
Motor (3)	4	24	4	24	4	24	1	6	-	-	1	6	3	18	
Visual (3)	-	-	7	21	7	21	7	21	2	6	11	32	-	-	
Total	4	8	11	22	11	22	8	16	2	4	11	22	3	6	

KEY: VS Very satisfied

MS Moderately Satisfied

SS Slightly Satisfied

DS Dissatisfied

MD Moderate;y Dissatisfied

VD Very Dissatisfied

FR Frequency

MR No Responss

Table 2. **Invariability of Educational Benefit (1), Frustrating Academic Competition (2). And Academic Dismissal (3)**

Disability	Opinion											
	VSA		SA		A		UN		DA		SD	
	FR	%	FR	%	FR	%	FR	%	FR	%	FR	%
Motor (1)	-	-	10	59	1	6	1	6	4	24	-	-
Visual (1)	-	-	1	3	-	-	7	21	4	12	11	32
Total	-	-	11	22	1	2	8	16	8	16	11	22
Motor (2)	1	6	5	29	3	18	-	-	1	6	2	12
Visual (2)	-	-	15	44	2	6	10	29	5	15	1	3
Total	1	2	20	39	5	10	10	20	6	12	3	6
Motor (3)	7	41	1	6	4	24	1	6	2	12	-	-
Visual (3)	23	68	3	9	4	12	2	6	2	6	-	-
Total	30	59	4	8	8	16	3	6	4	8	-	-

KEY : VSA Very Strongly Agree

SA Strongly Agree

A Agree

UN Uncertain

DA Disagree

SD Strongly Disagree

VSD Very Strongly Disagree

Teferra: Psychosocial & educ profile of disabled students in AAU

Table 3. **Self Appraisal of Academic Status**

Self Evaluation						
Disability	Above Average		Average		Below Average	
	FR	%	FR	%	FR	%
Motor	1	6	15	88	1	6
Visual	1	3	28	82	5	15
Total	2		43		6	

Table 4. **Interpersonal Relation in Campus (Lack of Curtesy and Respect (1), and Considerateness (2)**

Opinion													
DIS	VSA		SA		A		UN		DA		SD		VSD
	FR	%	FR	%	FR	%	FR	%	FR	%	FR	%	FR
MO (1)	-	-	-	-	2	12	3	18	3	18	1	9	8
VI (1)	11	32	3	9	5	15	3	9	8	24	2	6	2
Total	11	22	3	6	7	14	6	12	11	22	3	6	10
MO (2)	7	41	1	9	3	18	-	-	2	12	1	6	3
VI (2)	3	9	3	9	3	9	-	-	2	12	1	6	3
Total	10	20	4	8	6	12	6	8	8	17	3	6	13

KEY: VSA Very Strongly Agree SA Strongly Agree

A Agree

UN Uncertain

DA Disagree

SD Strongly Disagree

VSD Very Strongly Disagree

DIS Disability

VI Visual

MO Motor

Disability	Stigmatization							
	Always		Sometimes		Rarely		Never	
	FR	%	FR	%	FR	%	FR	%
Motor	-	-	1	6	1	6	15	88
Visual	4	12	6	18	12	35	12	35
Total	4	8	7	14	13	25	27	13

Table 6. **Alienation (1) and Dating (2)**

Disability	Opinion									
	Always		Sometimes		Rarely		Never		No Response	
	FR	%	FR	%	FR	%	FR	%	FR	%
Motor (1)	6	35	3	18	-	-	8	47	-	-
Visual (1)	5	15	11	32	5	15	13	38	-	-
Total	11	22	14	27	5	10	21	41	-	-
Motor (2)	4	24	1	6	-	-	9	53	3	18
Visual (2)	4	12	10	29	8	24	11	32	1	3
Total	8	16	11	22	8	16	20	39	4	8

Table 7. **Life in Addis Ababa University**

Disability	State of Satisfaction											
	VS		MS		SS		DS		MD		V	
	FR	%	FR	%	FR	%	FR	%	FR	%	FR	%
Motor	2	12	9	53	1	6	1	6	1	10	3	8
Visual	-	-	7	21	8	24	10	29	1	3	8	2
Total	2	4	16	31	9		11	18	2	4	11	2

KEY: VS Very Satisfied
SS Slightly Satisfied
MD Moderately Dissatisfied

MS Moderately Satisfied
DS Dissatisfied
VD Very Dissatisfied

Table 8. **Success in Life**

Disability	State of Confidence					
	Yes		No		No Response	
	FR	%	FR	%	FR	%
Motor	11	65	6	35	-	-
Visual	16	47	17	50	1	3

Table 9. **The Service Rendered in the Dormitory**

Disability	Degree of Satisfaction											
	VS		MS		SS		SD		MD		VD	
	FR	%	FR	%	FR	%	FR	%	FR	%	FR	%
Motor	4	24	8	47	1	6	2	12	-	-	2	2
Visual	20	59	10	29	2	6	1	3	1	3	-	-
Total	24	47	18	35	3	6	3	6	1	2	2	4

Table 10. Toilet Facilities

Accessibility of Facilities						
Disability	Good		Fair		poor	
	FR	%	FR	%	FR	%
Motor	10	59	3	18	4	24
Visual	17	50	17	50	-	-
Total	27	53	20	39	4	9

Table 11. Service in the Library

Support Service Available				
Disability	Yes		No	
	FR	%	FR	%
Motor	2	12	15	88
Visual	33	97	1	3
Total	35	67	16	31

Table 12. The Service in the Dining -Hill

Queuing Required										
Disability	Always		Sometimes		<u>Rarely</u>		Never		No	
	FR	%	FR	%	FR	%	FR	%	FR	%
Motor	1	6	3	18	-	-	12	71	1	6
Visual	3	9	-	-	1	3	1	3	29	85
Total	4	8	3	6	1	2	13	25	30	59

Figure 1. Histogram Depicting the State of Invariability of Educational Benefit between the two Groups.

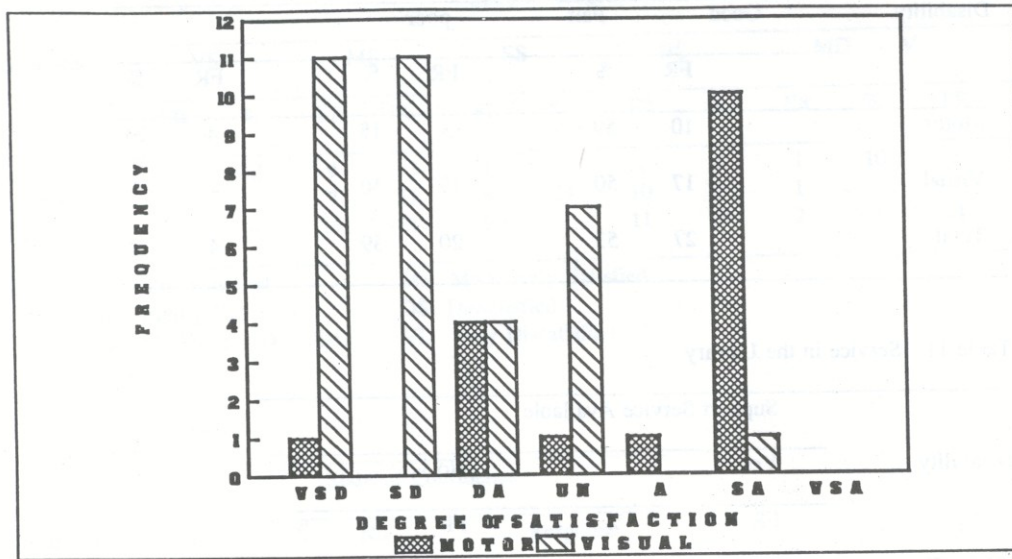
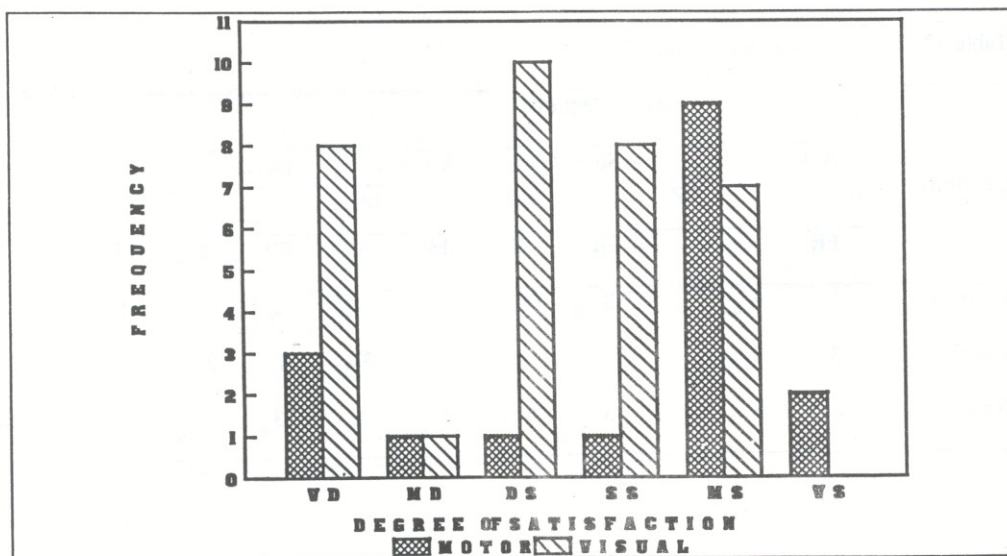


Figure 2. Histogram Depicting the State of Satisfaction of the two Groups.



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ANTIFUNGAL METABOLITES FROM SUBMERGED CULTURE OF *GANODERMA LUCIDUM* (POLYPORE)

Adane Bitew, BSc, MSc¹ and Dawit Abate, MSc, PhD¹

ABSTRACT: About 60 different basidiomycete cultures were screened for antimicrobial secondary metabolites. Among basidiomycetes screened for antimicrobial activity, the culture filtrate extract of the polypore, *G. lucidum* produced the most effective antifungal compounds. Growth in submerged culture of the polypore and isolation methods of the two antifungal antibiotics are described. These compounds were released to the culture fluid and the maximum amount of antifungal compounds was obtained after 12 days of submerged growth at 120 revolution per minute (rpm). The culture filtrate were characterized biologically. These metabolites had a wide spectrum of antifungal activity and affected the growth of several saprophytic as well as pathogenic fungi. The minimal inhibitory concentration (MIC) of 201A against *Candida albicans* and *Candida pseudotropicalis* was less than 1 mcg/ml and 1-5 mcg/ml respectively. Inhibition diameter zone of 36 mm was produced when 10 mcg/disc of 201A was applied on agar medium seeded with *Aspergillus flavus*. Bacteria were affected only at high concentration. *Ethiop.J. Health Dev.* 1994;8(1):63-70]

INTRODUCTION

In the last several decades, a large number of antimicrobial compounds have been discovered, of which only a small proportion of them are in clinical use. Major successes have been achieved particularly against bacterial infection. Though some important antifungal drugs of microbial and synthetic origin have also been discovered for the treatment of mycotic infection, they fail to achieve the desired results. Toxicity to the host [1], narrow spectrum of activity [2, 3], difficulty of drug administration [1], development of drug resistance [4, 5] and recovery of fungi after treatment [1, 6] are the major limitations of the existing antifungal agents.

Drawbacks of the presently available antifungal agents and a clear understanding of the importance of diseases of fungal origin particularly their association with AIDS patients [7, 8] in the last few decades have initiated the interests of many academic institutions and pharmaceutical industries for a search for new, better, less toxic and cheaper antifungal agents.

It has been pointed out that chemical synthesis and a search for natural products from living organisms (higher plants and microorganisms) are the two sources for new biologically active compounds [9].

Basidiomycetes particularly the tropical ones, have been little investigated from the view-point of bioactive secondary metabolites and thus more intensive screening of tropical basidiomycetes for new biologically active metabolites was suggested [10]. In this paper the growth of *G. lucidum* in submerged culture, isolation and biological characterization of the two antifungal antibiotics tentatively named 201A and 201B are discussed.

METHODS

Submerged Cultures and Isolation of Antifungal Metabolites from *G. lucidum* Equal numbers of about the same sized agar culture blocks of *G. lucidum* were transferred aseptically to 50 ml of 4.9 yeast extract (Oxoid, Basingstoke, Hampshire, England) 10.9 malt extract (Oxoid) and 4.9 glucose (BDH, Poole Dorset, England) medium in 250 ml Erlenmeyer flasks. Culture flasks were then incubated at 20-22°C on a rotary shaker set at 120 rpm. After 6 days of growth, seed cultures (inoculum) were inoculated to 400 ml of the

research Institute of Health,-
P.O.Box 1242, Addis Ababa Ethiopia
¹Addis Ababa University, Department of Biology,
P.O.Box 1176, Addis Ababa Ethiopia

same medium. All flasks were then incubated in the same condition as described above. Growth (mycelial dry weight), pH-value and antibiotic production were determined by taking aliquot of culture medium every other day. pH-values were determined by pH meter (Corning pH-meter mode 140), the dry weight was weighed by oven-dry method and antibiotic production by agar diffusion assay using *Aspergillus niger* as test organism. The culture was harvested when the antibiotic content of the culture filtrate reached its maximum.

The culture filtrate was extracted with half volume of chloroform (Merk, Darmstadt) after it was dried over anhydrous Na_2SO_4 (BDH). The chloroform extract was concentrated under reduced pressure and applied on a column of silica gel 60 (0.6 to 0.02 mm size; Merk) as a thin layer on top of the column, after the material was dried with silica gel and eluted with increasing percentage of methanol (Merk) in chloroform.

Biological Activity:

Effects of 201A and 201B Against yeasts and Bacteria;

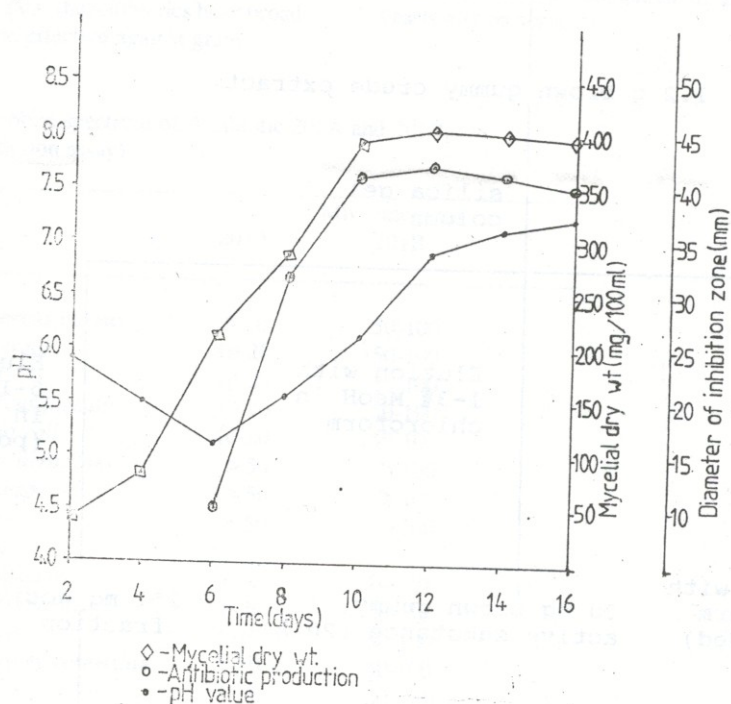
The minimum inhibitory concentration (MIC), against bacteria and yeasts was determined as described by Anke et. al [11]. In brief, test organisms ($2-6 \times 10^6/\text{ml}$) were inoculated to test tubes containing different concentrations of the test substances and incubated at an appropriate temperature for 24 hours. The MIC was recorded as the lowest concentration of the test substances completely preventing growth (visible turbidity) as determined by the naked eye after 24. hours of incubation.

Antifungal Activity Against Mycelial Fungi. The activity of antibiotic 201A and antibiotic 201B against mycelial fungi was determined by the agar diffusion assay as described by Dawit [10]. In brief, heavy spore suspension ($2-6 \times 10^6$ spores/ml) or macerated young mycelia (5 mg/ml) of each test fungus was suspended in Sabouraud dextrose agar (Oxoid) medium prior to pouring into sterile glass plates. Different concentration of test substances were applied to antibiotic assay discs (6 mm in diameter; Schleicher & Schuell, Dassel) and placed on test plates to which spores or macerated young mycelia of test fungi were seeded. Inhibition zone diameter was recorded after 24-48 hours of incubation at appropriate temperatures.

RESULTS

Submerged Culture and Isolation of Antifungal Metabolites from *G.lucidum*.

The time course of submerged culture of the producing fungus was followed by measuring the dry weight of the mycelium; the pH-values and antifungal activity of the culture filtrate against *Aspergillus niger* and the results are shown in Fig. 1. As shown in Fig. I, the pH- value of the culture broth decreased for the first six days of growth, followed by a continuous rise in pH. The optimum pH value corresponding to the highest production of antifungal agents was about 6.8. Mycelial dry weight increased rapidly from the 61h to the 101h days of growth and showed no appreciable increase or decrease up to the 141h day of growth. The antibiotic production started from the 61h day of growth and reached its maximum on the 121h day of growth. After 14 days of growth, a decrease in antibiotic production was observed.



66

Figure 1 Submerged Culture of *Granoderma lucidum*

Ten liters of culture filtrate obtained from growth of submerged culture was extracted with 5 liters of chloroform. The brown gummy crude extract (1.2 g) was then purified by a column of silica gel and preparative thin layer chromatography (PTLC) as shown in Fig. 2. Three fig of 201A and 5 fig of 2018 were obtained from a liter of culture filtrate.

Figure 2. Purification of antibiotic 201A and 201B

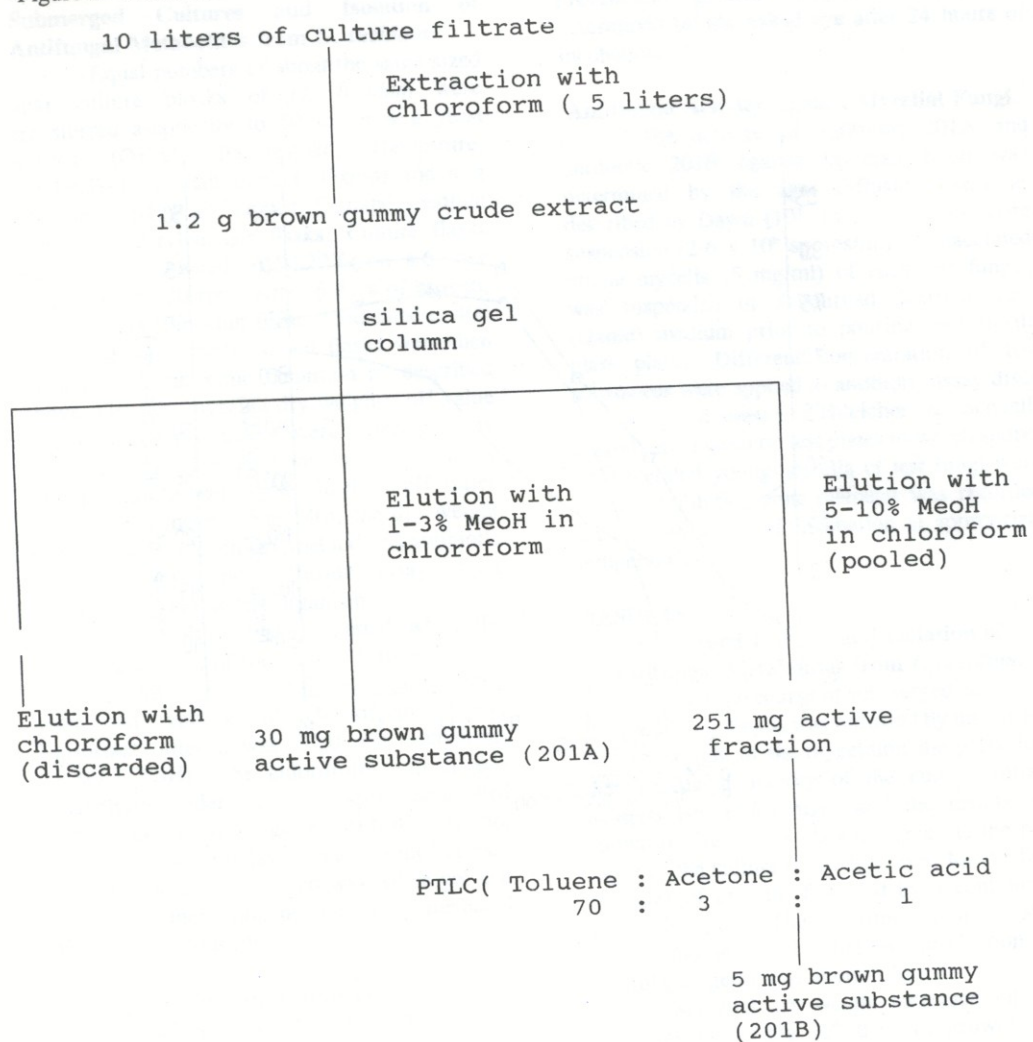


Fig. 2 Purification of antibiotic 201A and 201B

The approximate place of Fig 2 is immediately above biological activity of 201 A and 201B on page 6.

Biological Activity of Antibiotic 201A and 201B. Effect Against Bacteria and Yeasts.

The minimum inhibitory concentrations of 201A and 201B against an array of bacteria and yeasts are presented in Table 1. As is evident from this data, the antibiotics have broad spectrum and were effective against gram -positive bacteria and yeasts. The antibiotics were relatively ineffective against gram-negative bacteria. Antibiotic 201A was particularly effective against the pathogenic yeast, *Candida albicans*. Antibiotic 201B was active at a higher concentration when compared to 201A against yeasts and bacteria.

Table 1. Antimicrobial spectrum of Antibiotic 201A and 201B (serial dilution assay)

Test organisms	MIC/mcg/ml	
	201A	201B
Bacteria		
<i>Staphylococcus aureus</i>	5-10	50-100
<i>Bacillus cereus</i>	10-20	50-100
<i>B. subtilis</i>	10-20	50-100
<i>Streptococcus faecalis</i>	10-20	50-100
<i>Escherichia coli</i>	10-20	50-100
<i>Aerobacter aerogenes</i>	>50	>100
<i>Salmonella</i> sp.	>50	>100
<i>Proteus</i> sp.	>50	>100
Yeasts		
<i>Candida albicans</i>	<1	10-20
<i>C. Pseudotropicalis</i>	1-5	20-50
<i>C. tropicalis</i>	5-10	50-100
<i>Sacchromyces cerevisiae</i>	5-10	50-100
<i>Rhodotrula</i> sP.	1-5	20-50
<i>Torulopsis cremoris</i>	5-10	50-100
<i>Hansenia spora</i>	5-10	50-100

The results of the activity of antibiotic 201A and 201B against a variety of mycelial fungi is shown in Table 2. All the fungi tested were susceptible to the antibiotics. Species of *Aspergillus* were more sensitive to both test substances than the other mycelial fungi. *Aspergillus fumigatus*, a pathogenic mycelial fungus was strongly affected by 201A. The effect of 201B against mycelial fungi was moderate.

Table 2. Antifungal Spectrum of Antibiotic 201A and 201B (agar diffusion assay)

Test Mycelial Fungi	Diameter Inhibition Zone (mm) mcg/dsc						
	201A			201B			
	10	20	50	10	20	50	100
<i>Aspergillus niger</i>	30	35	-	-	-	20	25
<i>A. flavus</i>	36	45	-	-	-	28	32
<i>A. ochraceus</i>	25	31	-	-	-	25	30
<i>A. fumigatus</i>	32	38	-	-	-	18	27
<i>Colletothricum</i>							
<i>Coffeanum</i>	25	32	-	-	-	7	11
<i>Penicillium</i> sp.	17	32	38	-	-	0	10
<i>Trichodema</i> sp.	10	22	31	-	-	0	7
<i>Fusarium</i> sp.	10	19	22	-	-	0	5
<i>Rhizopus</i> sp.	15	25	33	-	-	0	10
<i>Mucor</i> sp.	24	28	-	-	-	8	19

0= no inhibition - = not tested

DISCUSSION

Among all basidiomycetes screened for an antifungal activity the polypore, *G. lucidum* produced the most effective antifungal compounds.

In submerged culture of *G. lucidum*, it has been shown that no significant antibiotic production was observed up to the first 8 days of growth. However, antibiotic production was found out to be maximum between 10 to 14 days of growth, when the growth of the producing fungus was completed (Fig. I). In batch cultures high levels of antibiotics are usually produced only after most of the cellular growth has already occurred [12].

Depletion of one or more growth limiting substrates has been reported to arrest growth and initiate antibiotic synthesis [13]. It is also clear that the production of antibiotics was almost linear between 10 to 14 days of growth, followed by a steady decline in antibiotic production. According to Martin and Demain[14], depletion of the precursors of the antibiotic, irreversible decay of one or more antibiotic synthetase and feedback effect of antibiotic against its production are the most probable explanation for antibiotic synthesis cessation. The pH of the broth medium decreased for the first few days of growth and such a decrease in pH in antibiotic fermentation with time could result in from production of organic acids. These are produced as a result of breakdown of carbohydrates [14, 15]. This was followed by a rise in pH to alkaline range and the maximum antibiotic production occurred during the earlier stage of this rise in pH. Exhaustion of carbohydrates as a cause of a rise in pH, and appearance of maximum antibiotic production in the earlier stage of a rise in pH in most antibiotic synthesis had been described [15]. However, a shift of pH to a more alkaline range, due to metabolic products, is usually associated. with a decrease in the yield or complete loss of antibiotic production [10]. This could also be a possible explanation for a decrease in antibiotic production in submerged cultures of *G. lucidum* in the later stages of fermentation.

Low yield of antibiotics from fermentation culture of basidiomycetes was pointed out as a major limitation in the investigation of these group of fungi for antimicrobial agents [16]. Amounts of 3 mg of 201A and 5 mg of 201B were purified from a liter of culture filtrate (Fig. 2). A number of factors that contribute to a reduction in yield of antibiotics have been discussed by many researchers working in the field of secondary metabolite production and regulation [14, 17, 18]. According to Demain [18] penicillin, cycloheximide, cephalosporin and chloramphenicol exert a feedback regulation on their biosynthesis. Inhibition of a common biosynthetic pathway of primary metabolism and secondary metabolism by primary end-products has been reported to affect the production of antibiotics [14].

In this work, the two antifungal antibiotics (antibiotic 201A and antibiotic 201B), isolated from submerged culture of *G. lucidum*, have been biologically characterized. Due to their effectiveness against disease-causing fungi (pathogenic yeasts and molds), the antifungal activity is described. At present there are a number of antifungal agents of microbial or synthetic origin in therapeutic use. These antifungal agents, however differ in terms of spectrum of activity potency and mode of action and thus treatment of many mycotic infections is far from satisfactory .

Polyene antifungal antibiotics (nystatin, natamycin, amphotericin B) have a broad spectrum of activity against mycelial fungi and " yeasts, but are inactive against gram-positive and gram-negative bacteria [19]. Narrow spectrum of activity is a. major limitation of the antifungal drugs, flucytosine and griseofulvin. Activity of flucytosine appeared to be limited to yeastlike fungi [2], while griseofulvin has been shown to posses fungistatic activity only against dermatophytes[20] .

With respect to a range of activities, both antibiotic 201A and 201B have a broad spectrum of activity against an array of bacteria, yeasts and mycelial fungi (Table 1 and 2). The in vitro MIC of antibiotic 201A and 201B against bacteria and yeast show variability. Among the bacteria, gram-positive bacteria were more sensitive to both antibiotics than gram-negative bacteria. Of the gram- positive bacteria *Staphylococcus aureus* has been shown to be the most susceptible. Gram-negative bacteria were almost completely resistant to both antibiotic 201A and 201B.

Both antibiotic 201A and 201B, were also active in vitro against a number of yeasts and mycelial fungi. Data on the in vitro antifungal properties of 201A and 201B showed that, the agents are active against the yeasts, *C. albicans*, *C. tropicalis*, *C. pseudotropicalis*, *Saccharomyces cerevisiae*, *Rhizotrichum* sp. and molds belonging to the genera of *Aspergillus*, *Rhizopus*, *Mucor*, *Penicillium*, *Fusarium*, *Cladosporium* and *Colletotrichum*. The in vitro susceptibility data indicated that the potency of antibiotic 201A against bacteria and yeasts was much better than that of antibiotic 201B (Table 1). The MIC value of antibiotic 201A against *C. albicans*, the most frequent cause of superficial, mucocutaneous and systemic mycosis [1] was less than 1 mcg/ml. The corresponding MIC value of antibiotic 201B was in the range of 10-20 mcg/ml. Comparing the MIC of antibiotic 201A against *C. albicans* with that of amphotericin B and ketoconazole from literature

have revealed that the MIC of antibiotic 201A was similar to that of amphotericin B which is in the range of 0.01 to 0.5 mcg/ml [19] and that of ketoconazole which is in the range of 0.3 to 2.5 mcg/ml [21]. These two antifungal drugs are known to have a wide spectrum of activity against a number of pathogenic fungi.

Results of antifungal activity testing with antibiotic 201A and 201B by agar diffusion assay against mycelial fungi (Table 2) showed that the potency of antibiotic 201A was strong against *Aspergillus clavus* and *Aspergillus ochraceus*. These molds are among the many fungi capable of producing aflatoxins and ochratoxin, respectively [22]. *Aspergillus umigatus*, an opportunistic mold, implicated as a cause of systemic mycosis [1] was also sensitive to the two antifungal agents. Members of the genus *Aspergillus* are found to be resistant organisms to both amphotericin B and flucytosine [23]. *Colletotrichum coffeanum*, which is a known coffee pathogen, was also sensitive to both antibiotics. The activity of the two antifungal antibiotics against disease causing protozoa and helminths, their mode of action, toxicity and the elucidation of their chemical structure are under investigation.

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UPDATE
AIDS CASE SURVEILLANCE IN ETHIOPIA: APRIL 30, 1994
National AIDS Control Programme
Ministry of Health

INTRODUCTION

This report- is published by the National AIDS Control Programme on a monthly basis. The major objectives of the publication are to.

.Notify the current status of AIDS epidemic in the country , and provide information for decision making and future planning.

* Provide feedback to health institutions and collaborating agencies in the country . This copy is being distributed free of charge for over 350 government and non-government institutions. From January 1986 to April 1994, a total of 12,402 AIDS cases have been reported by forty-eight hospitals in the country. Other surveillance and research activities carried out in Ethiopia among different population groups have also indicated the extent of the HIV/AIDS epidemic and its progression.

Note (1) you are kindly requested to share the information with your staff. (2) Comments and suggestions are appreciated for improving our reporting system

Table 1. Summary of AIDS Cases reported in Ethiopia, as of 30 April 1994

Variable	Cumulative value
Number of AIDS cases reported	12,402
Number of reporting Hospitals	48
Average age of patients	30.5
Sexually active age group (15-49 yrs)	93.3%
Proportion of paediatric cases (age <15 yrs)	1.6%
Proportion of elderly (age > 60 yrs)	0.9%
Heterosexual transmission	86.6%
Proportion of married people	34.8%
Female to male ratio of total cases	1:1.6
Reported case by A.A hospitals	53.5%
Patients residing in Addis Ababa	41.9%
Major clinical symptoms	
Weight loss of > 10% body weight	88.5%
Prolonged Fever for > month	84.5%
Persistent Cough for > 1 month	67.9%
Chronic Diarrhea for >1 month	61.1%

NB: 1. You are kindly requested to share the information with your staff .
Comments and suggestions are appreciated for improving our reporting system.

Criteria used to diagnose AIDS patients in Ethiopia.

The World Health Organization (WHO) provisional case definition with positive serology test for HIV antibodies is the criteria used to diagnose AIDS. According to the case definition, a patient has to manifest at least two major and one minor signs and show an HIV positive serology.(See page 9 of the report for the list of major and minor clinical symptoms/signs).

Summary of the report for the month of April

In April 1994 alone, a total of 475 AIDS cases were reported by 14 hospitals; 323 cases were from 9 Addis Ababa hospitals and the remaining 152 cases were from 5 regional hospitals. The following table identifies the number of cases reported during this month, by reporting hospital and region/zone.

Table 2. Distribution of reported AIDS Cases by hospital, for the month of April 1994.

Hospital	Region/Zone	Period of diagnosis	Cases
Alert	Addis Ababa	Oct. 93-Mar. 94	14
Armed Force		Jan. 94-Mar. 94	5
Central Prison		Mar. 94	6
Ethio- Swedish		Apr. 93 - Feb. 94	7
Kolfie TBC		Feb. 93-Mar. 94	7
ST. Paulos		Feb. 94 - Apr. 94	59
ST. Petros		Dec. 93 - Mar. 94	26
Ras Desta		Dec. 93 - Feb. 94	104
Yekatit 12		Nov. 93 - Mar. 94	95
	Sub Total		323
Asella		Feb. 94 - Mar. 94	23
Attat		Mar. 94	13
Bushulo		Oct. 93 - Apr. 94	35
Dessie		Feb. 94 - Apr. 94	74
Wonji		Mar. 94	7
	Sub Total		152
	Total		475

Table 3. AIDS Cases by Quarter of Report.

Year-quarter	Male	Females	Total	Percent
86-1	1	0	1	0.01%
86-2	0	1	1	0.01%
87-1	4	0	4	0.03%
87-2	0	2	2	0.02%
87-3	2	2	4	0.03%
87-4	6	1	7	0.06%
88-1	4	3	7	0.06%

88-2	21	5	26	0.21%
88-3	19	4	23	0.19%
88-4	23	6	29	0.23%
89-1	11	4	15	0.12%
89-2	44	17	61	0.49%
89-3	21	16	37	0.30%
89-4	52	25	77	0.62%
90-1	49	27	76	0.61%
90-2	67	14	81	0.65%
90-3	92	49	141	1.14%
90-4	84	66	150	1.21%
91-1	218	82	300	2.42%
91-2	101	77	178	1.44%
91-3	161	80	241	1.94%
91-4	105	61	166	1.34%
92-1	145	108	253	2.04%
92-2	327	218	545	4.39%
92-3	603	397	1000	8.06%
92-4	909	549	1458	11.76%
93-1	618	403	1021	8.23%
93-2	528	294	822	6.63%
93-3	1030	620	1650	13.30%
93-4	1011	620	1631	13.15%
94-1	1158	762	1920	15.48%
94-2	265	210	475	3.83%
Total	7679	4723	12402	100.00%

Table 4. **Distribution of AIDS Cases by Year of Report.**

Year	Sex			Sex Ratio Percent of	
	Male	Female	Total	(M:F)	Total
86	1	1	2	1:1	0.02 %
87	12	5	17	2.4:1	0.14%
88	67	18	85	3.7:1	0.69%
89	128	62	190	2.1:1	1.53%
90	292	156	448	1.9:1	3.61%
91	585	300	885	1.9:1	7.14%
92	1984	1272	3256	1.6:1	26.25%
93	3187	1937	5124	1.6:1	41.32%
94	1423	972	2395	1.5:1	19.31%
Total	7679	4723	12402	1.6:1	100.00%

The proportion of female patients being reported has increased since 1992.

Table 5. **Age and Sex Distribution of reported AIDS Cases.**

Age Group	Sex			Percent
	Males	Females	Total	
0-4	95	94	189	1.52%
5-14	11	10	21	0.17%
15-19	163	529	692	5.58%
20-29	2875	2527	5402	43.56%
30-39	2787	1074	3861	31.13%
40-49	1269	353	1622	13.08%
50-59	383	118	501	4.04%
60+	96	18	114	0.92%
Total	7679	4723	12402	100.00%
(percent)	(61.92%)	(38.08%)		

Average age for females = 27 years, and for males = 32.5 years, and for both sex = 30. 5 years.

Table 6. **Distribution of Reported AIDS Cases by Marital Status.**

Marital Status	Male	Female	Total	Percent
Single	3604	1811	5415	43.66%
Married	2982	1339	4321	34.84%
Divorced	402	955	1357	10.94%
Widowed	57	300	357	2.88%
Pediatric Cases				
(Age < 15 years)	100	102	202	1.63%
Unspecified	534	216	750	6.15%
Total	7679	4723	12402	100.00%

Table 7. **Reported AIDS Cases by Occupation**

Occupation type	Males	Females	Both	Percent
Age < 15 Years	100	101	201	1.62%
Armed Forces	1465	33	1498	12.08%
Bar Worker*	74	87	161	1.30%
Daily Labourer	375	121	496	4.00%
Driver	884	5	889	7.17%
Farmer	196	9	205	1.65%
Govt Employee	1348	349	1697	13.68%
House Wife	0	852	852	6.87%
Mechanic	230	3	233	1.88%
Merchant	794	184	978	7.89%
Prisoner	37	0	37	0.30%
Servant/House Maid	14	319	333	2.69%
Sex Worker	0	819	819	6.60%
Student	216	303	519	4.18%
Tella/Tej Seller	10	176	186	1.50%
Other	650	406	1056	8.51%
Unemployed	258	312	570	4.60%
Unspecified	1028	644	1672	13.48%
Total	7679	4723	12402	100.00%

- Bar worker include bar owners and those who are not at high risk as sex workers.

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Table 8. Average number of AIDS cases per month and number of reporting hospitals by year.

Year	Average no. of cases	Reporting hospitals		
	Per month	Addis Ababa	Region	Total
Before 1988	0 to 1	7	0	7
1988	7	13	2	15
1989	16	15	4	19
1990	37	17	14	31
1991	74	17	22	39
1992	269	17	29	46
1993	427	18	30	48
1994		18	30	48
Total	18	30	48	

Tale 9. Distribution of AIDS Cases by Reporting Hospitals and by Year of Report for Addis Ababa.

Reporting Hospitals	Year of Report										
	86	87	88	89	90	91	92	93	94	Total	Percent
Alert	0	1	32	37	61	0	339	224	38	732	11.04%
Amanuel	0	0	0	0	0	1	6	5	0	12	0.18%
Armed Force	0	0	0	0	0	0	0	0	5	5	0.08%
Armed Forces	0	4	3	22	59	164	36	30	8	226	3.41%
Balcha *	0	0	3	0	0	0	0	0	0	3	0.05%
Central Comman	0	0	2	0	0	0	11	33	28	74	1.12%
Central Prison	0	0	0	0	0	0	0	19	23	42	0.63%
Ethio-Swedish	0	0	5	0	0	3	3	0	7	18	0.27%
Gandhi	0	0	0	1	0	0	0	0	8	9	0.14%
Kolfie TBC	0	0	0	0	5	0	0	49	23	77	1.16%
Minilik II	0	0	0	13	7	0	210	378	149	757	11.42%
Paulos	0	0	4	0	1	23	18	294	173	513	7.74%
Petros	0	1	1	4	84	39	76	235	67	507	7.65%
Police	0	2	1	10	5	36	29	52	38	173	2.61%
Ras Desta	0	1	0	30	44	106	196	362	211	950	14.33%
Tatek	0	0	0	0	6	22	0	2	3	33	0.50%
Tikur Anbessa	0	3	25	47	43	148	148	634	273	1321	19.92%
Yekaait 12	2	5	3	13	22	16	251	199	99	610	9.20%
Zewditu	0	0	3	3	21	50	118	273	100	568	8.57%
Total	2	17	82	180	358	508	1441	2789	1253	6630	100.00%

- Balcha hospital reported AIDS cases only once.

Table 12. AIDS Cases by Risk Factors.

Risk Factors	Male	Female	Total	Percent
History of Multi-Partner Sexual Contact (MPSC)	6721	4015	10736	86.57%
History of blood Transfusion	69	45	114	0.92%
Maternal HIV or Breast Feeding	90	91	181	1.46%
History of illegal injection	64	57	121	0.98%
IV drug abuse	4	2	6	0.05%
Unspecified	731	513	1244	10.03%

Table 13. Clinical Signs and Symptoms of reported AIDS Cases.

Clinical Manifestation	Male	Females	Total	Percent
MAJOR SYMPTOMS				
Weight loss> 10% of body weight (Failure to thrive)	6765	4212	10977	88.51%
Prolonged Fever for> 1 month	6437	4040	10477	84.48%
Chronic Diarrhoea for > 1 month	4681	2892	7573	61.06%
MINOR SYMPTOMS				
Generalized lymphadenopathy	1996	1034	3030	24.43%
Persistent Cough for > 1 month	5265	3160	8425	67.93%
Skin rashes	118	63	181	1.46%
Tuberculosis (pulmonary and/or Disseminated)	1268	738	2006	16.17%
Recurrent herpes zoster	1133	607	1740	14.03%
Generalized pruritic dermatitis	1250	851	2101	16.94%
Oropharyngeal candidiasis	1547	920	2467	19.89%
Pneumonia (including PCP)	396	219	615	4.96%
Chronic herpes simplex	86	64	150	1.21%
CNS derangement	128	48	176	1.42%
Night sweats & Generalized	111	58	169	1.36%
Body Weakness				
Loss of appetite	19	6	25	0.20%
Kaposi's Sarcoma	31	8	39	0.31%

Table 14. Reporting Status of AIDS cases for Addis Ababa hospitals, January-April 1994

[illegible]

Table 15. Status of AIDS cases report for Regional Hospitals, January- April 1994

[illegible]

16. Goba													
17. Gondar Coolege			X										1
18. Heroes Center													
19. Hiwot Fana		X											1
20.Hossana													
21.Jimma													
22.Metehara													
23.Mizan			X										1
24.Nazreth		X											1
25.Nekemet													
26.Pawie													
27.Shashemene													
28.Wp;doya			X										1
29.Wonji	X	X	X	X									4
30.Yirgalem	X	X	X										3

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