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LABORATORY SERVICES IN HEALTH CENTRES WITHIN AMHARA REGION, NORTH ETHIOPIA
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ABSTRACT

Objective: **To identify current problems in laboratory services and elicit suggestions from the technicians aimed at improving the services in health centres within Amhara region, north Ethiopia.**
Design: **Cross-sectional study using a pre-tested questionnaire.**
Settings: **Twenty seven health centres in Amhara region, north Ethiopia.**
Participants: **Twenty seven laboratory technicians.**
Results: **Physical facilities were seriosly lacking, consisting of only one room in 85.2% of the health centres. Supply of electricity was never continuous. Whereas virtually all the health centres had up to five medical doctors each, laboratory manpower was grossly below the ideal requirement. Over half of the health centres had only one technician each, resulting into heavy workload. Laboratory reagents were insufficient, equipment lacking, and maintenance and repair were not accorded adequate attention. Eighty different tests were offered by the health centres in various combinations. Twenty categories of suggestions were advanced by the respondents.**
Conclusion: **There is a great shortage of manpower, equipment, chemicals and other supplies to provide adequate laboratory services in the health centres within the region. Consequently, the laboratories are functioning below capacity.**

INTRODUCTION

Laboratory service is an essential component of health care. Individual patient management requires diagnostic support. Investigation into epidemics and surveillance of endemic diseases cannot be carried out without adequate laboratory facilities and trained manpower. Any attempt to improve health services will therefore have to take the laboratory arm into consideration(1-4).

Health centres in Ethiopia are currently staffed by medical doctors, nurses and at least one laboratory technician(5). There has been no researched report on health centre laboratory service in Ethiopia. Therefore reliable information on laboratory service and parameters associated with it is not available.

The objective of this study was to identify the current problems in laboratory service and document existing manpower, facilities, diagnostic tests offered and suggestions to improve laboratory services in Amhara region of Ethiopia.

MATERIALS AND METHODS

The study was conducted in Amhara region of Ethiopia in November 1997. The region is divided into 10 zones, 106 districts and one special zone. It has an area of 170, 000 square kilometres and a population of 14, 792, 670 receiving health services from nine hospitals and 53 health centres. Only 119 laboratory technicians (106 males and 13 females) were giving laboratory service in the region at that time(5).

Questionnaires were administered to one currently active laboratory technician in each of the 27 health centres identified for the study. Respondents were requested to fill in data pertaining to manpower, patient load, tests performed, available reagents/equipment and safety standards. They were also asked to describe problems they believed were most important to solve in order to improve laboratory services where they practiced.

RESULTS

Participants: Twenty seven laboratory technicians, 22 males and five females, responded. Participating respondents came from 27 out of 53 health centres of the Amhara region. Of these 10 were senior, 11 junior, one assistant and two malaria technicians. Three did not specify current qualification. The respondents had a mean of 7.1 years (median 5, range one month - 33 years) of service as technicians. Eight per cent had service years below one year in health centres. Service at current place of work was for a mean of 4.2 years (range one month - 13 years). Their mean age was 27 years (range 19-48 years).

Manpower: Nine laboratories were staffed by only one technician, five had two, five had three and three laboratories had four technicians. Two health centres

(Gondar and Dessie) had seven technicians each. Technicians from three health centres did not respond. Twenty three laboratories provided no support person for specimen collection or patient registration. Ten laboratories had no cleaner. Seventeen laboratories provided cleaners to help the technician. Twenty two laboratories received requests from doctors and nurses and three from nurses only. Two participants did not respond.

Work load: Different basic laboratory tests in haematology, parasitology, urinalysis, microbiology and serology were performed in the health centre laboratories (Table 1). Estimated number of patients seen/day/health centre ranged between 60 and 150. Number of health workers requesting laboratory tests in the health centre were between two and 10.

Table 1

Status of laboratory tests in the health centre laboratories of Amhara region, Ethiopia, November 1997

Performed test	No. of health centres providing tests	No. of health centres not providing the tests
Gram stain	12	15
CSF microscopy	3	24
Acid fast stain	19	8
KOH for fungus	1	26
Blood smear for malaria/RF	25	2
WBC count	8	19
ESR	17	8
Urine microscopy	21	6
Urine multistix	21	6
Stool direct microscopy	24	3
Stool concentration	1	26
Haemoglobin	14	13
Haematocrit	22	5
Blood grouping	3	24
Cross matching	2	25
VDRL or RPR	1	26
Widal agglutination	0	27
Weil-Felix agglutination	0	27

Except one health centre which had no medical doctor, all the rest had from one to five medical doctors. Two thirds of the health centres did not give laboratory services at night. Only 26 % of the health centre laboratories gave services during week ends. Fifty five per cent of the respondents did not participate in epidemic investigation.

Facilities: Eighty five per cent of the health centres had only one room for laboratory services. Thirty per cent of the laboratories lacked shelves. There was a considerable lack of various pieces of equipment to undertake laboratory work in the various health centres (Table 2). Likewise, there was also a serious shortage of chemicals and reagents (Table 3). Alcohol and savlon were used as disinfectants in the majority of the laboratories followed by barakina, hypochlorite and formalin. Forty per cent of the laboratories did not have electricity during the day time. Sixty two per cent had electricity at night only, while forty five per cent had it overnight.

Table 2

Available equipment in the health centre laboratories of Amhara region, Ethiopia, November 1997

Equipment	No. of health centres with the equipment	No. of health centres without the equipment
Refrigerators	5	22
Centrifuges	3	24
Haematocrit centrifuge	19	7
Haemoglobinometer	13	14
ESR tubes	17	10
Haemocytometer	10	17
Test tube racks	21	6
Pricking needles	20	7
Pipettes	11	16
Bunsen burner	5	22
Oil lumps	8	19
Applicator sticks	19	8
Steriliser	3	24
Differential count calculator	12	15

Table 3

Available chemicals and reagents in the health centre laboratories of Amhara region, Ethiopia, November 1997

Reagents and chemicals	No. of laboratories with reagents and chemicals	No. of laboratories with out reagents and chemicals
Carbon fuchsin	18	9
Acid alcohol	22	5
Methylene blue	25	2
Crystal violet	15	11
Lugols iodine	13	14
Gram's decolorizer	11	16
Safranine	19	8
Ethyle alcohol	17	10
Ether	7	20
Formalin	14	13
Iodine	9	18
WBC dilution fluid	12	15
KOH	0	27
Wright stain	18	7
Giemsa stain	20	7
India ink	0	27
Sodium citrate	18	9
Oil for oil immersion lens	23	4

Table 4

Suggestions given by the respondents to improve laboratory service in the health centres of Amhara region, Ethiopia, November 1997

Suggestions given by the respondents	No of respondents
Provision of all the necessary equipment, reagents and chemicals	16
Refresher courses, workshops and seminars in fields of laboratory technology	14
Opportunities for upgrading the training quality of the technicians, for example to senior diploma in laboratory technology, BSc, MSc and PhD in fields of laboratory technology	10
Purchase of laboratory equipment, reagents and chemicals for use in the laboratories should be done by the technician or in consultation with the technician	8
There should be professional association of technicians to solve problems and initiate programmes (like annual and/or biannual conferences, seminars, etc) to the technicians	5
Work load in the health centre laboratories should be equivalent to the man power in the laboratory	5
There should be support staff and cleaner in the laboratory	5
Respect for the laboratory worker by the health team in the health centres and the society at large	3
There should be regular supervision and discussion by specialists in different fields of laboratory technology on the quality of the laboratory service with the technician in the health centres	2
There should be representatives of technicians at district, zonal regional and national levels to voice the rights of technicians	2
The number of technician training schools to post basic BSc should increase in number and their yearly intake (which has been only 15) should also increase	3
The laboratory rooms should be well designed	2
Newsletters, magazines, laboratory books and manuals should be available for reference in the health centre laboratory	1
The existing technician training schools should communicate with the health centre laboratories on regular basis	1
There should be quality control tests in the health centre laboratories	1
Electricity should be there	1
Training in the teaching schools should be based on practical issues	1
Facility for the technician should be fulfilled	1
Payment for the technician should be proportional to the work load	1
There should be health insurance for the technician	1

Only 18.5% had electricity in the evenings. Over 80% of the laboratories did not have spare parts for microscopes. Shortage of slides and cover slides were mentioned by 55. 6% and 59.3% of the respondents respectively. Reuse of slides and cover slides were indicated by 81.5% and 44.4% of the respondents respectively. In 18.5% of the laboratories, pipetting was done manually by the mouth only. Means of pipetting other than by the mouth included the use of syringe with intravenous set tubes and rubber tubing. In all laboratories gloves were used when drawing blood. In 40.7% of the laboratories gloves were reused after disinfecting with savlon or barakina, or boiling in water or autoclaving in health centres with autoclave. Less than two gloves/day were being used in 63% of the laboratories. Almost 75% of the laboratories experienced shortage of gloves. Shortage of needles were indicated by 40.7% of the respondents. Only 7.4% reused needles. Close to 80% of the laboratories did not have manuals. Nearly 90% lacked a book on laboratory methods. Of the 60 microscopes reported to be present in 26 laboratories, only 38 were working properly according to the laboratory technicians. Seventeen laboratories had only one functioning microscope in each; but the only microscope available in each laboratory was itself defective. Four laboratories had

two microscopes; three had three microscopes and one had four microscopes. One respondent did not volunteer information. Seventy per cent of the technicians had no experience in fixing microscopes. Participation in refresher courses was reported by only two thirds of the respondents.

Table 4 lists suggestions advanced by the laboratory technicians to provide improved services in the health centres where they practised.

DISCUSSION

This descriptive report indicates that there is a great shortage of manpower to render basic laboratory services in the health centres of Amhara region. Haematological and parasitological laboratory services constitute the largest portion of workload in the health centres. The laboratories could have given more and better services than what has been reported if there were adequate reagents, chemicals and equipment besides well-trained manpower(1,2).

The Amhara region is endemic for various vector and water borne diseases. Epidemics of diseases occur at different seasons of the year. Therefore laboratory services at night and during the weekends are very crucial.

The fact that safety procedures were well practiced in the health centre laboratories is important to reduce hazards related to the profession. However, there were still laboratories where mouth pipetting was in practice. This could have been avoided by undergoing local short term training in laboratory safety. Shortage of gloves was reported from three quarters of the laboratories.

The importance of laboratory manuals or books on laboratory methods for a technician giving laboratory service is unquestionable. But lack of these materials was also reported from many laboratories. Microscope is one of the most important pieces of equipment for a laboratory technician in a health centre. It is therefore very difficult to undertake laboratory work in such settings without or with malfunctioning microscopes.

The health centre laboratories were functioning below their capacity. This is evident by looking at the number of laboratories not providing the various tests. Simple and specific laboratory diagnoses of the most important health problems in the region, such as tuberculosis, malaria, schistosomiasis, anaemia in pregnancy, dermatophytosis, gonorrhoea(4,6) could have been handled by rendering laboratory services in the health centres. This would have greatly reduced the mortality and morbidity(6) besides the time and resources lost by service seekers travelling to areas with such services. Therefore provision of basic and consistent laboratory services should be made at the health centres in the region to satisfy the ever-increasing demand for these service(4,6,7).

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