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EVALUATION OF HEALTH SERVICES IN GONDAR

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INTRODUCTION

In technically highly developed countries, evaluation of health services is usually based on the statistical data of infant mortality, maternal mortality, life expectancy of certain age groups (e.g. the fifty years old), incidence of communicable diseases and less commonly, on the number and distribution of physicians, hospital beds, nurses, status of sanitary installations and national expenditures for health.

In technically developing areas, statistics, such as registration of births and deaths, death certification and reporting of communicable diseases are non-existent, incomplete or not reliable. Therefore, other methods have to be found if the effectiveness of health services is to be evaluated. It is needless to stress how important such evaluation in these regions is, where health policies have to be planned and established on more or less virgin ground and with very limited funds.

METHODS OF EVALUATION THOUGHT SUITABLE TO APPLY IN GONDAR

Such methods of evaluation in technically underdeveloped areas without the network of capillary health services and with non specialized health workers have to be elementary, direct and indicative.

1. By "elementary" we mean that relatively easy, well-tested diagnostic methods have to be applied. They must be practicable in existing rural health centres with their limited staff and modest facilities. Findings reliable enough to serve as a statistical evaluation of health services in these regions, are possibly mainly symptoms which can be expressed in figures, such as height, weight, easy diagnoses done by inspection, such as scabies and rickets. Lice could maybe included, but quite often the riter observed that this indicator is occasionally left to the examiners interpretation: is it a real louse infestation, or is it an "occasional" louse (which all health workers dealing with patients have very often after work, therefore this indicator is omitted in this evaluation. Tests done by simple laboratory methods, such as finding of intestinal parasites and their ova, and of haemoglobin levels could be also accepted, where laboratory facilities exist.

Diagnoses requiring complicated laboratory tests or examinations with specialized apparatus, (such as in typhus, typhoid, yellow fever,) seem impracticable. Diseases giving similar symptoms and signs and requiring highly skilled personnel for diagnosis, such as all kinds of conjunctivitis (including trachoma), and many deficiency diseases, according to the writer's observations, can be quite often misinterpreted by different examiners. They seem therefore also impracticable in a general evaluation.

2. By "direct" we mean that the chances for confusion or obscure interpretations of results should be minimized; e.g. in regard to infants and children, data based on reports of mothers, such as previous medical history, appetite, diarrhoea, diet, age of children above one year are not reliable enough to be useful in the evaluation of the effectiveness of health services. Only direct findings observed by the health worker can be used.
3. By "indicative" we mean that the methods of evaluation must be based on findings which are really suggestive for changes due to improved health services. Therefore, diseases, such as rabies, infective hepatitis, meningitis, whooping cough, measles, poliomyelitis, relapsing fever, are in order too sporadic an outbreak to be useful as significant criteria of the effectiveness of health services, except maybe after decades of observation. Diseases of longer duration, such as tuberculosis or leprosy can also not be indicative within a period of several years only.

Only diseases

1. prevalent throughout the year, and found
 2. in the majority of the population or a certain population group, and
 3. influenced by health services,
- might be indicative in the evaluation of health services.

PREVIOUS FINDINGS IN GONDAR

Before the establishment of the Haile Selassie I University Public Health College and Training Centre in October 1954, in Gondar city, with about 20,000 inhabitants, there was only a 150 bed hospital with only one to three qualified physicians during 1941 till 1954, which served as provincial hospital for Beghemidar, with an estimated population of 2,000,000. There were also twelve very modest dresser stations scattered throughout the province. All health services rendered were of a curative nature. Preventive services were introduced by the Public Health College step by step in the course of the years.

Statistical data were published by the writer in 1958 ("Data on School Health Services in Gondar, Ethiopia" Journal of Tropical Paediatrics, Vol. 4, Nr. 4, 1959, and "Data from a Maternal and Child Health Project in Gondar, Ethiopia" Courrier de Fevrier 1961, Centre International de l'Enfance, Vol. XI- No 2.) collected from an unselected group of school pupils, infants and mothers. This assembling of data was started four years after the College was inaugurated, and three years after the introduction of a quite elaborate school health service; and two years after commencing maternal and child health services in the city of Gondar. This period of three and two years respectively of activities, was probably too short to expect any major changes in the public health situation of Gondar due to these services rendered by the College. Therefore the figures of 1958 might represent the "original" health situation.

Diseases prevalent in these figures of 1958, in 50 Percent or more of the population were found approximately in the following order of incidence:

1. Malnutrition in infants above 6 months of life and young children (about 90 %),
2. Intestinal parasites (about 85 %),
3. Scabies (about 70 %),
4. Trachoma (different in different localities and age groups 60 to 75 %),
5. Syphilis and other venereal diseases in mothers (blood tests positive nearly 50 %).

Other communicable diseases occurring occasionally in limited epidemics were typhus, typhoid, relapsing fever, whooping cough and measles; in the rural areas of the province, malaria and smallpox occurred. But the correct figures of the incidence of these communicable diseases in the total population are, until today, unknown because of the lack of complete reporting. In Gondar town maybe the majority of the population attends health services. Reporting therefore may cover a greater part of the population, but certainly not the total. In the province maybe one tenth of the total population has the opportunity to attend health services, therefore reporting is accordingly limited.

Occasionally cases of tetanus, rabies, anthrax, infective hepatitis, chickenpox, parotitis epidemica and leishmaniasis were observed. Tuberculosis seems not to be a major public health problem in Gondar, with an estimated incidence of maybe one active case per 1,000 population. The incidence in the group of these diseases is too little (apart from their incomplete reporting and from the difficulty of preventing some of them) for serving as an indicator for possible changes due to improved health services.

No cases of variola or variola minor have been reported from Gondar town between 1958 and 1962. This favourable observation might be explained as a result of the vaccination campaigns carried out by the Public Health College regularly.

* with a lethality of about 1 % probably all cases of "variola" reported from Gondar province are variola minor.

A "genus epidemicus" certainly plays a role, maybe together with climatic factors, in the observed outbreaks of malaria epidemics near Gondar. Table Nr 1 indicates the number of cases in Kolladuba (a village 32 km from Gondar and about 200 m lower than this town, which lies above the malaria belt), in 1959, 1960, and 1961.

TABLE NR. 1
=====1
INCIDENCE OF MALARIA
SEEN IN OUTPATIENT CLINIC OF KOLLADUBA
(clinical and laboratory findings)

Month:	Year:	1959	1960	1961
January		29	25	0
February		29	21	8
March		21	18	5
April		19	5	0
May		16	18	0
June		3	15	8
July		5	5	17
August		6	28	6
September		41	21	26
October		55	14	126
November		118	5	300
December		26	10	100

The figures of previous years are similar to those of 1959. The spraying with insecticides each year (except in 1961) has not changed significantly the reported incidence of malaria in Kolladuba. The outbreak in 1961 cannot be ascribed to the fact that in that year no spraying was done, as in 1955, when also no spraying had been done, the number was not higher than in 1959. The event of 1961 may indicate that malaria incidence cannot be utilized for the evaluation of public health services.

EVALUATION METHODS

Most of the diseases occurring in Gondar and surroundings are preventable and therefore, the Public Health College, from its beginning, has given highest priority to all possible improvement of sanitary conditions, personal hygiene, vector control and indoctrination of the mothers (to give suitable available additional food to their babies), and vaccinations. For evaluating the effectiveness of the College's activities, the following observations have been compiled during the year 1962 and are in the charts below compared with results published by the writer in 1958:

1. weights of infants of which the date of birth was known (Table 2, Graph 1);
2. incidence of intestinal parasites in school pupils (Table 3)
3. incidence of scabies in school pupils;
4. incidence of positive VDRL tests in school pupils;
5. haemoglobin levels in school pupils (Table 4).

From the previously mentioned list of diseases with high incidence (malnutrition, trachoma, intestinal parasites, scabies, syphilis), trachoma was eliminated as an evaluation feature in the present survey, as the diagnosis of this disease is not always easy and therefore in such a delicate study cannot be entrusted to health workers without specialized qualification. The incidence of typhus, relapsing fever, whooping cough, measles, and in the province of malaria and smallpox etc. is too sporadic in our work and their reporting too much "chance", to be regarded as indicative of any possible effectiveness of our health services in Gondar.

The basic data from which the following informations were gathered, were collected and recorded by the Health Officer Students of the Public Health College under the direct supervision of the writer during two sessions when services were rendered. Therefore the present article is really the work of the Health Officer students, only the compilation has been made by the writer.

RESULTS OF THE EVALUATION

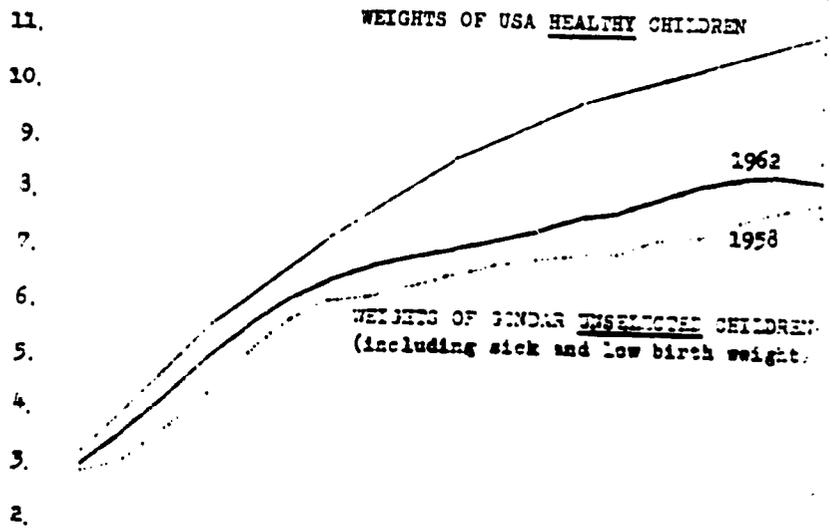
TABLE NR. 2
 INFANT WEIGHTS
 (in Grammes)

AGE:	1958 Average:	1962 Average:	Nr. of weighings	Lowest weight	Median weight	Highest weight
birth (1)		3050	750	1000	3000	5000
birth (2)		3200	628	2510	3130	5000
birth (3)		3150	680	2500	3100	5000
below 1 month	3290	3750	67	2530	3705	4955
from 1 to 2 months	3795	4440	89	2660	4500	5900
from 2 to 3 months	4493	5095	89	2750	5135	8050
from 3 to 4 months	5140	5850	85	3740	5700	8500
from 4 to 5 months	6119	6310	82	4450	6290	8900
from 5 to 6 months	6281	6615	85	4800	6600	9800
from 6 to 7 months	6415	6900	90	4600	6850	9300
from 7 to 8 months	6415	7145	75	5000	7040	10100
from 8 to 9 months	6798	7205	72	5100	7075	10610
from 9 to 10 months	6931	7230	65	5280	7150	9650
from 10 to 11 months	7169	7765	59	5900	7650	10800
from 11 to 12 months	6947	7715	71	6140	7650	11100
from 12 to 13 months	7374	8110	57	6500	8000	11000
from 13 to 14 months	7324	8065	54	6500	7750	11300
from 14 to 15 months	7633	8450	42	6880	8000	11500
from 15 to 16 months	7726	8845	45	7000	8450	16000
from 16 to 17 months	8165	8630	29	7055	8640	11500
from 17 to 18 months	8185	8560	31	7070	8150	12000
from 18 to 19 months		8915	33	7000	8650	12000
from 19 to 20 months		9460	23	7660	9100	13000
from 20 to 21 months		8700	20	7100	8115	13000
from 21 to 22 months		9325	28	7400	9120	14200
from 22 to 23 months		9500	25	7180	9300	14900
from 23 to 24 months		9970	55	7700	9500	13850
3rd year		11040	103	8000	10600	15800

birth (1) = birth weights inclusive immaturity (2500 gm and below)
 birth (2) = birth weights exclusive immaturity
 birth (3) = birth weights inclusive 2500 Gm babies who had no other evidence of immaturity.
 Birth weights were registered of those infants, who were attended by a midwife or physician at the delivery.

WEIGHT IN KILOGRAMMES MONTHS OF LIFE

	B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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The improvement in the average weights of Gondar infants between the years 1958 and 1962 is significant. Improvements were:

during 1st quartal	14.8 %
2nd quartal	7.4 %
3rd quartal	8.3 %
4th quartal	7.9 %
5th quartal	10.3 %
6th quartal	8.3 %

or a total average of 9.5 %.

All mothers attending MCH clinics in Gondar have again and again been advised to improve their own diet during pregnancy, and when nursing, to continue breastfeeding till the end of the second year of their baby, and to start giving additional food (teff porridge, injera, eggs, fruit) from the sixth month of the baby's life onwards. From the improvement of the average weight one may conclude that at least some mothers have accepted the advice. In addition, with the rise of the economical situation in Gondar town—certainly partly due to the existence of the College, as no major industries or other institutions have developed during the period—more people on fixed wages and of higher incomes may have facilitated a greater food consumption in general, including infants and children. Eventually more shops opened and offered attractive foodstuffs, and a farm and some small garden plantations have produced a variety of local products, such as milk, legumes, vegetables and fruit. Whatever the main reason for the improvement of the average and mean weight of infants in Gondar might be, there is little doubt, that the increase is indicative of the effectiveness of the College's activities.

TABLE NO. 3
FINDINGS OF INTESTINAL PARASITES IN SCHOOL PUPILS

Parasites	TOTAL		1962		1962			
	1958		1962		Boys	Girls		
Total	1773	100.0 %	947	100.0 %	495	52.3 %	452	47.7 %
No stool			74	7.8 %	41	8.3 %	33	7.3 %
Negative			273	28.8 %	145	29.3 %	128	28.3 %
Positive	1168	65.9 %	600	63.4 %	309	62.4 %	291	64.4 %
Double infestation		38.7 %	151	25.2 %	108	35.0 %	43	14.8 %
Triple infestation			6	1.0 %	1	0.3 %	5	1.7 %
Total parasites	1620	100.0 %	763	100.0 %	419	100.0 %	344	100.0 %
Ascaris	919	56.7 %	513	67.2 %	253	60.3 %	260	75.6 %
Trichuris	318	19.6 %	109	14.3 %	75	17.9 %	34	9.9 %
Strongyloides	35	2.2 %	52	6.8 %	35	8.4 %	17	4.9 %
Amoebiasis	249	15.4 %	38	5.0 %	27	6.4 %	11	3.2 %
Taenia	38	2.3 %	18	2.4 %	6	1.4 %	12	3.5 %
Ankylostoma	28	1.7 %	17	2.2 %	12	2.9 %	5	1.5 %
Others	33	2.1 %	16	2.1 %	11	2.7 %	5	1.0 %

There is no evidence that the incidence of parasites in school pupils has decreased in the period between 1958 and 1962. Maybe the drop of Amoebiasis from 15 to 5 % is due to water sanitation (chlorination) of the Gondar municipal water supply. All school pupils examined and found infested with parasites, were treated. They were checked six weeks after treatment, and if still found positive, again treated. In the above statistics they appear only once, with their first finding. Health education was given to all school classes in regular periods three times weekly. Personal cleanliness was watched, school latrines were inspected. In spite of all these efforts over a period of four years the parasitic rate did not change in the Gondar school pupil population. There is probably a general infestation with parasites of such an extent in the whole town, that permanent reinfestations cannot be interrupted.

INCIDENCE OF SCABIES IN INFANTS AND PUPILS

The exact figures of incidence of scabies had not been published by the writer in 1958 because minor affections had not always been mentioned in the individual health record, especially when other diseases attracted attention in the individual. The incidence of the recorded cases was 70 %. The incidence in 1962 has dropped in 435 unselected school pupils to 12 %, in 500 unselected infants attending MCH services in Gondar town to 15 %. Again there is little doubt that this significant improvement is due to the activities of the Public Health College.

INCIDENCE OF POSITIVE VDRL TESTS

Remarkable is the drop in the incidence of positive VDRL tests in pregnant women (the figures collected and published by Margret I. Mitchell are 23.5 % as compared with 46 % found in 1958). In school pupils the incidence dropped from 9 % to 4.5 % (girls 5.3 %, boys 3.8 %) in 947 unselected pupils.

No statement can be made as to whether this improvement is due to greater treatment facilities or to a change in the widespread habit of promiscuity.

HAEMOGLOBIN LEVELS IN SCHOOL PUPILS

Hb %	Boys		Hb %	Girls*	
	1958	1962		1958	1962
50	3	2	50		1
55	7	5	55		10
60	45	1	60		11
65	30	4	65	2	38
70	195	18	70	3	74
75	92	31	75	13	74
80	336	56	80	47	79
85	127	48	85	44	55
90	346	85	90	48	40
95	85	119	95	39	41
100	314	79	100	41	24
105		43	105		5
110		3			
average	1580	494	average	237	452
	84.8 %	90.2 %		88.4 %	79.4 %

The haemoglobin level was always high in Gondar, due to the high content of iron in the usual daily diet ("toff"-bread, made from *Eragrostis Abyssinica*) and to the altitude in which the town lies (about 2300 m). The significant improvement of the haemoglobin levels between 1958 and 1962 (1962 average in school boys 90.1 % - in girls the numbers of examinations in 1958 was too small) might be explained by an increased availability of food and maybe by the laxation of the young generation in their fasting habits.

CONCLUSION

It seems likely that the methods used for evaluating the health services in Gondar can be regarded as practicable. Some favourable results indicate an effectiveness of the College's activities. One may conclude that a certain improvement within the past four years is evident in:

1. that the individual mother feeds her baby better (improvement of average weight of infants), keeps it cleaner (drop of scabies incidence in infants), searches effective treatment (drop of positive VDRL tests in pregnant women);
2. that the individual child keeps cleaner (drop of scabies incidence in school pupils) and has more and better food (rise of haemoglobin levels).

On the other hand, the task of general sanitation, of keeping human excreta from contact with human food and body and to eliminate vectors of diseases, shows no significant achievements within the past four years in Gondar (incidence of intestinal parasites is unchanged in school pupils; the outbreak of malaria in Kolladuba in 1961 gives a hint that the vector control was still not successful).

SUMMARY

1. In Gondar, a town with 20,000 inhabitants in Beghemider Province with about 2,000,000 inhabitants in Northern Ethiopia (total country population 20,000,000) no public health services existed before the establishment of the Haile Selassie I University Public Health College and Training Centre in 1954. Statistical data collected and published by the author from a Maternal and Child Health Service and School Health Service between 1955 and 1958 might be regarded as "original" health situation.
2. It should be noted here, that in 1958 the group of girls visiting school, was a selection of students from families with higher social standing and better living conditions, as compared with the present time group of school girls which show a much higher percentage of lower social groups visiting school.

2. Possible "indicators" for evaluation of the public health services rendered by the College are discussed. The author selected the following findings as being practicable regarding their reliability and probably indicative:
 - a) nutritional status of infants, expressed in an average weight graph, indicative of a possible result of improved maternal and infant nutrition,
 - b) intestinal parasites, expressed in the percentage of children in whose stool parasites, or ova of parasites were found, indicative of a possible improvement of personal hygiene and general sanitation,
 - c) scabies, expressed in the percentage of children found infested, indicative of a possible improvement of personal cleanliness,
 - d) VDRL test, expressed in the percentage of positive blood tests of pregnant women and of children, indicative of improved treatment facilities and maybe of change of promiscuity habits,
 - e) haemoglobin levels, expressed in the number of school pupils having a certain haemoglobin nivenu, indicative of improved nutrition and of reduction of certain parasitic infestations.
3. The statistical data of 1962 as compared with those of 1958 show considerable improvement in baby feeding and general care, because of successful indoctrination of the mothers. The raise of the nutritional status, shown in the weight graph of infants, and in the raised haemoglobin levels of school pupils, is impressive. The incidence of venereal diseases in pregnant women and in school pupils has dropped to about half. General sanitation and personal hygiene have not yet improved to an extent as to be demonstrative in the reduction of rates of intestinal parasites. That no cases of variola minor have been observed in Gondar town, between 1958 and 1962 is probably due to the regular smallpox vaccinations done by the College.