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ECONOMIC WORTH OF A PAKISTANI AND SOCIO-ECONOMIC JUSTIFICATION OF HEALTH

By

*Professor A. H. Awan, M.B., M.P.H., T.D.D., M.D.,**

I. INTRODUCTION

A country cannot continue to exist half rich and half poor, half sick and half well. Sickness, starvation and unsolved human problems can malign the political, economic and social situation to such an extent that the existence and security of the whole nation may be threatened. A country cannot prosper if its constituent communities are handicapped by the burden of preventable illness and want. This is a challenge to Pakistan. The public health workers are, therefore, interested in organizing health programmes for the purpose of breaking the chain of "disease and proverty," and thus initiating an upward cycle of socio-economic development.

Public health administrators all over the world are confronted with the problem of getting more funds for their needed health programmes. Hence they are greatly concerned about methods with which they can successfuly solicit public and administrative support for financing health programmes for the people.

There are two related objections that are frequently raised against public health activities. One objection is that such programmes increase costs to the public and raise the economic burden of the tax payer. The second objection is that health workers cannot point to their benefits in a measurable or demonstrable fashion.

The physcians practising curative medicine can proudly point to the individuals whose lives they have saved through their treatment or whom they have mended and

*Professor of Public Health Practice and Dean, Institute of Hygiene and Preventive Medicine, Lahore.

made fit for work through medical or surgical intervention. Public health workers cannot do this and are thus at a great disadvantage and cannot seek public support for increasing financial support on the basis of such a measurement.

It is true that public health workers cannot point out particular individuals who have been saved from illness or premature death or disability through health programmes, but we do not have to measure our efficiency and productivaness by pointing to individuals. Our patient is the community and so different yardsticks are needed for demonstrating our achievements. In fact, with the help of measurements available to us we can demonstrate our productivness and successes in a much better and more dramatic manner.

The more one is removed from the threat of personal suffering or loss, the less consideration is given to such dangers. Before the starting of public health programmes, epidemics used to rage in the country and there was a high rate of mortality nnd morbidity. These epidemics do not occur now and our mortality and morbidity rates have fallen. Therefore, we have to tell people about the differences in the mortality rates now as compared to what these were in the past and point out the estimated loss which could have occurred due to sickness if the old morbidity and mortality rates had continued without intervention of public health programmes. Thus we can show to the people, in a spectacular and irrefutable manner, the value of investments on public health.

With reference to the first objection, *i.e.*, that public health programmes increase costs and thus increase the burden of the tax payers, it should not be difficult to demonstrate that increased investments in health represent really a decrease in the net bill for personal and community health services.[1]

A sound financial policy for public health services, therefore, must take into consideration not only humanitarian and social gains but also the economic advantages to be derived therefrom. We must demonstrate to the people the hidden costs and the collossal expenditure on medical care (in case of ill-health), and show them the savings which would result with the implementation of socially beneficial

---

1. The constru.tion and maintenance costs of public water purification system and sewage disposal plants are admittedly great. These costs, however, do not represent an addition to our economic burden because their absence would cost us similar, if not greater, sum for individual facilities. A single epidemic or repeated out-breaks of typhoid, for example, may cost a community much more in the long run than the installation of engineering and other measures designed for their prevention. The cholera out break in Gujranwala during 1960 cost us much more in terms of money spent on diagnosis, treatment and prevention, in terms of loss of productivity (due to the disease). and loss of economic potential (due to death of trained workers).

appropriations for public health programmes. Same approach can also be used for showing the superiority of one health scheme as compared to another approach by showing the cost benefit in the case of the former,

II. THE ECONOMIC VALUE OF LIFE.

One must admit that life has also an ecomic value. The loss of a parent or a spouse brings to society as a whole, as well as to the particular family involved, an economic as well as a sentimental loss (which is quite real and irrepairable). This loss may manifest itself as lowered family income adversely affecting the family's standard of living. Society suffers, because a trained and productive worker is lost resulting into a decrease of total national productivity and income. Besides his death also means an irrepairable social loss.[2]

Many medical economists have tried to evaluate man, *i.e.*, to put a price upon his economic worth. One of the earliest attempts was that of Sir William Petty[3] (1623—1687). Petty supposed that people of England were six million in number and that they spent £ 7 per head (i.e., totalling 42 million for the nation as a whole) per year. He further supposed that rent of lands was eight millions, and the yearly profit of all personal estate was another eight millions. He reasoned that labour of the people must have supplied the remaining 26 millions which the people spent every year. Calculating that man was capable of 20 years of prcductivity, Petty considered 520 million pounds (26 millions per year for 20 years) as the value of all the English people. Thus he calculated the economic worth of an Englishman (520 millions ÷ 6 millions = about £ 80).

Thus Petty was able to calculate economic loss sustained due to plague and slaughter of men in war, etc.

Similar calculations have been subsequently made by others (Sir William Far, Irving Fisher, Dublin *et al.*),[4] using life table technique, which give us more critical estimates.

---

2. Death of Quaid-i-Azam Muhammad Ali Jinnah not only meant economic loss to the family and the nation, but an irrepairable social loss to Pakistani Society. Had he lived history might have been different.

3. Sir William Petty, Political Arithmetic or a Discourse Concerning the Extent and Value of Lands, People, Buildings, etc., London : Robert Clavel, 3rd edition, 1969, p. 192.

The human body may be considered as similar to a machine. For example a machine designed for the production of ball bearings has no value in itself. Its true value is measureable in terms of its capacity to produce ball-bearings, thereby justifying its manufacture and existence. Similarly true value of life lies in the activities in which men engage themselves.

A machine has to pass through several phases or steps before it is ready to be of productive value. It must be built, which presupposes the existense of a considerable capital outlay in the form of factory site, building, raw material, tools, labour, etc. On completion the machine is not yet of true value. It must be prepared for use or function. This involves a series of installation expenditures *i.e.*, expenditure on its inspection, trial, transfer, oiling and tuning-up, etc. Following this the machine is ready to start productive work. The extent and efficiency of its usefu'lness depends on its original quality or lack of structural defects, the correctness of installation, and the manner in which it is routinely cared for and maintained while in use. It must be lubricated, fed the proper fuel, inspected periodically. over-hauled if needed, repaired and given proper rest Intervals to avoid metal fatigue. During this period of use a certain amount of expenditure is required for maintaining the machine. The ultimate value of the machine can only be determined after total investment in manufacture and maintenance is deducted from the gross value of its productivity. Thus a machine requires capital investment, installation cost and maintenance expenditure and has a gross production value and a net production value.

It is the hope and goal of the manufacturer that his machine will continue to function with relative efficiency at least long enough to produce sufficient items for sale to off-set all of the debits incurred by investments. In other words, from the moment machine is purchased, the curve of cumulative value lags behind the curve of cumulative investments for a cosiderable period. It is not until these two curves cross that the manufacturer can breath easily and begin to reap a net benefit from the use of the machine. If any untoward circumstances develop before the two curves cross, the manufacturer stands to lose not only a considerable investment, but also the expected gains.

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4. J. J. Hanlon, Principal of Public Health Administration, St. Louis. The C. V. Mosby Company, 1960, p. 82; L. I. Dublin, and A J. Lotka; The money Value of a Man, New York: The Ronald Press Co., 2nd edition, 1946; and L. I. Dublin and A. J Lotka, Length of Life; A study and Life Table. New York. The Renold Press Company, 1936.

Human body like a machine requires capital investment, installation expenditure and maintenance costs. After the age of about 18 years, human machine starts giving profits or returns. At first the credit side is less than debit side, but after some years, earnings equal investments made. Subsequent earnings constitute profits. Death of a human being at the age of 18 years not only means a loss of our investment but also a deprival from our expected earnings.

III. ECONOMIC WORTH OF A PAKISTANI.

Let us study the soccio-economic value of a Pakistani's life on this basis.

Table I, given below, lists capital investment which the society makes in the birth of a Pakistani child,

TABLE I.

Capital investment made by society in the birth of a living Pakistani child by the time it is born.

Type of investment.	Economic value,	
	U. S. A.[5]	Pakistan.
	$	Rs.
1. Economic incapacitation of the expectant mother ...	500	500
2. Risk of death to mother (prorated) ...	12	432
3. Risk of injury to mother, during child birth and its immediate or subsequent effect on her economic value ...	?	?
4. Immediate costs of child bearing ...	488	100
5. Risks of pregnancy wastage (prorated) ...	40	260
6. Risk of illness and injury to new born ...	?	?
7. Interest on capital investment ...	30	8
Total ...	1,070	1,300

(5) Hanlon; *op. cit.*, p, 83.

Income per capita per year in Pakistan is about four hundred rupees. An average family in Pakistan consists of about 5 persons. Thus total income per family is 2,000 rupees per year. On an average we can assume that there is one male productive member in each family who earns the above mentioned income.

Women in Pakistan, though usually not engaged in business or industry or any other economically productive enterprise, do perform a distinct and real function which has economic value. They serve as mothers, wives, companions and do various domestic functions besides doing their social and psychological functions. If they are are not available, and a substitute has to be employed, it would certainly cost money for each of the various functions (cooking, sewing, cleaning, decorating etc., etc.), they perform. Besides, our religion says women are equal to men. So let us assume, therefore, that the monetary value of the multiple functions which Pakistani women (after 18 years age) peform is equal to that of productively employed males, i.e., 2,000 rupees per year.

Following factors may be considered for computing the economic worth of a Pakistani :

1. Value of Economic incapacitation of the Expectant Mother :—The average period of incapacitation for a child-bearing woman may be roughly estimated at three months (two months before and one month after delivery), though the actual degree of incapacitation varies throughout the period of pregnancy and with individuals. Incapacitation for about one fourth of an year (at Rs. 2,000 per year) would amount to five hundred rupees.

2. Prorated value of the Risk of Maternal Death:—Maternal motality rate in Pakistan is estimated as 6-10 per 1,000 live births (say 8/1,000). If the efforts of a house wife and mother have an economic value and if she herself represents a considerable economic investment, her death as a result of child-bearing will constitute a monetary loss to society and her family. If we assume the average age at maternal death as 28 years, and since at this age women on an average may be expected to perform their functions till the age of 45 years, earlier death would result in a loss of (27 × 2,000) 54,000 rupees. Since there are eight maternal deaths for every 1,000 live-births, loss per live born child would be :—

$$\frac{54,000 \times 8}{1,000} = \text{Rs. } 432/-$$

3. Value of the Risk of Injury (short of death) to the Mothers:—Aa a result of child-bearing, many women suffer disablilities or illnesses, which although not fatal immediately, have a subsequent effect on their well-being, economic productivity, efficiency, and length of life. The total economic effect of this should be prorated to all infants born alive. It is difficult to estimate this loss.

4. The Immediate Cost of Child-bearing:—Child-bearing involves expenditure. There are costs related with pre-natal care (medical, food, comforts etc.), post-natal care, hospitalization, delivery, maternal clothes, infant's clothes and equipment (e.g., Jhula, feeding bottle, utensils). Besides, friends and relatives have to be entertained during lying-in period and after-birth and expense has to be undertaken for feasts, Hakika and thanks - giving charity. Delivery at home may require doctors, midwives, nurses, attendants etc., and in some households even a temporary housekeeper may be engaged or assistance may be requested from a relative, whose boarding and lodging would cost money. During pregnancy, for meeting additional caloric needs, there may be some expenditure on 'Achar', 'Chat', 'Imli, etc. This total expsnditure in Pakistan may be estimated as one hundred rupees on an average.

5. Prorated Value of the Risk of Pregnancy Wastage (*i.e.*, foetal loss and early neonatal deaths):—Foetus may die during pregnancy or early neonatal death may take place. These incidents usually require medical intervention and additional expenditure has to be undertaken by the family or the community (if public facilities are used). Investment in such pregnancy outcomes would vary depending upon the pregnancy period or early neonatal life period during which wastage occurs. Assuming that investments in such cases on an average, would be about equal to those for live-born infants we can calculate the economic loss due to pregnancy westage (at the rate of Rs. 200 per 1,000 live births)[6] as follows:—

$$\frac{200 \times 1,300}{1,000} = \text{Rs. } 260/-$$

6. Value of the Risk (Short of death) to the Infant:—As in the case of mothers, infants may suffer non-fatal damage before and durlng delivery. Besides additional medical costs this will limit their potentialities, earning capacity and length of life. It is difficult to estimate the value of this loss.

7 Interest on Capital Investment:—If parents would not produce children, and they would invest the money (instead of spending it on child birth) then they could

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6. A. K. Awan, Provoked Abortions, Lahore : M. C. W. A. P., 1969, p, 42,

is five years and if the human child at 18 years is worth 33,900 rupees, then the loss per person at 18 years age due to earlier deaths of children (prorated) would be :

$$\frac{33,000 \times 5 \times 40}{18 \times 100} = \text{Rs. } 3,667/-$$

7. **Risk of disability during first 18 years :**—Many children, before they reach the age of 18 years become physically, mentally or emotionally disabled. This would ultimately reduce their productivity, efficiency and may even shorten their length of life. Value of this loss is difficul to assess.

8. **Interest on Installation Costs :**—If a decision had been made against conceiving a child, and if all installation expenses had been saved and invested instead, then simple interest (at 8 %) on the amount would be : Rs 13,200 (excluding Rs. 264/- as service charges).[9]

Period of Human Productivity :—Up to this point the human machine has been constructed and has passed through all phases that constitute installation or get-ready period. A Pakistani is now ready to take his social position as a productive member of the society. The total amount invested in him so far amounts to 34,300/- rupees (*i.e.* Rs. 1300/- capital expenditure plus Rs. 33000/- installation expenditure). He is now in a position to begin to repay the considerable investment that society and his family has made for him. His earnings are small to begin with but they gradually increase and become maximum by the age of 40 years. On an average we can assume that he earns Rs. 2,000/- per year for 37 years (18 years to 55 years), giving a total of Rs. 74,000/-.

But while he earns, he has to be maintained and investment has to be made in him. Since average family size is 5, and the average family earning is Rs. 2,000/- per year, we can assume that 1/5th of this amount is spent on his maintenace (food, clothing, shelter, recreation etc). The total expenditure would, therefore, be :

$$\frac{2000 \times 37}{5} = \text{Rs. } 14,800/-$$

Thus, during this period (*i.e.*, 18-55 years) he will give a profit of (74,000-14,800)=Rs. 59,200/-.

---

9. Money invested in Pakistan Postal Savings Certificates gets doubled in 10 years. All monies will not be available for investment for 10 years and so roughly 8 per cent. simple interest has been estimated.

Thus if a person in Pakistan dies at 55 years, there is no loss ; because by making a net profit of Rs. 59,200/- he has already off-set money invested in him *i.e.*, capital expenditure and installation expenditure). Rather he has really given a net profit (59,200-34,300=24,900/-) of 24900/-rupees. But if he dies at the age of 18 years, society loses not only capital and installation investment (Rs. 34,300/-) but also the expected profit during the productivity phase (*i.e.*, 59,200/-) giving a total loss of 93,500/- rupees.

IV. CALCULATION OF POTENTIAL SAVINGS FROM PUBLIC HEALTH EXPENDITURES.

Let us consider the economic justification of investment in maternal and child health programme in Pakistan :

1. Problem :

(*i*) High birth rate (*i.e.*, 45/1000 pop.)

(*ii*) High infant mortality rate (*i.e.*, 120/1000 L. B.)

(*iii*) High maternal mortality rate (*i.e.*, 8/1000 L. B.)

2. Objectives :

In the developed countries birth rate is about 20/1000; infant mortality is 28/1000; and Maternal Mortality rate is 0.1 per cent. Let us lay down following limited objectives :—

(*i*) To lower birth rate (say to 40/1000)

(*ii*) To lower infant mortality rate (say to 60/000)

(*iii*) To lower maternal mortality rate (say to 2/1000)

We want and expect to achieve these objectives within a period of 10 years, on the basis of operational research findings obtained from a pilot M. C. H. project.

3. Economic loss due to the problem :

Examination of the proposed M. C. H. programme necessitates examination of its economic justification. Therefore let us calculate the economic loss due-

to the problem now and after 10 years when programme targets would have been achieved :—

TABLE III.

Economic value of infant and maternal mortality problem, before and after the proposed M.C H. programme.

After 10 years when objectives are expected to be attained.		Attribute.	Present position.
$\frac{40 \times 55\ M}{1000}$ = 2.2 Milllon	...	Births in Pakistan	$= \frac{45 \times 55 \text{ Millions}}{1000}$ = 2.5 Millions
(*i*) Loss due to infant deaths :—			
$\frac{60 \times 2.2\ M}{1000}$ = 0.132 Million	...	Infant Deaths	$= \frac{120 \times 2.5\ M}{1000}$ = 0.3 Millions
0.132 M × 1300 = 171.6 Million	...	Capital investment on O. 3 Million infants.	= 0.3 M × Rs. 1,300/ = Rs. 390 Millions
$\frac{O.\ 132\ M \times 33000}{18 \times 4}$ = 60.5 million	...	Installation expenditure (considering average age at death as 3 months)	$= \frac{0.3\ M \times 33000 \times 1}{18 \times 4}$ = Rs. 137.5 M.
171.6 M+60.5 M=232.1 Million		Total loss due to infant deaths.	=390 million + 17.5 million =Rs. 527.5 millions
(ii) Loss due to maternal deaths :—			
2/1000 (expected)		Maternal Mortality Rates	=8/1000 L. B. (existing)

After 10 years when objective are expected to be attained.	Attribute.	Present position.
$2 \times 2.2\ M = 0.0044$ Millions	Maternal Deaths in Pakistan.	$= 8 \times 2.5$ Million $= \frac{\text{Million}}{1000}$ $= 0.02$ Million
$0.0044\ M \times 34,200 = 150.92\ M$	(*a*) Capital and Installation investment on 0.02 M. women.	$0.02\ M \times 34.300$ $=$ Rs. 686 Millions
	Expected profits during productive age period (18-55 yrs).	$74,000 - 14,800$ $= 59,200$*
	Profit during first 10 years (i. e., from 18-28 years, 28 years being the average age of maternal death).	$= \frac{59,200 \times 10}{37}$ $=$ Rs. 16,000
0.0044×16000 Million $= 70.4$ M.	(*b*) Profits earned by 0.02 million women by the age of 28 years.	$= 0.02\ M \times 16000$ $=$ Rs. 320 Million
$\frac{74000 \times 27 \times 0.0044}{37} = 237.6$ M.	(*c*) Loss of productivity of 0.02 M. women due premature death.	$= \frac{74000 \times 27 \times 0.02\ M}{37}$ $= 1080$ M. rupees
$237.6\ M + 150.92\ M = 424.52$ Millions	(*d*) Total Annual Loss due to Maternal Mortality (*i.e., a and c*),	$= 1080\ M. + 686\ M$ $= 1766$ M. rupees.
$424.52\ M - 70.4\ M = 354.12$ M. rupees	Net Annual Loss due to Maternal Martality (*i.e., d and b*)	$= 1766\ M. - 320\ M.$ $= 1446$ M. rupees.

*As already calculated above.

4, Benefits :

Following table shows benefits which are likely to accrue from the implementation of the proposed scheme for M. C. H. Services :

TABLE IV.

Economic benefit of proposed M,C,H, Services,

	Type of M. C. H. Problem.		
	Infant Deaths	Maternal Deaths	Total
1. Annual economic loss at present (without the proposed M. C. H. services programme.	527.50 million rupees.	1446.00 million rupees.	1973.59
2. Annual economic loss after the implementation of M. C. H. service programme	232.10 million rupees.	354.12 million rupees.	586.22
3. Benefit as the result of decrease in economic loss per year.	295.40 million rupees.	1091.88 million rupees.	1387.28

5. Investment in the Proposed Programme :

Maternity and Child Welfare Association of Pakistan recommends investment of one rupee per head per year in M. C. H. services for purpose of lowering infant and maternal mortality. Let us assume that our proposed scheme for M. C. H. Services will cost us 1.50 rupee per head per year. Our investment would therefore be 55 million × 1.50 rupees = 82 5 million rupees.

Thus if we invest 82.5 million rupees per year in M. C. H. programme, after 10 years, we will start saving 1387.20 million rupees per year. Or we can say that

if we invest 825 million rupees during next 10 years, then in the 11th year we will have a saving of :

1387.20 Million—825.00 Million = 562.20 Million rupees.

This means that during the 11th year we will not only off-set our investment of 825 million rupees (for 10 years) but will have a net gain of 562.20 million rupees. Thereafter we will gain 1387.20 – 82.50 = 1304.70 million rupees, every year *i.e.*, 16.8 times our annual investment. And we will keep on gaining. These are rough estimates. Actually our gains will be greater because change will not occur suddenly but gradually every year, thus decreasing our actual problem and the consequent economic loss.

Savings Effected by other Public Health Measures:—Spectacular savings become evident when the economic value of life is considered with regard to such situtions. Charles Bolduan,[10] for example, has pointed out that in 1935 lobar pneumonia caused the death of 2, 039 males in Now York City, 809 of them between the ages of 20 and 50. He computed that these 809 deaths occurring among working males represented an economic loss of about 20 million dollars. This fact was used in requesting $ 500,000 to provide adequate pneumonia control work. It was estimated that the expenditure of this amount would result in a saving of 5 million dollars.

The economic soundness of expenditures for public health is perhaps more easily demonstrated by still a different approach. This considers only expenditures saved on hospital bills, medical care, laboratory work, and similar facifacilities.

One example,[11] that has been well worked out, deals with the control of diphtheria in New Yark City where an attempt was made to prove, among other things, that it is cheaper to prevent than to treat illness. In 1920 there occurred in New York City about 14,000 reported cases of diphtheria. Three thousand of these were hospitialized at an average cost of $ 112 of the tax payers's money per case, representing a total expenditure for hospitalization of $ 336,000. The remaining 11,000 patients were cared for at home at a cost to the city for various medical services at an average of $ 35 per case or a total of $ 385,000. Each of the cases was

10. C. F. Bolduan, Public Health and Hygiene : A Students Manual, 3rd edition, Philadelphia : W. B. Saunders Co., 1941, p. 76.

11. Hanlon, *op. cit.*, pp. 90-91.

visited by public health nurses ; hospitalized cases received an average of two visits, and home cases an average of six visits. At fifty cents a visit the public health nursing costs amount to $ 36,000. The laboratory work on the basis of ten "nose and throat" cultures examined for each reported case, at five cents per examination, cost $ 70,000. Of these patients, 1,045 died from the infection. At an average of $ 200 each, their funerals cost over $ 200,000. The total cost upto this point, therefore, was $ 1,027,000. In other words, the City of New York in 1920 spent over a million dallars for the onslaught of the diptheria organism.

From 1929 through 1931, the health department aided partly by private funds, carried on an intensive, well-organied campaign to secure the immunization of infants and children against diptheria. The cost of this campaign during those three years was $ 75,000. At the end of the three years, the programme was continued at a cost of less then $ 10,000 per year. Unquestionably many persons considered these sums as an added economic burden. However, let us see what was purchased with that money. During 1939 instead of over 14,000 cases, there were only 543 cases, despite known improved reporting. One half of these were hospitalized at $ 112 each. The total hospital bill, therefore was $ 31,000. And medical bill for those remaining at home at an average of $ 35 per case totalled $ 9,625. Nurses' visits to the patients costs $ 1,100 and the laboratory work was reduced to only $ 2,750. Instead of over 1,000 deaths, there were only 22 for whom the funeral bill was $ 4,400. Even if we add to this the cost of $ 375,000 for the three year programme plus seven times $ 10,000 to continue it between 1932 and 1939, the total bill for diptheria was only $ 493,875 *i.e.*, one half of the 1920 bill.

BIBLIOGRAPHY

Awan A. K. Provoked Abortions. Lahore : M. C. W. A. P., 1969.

Bolduan, C. F. Public Health and Hygiene : A student's Manual. Philadelphia : W. B. Saunders Co., 3rd ed., 1941.

Dublin, L. I.. and A. J. Lotka. Length of Life : A Study of Life Table. New York : The Ronald Press Co., 1936.

Dublin, L. I., A. J. Lotka, and M. Spiegelman. The Money Value of a Man. New York ; The Ronald Press Co., 2nd Ed., 1946.

Hanlon, J. J. Principles of Public Health Administration, St. Louis : The C. V. Mosby Company, 1960.

Petty, Sir William. Political Arithmetic or a Discourse Concerning the Extent and Value of Lands, People, Buildings, etc. London : Robert Clavel, 3rd Ed., 1969.

SOCIO-ECONOMIC CORRELATE IN DIABETES MELTITUS.

By

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Diabetes is not a disease of modern civilization. It is a disease of antiquity and the earliest coherent description dates back to 1st. Centry A. D. and even the ancient Indian Mythology carries some oblique references about it.

The tempo of work on the pathophysiology of Diabates Mallitus is such that definition might become obsolete before long, but there is a general agreement that high blood sugar resulting from the daficient Insulin secretion is only part of a more comprehensive theme. In more broad terms, it is a disturbance of the intermediary metabolism, presenting in its most overt form as loss of Insulin effectiveness with rise of blood glucose and having long term sequalae in the form of vascular disease affecting many systems of the body.

Incidence :

An accurate knowledge about incidence of this disease has been hampered by the behaviour of this condition i.e. The age onset, family size, the chances of dying before the onset of disease etc. It is well known that for any given number of patients with obvious disease, there is a sizeable number, who although do not have the overt disease, nevertheless have the necessary genetic background and would develop diabetes under appropriate conditions. Further difficulties have been added by the use of different criteria in various surveys. A study done in oxford (Massechusetts) U. S. A. revealed an incidence of 2% in a section of population. In 1964, a similar study was undertaken in Birmingham (England), [2] utilising the general practice patients; and it was found that 1·3% had diabetes. It is of interest that out of this nearly half were not known to be diabeties.

In Pakistan a study done at Hyderabad in the early sixties, using random urine samples, showed the incidence of glycosuria to be 1.8%. In the population of 40 years of age or above 2.8% recorded this abnormality. It is clear that random urine testing is a relatively insensitive method of detecting diabetes and may not reveal all the sufferers. It is nevertheless, a reminder of the magnitude of the problem, and these figures roughly agree with the statistics arrived at by other workers elsewhere.

SOCIO-ECONOMIC FACTORS.

Age Distribution :—In dealing with the Socio-Economic factors relevent to Diabetes Mellitus, I would like to refer to 2 series based on the Clinical Material available at the Diabetic Clinics of East and West Pakistan (Ibrahim PJMR 1964,[4] Mullick et al, PJMR 1964[5]). The age distribution in both the series have shown a peak incidence between 40—60 years, but a sizeable proportion were in the 30—40 years groups, and the latter formed 15% of all the diabetics detected. This is somewhat at variance with the studies in the West where the maturity onset diabetes occurs usually, although not always after the age of 40. These studies spotlight the need for modifying the age criteria in this country, when embarking upon any detection programme.

The figure about the Socio-Economic status of the diabetic patients can be biased by the geographical location of the study area, and type of clinical material it feeds upon. This is especially true when we know that most special clinics are situated in urban areas. The study of 2000 patients in East Pakistan showed a preponderance of middle class, and in the West Pakistan study 50% of the patients attending the clinics belonged to the lower economic strata. Most hospitals are visited by the poor, and as such some of the hospitals' figures could be skewed up and biased. Not withstanding these statistical limitations, one thing is almost certain, that Diabetes Mellitus is no longer a 'Royal Malady' as suggested by some in the past. In our own experience in this country it respects no social class.

Paper read on the 23rd World Health Day, April 7, 1971. Managing Editor, Pakistan Journal of Medical Research, Medi. al Research Centre, Mayo Hospital, Lahore.

Weight and Obesity :—Obesity has long been suspected as a strong predisposing factor, and the recent work, helped by the now very useful technique of Insulin estimation by radio-immunoassay, has made interesting contribution in the patho-physiology of obesity. It has been found that following a glucose load the Insulin response is much higher for a given level of blood glucose in the obese as compared to the normal. This has helped to invoke a state of tissue resistance to the action of endogenous Isulin. An interesting feature of diabetes in this country has been a rather lower percentage of diabetics who are obese. Infact, in the study done in West Pakistan only 25% were considered to be above 10% of their standard weight, while in East Pakistan the figure was much lower (10—15%). This Clinical presentation has been described in other countries of Africa and Asia, and thus emerged the concept of so called "Tropical Diabetes".

Type of Clincal Diabetes :—Excluding the so called "Prediabetes and Chemical Diabetes", the following Clinical Varieties have been described following the work done in various under devoloped countries.

1. **Juvenile Diabetes (Tyye I) :**—The patients are usually young and underweight. They are Insulin dependent and sensitive. Likely to go into Keto acidosis and coma. This form comprises less than 5% of the cases.

2. **Maturity onset type (Part II) :**—Usually over 40 years of age ; obese ; not Isulin dependent. Good response to sulphonylurea ; not likely to develop Ketosis under ordinary circumstances.

3. **Tppe 'Tropical' :**—Shows wide-age scatter.—The patients are usually underweight. They are not Insulin dependent and the response to salphonylureas is usually satisfactory.

Role of Diet-Occupation:—A question has been asked very frequently as to whether dietary factors, in particular the high carbohydrate intake plays any role in precipitating the disease. This issue is still very clouded. In a careful study of dietary habits in the diabetics and controls in East Pakistan, there was little difference in the 2 groups. However, both groups showed a high percentage of calories drawn

from the carbohydrate source, while 25% of the calories were derived from fat. The cholestrol levels were higher in the diabetics, but still were in the high normal range.

An interesting feature was a rather lower incidence of cardio-vescular-renal complications (24%) as compared to some western series in which a figure of 60-65% has been quoted. Most patients have belonged to the sedentary group of workers, but 10% have been those who were engaged in manualwork.

Other Aetiologieal Factors :—I might, as a point of interest touch upon some other aetiological facts drawn from other surveys done elsewhere. It has been the general impression that Diabetes is more common in cities. An interesting phenomenon was noted in the jewish population of Yemen imigrating into Israels. Inspite of the fact that jews have been known to have a greater predilection to develop diabetes: the incidence in Yemenite jewish population was low. However, it rose in the second generation and could have been the result of affluence and other environmental factors. In surveys done in Turkey, the incidence amongst the Jews, Greecks and Americans was higher than the Turks. Thus both racial and environmental factors play a rule in the genesis of Diabetes.

Familial Disease :—The familial tendency in Diabetes mellitus has been known for centuries. Most studies in the past have shown a statistically significant difference in the family history of individuals with diabetes as compared with the control population. There are considerable difficulties in establishing the pattern of inheritence, which are due to various factors like age behaviour of the disease, family size, and the chance of dying before development of the disease etc. The general impression in the past, has been that it is inherited as a autosomal recessive trait, but now some authorities believe that it may be a polygenic inheritance with multifactorial susceptibility. What is inherited is a biochemical aberration which finds expression in diverse ways through the enzyme system of the body. The discovery of a genetic marker would considerably simplify the problem of interplay of genes and could help in the detection of 'Carrier'. This hope, however, is far from being fulfilled.

Prevention :—To obey the precepts of rational therapeuties, we might ask ourselves "Can we treat the cause of diabetes?" And as a corollary, "Can we

prevent it ?". Unfortunately no satisfactory answer can be given at the present time. Certain abetting factors like intermarrying of the Diabetics, obesity, multiple pregnancies are well known. But beyond this most of the other known factors are uncontrollable.

Some Problems in Treatment :—Finally, I would like to briefly touch upon some of the problems encountered in the treatment of Diabetes Mellitus, which are relevent to our Socio-Economic set up. Fortunately for patients and doctors alike, the Juveinle type of Diabetes is seen in less than 5% of the cases. This type of disease can be difficult to manage especially when these cases are prone to Diabetic coma which needs biochemical monitoring. Since more than 90% of the cases belonged to the so called maturity on set type this part of discussion applies mainly to this group. Not unexpectedly most patients come up for treatment when they have severe symptons, *i.e.* infections, T. B. parasthesias, thirst, polyuria muscle pains etc. lately, there is an increasing awareness on the part of the general practitioner and the public, in the urban areas at any rate. Even when the patients ultimately start attending a Clinic, their subsequent attendance is by no means assured. Recently, during a study of a new anti-diabetic drug, the record of 100 patients were reviewed by us, and out of these at least 69% had a very indifferent treatment over the preceding one year. Although the dietary regimes and the correction of obesity are the mainstay of the treatment, experience has taught us that dietary prescriptions on strictly orthodox lines is likely to confuse the less sophisticated. This may encourage defaulters and there is case for confining the instructions, at least in the earlier stages, to the broad items of dietary control. In symptomatic patients, it is wise to start the theraphy on the first attendance, so as to control the symptoms and ensure further co-operation.

Interestingly enough, the management of Diabetes, could play a part in the health education of the country. Here is a disease, in which the patient can view the objective evidence in the form of urine results and know how the therapy can be tailored according to individual requirements. This gives him a new insight about health and disease and the way certain diseases can be controlled effectively if notcured.

Epilogue :—What has been given is and at best a jumbled description of Diabetes and its interplay with social, envoirnmental, genetic and other factors. I have

drawn to some extent from my clinical impression for which the evidence could at best be called anecdotal. It may seem like a jigsaw puzzle with some vital pieces still missing. But then the story of Diabetes Mellitus is far from complete. However it is a tribute to the level of therapeutic effort that a large number of patients are leading as normal a life as is conceivable, in spite of Diabetes. Much needs to done in this country through various Diabetic Associations to provide the patient a life long care and to give them chance of a normal and full life which they deserve.

References.

1. Wilkerson ; H. L. C. et al, (1947). *J. Amer. Med. Ass.* 135, 209.
2. Diabetic Survey—(1962) Report of a Working Party (1962) *Brit. Med. J. 1,* 1947.
3. Editorial (1964) *Pak. Jour. Med. Res.*, Vol. III, No. 4, pp. 253,
4. Ibrahim, M. (1964) *Pak. Jour. Med. Res.* Vol. III, No. 3, 159.
5. Mallick, S. M. K, et. al. (1964) *Pak. Jour. Med. Res.* Vol. JII No. 4, 255,
6. Cohen. A. M. (1961) *Metabolism,* 10 : 50-58.
7. Oker, C ; et. al. (1961) *4th Congres de. la. Federation International du diabete,* Geneve. p. 259.

RURAL HEALTH COVER*

*by***

Dr. M. J. Bhutta, S. K.

1. Provision of a comprehensive Health Cover to the population of Rural areas of Pakistan, is the most important and foremost requirement of the people in the Health Sector. 85 % of the people live in the rural areas, and the health cover provided to the vast majority of them is negligible and in actual fact non-existant.

2. The rural population provides the overwhelming majority of the Jawans to the Defence Forces and contributes the major part of the gross national product. The bulk of our foreign exchange earning also comes, directly from agricultural produce, like Jute in East Pakistan, and cotton and rice in West Pakistan. The major part of the foreign exchange earned by the Industrial Sector also comes from the industries based on agricultural produce, like, Jute and cotton Textiles.

3. However, the rural population which makes the major contribution to the economy of the country and economic development hardly gets any direct or indirect benefit. The foreign exchange earned goes to establish big Industrial Units of the famous 22 Families of Pakistan, and the development of great cities like, Karachi, Dacca and Lahore. The bulk of the rural population is still waiting for the benefits of Independence to reach them, in a tangible form.

4. So far, as medical services are concerned, the vast majority of the rural population are even worse off to-day 24 years after Independence, than before 1947. For example, on the 13th of August, 1947 every rural dispensary in the Punjab had

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*Speech delivered at the 31st Monthly Social get-together of P. L. A. Lahore Branch, held on July 25, 1971.

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a qualified doctor, to serve a population of 30-40 thousand. To-day, 75 to 100 % of these Rural Dispensaries in different districts are without any qualified doctors, for a population which has probably increased by 50 to 100 per cent.

5. The last break which the rural population got in the medical relief, was from Sir Fazl-e-Hussain, who formulated and implemented the scheme of rural dispensaries in the then United Punjab in a planned manner, so as to provide a a despensary for every 30.000 of the population, or 100 square miles of rural area.

6. The first attempt at the formulation of a plan for providing a comprehensive health service to the people of the sub-continent was made when the famous Bhore Committee, after a labour of three years, produced the Health Survey and Development Report in 1946 for provision of an integrated Qurative and Preventive Health Service for the entire population, rural and urban, of the sub-continent.

7. According to a decision of the All-Pakistan Health Conference held in October, 1946, to consider the Bhore Report, an Experts Committee was set up by the Punjab Government of which I had the honour to be one of the two technical advisors. I had to chalk out the scheme for establishment of Rural Health Centres in the Punjab based on the concept put forward by the Bhore Committee, but within the resources, in men, money and materials then available. My recommendations were accepted by the Committee and then by the Punjab Government; but before these could be implemented partition came.

8 The new Government of India were able to make a start with the scheme of Rural Health Centres and Referral Hospitals shortly after Independence. However, in our case the question did not arise, at the time, owing to the extreme shortage of personal besides lack of material resources.

9. However, by 1957, we were in a position to formulate and place before the Provincial and the Central Govennment a scheme for the establishment of Rural Health Centres, and Developuent of Health Services in West Pakistan, during a period of 15 years. The scheme was to be completed by the end of the year 1973-74. At the end of that year, there would have been 1000 Rural Health Centres, and 3000 sub-health centres, evenly distributed throughout West Pakistan, taking a

comprehensive preventive and curative Health Service to, practically, the door steps of the rural population.

10. This Scheme was to be the firstphase of development of Health Services in West Pakistan. It was enthusiastically supported by the then Director General of Health, Pakistan, Lt. Col. M. Jafar, and large scale aid was promised, by UNICEF, and I. C. A. no called U. S. Aid. This aid was in the form of imported equipment and transport.

11. However, the scheme got bogged down in the Provincial Secretariat Red-tape, till the first Martial Law Health Minister pushed it through and a beginning was made by the establishment of 10 demonstration cum trainning rural health centres, in different parts of West Pakistan. Six of these came to the share of Punjab.

12. The scheme was included in the Second five year plan, beginning in 1960. Against the proposed establishment of 275 rural health centres, according to the scheme put up by the West Pakistan Health Directorate, the Planning Commission approved the establishment of only 150 such Centres, with 450 sub-centres.

13. However, owing to non-release of sufficient funds, out of the 150 rural health centres approved, only 73 were actually constructed.

14. During the 3rd plan period, from 1965 to 1970 the Planning Commission had approved the establishment of 400 Rural Health Centres, and 1 00 sub-centres. However, not one was established.

15. The Fourth Plan started on the 1st July, 1970, with the disintegration of One Unit. Out of the original target of 150 Rural Health Centres to be established in West Pakistan during the 2nd Five Year Plan, a target of 69 has fallen to the share of Punjab. Out of these, only 30 were established during the 2nd plan period; from 1960-65. None were established during the 3rd plan period, either from the short-fall of the 2nd plan or the allocation from 400 for West Pakistan during the 3rd plan.

16. In the first year of 4th plan, 1970-71, construction of 11 Rural Health Centres was sanctioned, near the end of the year. A budget allotment of Rs. 75.00 lacs had been made during the year 1970-71, but less than Rs. 10.00 lacs was actually spent owing to late administrative approval.

17. During the 2nd year of the 4th Five Year Plan, 1971-72, it was proposed to complete the construction of the 11 started during the last financial year and to start the construction of additional 28 which were left over from the 2nd Plan period. If an effort were made to complete these Centres, we would have achieved the target of establishment of 69 Rural Health Centres, which were to be completed by the end of the financial year 1964-65.

18. The very grave short-fall has a number of causes, the foremost among these being the non-release of sufficient funds to meet the planned targets, and the holding up of the scheme by the West Pakistan Health Secretariat, with the idea of incorporating certain modifications at the periphery. After more than three years of correspondence, the Government of Pakistan turned down the proposals of the West Pakistan Health Secretariat, and ordered the original scheme to be implemented.

19. This set back means that the scheme which had to be completed by 1973-74, is not likely to be completed till the end of the 6th Plan period.

20. The implications of this delay are very serious and far reaching. Simultaneously with the start of the rural health centre scheme, in the 2nd Five Year Plan, the Government of Pakistan, on the advice of the W. H. O. and under pressure from the Aid Giving Governments, adopted the Malaria Eradication Programme, formulated by the W. H. O. Before the imposition of the 1st Martial Law, in 1958, the Central Health Ministry had been under great pressure from the W. H. O. and the U. S. Government to adopt and implement the Malaria Eradication Programme in Pakistan. However, the Health Ministry successfully resisted these pressures, on the advice of the then Director General of Health, Lt. Col. M. Jaffar, who firmly told the W. H. O. Executive Board and the World Health Assembly that the geographical, physical cultural and ecological conditions were such that it was impossible to eradicate Malaria in Pakistan by any known means, and that the only practical approach was

to adopt a policy for the control of Malaria, which would cost a fraction of what a Malaria Eradication Programme would.

21. The new Health Miaister of the 1st Martial Law Governuent was approached by the W. H. O. and U. S. AID ; Col. Jaffar was painted as the Dog in the Manager who was standing as an obstacle in the development of Pakistan. So he was readily over ruled and had to go. The 14 years Malaria Eradication Programme started and got into full air on a wave of propaganda through every means. Rosy pictures were painted of Malaria having been completely eradicated from vast areas of West Pakistan, and ultimately from the whole of the West Pakistan, till in 1969, there was a large scale epidemic of malaria in the region.

22. In the process, about 22 crores of rupees had been spent in West Pakistan alone on the Malaria Eradication Programme, which is now admitted as having failed in its objectives. Further it is admitted that the objective is unattainable. Col. Juffar has been fully vindicated, but at what costs.

23. Every year, when we used to go up for funds, for the Rural Health Programme, we were told that the funds we needed could no be made available, because Malaria Eradication Programme being an aided programme had priority. It has to be remembered that the aid was only a small part of the total expenditure, most of it had to be found from the resources of the Central and Provincial Governments, and the aid had to be returned in due course, with interest in foreign exchange.

24. Now even the World Health Assembly has passed a Resolution acknowledging that Malaria Eradication has failed all round the World that it should be kept as a long term goal, and that Malaria Control is to be recognised as a valid and indispensable interim step, where eradication is at present, impracticable. How one wishes that Col. Jaffar had not been overruled on the advice of W. H. O. Experts, and under pressure of U. S. AID. By now, we could have been well on our way to the completion of the Rural Health Programme, which is now being proclaimed as a pre-requisite to the maintenance of the Malaria Eradication Programme. This is an excellent example of putting the cart before the horse, on the advice of the foreign 'experts' and the AID Oriented Planning and Development.

25. Another crash programme which we were told in all seriousness, should be implemented on a war emergency basis, is the Family Planning Programme. The promise of AID for the 2nd Five Year Plan was tied to the Family Planning Programme. The plea was that the growth of the gross national product in Pakistan inspite of American Aid was only about 3 % which was said to be identical with the rate of growth of population in Pakistan. In the circumstances, the American economic advisor stated that they could not recommend to their Government to invest the American Tax Payers money in the development of a country, where the growth in the gross National Product, would be all eaten up, by the additional mouths being added every minute to the papulation.

26. It was therefore decided to bring down the birth rate by a crash programme of Family Planning implemented as a war emergency Measure. The General to lead this War was found in the person of one of the top most Members of the Distinguished Order of 303, who achieved this honour at the hands of the present Regime.

27. This programme is clinically un-certain, financially most extravagent, administratively inefficient, and in its results less effective than even the Malaria Exadication Programme. The extent of investment in this Programme can be judged from the fact that during the 3rd Plan period, the total allocation for the whole of Pakistan was 27.4 crores, and the actual expenditure incurred was 35.1 crores. In West Pakistan, during the 3rd Five Year Plan, the two Programme of Malaria Eradication and Family Planning were responsible for nearly 26 crores, whereas only 9.5 crores were spent on all other Health Programmes in West Pakistan including both curative and preventive health work and professional education.

28. There is no doubt that in another few years, it will be acknowledged by the sponsors of the Family Planning Programme that there has been no impact on the population by this Programme. There had been a gradual decrease in the birth rate in this centuary in the Punjab. The birth rate fell from 55 per thousand in 1905 to 35 per thousand in 1955, according to an excellent chart prepared by the Senior Statistical Officer of the Punjab Health Directorate. This was inspite of there being no knowledge of any Family Planning Programme in the Province.

29. If these two crash programmes had not been started and all these funds, so far spent, on these two had been utilized for establishment of Rural Health Centres, by now, we would have got a well established integrated preventive and curative health service in the Rural areas, and it would have acted as a base on which we could have built up programmes of control of Malaria and control of population at a fraction of cost, which has gone into these programmes under pressure from foreign Governments against the considered and almost unanimous advice of our own patriotic experts.

30. Now that the green light has been given for the Rural Health Programme to start once again, it is essential that the working of the existing Rural Health Centres, and the supervisory staff should be given a real hard look. I have seen something of this working in 4 of the Districts of Punjab. The programme is not at all working on the principles on which it was conceived. All members of the Rural Health Centre staff are engaged almost exclusively in curative work, to the near total neglect of the preventive duties, which were prescribed for them.

31. The success of the scheme was based entirely on complete, effective and continuous supervision of all categories of the staff of the rural health centres and sub-centres. I found this to be practically non-existant, with the result that both the Primary Health Centres, and its sub-Centres are working like purely curative Rural Dispensaries. Practically none of the staff has neither the concept of preventive work nor in most cases has any intention to do it. No one has been given any orientation or training. This was the most important part of the project, which has been completely and fully ignored.

32. The pivot of the supervisory staff was to be the Assistant District Health Officers. They have been appointed in practically all Tehsils, where there are Rural Health Centres. Actually they are the weakest link in the whole chain. I have seen places, where the A. D, H. O.s have not visited a Primary Health Centre or a sub-Centre even once in six months, although these places were situated on Main Road.

33. Now that Government have once again re-activated the programme and large scale funds are going to be invested in it, it is essential that the Health Department, should completely reorganise the working of the existing Rural Health

Centres, and ensure that those to be established in future, are organised and made to work in the manner expected of them by the people as well as by the Government. There are a large number of snags and difficulties which must be scientifically studied and removed. It will require a very special and dynamic effort on the part of all levels of the Health Department. The most important are orientation and training, removal of all defects discovered in the working of the programme so far provision of all necessary essential facilities to the staff of various levels to give up their best. Proper career planning is essential so that service in the Rural Health Service does not remain as unattractive as it is. The supervisory staff, like A. D. H. Os. and D. H. Os. should be reorganised, giving them adequate remuneration and facilities for their most important and arduous duties, and an effective system of continuous and effective supervision at all levels.

34. The Planning Commission has adopted the policy of integration of all the vertical programmes, like Family Planning, Malaria Eradication, Smallpox Eradication, T. B. Control etc., into the Rural Health Programme. The implication of such integration should be very carefully and scientifically studied, before its implementation. The personal of these programmes have got used to standards which are totally different from those of the Health Department personnel, and if such integration takes place, without very deep consideration and in a hurry, it will spell disaster for our health service. Integration is absolutely essential. Actually these vertical programmes should have never been undertaken, before the infra-structure of the Rural Health Centres had been completed and fully functioning.

SCIENTIST AS RESEARCH ADMINISTRATOR

by

*Professor M. Maqsood, M. S. (Michigan), Ph. D. (Cambridge)**

With the rapid advances in Science and Technology, it has become essential that the direction of a Reserch Organization should be in the hands of a Senior Scientist who is capable of commanding respect from scientists and other administrators. It is known that scientific workers are more readily prepared to accept directions from a reputed scientist then from a non-scientist. A balanced combination of research and administrative capablilities are the requisites for a successful administrator in a research organisation.

2, A scientist, when accepting administrative responsibilities must realize that this decision will not only result in major changes on his future career as a research worker but also on the recearch organization which he is going to head. His training as a specialist may serve him well, in his new position but he must become a generalist, to be able to coordinate the work of specialists and experts in a *wide* range of fields. A worker trained exclusively in general administration, without a research background, may not be in a position to understand the great potentialities of research and the idiosyncrasies of the researchers. He would be, therefore, unable to contribute to the development of the research organization. No administrator is infallible and a certain modesty, humility or willingness to accept advice from juniors/colleagues in after essential for the success of the organization. He must therefore, create facilities for regular and open discussion with members of the staff. General discussions on a particular research topic or project is valuable because of ideas which may originata worker outside the concerned discipline. In general, science makes progress from the analyses of emperical observations which, at first glance, may appear irrelevant and disjointed (Maqsood, 1962).

3. The important function of the administrator is the ability to deal with, a wide range of workers and to create an environment of confidence, appreciation understanding, helpfullness and genuine respect. In this age of science and tech-

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nology, research work considerably depends on the use of modern equipment, and nothing is more frustrating to a keen research worker than to be unable to carry on the work that he knows would help to solve the problem. Scientists as a group have certain characteristics, some of which are assets while others are liabilities. They are often allergic to administrative procedures and dislike controls. The administrator must find out ways of resolving the conflicting areas in the organization and promote the individualist drive of the research worker.

The system of directing research with the minimum of central control is considered the best for the brilliant research worker but it also sheters the idle and the incompetent. For the problem oriented institutions, team/group system approach seem to encourage competitive and creative work and produces scientists who are good at seeking solutions to research problems entrusted to them. An administrator who is research oriented must be careful not to put too much emphasis on one discipline, but he should see that a well balanced and integrated plan of research covering most of the disciplines is executed in his organization.

4. A scientist who has achieved a reputation as a capable research worker will be respected by his colleagues in the organization. His scientific competence is necessary not only for the actual direction of research effort but for ensuring his acceptance by his fellow-scientists as a leader. His scientific background and training is a prerequisite for the making of the decisions with which he is faced in the course of his work. If the role of an administrator is assigned to a non-scientist who is a competent administrator, the research workers will not have sufficient confidence in his judgments and will resent his status as a research project leader.

5. Recent researches have pointed out the need for the research administrators to use best human relation practices in order to motivate as well as to satisfy the needs of workers in the organization. The statistical models presented by Maqsood (1968) have shown that the relative degree of appreciation and utilization of various human relation factors (H. R. F.) by the administrator in an organization result in increase work productivity. Leadership may be defined as the projection of personality. The personality of a successful leader is a blend of many qualities, *i.e.*, creative, vision, courage drive, judgment, flexibility of mind, ability to delegate authority, ability to listen and learn, sense of participation and co-operation, and constructive outlook for the workers in the organization.

6. Advances in science and technology are the result of original contribution of scientists, the results of whose work are often unpredictable. Since most of the new developments in science have been the results of brilliant ideas by a few individuals, the research administrator must display wisdom, scientific acumen, broad mindness, great vision, and explorative tendencies, and be a connoiseur in the direction real of research, and a vigilant watch must be kept for the emergence of promising new points. It therefore follows that the most important impact that an administrator can ever hope to have is by recognizing such growing ideas as soon as they emerge and by giving them every possible encouragement. Research is primarily creative work and there are certain prerequisites, *i.e.*, freedom to think, freedom to work, and freedom to expound ideas with scientific colleagues in a research atmosphere, etc., which are favourable for stimulating creativity (Maqsood 1963).

7. It is desirable that a realistic assessment must be made of the projects quite early in their initial phases by the director. It is for the director to plan as to how best to deploy the expertise of scientists. As a class, scientists tend to be thoroughly trained and have a considerable degree of professional competance. Some forge ahead on a self-maintaining basis whi e others may "get stuck" at some stage of their careers and the director has to see that the workers get over the difficulties without much loss of time and effort.

8. The research organisation is a complex and dynamic structure, and therefore, the job of a director is bound to be complex. The main responsibilities of the research director are :

(*a*) Formulation of plan and preparation of budget ; (*b*) Efficient implementation of the plan ; (*c*) Effective communication within the organization ; (*d*) Co-ordination of research effort ; (*e*) Direction, motivation, and administration ; (*f*) Participation in conferences/seminars ; (*g*) Planning for in-service training and post-graduate education of the worker ; (*h*) Assistance in publications ; (*i*) International/National representation of the organization ; (*j*) Efforts to see that prospective Planning of the team is reflected in the National Research Plan ; and (*k*) Provision of dynamic leadership.

9. It is a basic tenet of administration that the head of an organization should not be directly in charge of any of the major activities of the organization, so that he is not handicapped in his ability to act as a co-ordinator, to determine policy and to plan for the future. He must delegate authority for a number of activities to his assistants and to a number of committees. The Director delegates

authority but cannot abdicate from his responsibility. He remains a focal point of responsibility in the organization and this is his genuine and indispensable contribution. According to Bavelas (1960) the main responsibility of the Ditector is assentially the "making of decision taken in the face of uncertainty" or what he calls "uncertainty reduction". When decisions have to be taken in situations in for certainty which the amount of information available is not sufficient of choice, it is up to the Director to decide and act after having listened to and evaluated the opinions of his associates and then have the courage to accept full responsibility for the consequences of his decision.

In brief, research administrator must be a reputed scientist and well versed in the application of principles of Development Administration in his organization. He must associate himself with the objectives of the organization and see that the workers and the organization grow with the demands of time. Further the director must devote some time for himself acquiring new scientific knowledge and for learning the newer trends in research methodology and its application (Maqsood, 1967).

REFERENCES

Bavelas, A. (1960) Leadership, *Admin. Sci. J*, 4, 491.

Maqsood, M. (1962) Application of Atomic Energy in Agriculture, *CENTO Scientific Symposium, London.*

Maqsood, M. (1963) Significance of Research, Proceedings, *CENTO* Symposium on Teaching of Science, Ankara, p. 117.

Maqsood M. (1967) World of Knowledge, *Pak. Jour. Hlth. 16* (4), 1-23.

Maqsood, M. (1968) *Productivity and Human Relations, Pak. Jour. Hlth, 17* (3), 117-136.

(The views expressed in this article are auihor's own views and do not necessarily reflect those of any organization).

MY OBSERVATIONS ON GALLSTONES.

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Gallstones are ubiquitous. Many features of their endemology, etiology, pathology and consequences are puzzling. Some of these facts are their high total incidence, their progressive increase with age, their predominence in female sex ; their racial and geographical variations ; their relationship to diabetes, diet, obesity, cirrhosis, hemolytic anemias and activity ; their exact pathogenesis ; their complications and their relationship, if any to development of primary cholecystic carcinoma.

My observations summarized herein, are based on the study of records of material like 7088 postmortems (at Philadelphia General Hospital, Philadelphia and Queen Elizbeth Hospital, Birmingham, U. K.) and 761 surgical cholecystectomy and gallbladder biopsy specimans (at P.G.H., U.S.A.; Q.E.H.; U.K.; Khyber Medical College, Peshawar; Nishtar Medical Collegc, Multan).

Proportion of cholelithiasis in total gallbladder disease.—My findings are that 59·5% (453/761) of surgical specimens of gallbladders removed for any reason, contained gallstones. This figure is lower than those of others, *e.g*,:—

Amiruddin (1964)	80%	(Lahore)
Derman et al (1961)	87%	(U.S.A.)
Glenn (1962)	95%	(U.S.A.)

A breakdown of my own figure of 59·5% for total cases is interesting, as the percentage was 91% (121/153) for U.S.A., 52·6% (161/306) for U.K. and 53·1% (171/322) for Pakistan.

In postmortem studies, I found that ratio of gallstone disease to other gallbladder diseases was 85·3% (1181/1385). No figures are available from others.

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Age factor in cholelithiasis.—96·9% (1144/1181) of subjects with gallstones in autopsy population were over 40 years of age. Maximum number of cases (32%) were in the 8th decade. Incidence of stones in autopsied populations upto age 40 was 5·6% (37/661).23% of subjects over 60 years had stones (contrast figure of 50% recorded by Crump 1953).

Rising incidence of gallstones with age—Total incidence of gallstones in consecutive postmortem population was 16·7%(1181(7088), The incidence of gallstones rises with age from O % (O/44) in the first decade to 68% (26/38) in the 10th decade. The figures of incidence (autopsies with stones divided by the total P. M. in the age group), for 2nd decade were 1% (2/89), 3rd decane 6% (11/171), 4th decade 7% (24/357), 5th decade 9%(76/866), 6th decade 12%, 7th decade 17%, 8th decade 25% (378/1488) and for 9th decade 33% (189 /566),

Sex and age in relation to cholelithiases —In postmortems, female cases with gallstones were 54·4% (643) and males 45·6 % (538). This gave a real female to male sex ratio of only 1·1 : 1. Only 206% (14/538) of males under 40 and 3·6% (2 /643) of females under 40 had gallstones by the time of their death. There was no female sex predominence before 20 and after 90 years of age. In my view, the autopsy figure regarding sex ratio in gallstones (1·1 : 1) is the real one and the commonly quoted figures are deflected. Is it possible that females with gallstones are more symptomatic?. 13·1% of males and 21.5% of females had gallstones at the time of their death. Gallstones did not occure earlier in women. Rising incidence with age is noted in both sexes.

Geographical variation.—It was my observation that 91% of cholecystectomy specimans in P. G. H. had stones as compared to figures of 52.6% in Q. E. H, and 53·1% in Pakistan (Peshawar + Multan). I also observed that earlier (Observations of postmortems in Q. E. H.) in U. K. (2nd decade) as compared to (P. G. H,) U. S. A. (3rd decade). The sex ratio in U. S. A. postmortems was 1·3 : 1 as compared to to 1 : 1 for U. K. Peak of stones in autopsies in U. S. A. was in 8th decade as compared to 7th decade for U. K. 97.6% of male autopsies in P. G. H., U. S. A. with stones were over 40 years as compared to 90·8 % in Q, E. H., U. K. 97·3% of female autopsies at P. G. H., U. S. A. with stones were over 40 years of age as compared to 94% at Q. E H., U. K. In total autopsies, the figures for incidence of stones in people under 40 were 8·7% for 1. G. H., U. S. A. and 3·7 for % Q. E. H., U. K., 27·3% of the dead over 60 years of age in P. G. H., U. S. A. had stones as compared to 15% at Q. E. H., U. K.

The incidence of stones in U. S. A. postmortems was higher (21·9%) than in U. K. (10·3%).

Incidence in P. M.	P. G. H. U. S. A.	Q. E. H, U. K.
All autopsies ...	21.9%	10.3%
People over 20 ...	22.7%	10.5%
People over 40 ...	23.5%	11.2%
Males ...	17.2%	8.4%
Females ...	27.9%	13.1%
Males 4th decade ...	8%	1%
Females 4th decade ...	15%	6%
Males 6th decade ...	9%	6%
Females 6th decade ...	19%	11%
Males 8th decade ...	23%	15%
Female 8th decade ...	38%	18%
Males over 70 ...	26%	17%
Females over 70 ...	38%	19%

Geographical variations are a reflection of both genetic and environmental factors.

Age and sex features of surgical cases.—In surgical cholecystectomy cases, femalse were 76·6% (347) and males 23.4% (106) giving a female to male sex ratio of 3·3 : 1, which ratio is much higher than that in autopsies (1.1 : 1). Are the females with stones, more symptomatic?. Are the females with stones less tolerant to stones?

The breakdown of sex ratio in individual hospitals of the present series was as under.

Cholecystectomies.	*Female to male sex ratio.*	
Q. E. H., U. K.	2·2 : 1	2. 5. : 1
P. G. H., U. S. A.	2·9 : 1	
N. M. C., Multan	3·6 : 1	5·8. : 1
K. M. C., Peshawar.	8·3 : 1	

The female predominence in Pakistan is particularly high, where woman are otherwise afraid of operations.

33% of operated cases were under 40 years of age. Peak of total surgical cases occurred in the 5th decade as also was the case with females. In males, the peak was in the 6th decade. The peaks occurred in earlier decades in Pakistani materials.

ETIOPATHOGENESIS

Infection and Inflammation.—Cholecystitis promotes formation of mixed stones, as inflammation causes excessive differential resorption of bile salts, provides nidus of exudate and bacteria, changes pH. and causes stasis.

What constitutes cholecystitis in histologic diagnosis is debatable and therefore the prevalence of cholecystitis as reported in the literature is extremely variable. Stones are said to be present in 90% of cases of cholecystitis, depending on the criteria used for diagnosis of cholecystitis.

It is very difficult to determine in many cases whether the inflammation is the cause of stones or is the effect of stones. It is a fact that even mixed stones are sometimes found in an otherwise normal gallblader. Is it that even a mild and transient inflammation can be concerned in their genesis.

Lorentz (1966) recorded that monkeys sacrificed for Laboratory use revealed no instance of gallstones, although 10%had non-calculous cholectystitis. All kinds of calculi (pure or mixed) can cause a chronic calculous cholecystits The fact that many gallbladders with stones show scant inflammatory changes implies that stones formed first and than caused inflammatory changes. Once stones are present and then cholecystitis develops further stones would form.

Most agree that acute cholecystitis is often chemical and not bacterial. Bacteria are cultured from bile or wall or stones only in 25% (Arianoff 1967) to 28% (Amiruddin 1964) of gallbadders with gallstones and 19% (Drennan 1922) cases of acute cholecystitis. The chemical cholecystitis can be caused by reflux, action of bile salts on damaged mucosa or by temporary increase in bile salt. content. It may even be due to an antigen (E coli)-antibody allergic reaction. Mixed gallstones are said to be preceded by and accompanied by chronic cholecystitis. metabolic pure stones develop in healthy gallbladders and then predispose to calculous cholecystitis.

I cultured mixed stones from 35 subjects. The result was as under :—

No growth	...	10 cases.
Pathogens grown	...	8 cases (23 %)
Non-pathogens or contaminants grown.		17 cases.

(Pathogens were grown only in23%).

Supersaturation.—Supersaturation of cholesterol in bile of hamsters may occur independent of any raised blood cholesterol level (Christensen et al. 1952 ; Fortner 1954). In rabbits, cholesterol feeding leads to biliary stones (Bevans and Mosbach 1956). In man there is no relation between the level of cholesterol in the blood and formation of cholesterol stones (Ackerman 1959). While with hypercholesterolemia, the biliary cholesterol level does not rise above normal, with low serum cholesterol levels, there is a low concentration in bile (Shore 1966).

There is a lower incidence of gallstones in parts of the world where the diet is low in cholesterol. Cholesterol is synthesized partly endogenously, independent of diet (as cholesterol stones develop in hamster kept on fat free diet). But there is no evidence to assume that people who get cholesterol stones have any abnormality of cholesterol metabolism. Hypercholesterolemia and hypothy-roidism can promote cholesterol stone formation (Aschoff 1924) but such stones do occur without hypercholesterolemia.

Increased biliary pigment concentration occuring in chronic hemolytic states leads to formation of bilirubincalcium bilirubinate stones. If the bile has supera- turation with cholesterol at the same time, the bilirubin can also act as nucleus for cholesterol stones. Griffin (1917) stated that about 50% of patients with congenital hemolytic jaundice show cholelithiasis. My finding is that 28·6 % of antopsied subjects with hemolytic anemias of various kinds had stones. This incidence is higher than the incidence in general (16·7%) in the present series.

Gallstones are said to be more frequent is obesity which may have its litho- genic effect through diet, hypercholesterolamia, laxity and inactivity. However, it should be kept in mind that lack of activity of women with gallstones may lead to greater body weight without any difference in caloric intake. It is also difficult to lay standards of degrees of obesity which can wax and wane. The remarkably high prevalence of gallstones in many American Indian tribes is not related to obesity (Comess et al. 1967).

My investigations in postmortem population at the Q. E. H., Birmingham. U. K. lead to the following finding.

Sex	Total subject with gallstones	Using the medium standared textbook weights.	
		Not obese	Obese.
Male ...	91	45	46 (51 %)
Females ...	77	36	41 (53 %)
Total ...	168	81	87 (52 %)

Diet.—Framingham study (Friedman et al. 1966) indicated no association of lithagenesis with dietery intake of protein, fat and cholesterol. The Marseilles study (Sarles et al. 1969) indicated a relationship with increased caloric intake

(irrespective of dietary composition) which cause increase in cholesterol concentration in bile. On the other hand, Melbourne study (Wheeler et al 1970) showed that gallstones subjects had a smaller intake of fat while the caloric intake was the same as controls. But this smaller intake of fat may be self imposed after the realization of disease by the patient. A survey in India (Malhotra 1968) indicated that cholelithiasis was 7 × commoner in Northern India as compared to south and this was attributed to some action through stasis. Japanese studies (Maki 1961) incriminate urbanisation and alterations in diet for the postwar increased cholelithiasis.

Diabetes and Gallstones.—Many workers have pointed out higher frequency of gallastones in the diabetics. My findings are as under :—

Particulars	*Gallstones in Portmortems.*
All autopsies.	1182/7088 = 16.7 %
Nondiabetics.	1079/6583 = 16-3 %
Diabetics.	112/505 = 22.2 %
Male diabeties.	33/209 = 15.8 %
Female diabetics.	79/296 = 26.7 %

However, only 8.8 % of the diabetic subjects with stones had cholesterol stones. Others had mixed stones.

Cholesterolosis and gallstones.—It is postulated that detachment of lipid laden mucosal fragments and cholesterol polypi in cholesterolosis, may form the nucleus of cholesterol stones. The condition is said to be found in association with pure cholesterol stones and the occurrence of both is related to unduly high biliary concentrations of cholesterol (Elman and Graham 1932 ; Rousselot and Bauman 1935). If there is cholecystitis in addition mixed or combined stones may form (Halpert 1966). In the present surgical series, I found the incidence of strawberry gallbladder as 4.6 % (U. S. A.+U. K.) and 2.7 % (K M. C. Peshwar). These figures are lower than others. In the present postmortem series, only 2.1 % had cholesterolosis.

Diabetics had if in 4.3 %. Out of the 149 cases, 58 % were males. Only 28 out of 149 cases (19 %) had stones. In 25 % the stones were cholesterol ones while in the other 75 %, the stones were mixed or pigment ones.

Hypertension and Cholelithiasis.—By the time of their death, the hypertensive autopsied population showed a lower incidence of gallstones due to shorter life span. My findings are given in detail below.

Particulars	*Incidence of gallstones in P. M.*	
Hypertensives.	131/904	(14.5 %)
Normotensives.	1950/6184	(17 %)
All autopsies.	1181/7088	(16.7 %)
Hypertensives with myocardial infarction.	36/281	12.8 %
Hypertensives without myocardial infraction.	95/623	(15.2 %)

Myocardial infarction and gallstones.—In the present necropsy series, there were 457 subjects with recent or past myocardial infarction only 56 (12.3 %) of which had gallstones.

Chronic peptic ulcer and gallstones.—In the present necropay series, there were 5.8 % (413) subjects who had chronic peptic ulceration. 59 of these 413 (14.3 %) persons had gallstones. This incidence is not al all higher then the general figure. In fact, it is lower than 16.7 %.

Cholesterol : Solvents ratio.—Changes in relative composition of the major constituents of bile leads to precipitations of cholesterol. The change in the composition of bile may be of hepatogenous origin (liver producing a supersaturated bile) or of cystogenous (composition altered by gallbladder wall) origin. Dam et al. (1968) showed that cholesterol stones can be initiated in the hamsters by a fat free-high glucose diet, through a deficiency of essential fatty acids and liver damage.

These stones were made to disappear by a curative diet rich in polyunsaturated fatty acids. Various American Indian tribes have a higher incidence of gallbladder disease, probably partly due to some abnormality in bile constituents for genetic or environmental reasons. A higher value for bile acid: cholesterol ratio has been found in Negroes (they have lower incidence of gallstones) (Lieber 1952; Lorentz 1966). Formation of biliary concretions in gallbladders of rabbits fed on dihydrocholestrol can be prevented by simultaneous administration of bile salts (Moshach) et al. 1959). The cholesterol holding capacity of bile is related to the relative concentration of bile salts as well as the phospholipids (Small 1969). The possibility that bile was changed in inflamed gallbladder (instead of production of abnormal hapatic bile) has been suggested by studies of several workers and it is best to assume that both factors can happen in man.

Portal Cirrhosis and Gallstones.—In the present series of postmartems, there were 325 subjects with Laenness cirrhosis 24.9% of them had gallstones. This rate was much higher than the rate of 16.7% for all autopaies and of 16.3% for the noncirrhotics. Davidson (1962) also recorded similar findings (33.1% for alcoholic cirrhsis; 14.2% for all autopsies). Hepatocytes of cirrhotic liver appear to produce abnormal bile.

Stasis, female sex and pregnancies.—Stasis which can promote precipitation can be due to inflamation, pressure, diet, sex, pregnancy, drug and hormones.

Hormonal factors from puberty onwards may condition higher rates of cholelithiasis in the females. Cholesterol and bilirubin stones have been produced in rabbits (Imamoglu at al 1960) by injections of large amounts of stilbestrol and progesterome concurrently. 80—90% of women with gallstones have been pregnant once. Pregnancy produces stasis (hormonal), delayed emptying (mechanical) abnormal bile (more cholesterol; less bile salts) and changed diet? Or may be that pregnancy only precipitates symptoms in a patient who already has a "silent" stone (Lancet 1970).

Size and number of stones.—In the present series of 1634 antopsy and surgical cases of cholelithiasis, 19.2% had solitary stones, 6.1% had two stones, 3.4% had 3 stones 1.5% had 4 stones 1.2% had 5 stones, 3.1% had 6—10 stones, 1.2% had 11—20 stones and 0.8% had 21—100 stones. In 63.6% the number of stones was not exactly recorded and adjectives like a few/several/multiple/many/numerous were used.

Large stones are usually single. All stones of over 4 cm size were single. In subjects with stones over 2 cm in size, 61% had single, 22% had double and 16% had triple. 9.^1% of the stones smaller than 1 cm dia were multiple and only 4% were single.

Small stones occur more often than the large ones. Only 10% of stones (67/674) were large (over 2 cm in dia).

Chemical composition and relative incidence.—In the present series, "pure" stones (cholesterol or pigment or calcium carbonates) were found in 11.8% of necropsy cases, 9.9% of surgical cases and 11.2% of total cases. This proportion was almost the same in both sexes.

The relative proportion of different kinds of stones in 1634 antopsy and surgical cases was as under ;—

Kind of stones.	Male.	Female.	All.
Cholesterol ...	4.8%	4%	4.3%
Pigment ...	6.2%	7.1%	6.7%
Calcium Carbonate ...	0.2%	0.2%	0.2%
Mixed ...	88 5%	88.5%	88.5%
Combined ...	03·%	0.2%	0.2%

Some say that "pure" cholesterol stones are usually solibary while others use the terms always. My studies revealed that only in 53.5% were the cholesterol stones solibary. They were two in 4.2% of instances, three in 4.2%, 4 in 2.8% 5 in 2.8%, 6 in 8.4%, 7 in 2 1% (1 case), 19 in 2 1% (1 case) and "several" in 21.1%

Although it is stated by some that in case of cholesterol stones, the gallbladder is always the seat of cholesterolosis, the truth is that cholesterol stones are found with or without cholesterolosis. In my investigation, cholesterolosis and present only in 19% of cases with cholesterol stones. Cholesterol stones formed 38.6% of "pure" stones, pigment stones 60% and calcium carbonate stones 1.6%. Mixed stones were in a proportion of 88 5%. Combined stones formed a ratio of 0.2%.

Complication of gallstones.—There are a number of effects of gallstones. On 1188 necropsy cases, these were acute cholecystitis in 16 cases (1 with rupture ; I with subphrenic abscess), empyema in 18 cases (2 with rupture), subacute cholecystitis in s1%) 10 cases, cholecystitis in 824 (70%) cases (296 mild ; 6 with calcification of wall with cholesterolosis), acute on chronic cholecystitis in 11 (1%) cases (1 with empyema). mucocele in 10 cases, hydrops in 4 cases (0.3%) hemorrhage pancreatitis in 7, choledocholithiasis in 90 (7.6%) cases, stone impaction in cystic duct or Hartmanns pouch in 52 cases, cholangitis in 8 cases, (2 with liver abscess), biliary cirrhosis in 8 (0.7%) cases, cholesterolosis in 27 cases, perforation 2 more cares fistula in 3 cases (2 into duodenum ; one into liver), Carcinoma in 32 cases and obstructive jaundice from stones in 33 (2.8%) cases. In 453 surgical cholecystectomy cases, the complications observed were acute cholecystitis in 15 instances (one with perforation), subacute cholecystitis in 15, chronic cholecystitis in 351 (13 were mild, choledocholithiasis in 7, obstructive jaundice in 7, impacted stones in cystic duct in 7 cases, acute on chronic cholecystitis in 27, cholangitis in 1, empyama in 3, mucoceele in 8, hydrops in 4, cholesterolisis in 9, benign tumours in 3 and carcinoma in 21.

I have calculated that 33 persons (55%) out of 60 who died with obstructive jaundice in 7088 antopsies, had the obstructive jaundice due to gallstones. It was also observed that mere choledocholithiasis does not necessarily produce obstruetive jaundice as was evident from the fact that out of 90 postmortem cases of choledocholithiasis, only 33 (37%) suffered from obstructive jaundice. Regarding acute ascending suppurative cnolangitis, it can be stated that all the 9 cases with this condition in the present antopsy series had associated choledocholithiasis. Biliary cirrhosis was observed to have occurred in 9% of autopsy cases with choledocholithias (8/90) or 0.7% of all autopsied cases of cholelithiasis. A study regarding over all etiology of biliary cirrhosis was made and it was found that there were a total of 15 cases of biliary cirrhosis in 7088 antopsies. 8 (53 3%) of these had cholelithiasis with choledocholithiasis.

In the present total of 7088 autopsies there were 56 cases (37 acute ; 19 chronic) of pancreatities giving a percentage of 0.8%. In the 1181 autopsis with cholelithasis, the incidence of pancreatitis was much higher i.e. 2% (24 cases ; 17 being acute and 7 chronic). The incidence of pancreatitis in persons with no gallstones was 0.5% 20 acute cases ; 12 chronic cases). Of the 56 total cases of acute or chronic pancreatitis, 43% (24 cases) had associated cholelithiasis while other 32 cases of pancreatitis had no stones but some other causative factor.

The question of relationship of cholelithiasis with genesis of primary cholecystic carcinoma has long been discussed. My observations are compared below with those of others.

Features.	World literature.	My findings.
Incidence of carcinoma of gallbladder in all postmortems.	0.36—0.66% (even 3 6 % in Navajo Indians in U. S. A.).	0.56 % (40/7088 autopsies.)
Incidence of carcinoma of gallbladder in cholecystectomies.	1.1—5 %	2.8 % (21/761)
Incidence of cancer of gallbladder in presence of gallstones in postmortems.	3 %	2.7 % (32/1181 antopsies)
Incidence of cancer in cholecystectomies with gallstones.	1—10 %	4.6 % (32/453 cystectomies).
Coexistence of gallstones and carcinoma and carcinoma of gallbladder.	60—100 %	80 % of autopsy cases. 40 % of cholec-ystectomies.

The incidence of cancer in stone containing gallbladders was 2.7 % (32/1181) as compared to .1 % (8/5907) in gallbladders with no stones. A separate later study revealed that in case of 42 necropsy cases of gallbladder cancer, stones were definitely present and recorded in 52 %, definitely absent in 14 %, and status of stones unrecorded in 34 % (only a guess could be made). Similarly in case of 97 cancers in surgical series, stones were definitely recorded to be present (records are defective) only in 17.5 % and status was unclear and unrecorded in the rest.

It is not clear whether or not the gallstones precipitate carcinoma, although both are found together in a very high percentage. Stones may have been formed even as a result (obstructive effect) of cancer. Comfort et al. (1948) reported that cancer developed in none of the 112 patients who had gallstones for 10-15 years. Derman et al. (1961) reviewed 1396 consecutive cholecystectomies and found that gallbladder carcinoma is not statistically related to the presence of gallstones as the incidence of cancer in the presence of stone was 1.2 % and the incidence of carcinoma in the absence of gallstones was (higher) 2.2 %. Experimental work in animals (Burrows 1940) has never supported the concept that stones and carcinoma may be related and moreover no carcinogenic constituents have ever been demonstrated (Shore 1966) in gallstones.

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FAMILY HEALTH FOR BETTER MATERNAL & CHILD HEALTH.

by

Professor A. K. Awan, M.B.B.S., M.P.H , Ph. D.*

The objective of M.C.H. Service has been to make motherhood and childhood safe. Therefore maternity care and child care have received prime attention of all health and welfare workers all over the world.

Maternal and Child Health Care Programmes are essentially preventive in essence ahd have been focussed on married women who are of child bearing age and are pregnant; on infants under one year of age, and on young children.

The motives which led to this concern are genuine because pregnancy and child birth are hazardous periods in a woman's life. A large number of mothers die of causes which are directly associated with pregnancy. An infant needs special health care because he is very sensitive to adverse social and physical environment, and becomes an easy prey. This situation results into high infant mortality,

Young children of pre-school and school age pass through a period of very rapid growth and development. This also is a very impressionable age so children acquire habits and attitudes, and develop a philosophy of life which determines their thoughts, behaviour and actions.

In Pakistan we have services for mothers and children. These services were started in the early twenties and include :

1. **Antenatal care.**
2. **Care during delivery.**
3. **Care of mother in early post-delivery period.**
4. **Care of the new born and infant.**
5. **Care of the pre-school child.**

***Head of Department of Mental and Child Health, Institute of Hygience and Preventive Medicine, Lahore.**

(Our M.C.H. Progrmmes do not include the school age child).

The impact of the service has not resulted into a sharp fall in mortality. This is in incontrast with the experience of other countries which had similar high level of mortality.

M.C.H. services are expected to lower mortality and morbidity in mothers and children and to promote their well-being. Mother and child are a sensitive group and health programmes for them must form priorities at community and personal level. But this group does not live in compartmentalized environment, in isolation. In fact this group lives in family environment which is dynamic. The mother and child receive constant stimuli and react to the family enviroment. The health status of the members of a family, the presence or absence of communicable disease in the household, the socio-economic, educational and cultural level, the standard of living, and the attitudes and beliefs of family members have deep repercussions on formation of health habits, awareness of health, desire to seek good health, develop heath services and utilize these services to the fullest advantage. So one may say that health is family-oriented. In-fact one may say that survival, good health and morbidity experiences are family-oriented. The family members share the family residential accomodation, family budget, family food, family support and family status.

Given the mandate of ensuring the survival of a woman during maternity and of the child during infancy and early childhood, the health/M.C.H. worker has to work with a family. He must study the problems of the "vulnerable group" in relation to the family. It is not possible to reach very far if the M.C.H. worker has "mother and child" as targets for good health and neglects the others in the household. We have to look after and display active interest in other members of the household. We have to involve them in the health care programmes for mothers and children at household and family level. Joint participation is bound to result into better co-operation and continuous practices for achieving lasting good health.

Maternal and child health service is based on the practice of preventive medicine for ensuring optimum healh for mothers and children. It attempts to solve immediate problems and envisages to achieve continuous good health. For meeting this objective the health and welfare of the family has to be kept in view.

The impact of family can be appreciated from the following presentation :

Behaviour of pregnancies was studied in Saddar Area, Lahore Cantonment (Saddar Pregnancy study, 1963-65). The pregnant women were followed and observed for the outcome of pregnancy. If a pregnancy was carried to term and a baby was born alive who survived the first seven days of life, the reproductive effort was considered fruitful. If a woman had an abortion or a still birth, the pregnaney was considered wasted. If a baby was born alive but the baby died within 7 days of life, such a pregnancy was also considered wasted. A total of I,447 pregnant women were studied. Spontaneous pregnancy wastage in these women was measured against certain family attributes. The most important of these were (I) family income (2) family education (*i.e.* education of the spouses) (3) family occupation (occupation of the head of the family). The conclusions were that pregnancy wastage was higher when family income was low, family education was low and ocoupational status of the family was low. Tables I, II and III illustrate this relationship clearly.

TABLE I

Crude Pregnancy wastage data as related to economic status-Saddar Pregnancy Study, 1963-65

Type of data		Economic status		Total
		Higher	Lower	
1. No. of respondents	...	147	1300	1447
2. No. of conceptions	...	151	1313	1464
3. Cases lost to study	...	0	10	10
4. Conceptions studied	...	151	1303	1454
5. Live-births	...	139	1167	1306
6. Foetal deaths	...	12	136	148
7. Early neonatal deaths	...	1	38	39
8. Total wastage	...	13	174	187
Total pregnancy wastage rate/1000*		86.1	133.5	128.6

*Difference between the two rates is significant (S. E. ±24.7) at 0.05 level of significance.

TABLE 2.

Crude pregnancy wastage data as related to educational status of spouses-Saddar Pregnancy Study, 1963—65.

Type of data		Educational status of spouses		
		Higher status	Lower status	Total
1. No of respondents	...	163	1284	1447
2. No of conceptions	...	166	1298	1464
3. Cases lost to study	...	1	9	10
4. Conceptions studied	...	165	1289	1454
5. Live-births	...	153	1153	1306
6. Foetal deaths	...	12	136	148
7. Early neo-natal deaths	...	0	39	39
8. Total wastage	...	12	175	187
Total P. W. rate/1000*	...	72.7	135.8	128.6

*Difference between the two pregnancy wastage rates (S. E. ±22.3) is significant at 0.005 level of significance.

TABLE 3.

Distribution of crude pregnancy wastage data as related to occupational status of the head of respondent's house-hold, Saddar Pregnancy Study, 1963-65.

Type of data		Occupational status		Total
		Higher	Lower	
1. No of respondents	...	558	878	1436
2. No of conceptions	...	564	889	1453
3. Corrected No of conceptions*	...	568.4	895.6	1464
4. Cases lost to study	...	1	9	10
5. Conceptions under study	...	567.4	886.6	1454
6. Live-births (corrected)	...	518.4	787.6	1306
7. Foetal deaths	...	49	99	148
8. Early neonatal deaths	...	9	30	39
9. Total wastage	...	58	129	187
Total P. W. rate/1000**	...	102,2	145.5	128.6

*Correction has been made for eleven cases whose occupational status was not recorded. These cases had live-births and so have been proportionately distributed among other observed live-births of similar "age-gravidity risk" category. Ths same numbers have been added to compute corrected number of conceptions.

**Difference between the two pregnancy wastage rates (S. E. ±17.4) is significant at 0.01 level of sign.ficanco.

The effect of family environment on an individual begins before birth. It is, therefore, logical to conceptualies that socio-cultural environment of the individual resulting from his family's socio-economic and health status would have an effect on the survival of human offspring.

Infant mortality rates also show strong relationship with the family of origin. The occupation of the father, educational and economic attainments and socio-cultural level have a strong influence on the survival of the infant.

I,306 live born babies were followed for survivorship from birth up to the age of one year (Saddar Infant Mortality Study, 1963-66). The survivorship status of these infants was studied in relation to educational status of the spouses, economic status of the family and occupational status of the head of the family. The result showed a strong relationship with these three variables. The infant mortality was higher when the educational status of spouses was low, when economic status of the family was low, and when the occupational status of the head of the house hold was low. Tables 4, 5 and 6 demonstrate this relationship.

TABLE 4.

Infant Mortality rate as related to Educational status of parents, Saddar Infant Mortality Study, 1963-66.

Type of data	Educational status		Total
	Higher	Lower	
1. No of live born babies ...	145	1113	1258
2. Alive after 1 year ...	137	1005	1142
3. Infant deaths ...	8	108	116
Infant mortality rate/1000 live birth ...	55.2	97.0	92.2

TABLE 5.

Infant Mortality rate as related to Economic status, Saddar Infant Mortality Study, 1963-66.

Type of data	Ecnomic status		Total
	Higher	Lower	
1. No of live born babies ...	131	1127	1258
2. Alive after 1 year ...	122	1020	1142
3. Infant deaths ...	9	107	116
Infant Mortality rate/1000 live births...	68.7	94.9	92.2

Table 6.

Infant Mortality rate as related to Occupational status of the Head of the Household, Saddar Infant Mortality Study, 1963-66.

Type of data	Oceupational status		Total
	Higher	Lower	
1. No of live born babies ...	499	748	1247
2. Alive after 1 year ...	466	665	1131*
3. Infant deaths ...	33	83	116
Infant Mortality rate/1000 live birth ...	66.1	111.0	93.0

*Eleven cases have been omitted as their occupational status was not recorded.

Tables 4, 5 and 6 illustrate that infant mortality is related to family environment.

It is precisely on account of this logic that M. C. H. service has to be rendered as a family health service, with special emphasis on the mother and child. The importance of the role of the family in achieving good health for mothers and childern cannot be over emphasised. We must not lose sight of the fact that family is the only institution so far devised by human society for the preservation of its race and culture. The reverse is also true. We need to have healthy mothers and children in order to have healthy and productive families. Therefore one may say that better Maternal and Child Health is an essential pre-requisite for the health and survival of the family.

References

1. Awrn Asghori, K. *Saddrr Pregnency Study, 1963-65.* Lahore : (Under publication).

2. Awan Asghari, K. *Saddar Infant Mortality Study, 1963-65.* Lahore : (Under publication).

SOME REFLECTIONS ON ACUTE INTESTINAL OBSTRUCTION.

By

*Dr. Shabbir Ahmad, F.R.C.S.E., F.R.C.S.G., F.R.C.S. I.**

On the average one case of acute intestinal obstruction is admitted to Mayo Hospital, daily. The mortality rate is alarmingly high. The cases arrive quite late and some even injudiciously labelled as so called "intestinal colic" don't get proper medical aid at opportune moment. Even at centres of greater repute abroad the mortality rate figures are as indicated below :—

First 24 hours	...	4.5%
Second 24 hours	...	23%
Thereafter	...	46%

The aim of this article is to recapitulate symptomatology of acute intestinal obstruction and to offer the findings as analysis of available record in East surgical unit of Mayo Hospital, Lahore. The unit is "on call" 36 hours a week for emergencies and upto year ending December, 1970, undertook surgery on 279 cases of mechanical intestinal obstruction and 56 cases of paralytic illeus excluding appendicitis during four years.

I. Mechanical Obstruction :

(A) Strangulated herniae	...	=28
(*a*) Inguinal	...	=20
(*b*) Epigastric	...	= 4
(*c*) Umbilical	...	= 2
(*d*) Internal herniae after previous ileotransverse colostomy	...	= 1
(*e*) Herniae through colostomy hole in abdominal wall	...	= 1

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(B) Adhesions/Bands/Kinking bowel	...	=25
(*a*) Postoperative	...	= 7
(*b*) Idiopathic	...	= 6
(*c*) Bands with mesenteric Lymphadenopathy	...	=12
	...	=42
(C) Volvulus	...	= 1
(*a*) Stomach	...	=22
(*b*) Small intestine	...	= 5
(*c*) Caecum	...	=14
(*d*) Pelvic Colon	...	=46
(D) Stricture	...	=22
(*a*) Ileum	...	= 5
(*b*) Jejunum	...	=15
(*c*) Ileocaecal	...	= 3
(*d*) Jejunal & Ileal	...	= 1
(*e*) Caecum	...	=24
(E) Round Worm	...	= 2
(*a*) Alone as a mass	...	=14
(*b*) Round Worm + Bands	...	= 4
(*c*) Round Worm + Volvulus	...	= 4
(*d*) Round Worm + Stricture	...	=35
(F) Masses (? Malignant)	...	=14
Gastric/Pyloric	...	= 4
Caecum	...	= 2
Ascending Colon	...	= 1
Hepatic Flexure	...	= 2
Splenic flexure	...	= 3
Sigmoid colon	...	= 7
Rectum	...	= 1
Amoeboma Caecum	...	= 1
Crohn's disease		

(G) Scarring duodenum (with D. U.) ... = 5

(H) Meckel's Diverticulum ... =10

(*i*) Meckel's with band ... = 2
(*ii*) Meckel's with Littres hernia ... = 1
(*iii*) Meckel's with Volvulus ... = 5
(*iv*) Meckel's with Intussusception ... = 2

(I) Intussusception ... = 8

(J) Hirschsprung's disease ... = 2

(K) Meconium ileus ... = 1

(L) Anorectal atresia ... =40

(M) Jejunal diverticulae ... = 1

(N) Retroperitoneal sarcoma ... = 3

II. Ileus :

(A) Adynamic ... = 0

(B) Paralytic :—

(*i*) Trauma ... = ?
(*ii*) Appendicitis ... = ?
(*iit*) Perforation of ileum (? typhoid) ... =20
(*iv*) Perforation Meckel's diverticulum ... = 2
Perforated duodenal ulcer ... =10
Leaking anastomoses ... = 4
Perforation Jejunum ... = 1
Perforation ileum+stricture ... = 1
Perforation Caecum ... = 1
Inflamed Meckel's dlverticulum ... = 1
Acute pancreatitis ... = 1
Tuberculous peritonitis ... = 2
Bile peritonitis ... = 1
Carcinoma peritoneii ... = 3
Pelvic abscess ... = 1
Tubo ovarian abscess ... = 1

Twisted ovarian cyst	...	= 1
Perforation gut enema fluid	...	= 2
Primary peritonitis	...	= 1
Total	...	=56

Anatomical, Physiological and Radiological Features of acute intestinal obstruction:—Unlike odd 20 feet length ascribed to small gut in dissection hall, in the operation theatre when healthy it is nearly 6—8 feet in length. With obstruction and distension viable bowel shortens further upto $\frac{1}{3}$rd of its length, however it lengthens on infarction. The velvety mucous membrane of small bowel is thrown into regular folds called volvulae conniventes while it is well supplied with musculature, these two characters taper off distally, longitudinal musculature falls short of the length and leads to appearance of taenia coli and haustrations and mucous membrane is no longer velvety and absorptive. Small intestine is responsible for major absorption duties, upto 7—8 litres of saliva, gastric juice. bile, pancreatic juice and succus entericus being secreted and absored daily from upper confines of gut, only about 400. C. C. being passed beyond the Ileocaecal valve. In other words the small intestine absorbs 95% of water and electrolytes entering it.

A. Mechanical obstruction of small intestine:—The first symptom nearly always is pain of most characteristic type (unless of course, the patient has undergone bilateral splanch nicectomy. It is followed after an interval by vomiting and distension. Not too much later, peripheral circulatory failure sets in with ultimate death.

1. Gut is a mid line organ in the embryo. Therefore, the first efforts of gut to overcome obstruction by violent peristalsis sets in colicky pain in the mid line symmetrically across the abdomen about the level of umbilicus. The pain is not unilateral as one would expect in a case of ureteric colic.

The pain is of commanding intensity and is rhythmically intermittent. Each spasm of gut produces pain which waxes rapidly, and after having lasted several seconds it more slowly wanes, to be followed by completely pain free intervals. During the bouts of spasm, in slim abdomens, actually the gut may be felt to contract under the palpating hand or the peristalsis is visible to the inspecting eye and loud borborygmi audible.

With slow waning of pain conversely, the slow relaxation of the spasm can be visualised in graphic fashion.

2. One must not patiently wait for the onset of vomiting and distension as the next episode to establish the diagnosis. To prevent high mortality rate, fullest vigilance on the part of every one after properly set alarm by the first symptom of "Characteristic pain pattern" is required as much in a case of myocardial infarction as in a case of acute intestinal obstruction. These next two symptoms of vomiting and distension are reciprocal *i.e.*, a very high obstruction *e.g.*, at duodenal level may only warn the clinician of its existence by virtue of characteristic pain pattern without any distension but accompanied by profuse vomiting. A high jejunal obstruction prevents the large quantities of fluids entering stomach and duodenum from reaching the enormous absorptive areas of small gut, therefore excessive subsequent dehydration occurs earlier, distension is not prominent.

However when obstruction occurs further distally as in terminal ileum, the proximal almost whole of small intestine keep on absorbing fluids for 2—3 days and as such, vomiting does not occur as early as in case of higher obstructions. Gradually in the face of continual obstruction. absorptive function declines and fluids collecting into lengths of proximal bowel give rise to the telltale distension so often awaited by the unwary to establish the diagnosis of acute intestinal obstruction.

Faecal vomiting sets in usually on 3rd to 4th day of ileal obstruction.

3. It is important to recall that in infants upto two years, multiple fluid level are often present normally and that in other age groups particulary a large bubble of gas in stomach and gas in colon especially caecum and sigmoid parts are normal features. However small gut usually has no normal gas. Therefore, gaseous distension is much lesser in evidence in cases of small gut obstruction in contrast to colonic obstructions. Radiological evidence of multiple gas shadows in small intestines must always be interpreted with alarm. The often stressed fluid levels however won't make their appearence till 6—8 hours after the onset of complete ileal obstruction since during that interval the gases separate from the stagnant fluids. Characteristic volvulae conniventes passing from antimesenteric to mesenteric border of jejumum land it its diagnostic watch spring radiological appearance, being visible as curved wide lines,regularly spaced. Distal ileum possesses few volvulae conniventes and was most aptly named characterless from radiological angle by Wangensteen.

4. Absolute constipation is commonly complained of in case of acute obstruction. However it must not be over loked that obstruction may exist without history of absolute constipation. In fact diarrhoea of irritative nature may accompany

certain obstructions of serious nature requiring earliest surgery such as Richter's hernia, mesenteric vascular occlusion or with a collection of pus in the pelvic basin.

The policy of two enemata can be easily dispensed with in well equipped centres. First plain X-ray in erect posture would naturally demonstrate gas in the confines of bowel distal to obstruction After one enema, the contents distal to obstruction including gas are evacuated and the 2nd X-ray then taken would demonstrate the absence of gas distally and thereby establish the diagnosis of complete obstruction, the same way as a second enema.

(B) Mechanical obstruction of large gut.—Here the onset is usually insiduous, pain being only seldom a prominent feature. Patients were found often to report rather late in the majority of cascs, their main complaint being that of constipation and abdominal distension.

Pain however is the inaugural symptom and occurs across the lower abdomen recurrently and in spasms. The intensity is not as severe as in the case of small bowel colic and the rhythmicity, so much a feature of small bowel colic is absent on account of paucity of musculature, irregular peristaltic rushes and accomodating nature of colon.

Partly liquid faeces, but mainly gas keeps on collecting in the colon and progressive distension appears. Except in cases of volvulus the abdominal distension is characteristically peripheral, volvulus of course leads to occupation of eentral abdomen by distended loop and hence central distension. The amount of liquid which accumulates in the colon is relatively small and the patient is seldom dehydrated. As the distension is greater in caecum and ascending colon, here the bowl becomes necrotic, ruptures causing fulminating peritonitis from freely and escaping faeces with death within few hours.

(C) Strangulation Obstruction:—All obstructions eventually lead to strangulation of same degree. The intraluminal pressure of small intestine after mechanical obstruction without a closed loop rises from a normal of 2-5 cms of H_2O. to above 5-15 cms of H_2O. In the face of closed loop obstruction, as in a case of volvulus, the rise is even more precipitous upto 20-30 of C.M.C. H_2O. These pressures per se dont cause compresson of vessels, but multiplied by distension, the tension built up is ample to embarass the capilary circulation, leading to necrosis of tips of intestinal villi and later of bowel wall in irregular patches, which may rupture. The bowel wall soon becomes thickened by oedema fluid and protein rich fluid exudes into peritoneal cavity.

On the other hand when main vessels are strangulated, the whole loop undergoes infarction with sometimes massive haemorrhage into the bowel wall and lumen.

1. **Suggestions to Decrease Mortality Rate:**—Prompt diagnosis and universal recognition of signs and symptoms of acute intestinal obstruction.

2. Prevention and eradication of intestinal parasites particularly round worms; quite clearly these worms can upset balanceof peristalsis in various loops of small gut, being nomarlly resident of upper jejunum, but on account of persistent insinuations through bowel wall can lead to small haemorrhages and finally can at least be blamed for majority of bands hitherto labelled as idiopathic in nature but found associated on the operation table with a mass of round worms intra-luminally Why could, not, the persistent haemorrhagic leaks organise into fibrinous and finally dense bands with essential volvulus ? Many cases of so called intestinal colic may be just due to a lump ef roundworms causing mechanical obstruction.

3. Prompt treatment and prevention of tuberculosis, and typhoid:—In too many cases; prompt treatment of typhoid in its early stages could have prevented the drastic perforation of terminal ileum after 10-14 days of enteric fever. Vast majority of such cases die with or without surgery.

The lymphatic infiltration and circular scarring caused by tuberculosis should not be allowed to reach a limit of absolute obstruction before starting medical or surgical treatment. All suspected cases must be thoroughly investigated long before such eventualities force acute surgical aid perhaps not in best hands at that.

Facilities for reliable Barium meal and Blood ESR studies must be provided within easy reach of poor patients, such being the vast major.ty of so afflicted. Pulmonary tuberculosis which leads to intestinal tuberculosis must obviously be eradicated.

4. Fluid and electrolyte losses are undoubtedly major factors causing death. Whereas dehdration should always be corrected and Laborious decompression via Ryle's tube be instituted preoperatively, no undue time must ever be lost in undertaking surgical intervention. Facilities for determining electrolytes play an important role and should be rountinely available to all cases.

6. All the primitive giving sets like glass bottles or rotten thick red rubber tubes must be dispensed with and replaced. Chances must not be taken on the already seriously ill lot of acute intestinal obstruction even of miner reac-

tions, allergie or progenic which undeniably occur on account of these very primitive sets.

7. Fluothane and an expert anaesthetist are indispensable. It goes without saying that the operator must not be an apprentice and should be well skilled in the art of surgery. Undoubtedly the cause of death in higher obstructions is fluid and electrolyte loss but absorption of toxic substances in obstructions at lower or ileal levels etc : are at least partly responsible. Therefore, intestinal decompression preoperatively as well at the operation table must be given due recognition. Patients can die despite surgical relief of obstruction postoperativly. At the table, of course decompression must be carried out carefully avoiding spillage into peritoneal cavity and tears of distended gut. The minimam required must only be undertaken and heroic surgery avoided under emergency conditions.

8. Enemata must not be administered too lightly. During one year I could easily quote two cases of wrongly diagnosed acute appendicitis getting enemate with demonstrable free enema fluid into peritoneal cavity and thereafter struggling survival.

9. Surprisingly two case records "reported no cause found at lapartomy" but the names of these patients were found entered in the Death Register. Ureteric colic etc. must be promptly diagnosed by its characteristic differential features. Two cases not included in the present series of analysis attracted my attention recently. One of them was on old man of 50 years with pleurisy & bad chest found to have multiple fluid level an plain X-ray of abdomen. Laparotomy revealed no cause for obstruction. Vigorous postoperative care after fruitless lapartomy which increased the chances of further deterioration in his chest condition, however, brought him out of a noticeably stormy course.

The other case was an old man of 60 who underwent laparotomy for acute intestinal obstruction where operator removed the prostate after having found distended urinary bladder at the table. Thank God he pulled through.

PRESENT STATE AND FUTURE DEVELOPMENT OF PUBLIC HEALTH* LABORATORY SERVICES IN PAKISTAN.

by

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Introduction.—With the recognition of the important role played by the Laboratory health services in the field of curative and preventive medicine, the need to recognise a comprehensive laboratory health service, specially in the developing countries of the world, received the attention of the W. H. O. and the matter was thoroughly studied by several expert committees sponsored by the World Health Organization who analysed the scope of functions of such services in great details. However, the acceptance of these recommendations of the said organization must be carefully examined in the light of thc existing health set-up of the country and this must be geared to the peculiar need of the country and must be planned in context to the resources of our country.

Before discussing the "Present state and future development of public laboratory health services in Pakistan", I may report that Haleem and Eveland (1969) have already published a detailed paper on the "Planning, Organization and administration of the national health laboratory services within a developing country (Pakistan)". The present paper will be confined in the analysis of the short-comings of our existing laboratory health services and attempt will be made for finding some means to over come such draw-backs in the development of such a service.

Existing Laboratory Health Services in Pakistan.—Although the health authorities of our country felt the need to emphasize on the public health programmes, because of the shortage of technical personnel, specially those of para-medical staff, besides the limitation of necessary finance, it has not been possible to launch such a comprehensive programme in the field of the laboratory health services in our country.

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As a result the present state of affairs in this field has remained most unsatisfactory. Presently the laboratory services in our country can be categorised as follows :—

(1) Government Hospital laboratory services catering the diagnostic need of the patients only.

(2) Provincial/Municipal analytical laboratories only deal with the sanitary bacteriology and examination of food articles.

(3) Biological production laboratories such as provincial vaccine Institute, Bureau of Laboratories etc.

(4) Provincial Chemical Examiners Laboratories are involved in the chemical analysis of the materials in the medicolegal cases.

(5) Drug testing laboratories both under the provincial and the central government which are involved in the qualitative and quantitative analysis of the drugs either manufactured within the country or imported.

(6) Local bodies hospital laboratory services which are invoved in routine diagnostic work of the hospitals and dispensaries under them.

(7) Private laboratory diagnostic services :—These are mostly commercial enterprises catering the diagnostic needs of well to do people factories and autonomous bodies like banks etc.

3. Draw Backs of the Present System of Laboratory set up.—The main defects can be analysed as follows :—

(1) Lack of co-ordination with hospital laboratory facilities and other groups of laboratory services.

(2) Lack of uniformity in the laboratory techniques.

(3) No system of evaluation of the laboratory data.

(4) Lack of properly trained auxilliary staff and non-existance of the systems of the inservice training of the laboratory workers.

(5) Lack of co-ordination between the biological production laboratories under the provincial and central government.

(6) No system of control over the private laboratories.

(7) Administrative bottle necks for the procurement of the laboratory supplies such as reagents and equipments etc.

(8) The present system of laboratory service is mostly limited to the city population and as such major part of our community who lives in the villages, are deprived of such facilities.

4 Proposed Administrative Organization of the Laboratory Health Services :

A. Provincial :—The administrative set up and the provincial aspect at the various levels of the comprehensive provincial laboratory health service have been presented in table 1. The main object of such a service will be to remove the aforesaid gaps at the various levels. The shortage of trained personnel may be overcome by introducing specialized laboratory courses at the provincial public health laboratories head quarters and at the teaching hospital laboratories of our country,

B. Central:—The public health laboratory set up under the central government have been presented in table II. Since the health coverage of the central Government employees is the responsibility of the fedral Government, there is a need to maintain laboratory facilities for the health care of the employees under them. But this should not be the main functions of the fedral laboratory services. The main responsibilities of such a service should be as follows :—

(1) To undertake national surveys in the respective fields, to determine our national problems and to suggest remedies for the same.

(2) To take up special research in the various fields of public health.

(3) Quality control of biological products as per international standards.

(4) To evolve standardized laboratory techniques which may be suitable for practice in our country.

(5) To take up the responsibility of specialized training programmes in the field of laboratory services imparting postgraduate degree courses in various fields of public health laboratory services.

(6) To co-ordinate with the provincial laboratory health services for evaluation of the laboratory data at the national level.

(7) To formulate legislation in the control of private laboratory services.

(8) To recommend to the government in categorizing the grades of the posts and in fixing qualifications for various grades of posts in the laboratory health services.

(9) To recommend the government for the establishment of national advisory council on the laboratory health services.

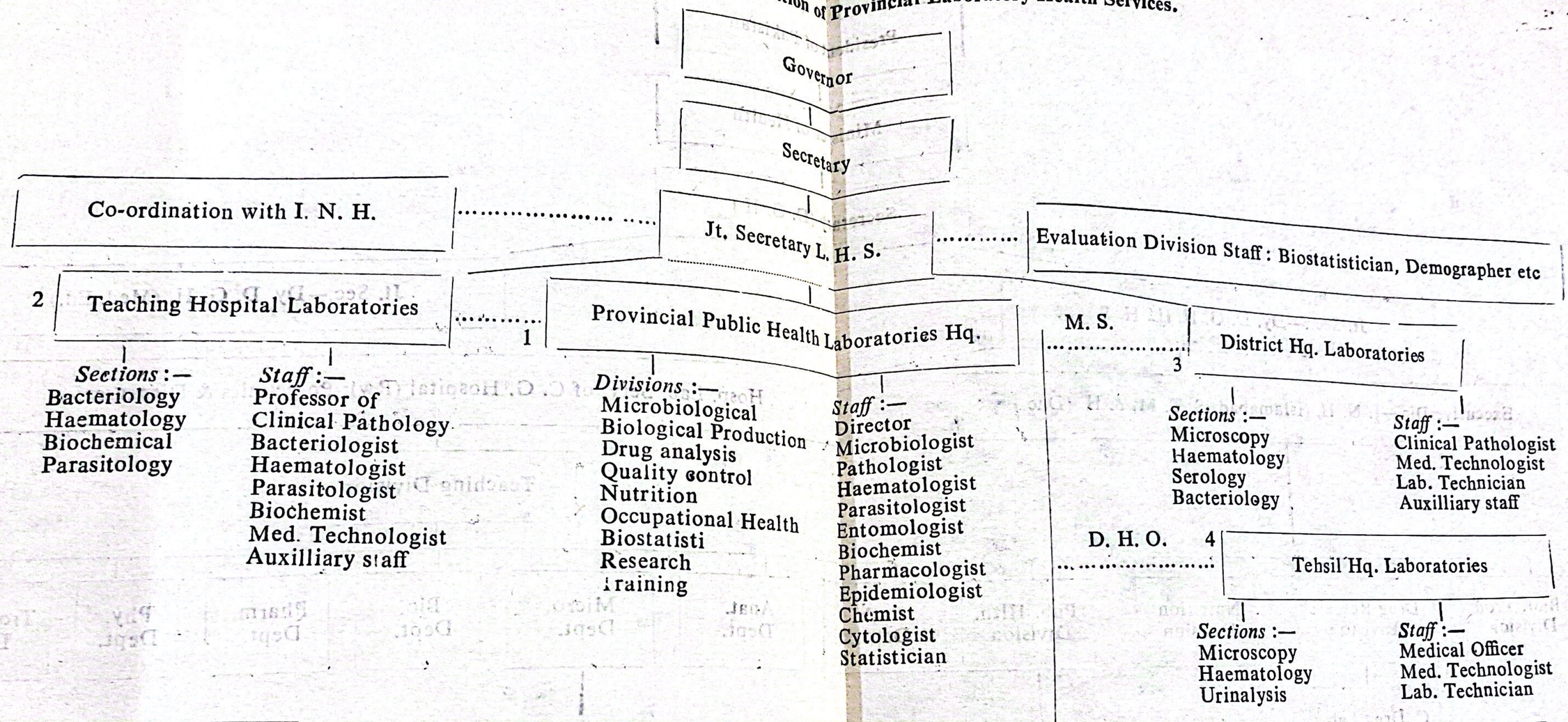
5. **Summary.**—The existing laboratory health facilities under the provincial and the central government have been discussed. The short comings of the prevailing system of the laboratory services have been pointed out and finally the proposals for the organisation and administration of a national comprehensive laboratory service at the provincial and central levels have been suggested.

Reference

Haleem, M. A. and Eveland, W. C. (1969) planning, organization and administration of the national health laboratory services within a developing country (Pakistan). East Pak. Jour. Med. Asso. 13 (1) : 1—18.

TABLE I.

Proposed Administrative Organization of Provincial Laboratory Health Services.



Surces of Staff at Various Levels

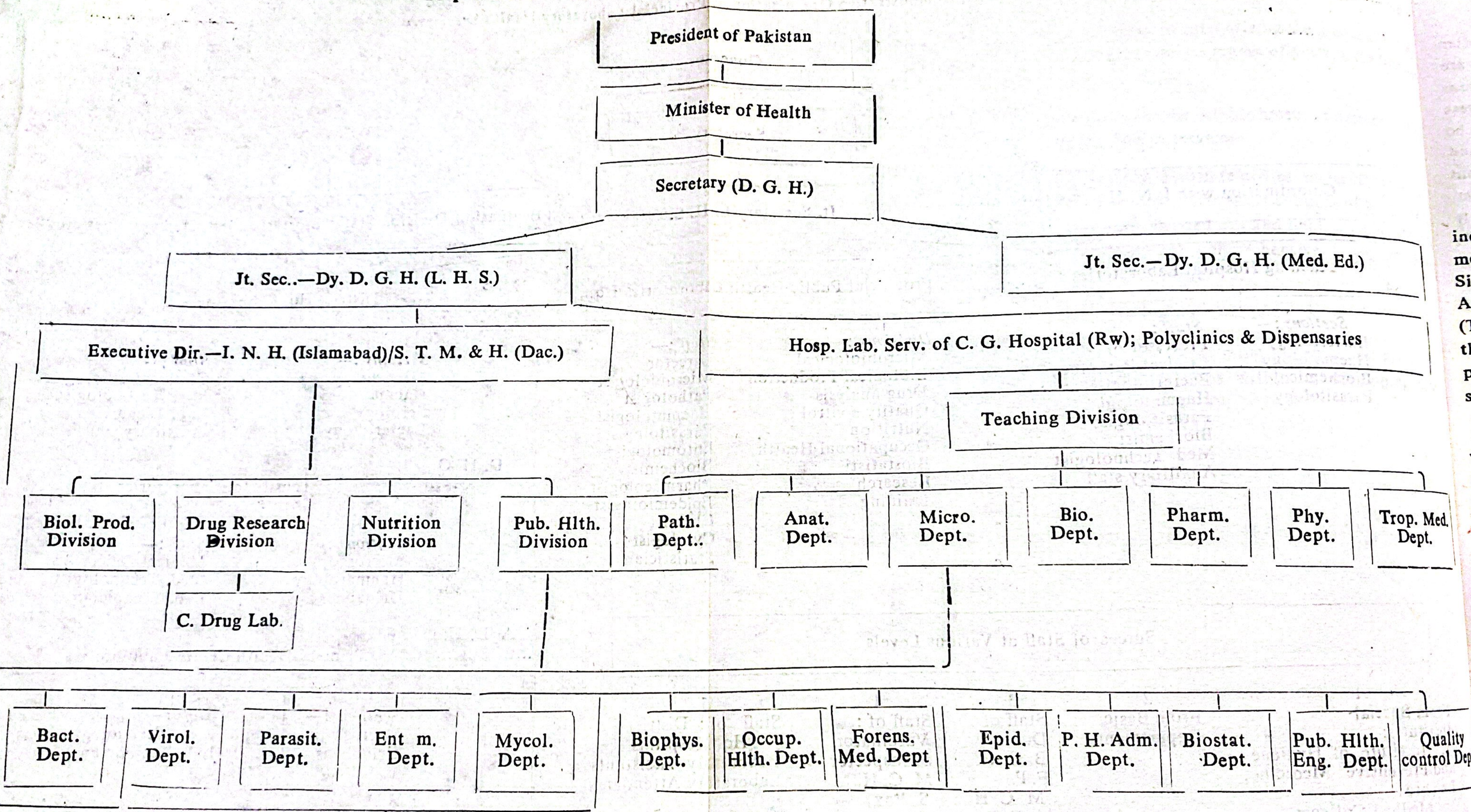
1	2	3	4	5
From Special Institutes: 1. Institute of Hygiene and Preventive Medicinc, Lahore. 2. Medical Colleges.	From Basic Departments	Staff of D. Hq B. C. G. F. P. M. C H. M. E. P.	Staff of : Vaccinator S. Inspeetor M. C. H. S. Pox M. E. P.	Staff of : District Hq. Hospitals. Laboratory Assistants. Laboratory Attendants.

Key for Abbreviations:

I. N. H: Institute of National Health
L. H. S: Laboratory Health Services
M. S: Medical Superintendent
D. H. O. District Health Officer
A. D. H. O: Assistant District Health Officer
F. P: Family Planning
M. C. H: Maternity and Child Health
M. E. P: Malaria Eradication Programme
S. Pox: Small Pox

TABLE No. II.

Proposed Administrative Organization of Federal Laboratory Health Services.



Key for Abreviations :—

1. D. G. H: Director General Health
2. L.H. S: Laboratory Health Services
3. Med : Medical
4. Ed: Education
5. I N. H: Institute of National Health
6. S. T. M, & H: School of Tropical Medicine & Hygiene, Dacca
7. Hosp : Hospital
8. Lab : Laboratory
9. Serv : Services
10. C. G. :Central Government
11. Rw. :Rawalpindi
12. Div. :Division
13. Dir.: Director
14. Bio. Prod.: Biological Production
15. Pb.: Public
16. Hlth: Health
17. Path: Pathology
18. Anat: Anatomy
19. Micro. MicroscoPy
20. Bio. Biochemistry
21. Pharm: Pharmacology
22. Phy: Physiology
23. Top Med: Tropical Medicine
24. Bact: Bacteriology
25. Viro : Virology
26. Parasit: Parasitology
27. Entom: Entomology
28. Myco : Mycology
29. Biophys : Biophysics
30. Occup. Health: Occupational Health
31. Forens. Med: Forensic Medicine
32. Epid: Epidemiology
33. P. H. Admn: Public Health Administration
34. Biostat: Biostatistics
35. Pb. Hlth. Eng: Public Health Engineering
36. Dept: Department

VITAL STATISTICS AS EVIDENCE OF NUTRITIONAL STATUS OF A COMMUNITY : A REVIEW OF THE PRESENT PRACTICES.

By

Dr. Muhammad Anwar Hussain, M.B.B.S., Dip. Nutr., Ph. D. (London),

Introduction:—Certain vital statistics have been traditionally accepted as indirect indices of nutritional status of a community. Crude mortality rates, age specific mortality rates and some cause specific mortality rates have been suggested. (Platt 1958 Sinclair 1948, Sebrel & Hundley 1954 Bengoa, Jelliffe & Parez 1959, Swaminathan & Apte 1959) and amongst them perinatal mortality rate has been suggested to be ideal. (Thomson & Duncan 1954). The most important advantage of this aproach is that these vital statistics can be measured precisely and objectively in a community. The purpose of the present paper, is to review critically the usefulness of certain vital statistices of nutritional status of a community.

Accuracy and Limitation of Vital Statistics:—In most of the developing countries where malnutration is very common the available data are very unreliable due to difficulties in estimating correct age, faulty and biased method of data collection, incomplete coverage and many other local and cultural factors.

International comparability of information of vital statistics is seriously hampered, and its usefulness limited, by the use of different tabulation systems, certification systems and diagnostic criteria, difference between medical opinions, use of different definitions of terms, different legislative practices and many other factors.

Even when statistics are collected and proved to be reasonably accurate and comparable, their interpretation remains a formidable problem. Apart from nutrition of other factors affect mortality and sometimes it becomes impossible to ascertain the primary cause of death.

Particular Vital Statistics which have been Suggested as Indicators of Nutritional Status.

A. "Toddler" mortality rates.

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The toddler is the pre-school child of about 1-4 years of age. This group often has limited access to the health services and at this age dietary requirements are relatively high. In the developing regions of the world this period is very dangerous because the child undergoes combined nutritional, infective and psychdological stress (Jelliffe 1966) the cumulative effect of which is reflected by death rates which may be 30-50 times higher than in Western countries (Table I). Protein-calorie dificiency and keratomalacia pre-dominently affect this group. Early weaning and other infant feeding practices must be taken into account while evaluating the rates because an earlier age incidence of protein-calorie dificiency has been reported with the early introduction of artificial feeding (Jalliffe et al. 1960). The use 1-4 years age-specific mortality rate as a public health index of malnutrition has been suggested (while and waterlow 1958; Herney 1958; Utley 1963). Herney produced evidence from a study of the effect of supplementary feeding of skimmed milk and reported a reduction of mortality in the 1-4 year age group which was statistically significant.

TABLE I

Death rates (all causes) for children 1-4 years old.

(Rates per 1000 total population).

Country	Rate		Ratio : country consideerd with Sweden.	
	Male.	Female.	Male.	Female.
Sweden ...	0·8	0·6	1·0	1·0
U. K. ...	1·0	0·8	1·3	1·3
Australia ...	1·0	0·9	1·3	1·5
U. S. A. ...	1·1	0·9	1·4	1·5
France ...	1·2	1·0	1·5	1·7
Yugoslavia ...	4·3	4·7	5·0	5·0
Portugal ...	6·8	6·3	8 0	10·0
Philippinas ...	8·5	7·9	11·0	13·0

Country.	Rate		Ratio : country considered with Sweden.	
	Male.	Female.	Male.	Female.
Panama ...	9·9	9·6	12	16·0
Honduros ...	13·4	13·2	17	22
Mexico ...	14·1	14·2	18	24
Columbia ...	15·5	15·5	19	26
U. A. R. ...	26·9	31·8	34	53
Guatemala ...	33·1	34·7	41	58

Source :—W. H. O. Statistics Annual, 1963 P. 266-271,

Mortality rates of children 1-5 years or 1-4 years old have been expressed in different ways and the following were suggested to be particularly useful in relation to nutrition. The inherent limitations and errors are more or less common to all—

1. Wills and waterlow (1958) suggested the ratio of death rates 1-4 years: death rates one month to 1 year as a good index of malnutrition They thought that this expression has two advantages. (*a*) poor. hygiene and consequent gastro intestinal and respiratory infections operate equally on both age groups.

(*b*) Death registration is more complete than birth registration and as a result estimates of infant mortality rates tend to be inflated. Wills and Waterlow assumed errors in death registratlon were comparable in both age groups and would even out if the respective death rates were expressed as a aatio.

Though the last assumption is reasonable, the validity of the first is open to question. Certain infections diseases for example tuberculosis Jayalashmi and Gopalan 1958) measles (Morley et al. 1967) parasitism and diarrheoa (Jordou et al. (1963) are more common in the 1-4 year age groups. although the situation varies from country to country. Morley reported (1967) a peak incidence of measles at 2 years in West Africa.Nutritional marasums is reported to occur mainly in the first year of life in Chile.Jelliffe et. al. (1960) reported a change in the age incidence of protein-calorie deficiency due to the introduction of early weaning in Trinidad. In Gambia,

Mcgregor et al. (1961) found a high pre-school mortality where primary dietary deficiency was uncommon but malaria and other infections were endemic. Thus local disease patterns and feeding practices must be taken into account while interpreting the retio. But on the whole the "Wille-Waterlow ratio" is a good approximate iedex of nutritional status in most places where malnutrition is prevalent.

2. Annual number of deaths in the 1-4 age group per 1,000 children of that age group. To determine this index, both the 1-4 year death rate and the total 1-4 year population must be known. In view of unreliability of present reporting systems in developing countries. Large errors are likely to be present in computation of the index and the information needed will certainly be more difficult to collect than that for the estimation of the Wills Waterlow ratio". A rate of 10 or over per 1,000 is suggested as indicative of the presence of widespread protein-calorie deficiency (Bengoa, Jelliff and Parvez 1959) Bengoa agreed with the author (personel discussion 1967) that this conclusion is merely based on his impressions after working in many countries of the world, but he could provide no scientific evidence to substantiate it.

3. Percentage of deaths of children under 5 years of age as a percentage of total deaths in the whole population. This can be calculated from Birth and Death records or census figures but requires a fairly good registration system which limits its usefulness in developing regions at the present time. As usual with other statistics this index will be high in developing regions but how far it indicates untritional involvement is uncertain.

4. A better concept suggested by W. H. O. (1963) is to analyse the mortality on a year to year basis so as to pick out the "peakage incidence" which is classically 1-2 years for protein-calorie dificiency (Table 2). A further refinement would be to use statistices from 6 months to 2 years of age in a 6 montly breakdown. Although this is out of tune with a worldwide tendency to early weaning, its introduction should be seriously considered especially in countries where malnutrition tends to occur early. But in any case, experience of the local disease pattern in childhood should be the main guide in deciding the most suitable age breakdown in statistical reporting bearing in mind that the data should be capable of being compared with that obtained elsewhere.

TABLE 2

Seeond year age specific death rates, selected countries by specified year.

(Annual death rate per 1000 population, aged 1 year and less than 2 years):

Malnutrition rare				Malnutrition common			
Country		Year	Rate	Country		Year	Rate
Sweden	...	1963	0·9	Thailand	...	1960	16·4
U. K.	...	1963	1·5	Chile	...	1960	24·3
Norway	...	1963	1·6	Mexico	...	1960	30 9
Japan	...	1963	2·5	Jordan	...	1960	30·0
U. S. A.	...	1963	1·6	Fl Salvador	...	1961	31·7
Italy	...	1963	3·2	Senegal	...	1957	61·0
Canada	...	1963	1·7	Guatemala	...	1963	62·1
Australia	...	1963	1·6	India, rural	...	1957-59	72·2
Netherlands	...	1960	1·7	Egypt	...	1961	107·0
France	...	1963	2.1	Gambia	...	1949-53	111 0
New Zealand	...	1963	2.2	St. Vincent	...	1960·62	147·6

Source :—Gordon, Wyon and Ascoli (1967).

Recently Gordon, Wyon and Ascoli (1967) have examined the second year death rate as an index of community malnutrition. They have found a good correlation between national food in take and second year death rate and also reported a good coincidence between clinical and epidemiological observation of nutritional deprivation and second year death rate in areas where field studies have been made.

B: 2-5 Months age specific mortality rate.—Aykroyd and Krishnan 1941) compared the infant mortality of 3 towns in a 'beriberi area' and 2 towns outside the 'beriberi area' in India with similar socio-economic background, and 10 towns in Burma where beriberi is unknown. A month by month analysis of the records showed a peak incidence of death between 2-5 months in the beriberi area but no peak was found for Burma or in town outside the beriberi area. Due to lack of comparable date they could not compare their findings with other countries where beriberi is endemic.

Aykroyd and Krishnan (1941) commented that though their observation was suggestive it did not prove that beriberi was the cause of the particular pattern of mortality during infancy. Proof could only be obtained by special field studies and therapeutic trials in sick children, which it seems to me, has never been done ; so the precise scientific value of this index has yet to be proved.

In view of the difficulties of assessing infantile beriberi by other means the 2-5 months age specific mortality rate may provide valuable circumstantial evidence. Other causes of death must be excluded or evaluated as far as practicable by reasoning.

It is unfortunate that the study of Aykroyd and Krishnan (1941) has never been repeated using bette- statistical and experimental design in other parts of the world where beriberi is common. An enormous amount of money has been spent on rice enrichment programmes but a infantile beriberi has not been undertaken. Otherwise valuable information would have been available about the relationship between age-specific mortality rates and thiamine deficiency.

C. Infant Mortaiity Rate.—It is generally agreed that infant mortality in one of the most sensitive indices of hygienic and health conditions of a community. But upon closer examination, as Yorusalmy (1945) pointed out, it is found to be true for mortality occuring during the 2nd to 12th month of life because neonatal mortality is not strongly correlated with external factors. With increasing age, infections become an important case of death in childhood,

TABLE 3
Infant Mortality in Selected Countries.

Malnutrition rare			Malnutrition common		
Country		Rate	Country		Rate
Canada	...	27·2	Ceylon	...	52·0
U. S. A.	...	25·2	Chile	...	117·0
Sweden	...	15·5	Mexico	...	70·0
New Zealand	...	19·5	Pakistan	...	120·0
Japan	...	28·6	U. A. R.	...	139·0
Israel	...	28·0	India	...	86·7

Source :—W. H. O. Epedemiological and Vital Statistic Report 1964.

The effect of poverty on infant mortality is very great, mainly because of associated malnutrition and overcrowding. Woodbury (1925) found an infant mortality rate in the U. S. A of 52.1 in households of with one person, 94.9 with two persons and a rate of 135.7 with 2 or more persons. There are many other examples which show this association because overcrowding increases cross infection.

Woolf (1947) after considering the effect of overcrowding, employment fertility rate and many other variables in a multiple regression equation concluded that poverty, mainly through malnutrition, and overcrowding are of equal importance in causing infant mortality. Overcrowding is a relatively unimportant factor in causiug still birth and most probably perinatal death also, but there is some association between overcrowding and neonatal deaths, Sutherland (1949) also reached the same conclusion. On final count Woolf (1947) estimated that overcrowding contributes 10.5 parts as against 37 parts by malnutrition in the causation of infant mortality illustrating that malnutrition is the more important factor.

In most of the countries where malnutrition is prevalent, poverty. overcrowding and bad hygienic conditions are also common place and infant mortality rates are also high (Table III). But the exact, contribution of different factors in still uncertain.

These rates are not strictly comparable due to unreliability underestimate than an overestimate. The date from developing countries mostly cover populations which have access to health centres. The great number of people in the developing countries are not covered by health services and for this reason are at greater risk.

Far higher mortality rates than shown in the table are reported for some African countries (Nicol 1949, Jalliffe 1952). Platt (1958) suggested that when rates as high as 500 per 1000 live births are observed, they are result of malnutrition and zymotic diseases and the blame may be shared equally by the two. It may be true but no scientific evidence is provided to support this hypothesis.

Infant mortality rate according to birth weight.—Traditional reporting of infant morality does not take any account of the birth weight. It is being increasingly recognized now that infants with a higher birth weight have more chance of survival than those of lower birth weight (Drillien 1966). Mackay et al (1969) have analysed detailed records of children during the first year of life and found a relationship between birth weight and mortality (Table 4).

TABLE 4.

Death rates during the first year of age by birth weight group.

Weight at birth in lbs.	No. of live births	No. of deaths	Rate of death/1000
up to 2·9 ...	26	12	462
3·0–3·9 ...	76	10	132
4·0–4·9 ...	351	8	23
5·0–5·9 ...	488	16	33
6·0–above ...	177	4	23
Total ...	1118	50	45

Souree :—Journal of Pakistan Medical Association,

D. The mortality statistic which is ideal as an index of nutritional status.—Thomson and Duncan (1954) suggested that "Ideally the best mortality statistic to use as an index of malnutrition would be one which depended little on either infectious or senile degenerative processes, but which was influenced by the physiological efficiency of the organism at its prime. No ideal mortality rate exists, but the neonatal death rate, or even better first week death rate, is probably one of the best because a substantial proportion of deaths in the earliest period of life are due to prematurity with no obvious pathological cause".

Many of the presumptive causes of death are common or similar in prinatal and neontal death. This is perhaps due to the fact that and neontal prinatal periods are continuous and complimentary to each other and an artificial devision in real terms is not possible. It is perhaps a matter of chance whather a child is stillborn or born alive to die within a week or in 4 weeks time (Sutherland 1949).

A substantial number of the causes of perinatal and neonatal deaths have not been properly determined, most alleged causes are merely descriptive of the mode of death and often this is unknown. Asphyxia, prematurity, atelectasis, congenital debility form a large number of the diagnoses of the causes of death. These terms do not tell us why the child is premature, asphxiated or debilitated. Date from the perinatal mortality survey in Britain (Butler and Bonham 1963) show that a third of the babies designated as premature because of a low birth weight were actually born after 38 weeks of gestation, and some born earlier were unduly small for gestational age. The current concept is that these "small for dates" babies suffer from some pathological change *tn utero* which leads to foetal malnutrition and growth retardation. In a series of observations in Madras (1957) Gopalan found that 73% of the neonated deaths were due to congenital debility and prematurity. A World Health Organisation report (W. H. O. 1966) mentions that on the average 45% of foetal deaths are classified under "diseases of the foetus and ill defined causes".

Most pathologists would probably agree that in a substantial number of cases even postmortem and histological examination of tissues do not help to establish a diagnosis, and even a specific diagnosis cannot always explain properly the cause of death. Butler and Bomham (1963) reported that autopay examination in perinatal deaths failed to reveal major lesions in 17% of cases of stillbirth and no histogical lesions in 8.7% of cases of early neonatal death. Antepartum and intrapartum anoxia were found to be the causes of 48.2% of stillbirth. Many other earlier studies came to the same conolusions (Cross, 1945 ; Baird, 1945 ; Drillion, 1947). These discussions clearly show the limitations of our understanding of the causation of

deaths in early infancy and much more knowledge is needed if we want to prevent this wastage of human life.

The postnatal development of an infant depends on its prenatal development, the one being continuous with the other (Hugget 1946-47). Genetics and nutrition are the two main prenatal factors which determine the chance of survival or well-being of an infant. The secular trend in birth weight and growth rate in different parts of the world and between different races points to the fact that nutrition is a more important determinant of health and well-being than is genetics. Genetice factor may determine the ultimate size of the body but nutrition is the prime factor which allows the attainment of the full potential of growth.

The source of all nutrients for the foetus in the mother. In the absence of organic disease of the mother or placenta the supply line is mainly dependent on nutrients in the mother's diets, her blood level of nutrients and her nutrient reserve in the body, that is to say the nutritional status of the mother and her ability to supply enough materials to the foetus. Therefore, it would be logical to discuss the effect of material diet and nutritional status, especially during pregnancy. and the effect of other environmental factors on perinatal death.

Maternal age, parity, socioeconomic class, antenatal care, obstetric skills-all have been shown to affect perinatal mortality rates (Sutherland, 1949 ; Duncan et al. 1952; Butler and Bonham, 1963). Still-birth and perinatal mortality rates were reported to be highest in first pregnancy, lowest second pregnancy and thereafter tended to increase with maternal age and parity. There is also a destinct socio-economic gradient, the ratesbeing highest amongst the poorest groups. Perinatal mortality survey data (Illsley and Kincaid 1963) also demonstrate a direct poverty gradient in nearly all causes of perinatal death. This is to be expected if nutritional involvement underlies the condition ; this would remain so even when standards of obstetric care are the same for all classes as shown in Aberdeen by Baird (1945). The effect of these biological factors must be considered when nutritional involvement is to be assessed.

The classic monograph by Boyd Orr (1936) provides most convincing evidence of the relation between poverty and malnutrition. He found that the poorest classes spent less money on food, had the poorest diets and smallest children. A higher incidence of rickets and anaemia were found in the poorest classes. This was true thirty years ago and there is no reason to suppose that is not so now especially in developing countries. The table 5 demonstrate that the combined perinatal and neonatal death rates are much higher in poorer countries.

TABLE 5

Early infant Mortality rates for Selected Countries (death per 1000 live births).

Country	Perinatal	Neonatal	Gombined	Country	Perinatal	Neonatal	Combined
Netherlands ...	16·76	12·76	18·17	U. A. R. ...	28·39	31·41	45·89
Sweden ...	16·27	12·44	17·64	Chile ...	32·81	36·99	47·32
Englad & Wales	20·38	15·08	2 2 48	Columbia ...	31·84	36·5	46·44
Japan ...	12·66	15·3	17·93	Philippines ...	30·65	33·49	41·59

Source :—W. H. O. Epidemiological Report 1966.

From the above discussion it is fairly clear that our knowledge of the causation of death during the perinatal and neonatal periods is far from complete and is perhaps holding up further progress in the reduction of mortality during these periods. More objective studies are needed to clarify this situation. It is also evident that many environmental and biological factors affect death during these periods. Though it is very difficult or almost impossible to measure the exact contribution of each factor there is not doubt that malnutrition is one of the most important primary causes for these deaths in early life. and in a study of perinatal deaths (Hussain, 1968 unpublished thesis) found that 34% of the babies had suffered from malnutrition as indicated by a high Brain weight : Liver weight : ratio (Brain weight Liver weight used as indicator of malnutition). The liver of these babies contained significantly lower amount of iron and folate compared to babies of normal Brain weight : liver weight ratio.

Effect of general nutritional status of the mother on perinatal martality.—(I) The Stature : Although adult stature is largely determined by genetic factors, the maximum stature in adult populations may change probably mainly for nutritional reasons (Boyne and Leith 1954). Thomson and Billewicz (1961) reported that in Aberdeen till primigravidae take a better diet than short primigravidae and this remains so even after standardisation, by regression, of the calorie intake to the mean body weight for all height. The proportion of tall women (196 c. m. or more) falls from 41% amongst the wives of professional men to 26% amongst the wives of semi-skilled or unskilled workers (Illsley and Kincaid 1963). In U. S. A. the average height of women aged 18—39 years in 1940 fell from 164.4 c. m. when the family income was

$3000 or more to 160.4 c. m. when it was less than $1000 (O'Brien and Shelton 1941). A possible explanation of this difference in stature may be that 'Many short women had been poorly nourished during growth and become stanted and unhealthy adults. Conversely, tall women had mostly been well nourished during growth and become healthy adults who reached the full stature of which they were generically capable' (Thomson and Billewicz 1963).

This hypothesis may well be true but how far this is due to nutritional factors or due to genetic and other environmental factors is not known. But assuming that this hypothesis is true, it is expected that mortality rates amongst the off springs of small women would be relatively high. Thomson and Billewicz (1963) found that perinatal mortality among babies of shorter women in Aberdeen was relatively high and also in Hong Kong. They also reported that the perinatal mortality and prematurity rate and caesarian section rate are higher in groups of primipara with the poorest standards of health and physique.

2. **Effect of diet during pregnancy on perinatal dealth.**—A number of investigations were conducted before, during and after the last world war. They were principally of two types :—

(*a*) The diet of pregnant women were carefully evaluated at some stage or stages of pregnaucy and the outcome of prcgnancy and related to the quality and quantity of the diet.

(*b*) The die of the poorer groups were supplemented with nutrients of various types and dietary advice given. The subsequent outcome and reproductive histories were evaluated and related to diets.

Most of the studies during or before the war reported beneficial effects of supplements or dietary advice durlng pregnancy (Ebbs et al. 1941 ; 1942; Cameron and Graham 1944 ; Burke et al. 1943 a, b ; Peoples League of Health 1946) and negative results were found only in two studies (Dickman et al. 1944 ; William and Fralin 1944). The techniques used in many of these studies is open to much criticism. In the Toronto study (Ebbs et al. 1941, 1942) the numbers were too small and according to small and according to Sinclair (1944) the paper contains contradictions and misstatements ; furthermore the incidence of complications in multipara was so great that it is doubtful whether the results obtained were really significant.

In Balfour's (1944) study selection of patients was baised, controls were not exactly comparable and dietary ratings were imprecise. The People League of Health

(1946) and Burke et al. (1943) used dietary questionnaries which have been ricticized severely by Lietch and Aitken (1949-50). In interpreting the result the normal physiological changes of pregnancy were sometimes not appreciated (Beaton 1961).

The limitations and critical evulation of these studies led to several more recent enquires using better statistical designs and better techniques. These later studies failed to confirm the earlier ones and it is fair to say that the results on the whole do not indicate any influence of the maternal diet on the outcome of pregnancy (Sontag 1947, Hobson 1948; Speert, Graff and Graff 1951; Moyer, Keely, Mack, Dilovets and Pratt, 1954; McGanity et al. 1954; Thomson 1959). In many of these studies the average nutrient intakes were not for below the recommended studies the average nutrient intakes were not far belows the recommended standards. Pathak (1958) reported the dietary intake of Indian beggers and mentioned that the young children were free from symptoms of malnutrition. On the other hand Woodhill et al. (1955) found a striking correlation between dietary history and reproductive performance. Evaluation of this contradictory evidence will be discussed later after presenting epidemlological evidence from times of war and scarcity of food.

3. **Evidence from times of war and scarcity.**—Valora (1946) and Tremolieres (1947) stated that during general food shortages and famines there were increases in the number of stiilbirths, premature births and of infants seriously underweight at birth; and an increase in infant mortality rate which was more pronounced than the accompanying increase in the general mortality rate.

Antonov (1947) reported that during the siege of Leningrad the average birth weight fell by 529 gms. The stillbirth rate was almost doubled, 49% of the children were premature and significant number at births were diagnosed as congenital debility. Antonov quoted several other Russain authers who found a reduction of birth weight during the first world war. He also described the severe conditions including lack of heating and compulsory manual work during pregnancy. He attributed the high infant mortality rate to the lack of vitality of the foetus.

Smith (1947) found that babies born durlng a period of wartime famine in Holland were about 200 gm. lighter and shorter than those born formerly. Prematurity was slightly increased but no ill effects on stillbirth and neonatal death were demonstrated. The birth weight rose after the return of food in a manner particularly related to maternal diet in the last half of pregnancy. It appears that during the period of severe hunger after 4 years of regulated and fair nutrition, the nutrient reserves of the mother had been sufficient to carry the foetus to term. During the

hunger period most of the women were amenorrhoric and too few babies were born to evaluate the situation statistically. Smith himself commented that "the result of any form of dietary inadequacy must very in accordance with the extent in time, with the period of gestation in which it occurs and equally with the duration of adequacy before pregnancy".

During the second world war, the stillbirth rate in Great Britain fell substantially from 38 to 28 which unparalleled even in peace time. The most striking fell was observed in the "ill-defined and unknown cause" group, congenital and prematurity. This decline coincided with the introduction of pripority feeding for pregnant and lactating mothers. Duncan et al. (1952) concluded that the fall in the rate of death duc to ill-defined causes suggests that the efficiency of reproduction of mothers was improved especially of those amoungst social classes III, IV and V (skilled, semi-skilled and unskilled workers respectively). They argued that at the height of the war, there was no reason to suppose that the efficiency of the maternity service had increased. Therefore, they concluded that the only factor 'which fits the facts' was improvement in the nutrition of the mothers. This monumental evidence in favour of better nutrition leading to improved reproductive efficiency at first sight seems to be in direct conflict with the result of controlled studies. Duncan et al. (1952) also reported that the relative distribution of early deaths remained almost the same amongst different socio-economic classes thus indicating the continuing importance of life-time nutrition or reproductive efficiency.

Not only does the diet of pregnant women vary within wide limits without apparently causing any ill effects on the foetus but there is also evidence that nutritional adeptation during pregnancy improves absorption and/or utilisation of certain nutrients (Beaton 1961). The so-called recommended standards, against which the adequacy of diets is judged includes a safety factor meant for optimum rather than minimum requirements. That is to say the minimum requirement is not defined. This leaves an assential gap in our understanding of the nutrient requirement of pregnant women and therefore we can only make some reasonable and intelligent guesses on the subject. In an absolute sense we are not in a position to interpret on a proper scientific basis the result of past and present studies on the relation of maternal nutrition to the condition of the foetus. No wonder that we get conflicting conclusions from different workers. May be the negative results of recent studies are due to the fact that though some of the diets were grossly imbalanced, they may still have been above the minimum requirements, Also negative results would most likely be

obtained in populations which are normally well fed, and always have a reserve to cope with an adverse situation. A good prepregnant diet is an insurance against abnormal pregnancy and the best insurance might well be a good diet from growth to maturity and throughout the reproductive cycle of a woman.

Not enough is known about the aetiology and physiological pathology of certain pregnancy disorders. The association of socio-economic gradients in nutritive value of diet and clinical statistics are often taken as a primafacie case for postulating an effect of diet on such disorders but mothers who differ in socio-economic class differ also in many other ways and it is impossible to find a group which differs only in their diet from the normal? It is reasonable to suppose that frank deficiency and undernutrition will definitely affect the reproductive efficiency and increase the incidence of perinatal mortality. The situation in wartime Leningrad is an outstanding example. Under ordinary circumstances it will not be easy to demonstrate the effect of diet on perinatal death especially when a community is usually well fed. In previous studies the numbers involved were too small to indicate a possible trend at national level. A slight and insignificant defference in a small group becomes significant in a large group. The wartime evidence if lookedat in this perspective does not seem to be conflicting at all.

Morbidity statistics and cause-specific mortality rate as indices of nutritional status.—Mortaliy and morbidity rates are adversely affected by malnutrition in certain diseases like tropical ulcer, diarrhoea of infectious origin, tuberculosis, measles and bronchopneumonia (W. H. O. 1963). Therefore mortality and morbidity rates from these diseases are suggested to be indicative of nutritional status.

Diseases affecting nutritional status Diarrhoea.—Diarrhoea is the most important cause of death amongst young children and may be responsible for a substantial number of deaths that occur in the latter half of first year of life (W. H. O. 1951). Malnutrition and infection act synergistically to cause the death of the child, making almost impossible to determine the primary cause of death even at autopsy. But an infection presumably give the 'coup de grace' it is diagnosed in ordinary practice as the primary cause of death. Scrimshaw (1964) reported that in as many as 80% of cases of weanling diarrhoea in malnourished children no pathogenic bacteria have been isolated and it is assumed that the children have become sensitive to a number of normally harmless organisms.

I studied the dietary history and history of illness amongst 400 East Pakistani children under 4 years of age (Hussain, 1963). Three quarters of them gave a history of diarrhoea. current, recurrent of chronic; 77.5% gave a history of respiratory

disease and 53% had passed round worms in their stools. Malnutrition was doubtless a predisposing cause but it was very difficult to decide which was the primary cause of ill health, disease or malnutrition.

In the rural hightlands of Santamaria, Guatemala conventional public health measures were applied in one village and in another similar village the people were given nutritional supplements without any public health measures (Scrimshow 1964). In the first village there was no reduction of diarrhoeal disease. In the other village where supplementary feeding was given there was a reduction of diarrheal disease over the same period of time. This study shows clearly the importance of nutritional status in the prevention of diarrhoeal disease and therefore the incidence of diarrhoea in early childhood is a valuable index of nutritional status.

Measles.—Measles is a universal disease and the attack rate remains high even in countries where mortality due to this condition is now very low (Wilson 1962). Under the universal stress of infection with the measles virus mortality rate and severity of the disease seem to be to a considerable extent related to the nutritional state of the group affected (W. H. O. 1963). The effect of malnutrition on the mortality rate of measles was reported by Raba 1957 (quoted by Lowenstein 1963) who compared the mortality rates of measles in two similar villages, one with a supplementary feeding programme protecting children against protein calorie malnutrition and the other one as control. The mortality rate in the control village was 4 times higher than in the experimental village. Morley et al. (1967) found that in West Africa 16.3% of the cases of meales either had oedema or skin changes characteristics of kwasiorkor or, is most cases, developed malnutrition subsequently. They also found that the average weight of the children affected by measles was considerably lower than the average standard weight of West African village children (Morley 1967); weights of children who died after the year were considerably below the 10th percentile. Morley (1962) also reported that in a Western Nigeria hospital lethality from measles was 25%, and 13% of the cases of measles devoloped kwasiorkor. Measles epidemics are reported to be followed 6—8 weeks after by epidemics of kwasiorkor (DeMaeyer 1958). Measles is a disease which seems well known in all communities so that information about it can be obtained by questioning the villagers. The following table shows the mortality rate from measles from selected countries and demonstrates that is much higher in countries where malnutrition is common.

TABLE 6

Death rate from measles in children under 1 year and 1-4 years old.

(Rates per 100,000 population and per 100,000 live-born for infants under 1 year).

Country		0-1 year 1963/1964	Rate	1-4 years 1964
Belgium	...	1·2	(1963/64)	0·6
U. S. A.	...	2·0	(1963/64)	1·1
Japan	...	21·4		5·7
Panama	...	41·5		26·7
China (Taiwan)	...	48·4		35·6
Philippines	...	58·4	(1963)	31·8
Colombia	...	61·1		54·8
Mexico	...	88.4	(1963)	41·7
United Arab Republic	...	71·0		101
Guatemala	...	...		184·2
Chile	...	413·2		155·3

Source :—Word Health Statistics Annual, 1963 ; Epidemiological and Vital Statistics Report 1967, 201, and 2.

Tuberculosis.—An increased mortality from tuberculosis is a well know companion of war and famine (Sebrel and Hundley 1954). During the first world war a rise of 30% was recorded in Denmark which was associated with a decreased supply of food. There was a reduction in the incidence of tuberculosis to the pre-war level when more food become available (Reitch 1950). High mortality was also reported for England in 1914-18 and Cobbett (1930) concluded that interference with food supplies was the main cause. Leitch (1945) reported a reduction in the incidence of tuberculosis when fresh milk was added to the diet of cadets, whereas no reduction was achieved through better housing. In Holland in 1944, when famine conditions

prevailed there was a great increase in tuberculosis which suggests that a dietary factor was involved ; but one paradoxical finding was a reduction of the proportion of children with a positive skin test (Pirqet) in spite of the increase in the number of open cases (Burger et al. 1948). This suggest that the increased number of deaths might have been due to lowered resistance of the infected persons rather than an increase in the number of new cases. Tuberculosis is also reported to be more common in nutritionally vulnerable groups like toddlers (Jayalaksmi and Gopalan 1958) and adolescent girls (Johnston 1953).

It is almost impossible to qualify the part played by nutrition in the causation of tuberculosis which is primarily a specific bacterial disease. But the outcome and course of the disease is worse in malnourished populations. Though chemotherapy has changed the outcome of the disease, nutrition still plays a substantial part by affecting the resistance of the patients after they are infected rather than influencing the incidence of infection itself. The general reduction of mortality from tuberculosis over the years in developed couutries though usually assigned to better treatment and control, has also been associated with a marked improvement in standards of nutrition.

From this discussion it is evident that malnutrition adversely affects the outcome of tuberculosis but there is conflicting evidence regarding the association between the incidence of tuberculosis and malnutrition. More controlled studies are needed to clarify the situation. Meanwhile tuberculosis specific death rates may be used with reservation as a nutritional index.

Life expectancy.—Survival of the fittest is a law of nature and survival and wellbeing should be the final criteria to judge the health of an individual or community (Wadsworth 1963). Nutrition, which is associated with life from conception to death is the most important determinant of health. Thus it can be argued that a longer life expectancy is associated with better nutrition, and is, therefore, a good index of nutritional status,

Life tables are based on past mortality experience and lower mean expectancy means that very many people die younger. Life expectancy is ever changing and an increase indicates that fewer deaths are occuring in early life, that is at an age most strongly influenced by nutrition, therefore a life expectancy table is a very useful index of the level of health and nutrition in a community.

Percentage of survival over 50 years of age.—Life percentage below 4 or 5 years of age, percentages of survival over the age of 50 years may be an index of nutritional status because fewer people survive after the age of 50 years in countries where there is less food.

TABLE 7

Percentage of Survival after the age of 50 in Selected Countries.

Country		% Survival	Country		% Survival
England	...	96	India	...	27
Canada	...	75	Mexico	...	27
Japan	...	67	Thailand	...	27
Israel	...	59	Egypt	...	25
Ceylon	...	36	Guatemala	...	20
Malaya	...	28			

Conclusions.—From this discussion of vital statistics some broad conclusions can be drawn.

Malnourished communities are characterised by high perinatal and neonatal mortality rates, higher infant mortality, exceptionally higher toddler mortality and high rates of mortality and morbidity from diarrhoea, measles and tuberculosis; low mortality and morbidity from diabetes and atheroslerosis; low percentage of survival over 50 years of age and low life expectancy. The opposite is usually true for well nourished communities.

Interpretation of vital satistics is difficult and sometimes liable to be wrong. Each case must be valuated according to the known disease pattern of the country or community making allowance for the reliability and limitation of the particular data, Evidence from clinical, dietary and biochemical studies and other related information must also be considered. Vital statistics provide only circumstantial but valuable evidence for evaluating the effect of public health programmes including those

directly concerned with nutrition. But unless the quality of the statistics is markedly improved in the majority of countries they can lead to erroneous conclusions and in a scientific sense they are of limited value. If vital statistics are going to be used as a reliable index of nutritional status urgent efforts must be made in developing countries to improve their quality. To effect this, sample areas could be put under direct observation as a part of a longitudinal study and statistics collected over a specific period of time. As a result of such studies a reliable system might be applied to a whole country. Only by special efforts can information be obtained which public health workers could use with condifence. The particular virtue of information about mortality rate is the fact that it is messurable in precise terms at national or communal levels. Death of course is the end result of many causes, but in most countries death early in life seems to be strongly indicative of poor standards of nutrition. Thus the development of a reliable means of collecting and analysing infant and child mortality rates would be of major importance in public health nutrition practice.

Reference

1. Antonov, A M (1947) *J Pediat* 30, 250.
2. Aykroyd, W. R. and Krishnan, B. G. (1941) *Ind. J. Med. Res.* 29, 703.
3. Baird, D. (1945) *J. Obstet Gynec. Brit. Emp.* 52, 217 & 339.
4. Belfour, M. I. (1944) *Lancet*, 1, 208.
5. Beaton, G. H. (1961) *Fed. Proc.* 20, 196 Suppl. 7.
6. Bengoa, J. M., Jalliffe, B.D , and Parez, C. (1959) *Amer. J. Clin. Nutr.* 7, 714.
7. Bengoa, J. M., (1967) *personal communication*,
8. Berger, G. C. E., Drummond, J. C., and Standstead, H. R. (1948) *Malnutrition and Starvation in western Netherland* Sept. 1944, July 1955 Part I, The Hague Central Printing Office, Page 26.
9. Boyne, A. W. and Litch, I. (1954) *Nutr. Abstr. & Revs.* 24, 2255.
10. Burke, B. S , Beal V. A., Kirkwood, S. B., Stewart,, H. C. (1943) *Amer J. Obstet. Gnec.* 46, 38.

11. **Butler, N. R., and Bonham, D. G., (1963) perinatal Mortality,** *The first report of the 1958 British Perinatal Mortality Survey,* **Livingstone Edin & Lond.**

12. **Cameron, C. S. & Graham, S. (1944)** *Glasgow Med.* **J. 24, 1.**

13. **Cobbett, L. (1930)** *J. Hyg.* **30, 79.**

14. **Crosse, V. M. (1945)** *The Premature baby,* **Churchill London.**

15. **Dickman, W. J., Adair, E. L., Michel, H., Kremers, S. Dunkle, F., Aurther, B., Costin, B., Compbell, A., Weusley, A. C., Lorang- E., (1944)** *Amar. J. Obstet Gynec.* **47, 357.**

16: **Drillien, C. M. (1947)** *J. obstet Gynec. Brit. Emp.* **54, 300 & 443.**

17: **Drillien, G. M. (1966)** Prematurity and Low Birth weight. In *Child Health and Development,* Ed. Ellis, R. W. B., Churchill, Lond. P. 87.

18. **Duncan, E. H. L., Baird, D. and Thomson, A. M. (1952)** *J. obstet. Gynec. Brit Emp.* **59, 2,** 183.

19. **De Maeyer, D. B. (1958)** *Personal communication.*

20. **Ebbs, J. H., Brown, A. Tisdall F. F., Moyle, W. J., and Bell, M. (1942)** *Canad. Med. Asso. J.* 46, 6.

21. **Ebbs. J. H., Trisdall, F. F., & Sco. H., W. A. (1941)** *J. Nutr.* 22, 515.

22. **Gopalan, C. (1957)** *J. Twp. Pediat.* 3, 3.

23. **Gordon, J. E., Chitkara, I. D. and Wyon, J. B. (1963)** *Amer. J. Med. Sci.,* 245, 129.

24. **Gordon, J. E., Wyon, J. B., and Ascoli, W. (1967)** *Amer. J. Med. Science* 254, 3 No. 1145 121/375.

25. **Harney, L. (1958)** *West Ind. Med. J.* 7, 211.

26. **Hobson, W. (1948)** *J. Hyg.* (*Camb*) 46, 198.

27. **Hugget, A. St. G. (1946-47)** *Brit. Med. Bull.,* 4, 3, 196.

28. **Hussain, M. A. (1963)** paper presented at *10th Annual Conference Pakistan Med, Associatien,* Dacca.

29. **Hussain, M. A. (1968)** ***unpublish thesis.***

30. **Illsley, R. and Kincaid, J. C., (1963).** ***In perinatal Mortality*** **Ed. Butler & Bonham.**

31. **Jayalakshmi, V. T. and Gopalan, C. (1958)** ***Ind. J. Med. Res.*** **46, 187.**

32. **Jalliffe, D. B. (1952)** ***Trans. Roy. Trop. Med. Hgy.*** **46, 13.**

33. **Jalliffs, D: B., (1966).** The assessment of Nutritional Status of the community, *W. H. O. Mon.* Ser. 53 Geneva.

34. **Jalliffe, D. B., Symonds, B. E. R. and Jelllffe, E. F. R. (1960).** *J. Paedlat* 57, 922.

35. **Johnston, J. A., (1953)** ***Tuberculosis in Adolescent Girls*** Springfield, Illinois, Thomas—C.

36. **Leitch, I (1945)** *Proc. Nutr.* **3, 157.**

37. **Leitch, I., and Aitken, F. C. (1949-50)** ***Nutr. Abst. & Revs.*** **19, 507.**

38. **McGanity, W. J., Cannon, R. O., Bridge-forth, E, B., Martin, M. P., Densen, P. M., Newbill, J. A. McClellan, G. S. Christic, A., Peterson, J. C., and Darby, W. J. (1954)** *Amer. J. obstet. Gynec.* **67, 101, 491, & 501,**

39. **McGregor, I. A., Billewicz, W. Z., and Thomson, A. M. (1961)** *Brit. Med. J.* 2, 1661.

40. **Mackay, D. M., Rahman, M. M. Bairagi R. (1969)** ***Journal of the Pakistan Medical Association,*** **pages 19 : 144—146.**

41. **Morley, D. C. (1962)** *Amer. J. Dis. Child.* **103, 230.**

42. **Morley, D. C. Woodland, M., Martin, W. J., (1963)** *J. Hyg. (Camp)* 61, 115.

43. **Morlay, D. C., Martin, W. J., and Allen, I. (1967)** *West Afi. Med. J.* 16, 1, 24.

44. **Nicol, B. M, (1949)** *Brit. J. Nutr.* **3, 29.**

45. **O'Brien, R and Shelton, W. C. (1941)** *U. S. Dept. of Agriculture* Misc. Report 454.

46. **Orr, J. B. (1936)** *Food Health and Income*, Macmillan, London.

47. **Pathak, C. L. (1958)** *Amer. J. Clin. Nutr.* 6, 151.

48. **Peoples League of Health (1946)** *J. Obstet. Gynex.* 53, 499.

49. **Platt. B, S. (1958)** *Trans, Rop. Soc. Trop. Med. Hyg.* 52, 499.

50. **Reitch. R. A. (1950)** *Pathogenesis of Tuberculosis* Ed. Thomas, C. C. Springfield, Illinois.

51. **Scrimshaw, N. S. (1964)** *Amer. J. Clin. Nutr.* 14, 112.

52. **Sebrell, W. H. Jr. & Hundley, J. M. (1954).** *In methods for evaluation of Nutritional adequancy and status* Washington, D. C., National Academy of Sciences N. R. C., pages 180.

53. **Sinclair, H. M. (1948)** *Vitamins & Hormones*, 6. 101 A. P. N. Y.

54. **Smith, C. A. (1947)** *J. Pediat.* 30, 3, 229.

55, **Sontag. L. W. and Wines, J. (1947)** *Amer. J. Obstet. Gynec.* 54, 994.

56. **Speert, H., Graff, S., and Graff, A. M. (1951)** *Amer. J. Obstet. Res.* 62, 1069.

57. **Swaminathan, M. E., Apte. S. V., Someswaro Rao, K. (1960)** *Ind. J. Med. Res.* 48, 762.

58. **Sntherland, I. (1949)** *Stillbirth, Epidemiology and Social Significance,* Oxford University Press.

59. **Thomson, A. M. (1959)** *Brit. J. Nutr.* 13, 509.

60. **Thomson, A. M. & Bellewiez, W. Z. (1963)** *Proc. Nutr. Sec.* 22, 1, 55.

61. **Thomson, A. M. and Duncan, E. M. L. (1954)** *Nutr. Abstr. & Revs.* 24, 1.

62. **Tremolieres (1947)** quoted in U. N. *report on Roetal Infant and Early Childhood Mortality* Vol. II. Biological, Social & Economic factors. No. 13, 1954.

63. **Uttley, K. H. (1963)** *Trans. Roy. Soc. Trop. Med. Hyg.* 57, 41.

64. **Veloras, V. (1963)** *Milbank Memorial Quaterily*, 21 (3) 215.

65. **Wadsworth, G. R. (1963)** *Proc. Nutr. Soc.* 22, 1, 72.

66. **William, P. F. and Fralin, F. G. (1942)** *Amer. J. Obstet- Gynec.* 43, 1.

67. **Wills, V. G. and Waterlow, J. C. (1958)** *J. Trop. Pediat* 3, 167.

68. **Wilson, G. S. (1962)** *J. Dis. child*, 103, 219.

69. **Woodbury, R. (1925)** Quoted in *U. N. Report on Foetal Infant & Early Chilhood Mortality* Vol. II Biological Social and Economic Factors, No. 13, 1954.

70. **Woodhill, J. M., Vandenberg, A. S. Burke, B. S. & Stare, S. G. (1955)** *Amer. J. Obstet. Gynec.* 70, 987.

71. **Woolf, B. (1947)** *Brit. J. Soc. Prev. Med.* 1, 73.

72. **W. H. O. (1950)** *Tech. Rep. Ser.* 25, 12.

73. **W. H. O. (1966)** *Tech. Rep. Ser.* 258.

74. **W. H, G. (1966)** *Epidemiological & Vital Statistios* Vol. 19, 6.

75. **Yorusalmy, J. (1945)** *Human. Biol.* 17, 45.

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LEPROSY IN EAST PAKISTAN

Dr. Mushtaq Ahmad Chaudhary, M.B.B.S., D.P.H., D.E.C.D., (Prague).**

Suceptibility.—Leprosy is a chronic, mildly communicable disease caused by *Mycobacterium leprae*, the source of infection being exclusively human cases discharging bacilli. Lepromatous cases constitute the principal, though not exclusive source of infection. Even lepromatous form does not appear to be infectious to most of the individual. It is the natural suceptibility of the host that plays an important role in deciding whether or not an individual will develope the disease.

Natural suceptibility is greatest in child-hood. In small proportion of individuals the suceptibility does not decrease with age. It is in these minority of individuals that clinical leprosy may develope at any time, often in later life after exposure to infection.

Distribution of leprosy in the World.—Number of estimated leprosy cases in the world in 1965 was 10,786,000 of whom 3872000 had some disability including anaesthesia). The number of estimated cases by continent was as follows : Africa : 388000 ; Asia 6475000 ; Europe 52000 ; Oceania 33000. In the last five years 500,000 cases have been detected and registered in 75 countries. It is unlikely that the prevalance rate will exceed 50/1000 even in highly endemic areas.

Human, Social and Economic implication of leprosy.—While considering the seriousness of leprosy in relation to other diseases ; the duration of the disease, the disabilities the causes, and human and social consequences to the leprosy patients and their families must be taken into account. The long duration of the disease, the frequent and persistant disabilities, the normal span of life of tuberculoid and indeterminate cases and high cost of reconstructive surgery give leprosy a special position among diseases. To all this should be added the age old prejudice against the disease cause such a reaction in the society, and so much distress and unhappiness to patients and their families.

Situation in East Pakistan.—With the assistance of W. H. O. a leprosy control project was started in East Pakistan in January 1962. Exact situation of the disease at that time is not known. In 1963 there were approximately 3,000 registered cases

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and this figure increased to 11,775 in the later part of 1966. These cases were registered at I) Mobile Unit Dacca, 2) Static clinic Dacca 3) Mobile Unit Nilphamari, 4) Statics clinic Nilphamari, 5) Mobile Unit Sylhet 6) Leprosy Hospital Sylhet 7) Mobile Unit Rajshahi 8) Missionery agencies (7 in number).

Lepromatous rate was different in different centres ranging from 14% to 30% with 22% as the average. Sex ratio also differend widely from 2 : 1 to 5 : 1 male to female. Children were affected from 10% to over 20%.

The cases mentioned above were registered without active case finding activities.

Pilot Project Nilphamari sub-division 1967.—A pilot project was started in Nilphamari sub-division towards the end of 1967 with a view to develope case finding activities and also to determine and demonstrate suitable methods of leprosy control adopted to local conditions.

Exact number of registered cases in Nilphamari sub-division before the starting of pilot project was 1662. The population of area (1961) being 6,93,125 the leprosy rate comes to 2.4/1000. Infectious cases among these 1662 were 313 giving a percentage of 18.8. The estimated prevalence rate was calculated between 7.19/1000 to 13/1000.

The pilot area consisted of four out of six thanas of Nilphamari sub-division. The area covers 410 sq. miles or 1000 sq. K. M. with a population of 5,70,000. The area was divided into 10 almost equal sectors. Case finding methods consisted of :

(*i*) Home visit to already registered cases.

(*ii*) Contact Examination.

(*iii*) Discovery of new cases by notification.

(*iv*) Examination of groups population, mainly those living in the vacinity of already registered or newly discovered patients.

Case-finding activities.—During the three year period from 1968-1970 a total of 11314 contacts had been examined, 547 (4.8%) of these had leprosy. Notification was the most effective case-finding method. During the three year period 1945 case were notified and 1445 of these had actually the disease *i.e.* 74.3% of notified persons had leprosy. During 1970 a total of 210 persons came in voluntarily for examination and 184 (87.6%) of them, were found to be suffering from disease. Among the various groups of population 0.2% of the examined had the disease. 35 (0.6%) out of 5979 school children examined had leprosy.

Year wise cases found by different case-finding methods are given in table No. I. Tables No. II, II (*a*) and II (*b*) give break down of these cases in age groups 0-14 and 15 and over and also sex-wise distribution. It is seen that during the period from 1968-70 a total of 144,725 persons had been examined and 3263 (2.3%) of them were found to be suffering from leprosy.

Contact Tracing.—As has been mentioned before, during 1968—70, out of a total number of 11314 contacts examined 547 (4.8%) had leprosy. On further analysis it is seen that out of total contacts examined 2595 were contacts of lepromatous cases. Out of these 244 (9.4%) cases of leprosy were discovered, 27 of these secondary cases were lepromatous, 68 indeterminate and 149 tuberculoid. In case of 1807 contacts the index cases were of indeterminate type and in all 20 (1.1%) cases were discovered among them. Out of these one was of lepromatous type, indeterminate and 11 tuberculoid. Among the 6,907 contacts of tuberculoid cases a total of 282 (4.1%) secondary cases were discovered. 16 of these were lepromatous, 90 indeterminate and 176 tuberculoid.

It is seen that lepromatous cases are most infectious ; infection rate among the contacts of these cases being 9.4%. Although tuberculoid cases are not as infectious as lepromatous one, it is seen that 4.1% of contacts of these also developed the disease. It has been suggested that truly polar tuberculoid cases are not normaly infectious. Fernandex has been quoted as having failed to discover a single instance of infection in a large group of child contacts with this type of leprosy over a period of 15 years. Similarly in Brazil among 40,000 contacts not a single case of leprosy appeared among those exposed to the truly polar tuberculoid type. It should however be emphasised that these observations refer to contact with truly polar tuberculoid leprosy.

From table No. III it is also seen that out of a total of 547 secondary cases discovered during the three year period, more than half (336) were of tuberculoid type. There were only 44 lepromatous cases among the secondary cases. These findings correspond with the view expressed in third report of the W. H. O. Expert Committee in leprosy, that most secondary cases are tuberculoid and of minial extent.

Year-wise details of the cases discovered by examination of contacts are given in table No. III.

Type of the cases discovered.—Table No. IV and IV (*a*) give the break down of the detected cases according to lepromatous, indeterminate and tuberculoid type and their distribution according to age, sex and year. Most of the discovered cases were of tuberculoid type. Thus 2104 (64.48%) of 3263 cases were tuberculoid. About 20%

were of indeterminate and 16% of lepromatous types. Males predominate over the females in all types. Less than 1/3 of the total cases were among the females.

Bacteriological Status of the cases.—In the year 1968 a total of 1173 case were detected, of which 1141 were bacteriological examined. All of 233 lepromatous cases examined were found positive. All of 222 indeterminate type examined were negative, whereas only 23 out of 685 tuberculoid examined were found positive. In the year 1969 out of 186 lepromatous cases examined bacteriologically 181 were positive, one out of 242 indeterminate type was positive and 6 out of 781 tuberculoid case were positive. In the year 1970 all of the 103 lepromatous cases were positive, all of 163 indeterminate cases were negative and similarly all 615 tuberculoid cases negative. Thus, during the three year period it is seen that all detected cases except 32 were bacteriologically examined and 547 of these were found positive, which means that 16.9% were positive. In all cases cutaneous lesions were examined.

Disabilities.—Table No. VI and VII. Disabilities were proportionally much more among the lepromatous cases. 45.4% of all these types of cases had some kind of disabilities. This group was followed by tuberculoid, where 28.3% had disabiliites, while 10% of indeterminate type had disabilities. Taking all types of cases in to consideration it is seen that 27.6% of leprosy cases had disabilities.

Most common disabilities were those of anaethesia to pain in hand and or feet. 604 cases had this disability. This was followed by claw hand 378 ulcer feet (planter ulcer) (290), partial mutilation of feet (109), gross multilation feet (109), gross multilation feet (103) in that order. Blindness was found in 4 cases. 19 cases had loss of vision in one eye or dimness of vision in both eyes (can count finger). Other disabilities and their number are given in table No. VII.

Prevalence rate.—Before starting the pilot project the estimated number of cases were fixed as three times the registered ones in Nilphamari sub-division Thus 4986 case were estimated in a population of 69,3,425 giving a prevalence rate of 7,19/1000.

In the original Plan of Action, in an area with a population of 570,000 a prevalence rate of 15/1000 was tentatively established after a selected and random survey of about 1000 population. At the end of second year of operation it was considered that this rate was too high and it was suggested that estimated prevalence should be fixed as 13/1000.

After three years of operation total number of detected cases in the pilot area were 3263 in a population of 570,000. During 1st year 1173, during 2nd year 1209 and during 3rd year 881 cases were discovered. Originally this project was to continue

for an other year and it was planned that during four years all leprosy cases will be detected, but due to unavoidable circumstances case finding activities could not be continued during 4th year. It is logical to reason that if only 881 cases were discovered during 1970 the 3rd year of operation as against 1209 during 1969, fewer still cases will have been detected in 1971. In any case the number of cases detected in 1971 would unlikely to have been more than 1000. So if we assume that even if 1000 cases would have been discovered in 1971, the total detected cases during four years would be 4263 in a population of 570,000, giving a prevalence rate of 7.47/1000. This rate is almost the same (7.19/1000) which was estimated on the assumption that estimated number of leprosy cases in Nilphamari sub-division is 3 times the number of actually registered cases before the start of pilot project in late 1967.

Summary.

Leprosy is a mildly communicable disease caused by *Mycobacterium leprae*, which has considerable social and economic implications. By the end of 1966 there were 11,775 registered cases in East Pakistan. A pilot project to develope case finding activities was begun in Nilphamari sub-division in late 1967. During the three year operation a total of 3263 cases were detected 64.48% of there were tuberculoid 20% indeterminate and 16% lepromatous. Lepromatous cases were most infectious. 9.4% of contracts of these cases developed while 4.1% of the contracts of tuberculoid, followed by indeterminate. 16.92 of all cases were found bacteriologically positive. 27.6% of all leprosy cases had disability of some kind.

References

1. Control of Communicable diseases in man: Eleventh Edition (1970) An official report of American Public Health Association.

2. World Health Organization Geneva (1960) W. H. O. Expert Committee on Leprosy (Second Report).

3. World Health Organization Geneva (1966) W. H. O. Expert Committee on Leprosy (Third Report).

4. World Health Organization Geneva (1970) W. H. O. Expert Leprosy (Fourth Report).

TABLE I

Case finding 1968-70

(Nilphamari Pilot Area)

Case finding methods	1968			1969			1970			Total		
	Examined	Cases detected	Per cent of detected	Examined	Cases detected	Per cent of detected	Examined	Cases detected	Per cent of detected	Examined	Cases detected	Per cent of detected
Contacts ...	5415	188	3.5	3403	213	6.3	2496	146	5.8	11314	547	4,8
Group of Population ...	84	4	4.8	...	...	...	56654	121	0.2	56738	125	0.2
School Children ...	2790	25	0.9	1728	5	0.3	1461	5	0,3	5979	35	0.6
Others ...	34121	416	1.2	...	...	...	128	84	65.6	34249	500	1.5
Mass Survey ...	919	4	0.4	31325	418	1.3	2046	5	0.2	34290	427	1,2
Notification ...	745	536	71.9	784	573	73.1	416	336	80.8	1945	1445	74.3
Voluntarily ...	...	...	...	...	...	...	210	184	87.6	210	184	87.6
Total ...	44074	1173	2.7	37240	1209	3.2	63411	881	1.4	144725	3263	2.3

TABLE II

Sex and age distribution of cases detected in 1968

(Nilphamari Pilot Area)

Case finding methods	EXAMINED							LEPROSY CASES						
	Male			Female			Total	Male			Female			Total
	0–14	15+	Total	0–14	15+	Total		0–14	15+	Total	0–14	15+	Total	
Contacts ...	1323	1465	2788	1328	1299	2627	5414	46	63	109	38	41	79	188
Groups of population ...	...	84	84	...	...	...	84	...	4	4	...	...	...	4
School children	2068	355	2423	351	16	367	2790	14	6	20	5	...	5	25
Others ...	10084	12370	22454	7283	4384	11667	34121	49	271	320	13	83	96	416
Mass-Survey ...	265	273	538	209	172	381	919	...	3	3	1	...	1	4
Notification ...	95	407	502	69	174	243	*745	32	345	377	26	133	159	536
Total : ...	13835	14954	28789	9240	6045	15285	44074	141	692	833	83	257	340	1173

*Age break up of 64 examined is not available.

TABLE II (A)

Sex and age distribution of cases detected in 1969.

(Nilphamari Pilot Area).

Case finding methods.	EXAMINED							LEPROSY CASES						
	Male						Total	Male						Total
	0–14	15+	Total	0–14	15+	Total		0–14	15+	Total	0–14	15+	Total	
Contaets ...	1011	851	1862	821	720	1541	3403	74	46	120	47	46	93	213
School Children ...	1204	338	1542	186	...	186	1728	4	...	4	1	...	1	5
Mass-Survey ...	9857	7609	17466	8017	5842	13859	31325	66	227	293	31	94	125	418
Notification ...	89	433	522	58	204	262	784	53	334	387	32	154	186	573
Total : ...	12161	923 1	21392	9082	6766	15848	37240	197	607	804	111	294	405	1209

TABLE II (B)

Sex and age distribution of cases detected in 1970.

(Nilphamari Pilot Area)

Case finding methods	EXAMINED							LEPROSY CASES						
	Male			Female			Total	Male			Female			Total
	0–14	15+	Total	0–14	15+	Total		0–14	15+	Total	0–14	15+	Total	
Contacts ...	634	623	1257	658	581	1239	2496	43	37	80	32	34	66	146
Group of population	16028	14636	30664	14059	11931	25990	56654	26	51	77	15	29	44	121
School Children ...	1119	198	1317	134	10	144	1461	5	...	5	...	...	...	5
Others ...	37	52	89	7	32	39	128	16	47	63	3	18	21	84
Mass Survey ...	523	544	1067	461	518	979	2046	...	1	1	1	3	4	5
Notification ...	35	245	280	26	110	136	416	16	215	231	15	90	105	336
Voluntarily ...	30	117	147	13	50	63	210	20	113	133	6	45	51	184
Total : ...	18406	16415	34821	15358	13232	28590	63411	126	464	590	72	219	291	881

TABLE III

Contact Tracing 1968-1970.

Index case	Year	Contacts examined	Leprosy cases detected among contacts				
			Lepromatous	Indeterminate	Tuberculoid	Total	
						Number	%
Lepromatous ...	1968	1660	16	17	55	88	5.3
	1969	601	7	33	44	84	14.0
	1970	334	4	18	50	72	21.6
Total : ...		2595	27	68	149	244	9.4
Indeterminate ...	1968	807	...	...	...	...	0.0
	1969	606	1	7	7	15	2.5
	1970	394	...	1	4	5	1.3
Total : ...		1807	1	8	11	20	1.1
Tuberculoid ...	1968	2943	9	23	67	99	3.4
	1969	2196	6	38	70	114	5.
	1970	1768	1	29	39	69	3.9
Total : ...		6907	16	90	176	282	4.1
Un-classified ...	1968	5	...	1	...	1	20.0
	1969	...	...	...	...	...	...
	1970		...	...	...	...	...
Total : ...		5	...	1	...	1	20.0
	1968	5415	25	41	122	188	3.5
	1969	3403	14	78	121	213	6.3
	1970	2496	5	48	93	146	5.8
Total : ...		11314	44	167	336	547	4.8

TABLE IV

Classification of cases detected 1968-1970

(Nilphamari Pilot Area)

	1968				1969				1970					
	Male	Female	Total	%	Male	Female	Total	%	Male	Female	Total	%	Grand total	%
Lepromatous ...	181	57	238	20.29	137	49	186	15.38	73	30	103	11.69	527	16.15
Indeterminate ...	175	51	226	19.27	150	92	242	20.02	91	72	163	18.50	631	19.64
Tuberculoid ...	476	232	708	60.36	517	264	781	64.60	426	189	615	69.81	2104	64.48
Un-classified ...	1	...	1	0.08	...	...	...	...	...	...	...	...	1	...
Total ...	833	340	1173	100%	804	405	1209	100%	590	291	881	100%	3263	...

TABLE IV (A).

Classification of detected leprosy patients 1968-1970.

(Sex and Age distribution).

Type	Year.	NEWLY DETECTED LEPROSY CASES.										
		Male.					Female.					
		0—14 year		15 and over		Total.	0—14 year		15 and over		Total.	Grand total.
		No.	%	No.	%		No.	%	No.	%		
Lepromatous ...	1968	12	6.6	169	93.4	181	5	8.8	52	91.2	57	238
	1969	12	8.8	125	91.2	137	5	0.2	44	89.8	49	186
	1970	4	5.5	69	94.5	73	1	3.3	29	96.7	30	103
Total ...		28	7.2	363	92.8	391	11	8.1	125	91.9	136	527
Indeterminate ...	1968	41	23.4	134	76.6	175	20	39.2	31	60.8	51	226
	1969	63	42.0	87	58.0	150	38	41.2	54	58.7	92	242
	1970	37	40.7	54	59.3	91	27	37.5	45	62.5	72	163
Total ...		141	33.9	275	66.1	416	85	39.5	130	60.5	215	631
Tuberculoid ...	1968	87	18.3	389	81.7	476	58	25.0	174	75.0	232	708
	1969	122	23.6	395	76.4	517	68	25.8	196	74.2	264	781
	1970	85	20.0	341	80.0	426	14	23.3	145	76.7	189	615
Total ...		294	20.7	1125	79.3	1419	170	24.8	515	75.2	685	2104
Total ...	1968	141	16.9	692	83.1	833	83	24.4	57	75.6	340	1173
	1969	197	24.5	607	75.5	804	111	27.4	294	72.6	405	1209
	1970	129	21.4	464	78.6	590	72	24.7	219	75.3	291	881
Total ...		464	20.8	1763	79.2	2227	266	25.7	770	74.3	1033	3261

TABLE V

Bacteriological Status of Detected Cases 1968

Classification.	Cutaneous lesions				
	−	+	++	+++	Total.
Lepromatous ...	...	...	102	113	18	233
Indeterminate ...	222	...	...	...	222
Tuberculoid ...	662	23	...	...	685
Un-classified ...	1	...	...	...	1
Total ...	885	125	113	18	1141*

*Bacteriological Status of 32 cases could not be determined.

TABLE V (A)

Bacteriological Status of Detected Cases, 1969

Classification.	Cutaneous lesions.				
	−	+	++	+++	Total.
Lepromatous ...	5	108	60	13	186
Indeterminate ...	241	1	...	...	242
Tuberculoid ...	775	6	...	...	871
Total ...	1021	115	60	13	1209

TABLE V (B)

Bacteriological Status of Detected Cases 1970

Classification		Cutaneous lesions				
		–	+	++	+++	Total.
Lepromatous	...	...	36	53	14	103
Indeterminate	...	163	...	...	...	163
Tuberculoid	...	615	...	...	...	615
Total	...	778	36	53	14	881

TABLE VI

Disabilities among the detected cases, 1968-1970.

Classification.	Year.	Total.	With disabitities	
			Total	%
Lepromatous ...	1968	238	113	47.5
	1969	186	84	45.2
	1970	103	42	40.8
Total ...		527	239	45.4
Indeterminate ...	1968	226	46	20.4
	1969	242	14	5.8
	1970	163	6	3.7
Total ...		631	66	10.5
Tuberculoid ...	1968	708	238	33.6
	1969	781	211	27.0
	1970	615	147	23.9
		2104	596	28.3
Total ...	1968	1173	397	33.8
	1969	1209	309	25.6
	1970	881	195	22.1
Total ...		3263	901	27.6

*1 case being unclassified.

TABLE VII

Type of Disability : 1968-1970

Disabilities		*Number*
Only anaesthesia to pain (hands and or feet)	...	604
Collapse of the nose	...	83
Facial paralysis	...	74
Loss of vision in one eye or dimness of vision in both eyes (can count fingers).		19
Blindness	...	04
Claw hand	...	378
Claw feet	...	46
Ulcers — Hands	...	75
Ulcers — Feet (Planterulcer)	...	290
Dropped foot	...	71
Partial mutilation — Hands	...	83
Partial mutilation — Feet	...	109
Gross mutilation — Hands	...	38
Gross mutilation — Feet	...	103

SOME PATHOLOGICAL ASPECTS OF HEART.

Professor M. A. Farooki, D.Sc., M.P.H., M.R.C.Path., F.C.A.P.

The "Heart in your Health" and vice-versa are both true :—Heart diseases are the 20th century epidemic. In U. S. A., Cardiovascular diseases accounted for 54% of all deaths (1813000) in 1963. The most important and alarming kind of heart disease is the coronary heart disease as heart attacks cause 55% of all cardiovascular deaths (U. S. A. 1963). The recognition of the coronaryprone individuals (family hx; Hines and Brown test etc.) would be important. Also behaviour and personality assessment has identified the young "Coronary candidates" as the hard driving male of excessive ambition and competitiveness, constantly working and living under deadlines pressures. They should be cooled down.

In my studies, M. I. (myocardial infarction) was recorded in 8.7% of (566/6541) consecutive autopsies, has shown a rising incidence over the decades and has a male preponderance of 1.3 : 1. Coronary heart disease is most common in the obese mesomorph after he has finished his athletic career and become a glutton.

Although Hippocrates stated that in all maladies, those who are fat about the belly do best and it is bad to be very thin and wasted here, but he also stated that sudden death is more common in those who are naturally fat than in those who are lean.

Obesity is associated with increased incidence of diabetes, H. T. (hypertension) and advanced atherosclerosis etc. Mortality in the grossly overweight individuals is 50% above the normally expected rates. About 40% of people (in U. S. A.) are overweight. Obesity is present if the distance between the opposing fingers (on pinching the subcutaneous tissue below the umbilicus) is more than 1" in males 1.5" in females.

Lack of excercise is of critical importance in predisposing to heart disease partly because of relationship of inactivity to obesity (H. T. ; Athero) and high blood cholestrol levels (athero ; thrombosis) and partly because of benefits of exercise per se.

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27% (153/573) of the diabetics develop hypertension with K-W lesions and 29% (164/573) without K-W were seen in 45% of hypertensive diabetics and 29% of normotensive diabetics. H. T. in an additional factors for increased incidence of M. I. as seen below :—

M. I. in nondiabetic/normotensives	...	3.8% (164/4272)
M. I. in diabetic/normotensives	...	14.1 % (36/256)
M. I. diabetic/hypertensives	...	22.4% (71/317)
M. I. in nondiabetic/hypertensive	...	17.4% (295/1695)

Pyelonephritis is an occasional cause of renal hypertension but is a potent cause of aggravation of E. hypertension. It is my view that most often pyelonephritis is a secondary process in hypertension, the latter promoting the former. My finding regarding pyelonephritis, diabetes and H. T. are as under :—

Pyelo in normotensive	...	7.3% (338/4649)
Pyelo in hypertensives	...	20.4% (335/1638)
Pyelo in diabetics	...	22.0% (127/573)
Pyelo in normotensive diabetics	...	18.0% (46/256)
Pyelo in hypertensive diabetics Conversely ;	...	26.0% (81/317)
Incidence of H. T. in cases of pyelo was	...	50% (335/673)
Incidence of H. T. in subjects without pyelo was	...	23% (1303/5614)

Pyelonephritis should be avoided, looked for and treated. There is a positive association between the amount of cigarette smoking and coronary heart disease as it produces vascular constriction, increase in blood pressure, increase in pulse rate and increase in fatality rate from coronary artery disease.

Heart attack death rates are 70% higher among cigarette smokers. This calls for less smoking.

Since pulmonary emphysema and congestive heart failure are related, pulmonary sclarosing and obstructive diseases should be avoided. Heredity and genetic veriables in some cardiovascular diseases call for study of medial genetics and practice of eugenics.

Cardiac congenital malformations could be reduced by cutting down the environmental factors acting through the mother. Repeated attack of rheumatic fever pose a life-long threat to susceptable individuals. Rh. H. D. should be prevented through prevention or early identification and of streptococcal sore throat.

Control of infective endocarditis begs for antibiotic prophylaxis at the time of dental treatment, antibiotic coverage of tonsillectomy, g.i. operations, dirty wounds, septie infectious and bacteremias, especially in cases of congenital heart disease, Rh. H. D. and nonbacterial thrombetic endocarditis.

CONTRIBUTION AND IMPORTANCE OF VETERINARIAN TO PUBLIC HEALTH

By

*S.M.S. Jaffery, Research Officer Veterinary**

A Veterinarian's responsibility lies in the field concerned with "disease and health" of non-human animals, but in a number of ways his obligations are directly related to man's well-being. Veterinary medicine is of significance to human welfare not only because of the economic social and cultural consequences of disease, but also because of the equally varied ways in which the lower animals specifically effect the health of higher animals-the humans. The erroneous prejudices that are harder to die in medicine than in any other branch of science, have always thwarted due appreciation of the veterinarian's contribution to the development of medicine in general. Probably further development in the field of zooneses may help break the ice and induce a healthy element of sharing the interests.

Human medicine relates to public health, treatment and eradication of diseases of men. From the simple beliefs and practices of the past the present day approach is sophisticated. It is also acquiring the form of herd medicine *i.e.* study of disease of community and the complex relationship of man with his physical and biological environments. The philosophy of veterinary medicine is being applied to human medicine. Treatment of sick individual is not all there to medicine. Measures embracing the whole herd—the community as well as environmental factors are required to produce effective influence on public health.

In ths USA very recently a facility named as veterinary public health has emerged with activities directing the veterinary skills towards the solution of community problems of health and disease in man. In order to achieve effective results, mutually initiated efforts from a common platform would, with the passage of time, become imperative in the realm of general disease control Programme. A broad approach to public health which is no more or less the sole responsibility of physician than is veterinary medicine the exclusive domain of a Veterinarian, will progressively develop because both are based on identical population concept and share the basic philosophy. The flock-the herd-has assumed a more important place in Veterinarian's approach than has an individual animal. Similarly in public health the individual as a patient is making way for community as a patient. The physician might however require reorientation in his approach from "individual" to "population" for disease control, but this is not so with the Veterinarians. Only with individual animals of high value, monetary or sentimental, can the veterinarians attitude towards health and disease be said to approach that of a physician An Expert Committee of the WHO (1961) recognised this fact and stated that "the Veterinarian's educational preperation is especially useful in grasping principles of public health".

Through his interest in the same disease in many animals or many species of animals the Veterinarian's thinking is disease centred rather than being host-centered. His approach is from comparative point of view and has less difficulty in viewing man with some objectivity as just another host species in the epidemiological pattern of any particular disease. Interactions of host with his environments determine the patterns of diseases as they appear amongst the population, may it be man or animal. Identification of causes depends upon epizootological (epidimiological) and ecological factors. Infact the discipline of epidemiology is not distinct from the veterinary

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medicine. Not only do the public health & Veterinary medicine share common ground and have common roots in the herd practice, both are also governed by similer economic considerations A Veterinarian is required to know not only the best and uptodate procedure to adcpt in any patticular situation, but also the cheapest and easily available procedure. Similarly in public health, circumstances often require the choice of a less expensive approach.

Preventive medicine offers a close parallel between the public health and veterinary medicine, although emphasis on the control and eradication of disease has been more in veterinary medicine than in human medicine. Veterinary medicine has contributed to general medicine chiefly in this field, whereas contribution of human medicine has been towards intensive management of sick animals. The veterinary and human medicine are two branches of medicine that have developed side by side, each has contributed its share in the development of general medicine and each has profitted from one other. From the time differentiation between human and veterinary medicine took place, veterinary medicine has been a clear cut science. It is based on practical experience and investigation, observation of facts and principles derived from. A strong case exists for veterinary medical training as the most suitable basic training for biomedical research. The bulk of literature about diseases of animals is concerned with man and economically important domestic species. Educational background of a physician and a Veterinarian is similar in many respects. Both undergo lengthy training and preperation in biomedical sciences. In fact Burnett (1957) and Darlington (1962) suggested unified teaching of biological disciplines.

As both are agricultural and health sciences the Veterinary medicine enjoys a unique position in the set up of human welfare. The veterinarian thus contributes to fight against the two major enemies of mankind-starvation and diseases. This situation is amply illustrated by the link that veterinary medicine provides between important programmes of FAO, and WHO of the UNO. While collaborative activities are being instituted all over the world, a Veterinary Public Health Section of WHO was established in 1940. Both as a health and agricultural scientist the Veterinarian is called upon to play a pivotal role in the interdisciplinary activities. There is increasing recognition of the fact that many public health problems are not confined to geographical boundries. There are a number of international agencies interested to sponsor the relationship between veterinary medicine and public health. The oldest such organisation, the International office of Epizootics in Paris, was established in 1924. The Animal Production and Health Division of the FAO of UN in Rome is another such organisation that works in the direction of improving human health.

It is a well established fact that for the services of Veterinarian no basis for a modern economy would exist in many countries. Veterinary medicine's position in the life of a country (or province) is always significant and occasionally a central one. Ample eivdence evidence of this is available in the continent of Africa. The editorial of 'Veterinary Record' (1965) says that "the work of men such as Theiler & Edwards comprise the very foundation stone on which the economics of many new nations have been built". The famous philosopher Julian Huxley had pointed out earlier in 193! that "the prosperity and indeed habitability of enormous areas of African continent hangs upon the Veterinarians success or failure in research, and research along the broadest biological and medical lines".

Substantial benefits accrue in the development of rural economy where full advantage is derived from the unique liaison provided by the veterinarian between

Health and Agriculture Channelising village and rural public health services and educational efforts along established avenues of agriculture and veterinary science has yeilded beneficial results by forging basic links for the establishment of comprehensive community development programmes.

Not only has the veterinarian a great deal to contribute but also has much to gain. In accepting man's health as its ultimate purpose, the veterinary medicine faces a great challenge. It is undergoing profound change as regards its immage with public. The outcome depends on a chain of events knit around public under standing and appreciation. The final objective lies in the welfare of man and the role played in the overall human development and its interrelatedness to human health, agricultural development, economic development and other aspects of community welfare is extremely significant. Animals are not only economical assets of people but they play an important part in many aspects of public life. The two branches of medicine are distinguishable only in that human medicine is and has been a benevolent approach to disease in an individual, whereas veterinary medicine has been an economic approach to disease in population The veterinary approach is increasingly influencing the human medicine in the form of public health.

With Jenner's discovery in 1796 that cowpox protected against small pox, the distinction between man and animal was no more tenable as far as the medicine was concerned. Luis Pasture's work besides laying foundation for the field of pathogenic bacteriology, was of practical and immediate censequence to veterinary medicine and to agricultural economics It demonstrated conclusively that lower animals serve as useful media of studies in the discipline of medicine. Since then many a physician has turned his interest to veterinary medicine and collaborative research has yielded significant results Many a great contribution to medicine in its microbiological aspects has been made by men whose research heavily leaned towards veterinary science. Loeffler and Frosch discovared first animal virus. Nocard & Raus made great contribution in studies on etiology of Bovine pleuro-penumonia. With the development of experimental medicine and physiology, human and Veterinary medicine have drawn into much closer interdependence.

Work done by veterinarians to promote public health in the field of infectious diseases is historical. Gaston Ramon developed diphthria and tetanus toxoids. David Salmon and Theobald Smith discovered Salmonella and evolved killed vaccines which served to protect human beings against cholera, plague and typhoid fever. Contribution of veterinarian in the field of human tuberculosis is a shining example. Efforts of Veterinarians have almost eliminated human tuberculosis of bovine origin from North America and several Western European countries. Tuberculine was first made by Bernard Bong which has now been improved as PPD by John Mohler of the U.S. Bureau of Animal Industry. William Fieldman laid the ground work for the present knowledge of T.B chemotherapy; BCG was the result of joint efforts of a veterinarian and a physician. Perroncite recognised hookworms in man and suggested its treatment and conducted important studies on biology of the parasite. Maurice Hall and Jacob Schillinger evolved effective treatment of hookworm disease in man. Many important discoveries were made by veterinarians on anthropod borne diseases. Udall and Meyer described Equine Encephalomyelitis. Transovarian transfer of virus in ticks was discribed by Daubney and Hudson who also isolated Rift Valley fever virus. Kelser demonstrated transmission of Western equine encephalomyelities through mosquitoes. Shahn and Gietner Holden established host susceptibility of encephalomyelitis virus in man, birds and equines.

Association of veterinarians with public health is not a new concept. It has developed slowly with accumulation of knowledge about diseases. While, however, this

development has not so far received recognition due to it, a number of individuals at different times have demonstrated some conscientiousness and showed interest in human health aspect of veterinary medicine.

The awareness since very early times that there are certain diseases common to man and animals gave rise to the present day science of zoonoses. Besides zoonoses one of the most important areas of active participation of veterinarian in public health relates to food from animal origin. In this field public health and veterinary medicine share a number of common roots and common approaches to problems of hygiene and health. Thus veterinary medicine in its entirety exerts an important overall influence on man's well being. The place of veterinarian in public health is being increasingly recognised in developed countries (Schuman 1959).

The veterinary profession more than any other group makes it possible for farmers to provide abundant food—both of plant and animal origin—to man. In agriculturally advanced countries like Denmark and in developing countries like ours, the veterinary services may even underwrite the entire national economy to a very great extent. To ensure adequate health and nutritional standards it is imperative to develop the veterinary profession and lay emphasis on its programmes. According to Salmon (1904) all activities of a veterinarian directly lead to one main goal of improving public health.

The broad based training of a veterinarian plus his comparative approach to the study of disease, qualify him for participation at all levels of and in many specific aspects of public health. For the specific areas of epidimiology, zoonoses, laboratory technology, environmental hygiene, nutrition and health education, a veterinarian's skill is most valuable. The changing picture of infectious diseases is bringing in new and vast openings in this field. The present day physician is relatively less trained in this aspect than the veterinarian. While medical education gives little attention to this field, the veterinary education is still so vitaly concerned with communicable diseases and public health. By virtue of his training in medicine a veterinarian is *ipso facto* an epidemiologist epizootiologist). Appreciation in this field is growing very fast; epidemiologists are now involved in practically every type of public health activity at every level.

References :

1. Baldwin, E. (1949) An introduction to comparative biochemistry, Cambridge University Press.
2. Burnett, F.M. (1957), Biology and medicine, M J. Australia *1*: 405-410.
3. Darlington, C.D. (1962), The unification of biology, New Scientist, *13* ; 72-74.
4. Editorial, (1965), Vet Record, *77* : 553.
5. Huxley, J S. (1931), African View, Harper and Brothers, New York.
6. Mayers, J.A. (1940), Man's greatest victory over tuberculosis, C.C. Thomas Publichers, Springfield, USA.
7. Salmon, D.E. (1904); Veterinary Science in its relation to public health' Reference and book of Medical Science, 224-233.
8. Schuman, L.M. (1959), The first national institute of Veterinary public health practice. Am. J. Pub. Health, *49* : 213-224.

A NEW SPECIES OF FINLAYA (DIPTERA : CULICIDAE)[1] FROM PAPUA

By

M. Qutubuddin[2]

Aedes (*Finlaya*) *shehzadae Sp. n.*

Head : Nape and occiput covered with flat decumbent black scales which look dark brown from certain angles ; black erect scales on occiput near eye-margins. Eye-margins with a distinct border of flat silvery scales, but no median stripe separating the eyes. A pair of long brown seatae projecting front in the middle, a row of four strong medially directed setae. *Antenna* : Torus dark brown ; flagellar segments dark brown with 4-5 long brown hairs. Clypeus dark brown. Palps and proboscis black scaled, almost as black as the head. Palps about one-fifth of the length of the proboscis, which is a little longer than fore femur. Labella almost as dark as the rest of the proboscis. *Thorax* : Integument dark brown, with a patch of narrow white silvery scales on the anterior one-third to half of the scutal margin anteriorly. The rest of the scutum, except the prescutellar bare area, covered with dark brown narrow curved scales. Four pairs of strong dark acrostichal bristles ; one on the silver scaled area. Twelve prescutellar bristles. Six scutellars on the mid lobe, and four on each of the lateral lobes. Integument of scutellum light brown. There is a row of fine erect golden hairs on the scutellum anterior to the scutellar margin. *Pleura* : *Apn* with silvery flat scales and strong black bristles on the upper aspect ; *ppn* bare. Both upper and lower sternopleura and preala below knob covered with silvery white scales. Paratergite and lower mesepimerum bare, one or two flat white seales on upper mesepimerum. Six postspiracular bristles, but no scales in the area, nine upper mesepimerals. No upper sternopleural and lower mesepimeral bristles. One or two lower sternopleural on the posterior margin. *Legs* : Purplish black scales with no extensive pale markings. Fore legs dark except the underside of femur which is white-scaled, basal one-fifth and apical one-third is dark scaled. Mid femur with similar but more distinct white scaling on the underside, first tarsal segment with basal one-fourth all white. Rest of the tarsi dark-scaled. Hind femur largely whitc with a black band near tip, and another black band of about equal length at base. Rest of the segments all dark. *Wings* : Dark-scaled, outstanding scales light brown, very long, and narrow. Upper forked cell about twice the length of its stem. Lower cell equal to its stem, its base being slightly distal to that of the upper. Haltere with pale stem and black knob. *Abdomen* : Tergites clothed with purplish black scales dorsally Tergites IV-VII with lateral patches of white scales. Tufts of roughened partly outstanding scales on sternites V-VII. Sternites dark-scaled with basal narrow pale bands, almost uniform in width throughout. Eighth sternite large, cerci very small.

Type Data : Described from a female in perfect condition. Type locality : Papua, Mafulo, 4000 Ft I-1934, L.E. Cheessman B M. 1934-321.

Male and early stages not known.

Taxonomic Discussion : The assignment of this species with absolute certainty to any of the groups erected by Edwards (1932), and redefined by Knight and Marks (1952) is rather difficult. While it answers largely to Edwards definition of Group B (*terrensgubernhtoris* group : *Gualteria*), it differs from this group of species in the absence of a broad ring over joint between II and III hind tarsal segment, and in bare *ppn*. However, as other characters will show, it does belong to

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1. This work was carried out in the Department of Entomology, British Museum (Natvral History).
2. Home Address : 62, Veruham Road, London, S.E. 18, England.

this group rather than any other group of the subgenus *Finlaya*. Within the group it has affinities with at least two subgroups ; with the monotypic Oriental subgroup V. *unicinctus*, it shares the dark hind tarsi and the basal white ring on I, and outstanding and roughened scales on some of the sternites apically. But it differs from it in (a) the presence of a well-defined anterior pale area on the scutum in the female, (b) in the bare *ppn*, and (c) in the absence of a dorsal white area at apex on the fore tibia. It is distinct from *unicinctus* also in the pleural scaling. With the the subgroup III—*gubernatoris*, it shares the scutal markings although there is no separate patch of pale scales before wing base ; the bare *ppn* is also a character shared by this species with at least some members of the subgroup. The broad scaled vertex of the new species is a third character which it shares with this subgroup, although it differs from this group of species in the (a) absence of an apical band or spot on hind tarsal segment I, and (b) a basal band on segment II However, Professor K. L. Knight (*in litt*) is of the opinion that' it belongs to the subgroup with *unicinctus* ; but he adds coming from well outside the range of *unicinctus* this presumed relationship may be open to question".

The species has been named after my daughter Shehzad.

Acknowledgments

My grateful thanks are due to Dr. Paul Freeman, Keeper, Department of Entomology, British Museum (Natural History) for the permission to work in his department, and to Dr. P.F. Mattingly for kindly putting the collection at my disposal and the help given in many ways. I also owe a deep debt of gratitude to Professar Kenneth L. Knight, Head, Degartment of Entomology, North Carolina State Uniuersity, Raleigh, U.S.A , and Consultant Specialist to the South Eastern Mosquito Project, Smithsonian Institution, Washington, for favour of confirming the diagnosis and going through the MS.

Literature Consulted

1. Belking, J. N. (1962) *The Mosquitoes of the South Pacific*. Berkly University of California Press. I : 608 Pp. II 412 Pp.
2. Edwards, F.W. (1932) *Genera Insectorum Diptera*, Family *Culicidae* Fascicle 194, 258 Pp Illus., Belgium.
3. King, W.V. and Hoogstraal H (1946) Description of three new species of Mosquitoes of the genus *Aedes* Meigen Subgenus *Finlaya* from New Guinea. *Jour. Wash. Acad. Sci. 36* (9) Pp 306-313.
4. Knight, K.L , Bohart, R.M. and Bohart, G.E (1944) *Key to the mosquitoes of the Australasian Region* : National Research Council Publication, Washington.
5. Knight, K L and Marks, E.N. (1952) An annotated check list of the mosquitoes of the subgenus *Finlaya* genus *Aedes*. *Proc. U. S. National Museamy* 101 : 513-574.
6. Marks, E.N. (1955) Studies of Queensland Mosquitoes Part V : Subspecies of *Aedes* (Subgenus Finlaya). *University of Queensland Papers, Department of Entomcl gy, 1* (2) : 12-29.
7. Peters, W. (1963) Mosquitoes of the New Guinea (Diptera, Culicidae) IV Two new species of *Aedes* Meigen and *Armigeres* Theobald, *Proc. Roy. ent. Soc. London* (B) 32 (ptsl-2) : 1-11.
8. Stefan, W.A (1966) A Check-list and review of the mosquitoes of Papua subregion. *Jour. Med. Ent*. 3 (2) : 179-237.

A SURVEY OF TUBE WELL IRRIGATION WATER PUMPS IN PUNJAB (PART—I)*

By

*Muhammad Abdur Rahman Malik, M. Sc. (Engg.)***

1. INTRODUCTION

1-1. The Punjab is a province of West Pakistan. Its total area is 78,542 square miles with a population of 25.6 Millions according to the census of 1961. 80% of the total population lives in rural area. The means of the subsistance of this population is AGRICULTURE ; rather on the whole, the entire PAKISTAN has Agriculture as its main economy.

1-2. In the Punjab, lands are irrigated by Canals from the rivers. Due to scanty rain falls in the province, particularly in winter, there is shortage of water for crops which include wheat. To augment the water supply, tube well irrigation has become very popular.

1-3. In certain areas intensive canal irrigation resulted in salinity and water-logging ; for which tube well installation was considered a necessity ; which helped in lowering the water table as well as washing the salts downwards.

1-4 In July, 1963, U.S. AID (PAKISTAN) decided to carryout a survey of Irrigation water pumps in use in Pakistan along with the future demands of these pumps for the years of 1964 and 1965. This required collecting the information about sizes, types, capacity and operative system etc. of these pumps.

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*Survey carried out under the auspices of Engineering Division of U.S. AID (Pakistan) in year 1963-64.

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2. METHODOLOGY

For this survey, West Pakistan was divided into following zones.

(i) Former Punjab Province excluding Bahawalpur Division.

(ii) Former Bahawalpur Division.

(iii) Scarp No. 1 (Punjab) (Salinity Control and Reclamation Project).

(iv) Scarp No. 2 (Punjab).

(v) Thal Development authority (Punjab).

} ***

(vi) Former Northfrontier Province.

(vii) Former Sind Province.

(viii) Scarp No. 3 (Sind) } ****

(ix) Baluchistan Province.

2-2. One land-rover Jeep alongwith a driver was allocated by the U.S.AID (Pakistan) and the task of this survey was assigined to the author.

3. PLAN

3-1. Intimation used to be sent well in advance for proposed visits to the district heads of Irrigation, agricultural Engineering, and other Corelated departments. Conferences were held with divisional and provincial heads of these departments. Many a sites of these pumps were visited to see the operation. Visits were also paid to the manufacturers and workshop owners related with the production and repair of these pumps in different towns.

A proforma was prepared for the purpose of this survey. The result of the survey was compiled for each zone.

3-2. The largest number of irrigation pumps having been installed in the former punjab, scarps 1, 2 and Thal Development authority, the results of the survey of these areas now called the present Punjab having been compiled are given in the chart.

***Since 1969, these areas form the part of the Punjab Province.

****Since 1969, this area form the part of the Sind Province.

Consolidated Chart Of Tube Well Irrigation Pumps in the Punjab (Pakistan) upto the Year 1965.

Size	Capacity	Horse Power	No. of Pumps				Type		Operation		Ownership		Source of Manufacture		Remarks
			Installed upto 1963	Likely demand for the year 1964	Likely demand for the year 1965	Total up to 1965	Centrifugal	Turbine	Diesel.	Electric.	Govt.	Private.	Local	Foreign	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1" to 4" dia	.25 to .5 cusecs	½HP to 5HP	352	160	130	642	580	62	522	120	60	582	642	—	
5" dia	.75 to 1.0 cusecs	8 HP	1,382	685	525	2,592	2,344	248	2,344	248	248	2,344	2,480	112	
6" dia	1.0 cusec	2 HP	5,044	2,190	2,843	10,077	7,871	2,206	8,158	1,919	1,314	8,765	9,899	178	
7" dia	1.5 to 2.0 cusecs	15 to 20 HP	—	—	—	—	—	—	—	—	—	—	—	—	
8" dia	2 5 to 3.0 cusecs	25 to 30 HP	2,427	170	315	2,912	558	2,354	500	2,412	2,352	560	239	2,673	
10" dia	3.4 to 4.0 cusecs	30 HP	1,197	64	374	1,635	—	1,635	—	1,635	1,635	—	—	1,635	
12" dia & above	5.0 cus. & above	Above 30 HP	—	165	—	165	—	165	—	165	165	—	—	165	

Total pumps of all sizes Installed up to 1963	=	10,402
Total likely demand by end of 1964	=	3,434
Total likely demand by end of 1965	=	4,187
GRAND TOTAL	=	18,023

5. CONCULUSION

5-1. This survey gives the total number of pumps of different sizes in use in the Punjab. It was found that 50% of the total tube well pumps installed upto 1963 were of 6" size. This information is a great value for the planners of the irrigation system, and for the manufacturers of pumps and their accessories. The manufacture of 6" size pump on a large scale can reduce their price compared with manufacture of the pumps of other different sizes.

5-2. It can be seen that the total number of tube well irrigation pumps installed during twenty years, i.e. from 1943 to 1963, in the whole of the Punjab was 11,136. Their demand for the year of 1964 was 3,901, which is 33% of the total installed during the last 20 years. Similarly demand for the year 1965 was 5,156 ; which is 40% more campared with the demand for the year 1964. This indicated the rate of growth of tube well irrigation pumps for increasing agricultural production.

5-3. This survey can also serve as a base for future investigations in this field.

6. ACKNOWLEDGEMENT

Thanks are due to Mr. Fredlocker — Chief, Power and Transport Division, U.S.AID; Mr. E.G. Roberts, Chief, Water Resources, U.S.AID and Mr. C.H Inman, Chief, Genel Engineering, U S.AID, Lahore, who rendered every possible guidance and assistance in carrying out this survey. The author is also grateful to various officers of Irrigation, Agricultural Engineering and of other corelated departments, various manufacturers and workshop owners, for their cooperation and for providing every information and assistance.

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The General Body of the P.H.A.P. made the following recommendations.

RECOMMENDATIONS

on

"Accidents, their Prevention and Treatment."

The Seminar organized under the auspices of Public Health Association of Pakistan was the first of its kind in the country. With increasing population and complicated equipment of all sorts, accidents of all kinds are becoming more and more common. The commonest of all accidents are road accidents which take very heavy toll of life. Accidents today are among the commonest causes of death

Prof. Nazir Ahmad stressed upon the high mortality and morbidity from road accidents and recommended preventive measures to be taken as early as possible. He stressed the use of strict control on driving licences, good wide roads and high st ndard of emergency care. Also there must be highly organized team work by various people like educators, engineers and enforcement officers.

It was also recommended that all causes of accidents should be removed immediately after they have been pin pointed.

Prof. M.A.R Ansari stressed the point that one of the four hazards to man in the modern world was accidents. In Pakistan the death rate from accidents may vary from 7·8% to 12·2% per hundred thousand. It was recommended that the prevention of accidents be borne by the Public, the Police, the Psychologist and the Public Health Physician. It was also recommended that mass communication to make the public aware for prevention of accidents be established.

Dr. Safdar Bokhari, Secretary, Public Health Association of Pakistan outlined various methods for preventing home accidents, farm accidents and fire accidents. He stressed on the numerous accidents caused by electricity and improper use of electrical appliances.

He also recommended the teaching of prevention of accidents in growing up children so that when they grow up their self discipline and responsibility will minimize accidents. This can be started as part of the school curriculum.

Prof. M. Islam Sheikh of Engineering University discussed various accidents in life from the Public Health Engineering point of view and recommended various Public Health Measures to prevent accidents due to water supply, air pollution, radiation, pesticides, etc.

The seminar recommended that for the prevention of accidents, it was essential that large scale education be given to the younger generation at the school level. In this respect full use may be made of the mass communication media *e.g.*, Radio, Press and Television, and the Mosques.

The Seminar noted with growing concern the increasing toll of road accidents throughout Pakistan. It strongly recommended that adequate and urgent programme for improving highways and strictly enforcing the traffic rules and regulations for all categories of traffic be launched apart from educating the drivers of motor vehicles.

The seminar further recommended that :—

(*i*) Adequate medical officers and first aid medical centres be provided in the major cities, in all major industrial concerns and at suitable strategic places with an efficient ambulance service so that the victime of these accidents should be within the reach of adequate medical care.

(*ii*) Future population growth should be anticipated and urban and town highway planning be undertaken to ensure maximum safety in cooperation with Educators and town planners.

(*iii*) The Medico Legal procedures involved around an unfortunate accident victim should not be given preference over saving the victim's life by the doctors. It is common knowledge that many a victim simply die on account of unnecessary and hostile police intervention.

(*iv*) Accident data according to accepted international procedures may be maintained to accurately record the various types of accidents according to W.H.O. recommendations. These statistics will in due course of time give us very valuable information and help in the future planning to prevent these accidents.

(v) Strict criteria be laid down for giving licenses to drivers of motor vehices. Special emphasis should be laid on accurate visual examinations and psychological tests.

(vi) Occupational health services in the country should be introduced with a provision of safety engineers to be provided by all industry and a national industrial safety advisory council be initiated to constitute committee on safety, statistics, etc.

(vii) Urgent immediate steps must be taken to ensure enforcement of safety regulation. Adequate legislation does exist for safety measures for industries construction works, fissuries etc. but its enforcement is totally lacking.

(viii) Special and urgent attention be given to the road hazards and obstacles to smooth the flow of traffic. The traffic police must be singled out for reorientation towards efficient performance of their duties to prevent road accidents.

(ix) A properly qualified doctor be compulsorily appointed in all industrial concerns.

(x) The mine safety regulations be improved and properly enforced to minimise mine accidents as these accidents are one of the more lethal forms of accidents.

(xi) Proper regulation of Electricity, its uses and the proper use of electrical appliances, be properly published and practised.

(xii) The blood transfusion services throughout the country should be popularized, enlarged and recognized to be able to cope with national emergencies war, or accidents. Suitable arrangements should be made for blood grouping of all employees of organized services, educational institutions so that enough blood with suitable grouping can be made available in times of need.

(xiii) The large cities, be divided into sectors and each sector provided an adequate accidents centre with ambulances, emergency drugs and laboratory facilities. Auxilliary staff should be provided to do the clerical work; these may be established as part of general hospitals.

(xiv) Adequate leach laws and licences of dogs be issued.

good health, as possible. Labour turn over is low and it has got better preventive measures than probably most of the other fatories. Even then 3295 working days were lost due to accidents in the year 1968. The total number of accidents were 484 out of which 31 were reportable on the basis of the definition of accident that any injury which interfers the worker to carry out his routine duty for more than three days must be reported. Well, I admit all of these were not reported. We can appreciate what is happening to the industries where all is neglected.

Accidents are costing us much more than one could imagine. Let us not for get our social set up where one earning man is the navigator of of a larger family-ship. What doom falls on the family if he dies or gets disabled. Quite a few children will probably be able to get proper education or even proper food to remain well-nourished. How much money is spent on treating the injured and then on rehabilitation ? How many hospital beds and Doctors remain occupied by them ? Even the factories have to pay compensation for the disablement. Thus we can see the financial losses to the Nation and the individual.

After grasping the size of problem let us see what we can do to tackle the situation. First essential is the introduction of Occupational Health Services in the country not only to prevent the accidents but also to look into the Occupational Health hazard. Occupational health Experts should suggest the ways and means of accident prevention and they should set up a national Industrial Safety Advisory Council under whose guidance three Committees should be constituted dealing respectively with joint consultation on safety, research and statistics and safety training. All the industries should compulsarily be made members of these Committees through their own safety Committees. Safety Committee of a factory should have Industrial Medical Officer as its Chairman and Safety Officer as the Secretary. Members should include Welfare Officer, Personal Officer, Shift Incharges and Shop Assistants. Monthly meetings of these Committees should be convened and various accidents and their causes during the previous months be discussed. Thereafter, the preventive measures be implemented and potential sources of accidents sorted out. Safety Officer must train Shop Assistants and Shift Incharges who should explain all the potential sources of accidents to new recruits. They should be provided with safety equipments like goggles, gloves, overalls, helmets, gauntlets, hoods, masks, Boots etc. Sir Thomas Legge's axiom is that "Worker will do next to nothing unless the employer does everything to protect his life".

Although legislation already exists to protect the worker, in the form of provision of gaurds to the machines, covering of moveable parts, automatic power cut off arrangements for electric machines while cleaning or during some specific manouvers, etc. and Labour code of Pakistan is full of various acts like Boiler Act, Sand Blasting, Cotton Ginning and Pressing Acts for every industry etc , but their implementation is very poor. Inspectors of factories, Boiler Inspectors and Electrical Inspectors should pay regular visits to the factories to facilitate the management to observe rules and regulations in their own interest as well as for their employees. It might be interesting to know that factory Inspectors in England have very friendly relations with employers who quite often invite them to seek advice on various matters concerning legislation and safety. Why ca'nt we develop the same attitude.

Usual causes of accidents in factories are Poor house keeping, Bad lighting arrangements– bright light is as defective as too dim, Poor ventilation, Excessive noise, Overcrowding, Presence of Dusts and gases of various descriptions, Smoky atmosphere, Extremes of temperature, Excessive moisture, Slippery floors and neglect of personal protective equipments. Obviously all these must be looked into by the management, occupation hygienists, factory Inspectors, Safety Officers and Industrial Medical Officer.

Building construction is one of the most hazardous occupation. Maximum deaths occur at construction sites and not enough legislature exists to prevent the accidents. Most usual causes are fall of persons and fall of objects. Scaffoldings are poorly erected and they are too narrow, most often they collapse. Ladders are not properly kept, with rungs missing and cross bars broken. Most of the labour at construction sites lack in training and they are unskilled hence the use of construction machines like mixers, fork lifters, vibrators, earth diggers etc. also add to the accidents.

Cranes coming in contact with overhead power cables cause death with electrocution and remains one of the major hazards. Sometimes jibs fracture causing dangerous accidents. One such accident I witnessed in Notingham where a jib fractured and fell on the nurses home of a General Hospital causing collapse of Building with some casualties.

Accidents in Agricultural Industry are not to be ignored. Due to mechanisation of this Industry but lack of training there are quite a few fatal accidents. Usual examples are overturning of tractors, Electrocution and other accidents at

Tubewells. Accidents from animals are very common. Bulls could be notoriously dangerous at times without obvious reasons.

Aonther hazardous occupations is fishing where fishermen are liable to drown and possibly injured by sharks or other sea animals. There occur several such incidences in East Pakistan. Ship building and dock workers get various sorts of injuries.

I have already very briefly outlined the Accident Preventive Programme but a detailed scheme could be worked out. This is of vital importance and calls for the earliest possible attention. Cost of Preventive measures will definitely be far low than what we are paying otherwise.

Larger organisations could very conveniently employ Safety Officers of their own while smaller groups could collaborate and one Safety Officer may look after two, three or more organisations. I have omitted discussion on the treatment of industrial accidents and that how effectively we can organise hospitals, first aid centres, clinics etc. as this is entirely a different subject. I have tried to concentrate towards prevention as prevention should come first according to the good old saying "Prevention is better than cure".

ORGANISATION OF ACCIDENT SERVICES

By

Dr. Manzoor Ahmed Khan.
M B.B.S., M S., Orth., E.I .C S.

Accidents and incidents are important in life. Accident makes difference between life and death, normal and disabled ; life incidents change the course of life.

Accidents will always occur. We cannot prevent it. We can reduce its incidence. Therefore we must organize ourselves to meet its challenge.

It is a fact that through the long period of history from American civilization to the turn of ninetheen century, there was virtually no change of approach to the management of the wounded although there was no shortage of military engagment.

Since the close of world war II, the increase in the incidence of home, road and industrial accidents and the prevailng use of high speed traffic have ensured that the treatment of multiple severe injuries shall be a daily problem. The principles of Accident Service, exploration of the wound, decompression of soft issues, removal of foreign matter and devitalised tissue, closure of the skin, and immobilisation remain the guide for the management of the injured. The best means of achieving these ends is frequently the cause of debate (and even of controversy) but it is intended that some measure of agreement shall be reached in the establishment of a country-wide accident organisation greater and more highly developed than any military emergency has ever brought into play ; nothing less can be adequate for the present and yet more may be needed to meet the challenge of the future.

The economic loss can be appreciated from the figures as given for Austria with a population of millions. A total of 30.7 million sick leave days were reported in 1956. Out of these 25% were due to accidents. The Republic of Germany had a population of 49 millions out of which 16 millions are socially insured employees. These had 180 million days of illness, of which 40 millions i.e. 22.50% were due to accidents.

The treatment of fractures differs from other branches of surgery where success or failure depends upon the technique of an operation. The most excellant primary treatment of a fracture is worthless if equally expert treatment is not continued for many weeks or months afterwards. The after-treatment may indeed be more important than the primary treatment.

The chain of treatment obviously consists of many links, the breaking of any-one of which may cause failure. Orgnization is imperative. The system by which fractures were treated in general surgical wards rendered general surgical routine gravely defctive. The results were often disastrous, not because surgeons were lacking in skill but because skill was not available to the patient at the moment when it was most required. It was proved beyond doubt by B M A. fracture report which showed that indifferent treatment and lack of organisation may be responsible for inceasrng the incapacity period from few weeks to few months. The inter-departmental committee of England reported that the most authoritative surgical opinion of the country is agreed in recommending the institution of special fractures services. Thc merit of organisation has been proved in the war. Despite the frequeney of multiple injuries, often of appalling severity and with gross contamination of wounds, less than 5 percent of patientf were invalided. The incidence of non-

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union in one service of nearly 15,000 compound and closed fractures was 0 per cent and the amputation rate was 0 1 per cent.

However I regret to say that nothing has been accomplished in the organisation of accident service in this countary. A very good lesson was learnt during the 1965 war and value of efficient organisation of accident service was appreciated. But it led only to the establishment of emergency wards in Mayo Hospital and nothing more. Its true efforts were lost in the doldrum of human ideas for daily living. However beginning has been made. General accident services must now be organised. Acomprehensive service must embrace the treatment not only of fractures but also of soft-tissue injuries, infections of hand, burns, tendons and nerve injuries and indeed all injuries of locomotor system. It has been rightly recapitulated by the Report of interdepartmental committee; "We have little doubt that the principles of continuity of treatment and after-care until working capacity has been restored should be applied in the accidenl department of hospitals to the treatment of all injuries entailing disablement. We believe that the results of organised fracture treatment will lead to adoption of similar measures for dealing with other disabling injuries".

Soft tissue injuries are no less incapacitating than fractures ; they are no less serious in their infiluence on industrial production and future earning power and because numerically they out number fractures in the proportion of five or ten to one, the problem they present is much greater. The practice in this country is to appoint a junior inexperienced, man who is given the responsibility of treating wounds, lacerations and soft tissue injuries unguided by senior members of the visiting staff. The basic requirement of accident service is

Casualty Reception Wards

Fracture Follow up — Wound follow up

Rehabilitation

An important medical challenge of our time is the necessity to abolish architectural archiac casualty departments and associated old-fashoined notions ; these must be replaced by an efficient system of accident services based on modern ideas of need and origin.

An efficient organisation must be based on two inter-related principles : (1) the formation of accident departments in hospital through the segregation of accident cases and (2) the availability of a whole range of medical, surgical, pathological and radiological services almost at a moment's notice.

The modern accident problem sterns largely from social and industrial developments of nineteenth and twetieth centuries—A considereble number of accidents arise from industrialization and the rapid increase in motor transport, whilst increased longevity has added to the incidence of certain injuries in the aged Among a population of about 50 million people in Britain about 20 millions injured are treated every year outside the hospital for minor injuries. In addition about 2 million casualties are treated in hospitals. In 1958, road casualties totalled 293,727 persons injured and 5,970 persons killed. The total injured were the highest on record and the total deaths the largest since 1944. In 1957, reportable factory accideuts (excluding the docks and mines) numbered 174,713 with 651 deaths, even though there was a tendency for industrial injuries to fall in the previous decade.

For domestic and other accidents, in 1956, 3498 deaths took place due to accidents by falling at home. Of these 3173 were in elderly persons (over 65 years).

Foundation of the Unfallkrankenhans in Vienna in 1956, under the direction of Dr. Bohler was great ... because for the first time a major curlian hospital assumed responsibility for treating injuries and only injuries, supported economically by insurance companies.

It is a fact that traumatic surgery covers such a lot of ground. A man may have a crack on the head or a ruptured intestine. One man can't be expected to specialize on all these things; they belong to different departments of traumatic However surgical opinion is agreed - that special fracture services be instituted. The system which was universal to a recent date by which fractures are treated in general surgical wards under general surgical routine is gravely defective. The most important and most urgent need at present is the provision of services for the treatment of fractures. It must be admitted that advance towards the wider conception of a traumatic unit is more likely to take place by a process of development than by pressing the conception at once. Till the development of a traumatic unit the casualty departments of general hospitals must be replanned, re-organised, and rebuilt. There must be a separate organisation and even a separate door of entry for accident cases on the one hand and acute medical and general surgical emergencies on the other. In the accident department, many cubicles should be available where patients are prepared, examined and treated for shock. There must be immediate access to radiographic departments leading directly to emergency theatre fully equipped for the excision of wounds and the emergency treatment of injuries. There should be provision of a laboratory service particularly for the technical aspects of blood transfusion.

A nation—wide service must have a regional basis the suggested requirements of which are :—

(1) At the centre of each region an accident hospital or a large accident block of a big general hospital.

(2) A peripheral service based on accident departments in designated general hospitals ; and

(3) Further to the periphery the full up-graded services of general practitioners. The hospital service should work closely with the casualty services in industry. Full facilities for treating minor injuries by general practitioners would not only relieve the hospitals of a large burden of work but would prevent many minor injuries from developing major complications. This can be properly implemented only through group practice, preferably in health centres which could provide facilities for minor surgery and radiology.

At the factory level an extension of efficient casualty departments in large and medium-sized factories is needed whilst the possibility of sharing a casualty deparment amongst a group of small factories should be further explored.

The central accident service in an urban area could be provided either as an independent accident hospital or alternatively a semi-autonomous large wing or block attached to a major general hospital, preferably in an undergraduate teaching hospital. Such a link with the medical school would stimulate a more comprehensive teaching of undergraduates in the treatment of accidents ond so equip the general practitioners and surgeons of the future. The advantages of an accident block over

an accident Hospital are the ready availability of medical, surgical and other specialists in other parts of the hospital ; secondly the possibility of rotating nurses, radiographers medical and other staff, thirdly the training of large number of staff. The accident block must have continuous service of consultants so that it does not become the back water of junior staff working in Isolation and losing their enthusiasm.

A better possiblity for our country is to have an emergency hospital like Moscow Emergency Hospital, which receives all kinds of medical surgical emergencies including the injured. Such a scheme would upgrade the treatment of all emergencies. However the accident service cannot be efficient without an efficient ambulance and first aid services—. The teaching of first aid should be improved. The provision of accident service to isolated rural communities is a special and difficult problem. Australia solved this problem by an efficient helicopter system of transportation.

Karachi, Lahore and Peshawar stand at the three corners of the country. If one travels from one of these places to the other, one comes accross certain pockets of accidents. They are 20 miles outside Karachi, Muridke outside Lahore and Nowshera near Peshawar. If the figures of accidents are analysed, one would appreciate that some emergent measures have to be taken to be available to the accident cases at these three places to save their lives. This calls for an efficient Ambulance service ; a service with staff trained in first-aid and resuscitative maasures, otherwise the major hospitals will always remain crowded with these problems.

The major causes of accidents in this country are the rapid urbanisation of the cities, narrow roads, lack of traffic sense, varied types of vehicles on the roads, untrained staff in the industries, lack of protective covers in the factories, etc. At home the children are exposed to fire, cutting instruments and drugs. The modern clothing have also added to the increased incidence of accidents.

ROLE OF STATISTICS IN ACCIDENT PREVENTION

By

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An accident has been defined by the World Health Organisation as "an unpremediated event resulting in a recognisable injury."

2. It is well known that different groups of population are affected very differently by accidents. It is a general experience that traffic accidents are more common in young adults, in truck drivers, in bus drivers of private companies rather than drivers of government transport and so on. Similarly accidents in factories are more likely to occur to individuals who have put in a certain number of working hours. Accidents at home are usually of a particular nature and affect predominantly a particular age group. It is also seen that traffic accidents tend to occur more at some particular places usually called as "black spots." Accidents are also known to have a relationship with the time of the days and other environmental factors such as visibility, weather conditions etc. etc. All this goes to prove that accidents do not happen by chance.

3. It may thus be seen that accidents are also ammenable to preventive measures and that they can be controlled and brought down to minimum level.

4. Any programme directed towards the prevention of accidents in a community would necessitate the determination of the extent and the magnitude of the problem. The success of such a programme would depend on the knowledge of the various factors connected with the causation of such accidents.

5. Epidemiological studies of various types of accidents will lead to the determination of various characteristics of the three factors: man, machine and environment, which combine resulting in an accident. However, in this paper an effort is made to show as to how best the data on accidents can help in accident prevention. No doubt the knowledge of the magnitude of the problem will help in

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determining the priority for initiating the preventive measures but it may also be seen that data on accidents does help in selecting the best preventive measures.

6. The World Health Organization in its International Classification of Diseases has provided a dual classification for cases of accidents, poisoning and violence. The dual classification is according to (i) the external cause and (ii) the nature of injury called as 'E' and 'N' classifications respectively. It is recommended that cases of accidents, poisoning and violence be included in both the classifications so that the resultant data becomes more meaningful. As we know that an accident can result from collision between two motor vehicles, a vehicle and a pedestrian, a motor vehicle and a train, and non-collision of motor vehicles and perhaps from a hundred different such situations. Similarly there may be water transport accidents, air and space transport accidents, accidental poisoning of drugs and medicines, accidental poisoning by other solid and liquid substances, accidental poisoning by gases and vapours and accidental galls etc. etc. In Industrial concerns accidents may take place due to falling objects or by being caught between objects and so on. All these various types of accidents have been taken care of in the International Cassification of Diseases in its external cause classification separtely for each category of accidents. The external cause classification runs from code 'E800-E999, thus, providng about 199 different situations of accidents, poisoning and violence.

7. The nature of injury is similarly taken care of in the 'N' classificaton. An injury may be a fracture of a particular bone or bone's, dislocation without fracture and sprains and strains of joints and adjoining muscles. An injury may be an intracranial one or it may be an internal injury of the chest, abdomen or pelvis and so on. Here too the nature of injuries classification provides 199 different categories of injuries. The codes in this cassification are from 'N800 to N999'.

8. It may be seen that in an accident fracture of the base of the skull of a motor cyclist occurs as a result of a collision with another motor vehicle. The condition will thus be classified to 'E812.2' which is the external cause classification code and 'N801' which is the nature of injury code. Statistics of accidents if, properly maintained, will tell us the number of persons injured in traffic accidents, rail and air travel accidents or by accidental falls. When cross-classified, the usual nature of injuries resulting from particular causes of accidents will become obvious. It may thus be found that in road traffic accidents the predominant nature of injury

is the fracture of the spinal column or the concussion of the brain. Similarly in accidental falls it may be found that the nature of injury most usually occuring is the fracture of the neck of the femur or the dislocation of the shoulder joint, We can thus find out the nature of injuries resulting from particular types of accidents from the statistical data on accidents if properly maintained.

9. Furthermore, the experience of case fatality in particular type of injuries correlated with the cause of injuries, will tell us the prognosis of injuries in various types of accidents. It may be found that concussion of brain resulting from traffic accidents is 80% fatal while concussion of brain due to other accidents gives a much lower fatality rate. Similarly fracture of bones resulting from accidents caused in industrial concerns due to being caught between two objects has very bad prognosis as compared to fractures due to other accidents.

10. One can enlarge on the subject to any extent but it is quite obvious from what has been said that statistics of accidents give us the information without which neither the preventive nor the corrective measures can be adopted with any reasonable degree of accuracy or confidence. However, the pity is that data in health institutions in this country is not kept as recommended by the World Health Organization. We, therefore, have little information which can help us in planning the correct remedial measures.

11. It is only in two institutions in the country that indoor data is being maintained according to Internationl Callsification of Diseases, but here too cases of accidents, poisoning and violence are classified only according to 'N' classification as the information supplied by the medical staff does not give the external cause of injury or the nature of the accidents etc.

12. It has also not been possible to follow the international 1,000 diseases list because of the lack of statistical staff. The list therefore being followed in the two institutions is the list of 150 causes of morbidity and mortality, which groups the cases of accidents, poisoning and voilence into 13 broad categories for the external cause and in to same number of categories for the nature of injuries.

13. The data from Jinnah Postgraduate Medical Centre, Karachi for the period 1963-65 which might be of some significance in understanding the extent of the problem. Cases of accidents, poisoning and violence formed about 6% of the total admissions in the hospital in the year 1965 and this percentage was a gradual

increase as in the year 1963, the cases of accidents, poisoning and violence formed only 3.4% of the total admissions. The average case fatality for the three years for this group was 6.7%. Cases of head injuries (excluding fractures) formed 32.7% of the total cases of accidents. Poisoning and voilence and was the highest in the group. The next highest were the cases of fracture of the limbs which formed 26.8% of the total cases. Burns formed 8.5% while eflects of poisons formed 5% of the total cases of accidents, poisoning and violence.

14. The case fatality for the head injury was the highest. It was 14% while burns had a case fatality of 5.6%. Fatality in other cases of accidents, poisoning and violence was almost negligible.

15. It is quite apparent that the immediate need is that the data on accidents be maintained according to international recommendations which will not only help in the determinatlon of various forces of morbidity and mortality due to accidents but will also help us to compare the situation with other countries in the world.

REFERENCES

(i) Normon, L, G. (1962) ... Road Traffic Accidents. W.H.O. Public Hcalth Papers—Series 12.

(ii) W. H. O. International Classificarion of Diseases. ... 1965 revised.

PSYCHOLOGICAL ASPECT OF ACCIDENTS

By

Dr. Muhammad Rashid Choudhry, T.Q.A.

Accidents represent an important factor in the personal and social cost of work, much more important than is commonly realized. For example, during the period of the Second World War accidental deaths in the United States, numbered about 355,000, and there were approximately 36,000,000 accidental injuries. War casualties in the United States, on the other hand, totalled only about 295,000 killed or missing and 652,000 wounded Research in accident prevention has centered largely about industrial and highway accidents, the kinds which account for a large portion of the toll.

Factors which influence the incidence of accidents may be divided into (*a*) General, (*b*) Specific.

(a) General causes of Accidents

There are a number of general factors which effect overall accident rates regardless of individual differences in liability. Many conditions that effect accident rate are found in the working environment, *e.g.* illumination, temperature, etc. There is some evidence that fatigue increases the frequency of accidents towards the end of the day. So it seems likely that any condition of work which makes for the elimination of excessive fatigue will tend to decrease the likelihood of accidents.

(b) Specific Causes of Accidents

Accident Proneness : The fact that the greater number of accidents occurs among the smaller proportions of individuals is becoming well known. Clearly this is one of the group of individuals who have been described as "accident-prone." That such a group exists is supported by statistical as well as psychological evidence. On the basis of studies carried out by the National Research Council it is estimated that 88-90 per cent of all industrial accidents seem to be related to something in the personality of the individual, and it is known statistically that the probability of having accidents is greater in the person who has had previous ones. In a small proportion of patients with head injury the history will reveal that they have been repeatedly involved in accidents. It may be found for example, that a lorry driver, despite adequate experience on the roads, has sustained a succession of injuries in the course of a few years. Every effort should be made to persuade such accident-prone individuals to change their occupation to one less likely to expose them to risk.

In an analysis of the relevant traits of personality, the Metropolitan Life Insurance Company of New York (Viteles, 1933) has shown that nervousness and fear, worry and depression, impulsiveness, irresponsibility and fatiguability together make up 28 per cent of the primary causes of "accident proneness". In recent years many attemtps have been made to develop psychological tests which would make it possible to identify accident-prone individuals in various kinds of work. Tests of reaction time, motor-co-ordination, distractability and visual functioning have been employed for this purpose with some success. Research of this sort will eventually enable us to determine the extent to which accident proneness is a generalized charcteristic of the individual and to what extent it varies with the activity in which he is engaged. It ought eventually to be possible to keep people from engaging in pursuits in which they are particularly prone to accident or at least to provide them

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in advance with special training or equipment designed to reduce their accident liability.

Psychological tests that have been employed for the selection of drivers in various countries have not only reduced the number of road accidents, both serious and minor, but also brought about national savings. It has been estimated that the introduction of psychological procedures in Berlin for the selection of tramway drivers saved an amount of twelve million Marks in one year. Similar results were obtained in Paris, where psychological tests were introduced for the selection of street car and Bus drivers representing a saving of 300,000 Francs per annum. The test was introduced as a routine device for hiring drivers in Milwaukee (U S.A.) and a follow-up showed that the number of men discharged because of accidents decreased from 14.1 per cent to 0.6 per cent. Apart from this considerable reduction in accidents it was also found that there was a marked reduction in turnover, 75 per cent remaining in service, as compared to 62 per cent prior to the introduction of the test.

But it is not always possible to predict exactly what will be the qualities required in a given job. As for instance, quick reaction time would be useful in taxi drivers. It was found, indeed, that a driver with the greatest number of accidents had the slowest reaction-time, on a performance test. However, men with the fastest reaction-time also tended to have a great many accidents. The interpretation may be that those who are very quick are likely to take chances because of over-confidence, thus, inviting accidents.

Although these tests point to the possibility of detecting accident-prone individuals before they have had serious accidents, the past accident history of the individual is still the most reliable indicator we have on accident tendencies. For one thing the tests measure only some of the factors which make an individual accident-prone, and for this reason a person can be accident-prone even though his test performance is good. On the other hand, a person can very often compensate for his deficiencies and consequently can have a good safetly record although his test scores are not at all satisfactory. At present, therefore, best results are obtained when the diagnosis is based both upon test scores and upon previous accident history.

Mental Health and Accidents

No one knows for certain how many accidents are due to mental ill health. There is no doubt, however, that persons suffering from epilepsy, or liable to sudden attack of disabling giddiness or fainting or having mood disturbances, *e g.* mood swings from depression to manic excitment, become accident-prone during the attack. In order to prevent accidents a driver, minor or a factory worker, must thus, be emotionally stable and free from any mental disorder.

Conclusion

In conclusion it may be said that in order to reduce the incidence of accidents, we should control not only the general factors but also attempt to identify those individuals who are accident-prone. Having determined the principal reasons for their high liability to accidents we should either correct the conditions which endanger their safety or reduce their exposure to hazardous situations.

CAUSES OF THE TRAFFIC ACCIDENTS AND HOW TO AVOID THEM

By

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Road Accidents are a natural feature of our modern life. The number of motor vehicles is on the increase every day. Road accidents are the most unhappy events of one's life. These either prove fatal or disable a man for the rest of the life. The problem is both grave and serious. In America the total death in road accidents is 3000 persons a day. Fortunately the figures are not so alarming in our country but these certainly cannot be ignored also.

2. The following are the main causes of road accidents :—

1. *Narrow and un-smooth road.* The introduction of 52 seaters buses have made the situation worse. It is essential that the road should be widened. A main road should not be less than 18 feet in width, so that two large vehicles can cross easily. In the absence of wide roads, accidents are bound to occur. If one driver does not keep to his side and fails to make room for the bus coming from the opposite direction, the result is an accident.

2. *Over-speeding.* Diesel buses can easily run at a speed of about 60 miles per hour. The conditions of the roads do not permit such speed. Out roads are equally shared by pedestrians and slow moving traffic. Under such conditions the speed of the buses should not be more than 40 miles per hour.

3. *Absence of Training.* There are no schools in which the drivers can get training. The ordinary driving licences for motor cars are given by the local Police, while licences for heavy and public service vehicles are given by the Motor Vehicle Inspectors. There

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is no proper system by which driving ability and character verification can be determined adequately. The result is that sometimes in-efficient, in-experienced and bad characters also get licences. Some of them are drunkards and opium eaters. One can well imagine the fate of a public service vehicles and its passengers whose stearing is in the hands of a drunkard and an opium eater.

4. Another cause of accidents is lack of ability to determine right of the way. In such a case if the driver of the vehicle coming from the opposite direction does not yield, the natural outcome is a head on collusion. The drivers must be taught that they can only push through if they have a right of way and not otherwise.

5. *Crossing with dazzling lights at high speed at night.* It is noticed in many cases that accidents occurred at night because a cart or a tonga going in front could not be seen. The habit of crossing a vehicle with full lights is a major cause of road accident. If the vehicles cross each other at speed less than 40 miles and both use dippers, many accidents at night can be prevented.

6. *New Transport Policy.* The new routs policy which allows permits to a person having a bus has encouraged in-deciplined transport. No time table is followed and drivers who are provided commission for running more trips induldge in rash and dangerous driving.

7. *Disregard of Traffic Signs.* The drivers do not have any regard for the traffic signs installed by the highways authorities. The relevant rules should be enforced strictly.

8. *Growth of dense trees and bushes on the side of a road.* The climate of our country being hot, the shady roads are preferred. The dense growth of trees on the road side sometimes becomes the cause of an accident. A sudden appearance of a child or an animal from the trees sometimes unnerves the driver and the vehicle hits a tree. In all countries where there is lot of traffic there are no trees on the highways. The road should be clear of all bushes and trees and the driver should be in a position to see upto a distance by which he can easily control his vehicle even if it is

running at high speed. At least the trees should be thinned down if not altogether cut,

9. The following suggestion may help to avoid such accidents :—

(*a*) The motor cycles and scooters especially with the student community are also a cause of the accidents. They drive very fast and disobey the traffic signals.

(*b*) Accidents can be reduced appreciably through a regulated and organized traffic.

(*c*) The people as well as the driver should be made to understand the usefulness of obeying the traffic laws.

(*d*) Special police-cum-magisterial check up, should be organized frequently. The police and the magistrate should have sufficient time at their disposal to attened to traffic checking.

(*e*) Schools for the training of drivers be set up in all Divisional Headquarters, where training of drivers of all types of vehicles should be given.

(*f*) All the main roads be properly metalled and their width be increased to 18 feet at least if not more.

(*g*) The habits and character of a driver must be verified before a public service vehicle licence is given. Drunkards and opium eaters shouid never be given licences.

(*h*) Separate lanes for slow moving traffic and pedestrians should be constructed.

(*i*) Slow moving vehicles must have sufficient light to indicate its existence on the road.

(*j*) Drivers when crossing another vehicles must use dippers and not cross with full lights.

(*k*) Till roads are not widened enough and separate lanes are not constructed for slow moving traffic and pedestrians, the speed

of all kinds of vehicles be restricted. At present there is no speed limit for cars, motor cabs, mini buses, motor cycles, scooters, and on the highway. Speed limits be restricted after consultation with the highways and police authorities.

In the end it would not be out of place to mention here that the recen tlegislative protection provided to passengers of buses in the event they meet the accidents is not exhaustive. Since it does not provide for any protection to a pedestrian killed or injured by bus or a car. In Saudi Arabia every death whether murder or accident has to be compensated for in the form of "Kassas" or compensation which is fixed there as twenty thousand Rials. The system provalent there, is that in the event of the death of a person, the driver is responsible to pay 20,000 Rials, to the heirs of the deceased, and give him a margin of a week or so wlth an appeal to the philan thropist ropists of the town to help the man and invariably he brings the money to deposith in the court for reimbursement to the heirs of the deceased. I would suggest that Rs. 8,000 should also be fixed as compensation for a person killed in the road accident as provided for the passengers of a bus. This would serve a double purpose, on the one side the heirs of the deceased would be compensated and on the other it would provide a chack to the driver to be more cautious and careful which would certainly reduce the number of the accidents.

PUBLIC HEALTH ASPECTS OF RURAL FAIRS IN PAKISTAN

By

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1. *INTRODUCTION.*

Rural Fairs are of main importance in Pakistan's rural economy. Apart from being a source of entertainment to the villagers, these fairs serve a meeting ground for various groups of community where lot of business-transactions take place during these fairs. People buy any sell the articles of daily use. The most important aspect of busines is the transaction of animals, Horses, Buffaloes and cattle.

2. *PLANNING.*

To organize these fairs lot of planning in the Public Health is required in connection with the site, disposal of human excreta, refuse disposal, drainage, water-supply, Food Hygiene, medical aid, transportation and other public utility services. The bigger the fair, the bigger is the number of the people attending the fair. These people come from different villages, some of which are fairly far from the fair site.

Before permission for the organization of a fair is granted, it should always be checked, that no epidemic is prevailing round about the place of the fair. Check posts are to be set up on the various approaches to the fair to see that persons suffering from communicable diseases do not attend the fair. If the fair is of very big size, all the incoming persons should be vaccinated against communicable diseases, like cholera, small-pox and typhoid. The organisers should keep in mind the following points at the time of organising a fair.

(*i*) Number of persons expected to attend the fair.

(*ii*) Number of days the fair will last.

(*iii*) Animal population expected to attend the fair.

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3. *PUBLIC HEALTH ARRANGEMENTS.*

Among the public health arrangements the following need special care ;—

1. *SITE* :

There is not much choice as the site of these fairs is fixed since ages in accordance with social, religious and other factors. However, the zoning of different sectors for the shops, amusements, moving theatres, play grounds and animal sheds could be planned separately.

Similarly siting of lavatories are to be kept away from water supply points. These lavatories should be constructed on a lower slope of that of water supply source.

2. *WATER SUPPLY.*

(*a*) This should be preferably by hand pumps. These pumps should be installed at different sites of the fair *e.g.* shops, residential area and cattle sheds etc.

(*b*) If it is by wells, those should be disinfected a week before fair starts and then again a day before the fair is held. These wells ought to be chlorinated daily during the fair. Best method of drawing water from the well is by pump intalled in the well or by means of persian wheel connected to a outside pucca reservoir having taps. Separate arrangements should be made for bathing and washing of clothes. There should be separate drinking troughs for animals. The waste and spilled water should not be allowed to stagnate near the pumps or wells.

3. *HUMAN EXCRETA DISPOSAL.*

(*i*) Trench Latrines can be dug in groups at convenient places for different sectors.

(*ii*) Male latrines ought to be separate from female latrines because of the socio-culture system in Pakistan.

(*iii*) Proper enclosure should be provided as Purdah.

(*iv*) These latrines should not be dug very deep, and the dug soil should be kept near by, so that the excreta is covered with the soil.

(*v*) Enough conservancy staff should be posted to attend these latrines.

(*vi*) In case of water logged area, raised trench latrines are the answer of this problem.

After the fair is over, all the trench latrines should be raised to the ground, properly filled with earth and should be levelled.

4. *REFUSE DISPOSAL* :

In these fairs lot of waste paper, waste food, left over eatables and all sort of other refuses mixed with dust get accummulated here and there.

It is very important to provide refuse pits or refuse tins at different points. But this can not be sufficient unless the special convervancy staff is deputed to pick up the refuse and put the same in tins. Later, these tins can be taken away and the refuse can be buried in the ground or it can be burnt.

5. *FOOD SUPPLY* :

The shops for the articles of food and drinks should be licensed, and be located at a central place. Special attention should be paid to dust and fly nuisance. All eatables should be properly covered. Sale of under-ripe or over-ripe fruits should be prohibited. Adultrated milk and food should not be allowed to find their way in these shops.

Slaughtering of animals and poultry should be done at a proper place away from the fair site and must be supervized by a veterinary officer and care should be taken for propar disposal of offal, blood and bones etc.

6. *MEDICAL ARRANGEMENTS* :

(*a*) *Out door dispensary* :

This shonld be under the charge of a qualified Medical Officer, with sufficient medicines and equipment to render first aid and to provide treatment against minor ailments.

(*b*) An isolation camp for persons suspected to be suffering from infectious diseases is to be arranged at a distance from the main fair site but it should be easily approachable.

7. *PUBLIC HEALTH EDUCATION.*

The rural fairs are the best channels to propogate the public health programmes for the health education of the rural propulation. For this purpose lectures in local languages with the help of filme, slides, charts and posters can be arranged.

Holding of public health exhibitions may also be very useful. Help in this regard can be sought from the local school children and scouts and other volounteers. These people can help in the display of the exhibits, distribution of the hand bills and organising the health dramas.

8. *PUBLIC HEALTH STAFF.*

It may be suggested that Assistant District Health Officer of the local area should be over all incharge of public health arrangements for the fair.

He should be assisted by an adequate number of Sanitary Inspectors, Sanitary Patrols, conservancy staff and water sprinklers etc.

Further it is advisable that District Health Officer himself may visit the fair before its start, during its progress and after it is over.

URBANIZATION AND RELATED ENVIRONMENTAL HEALTH PROBLEMS

By

Mr Francis A. Jacocks WHO Consultant

Introduction

For all of man's progress in science and philosophy, he has behaved for all of his time on earth as though he and his actions were exempt from the natural laws that govern his ecosystem. Either man controls his exploding population, his crowding into cities, and his industrial activities, or he faces disaster through his pollution and manipulation of our planetary environment. Man, above all living things, is capable through his own controlled activities of co-operating with the natural laws to correct the damage already accomplishede and to preserve an ecosystem which will be beneficial to man.

We must recognize that man has made ill use of this earth and that a major change must be made if man is to survive. So long as his numbers were small, and his impact on the environment remained limited and localized, he did not have to pay for his lack of foresight. When he had despoiled one area he could change his locale and hope that the natural laws would correct his despoilment. He was not greatly concerned that what he could destory in a relatively short period of time could only be corrected over a very long period of time.

World conditions today have changed. Human populations have soared. It took several millon years for the world to reach a population of two billion; 1930 was the year. The second two billion will take only fortyfive years. That will be 1975 This rate of increase is of itself alarming but the problem is being compounded by the increased population being concentrated in urban areas. Almost incredible advances in science and technology have given man a new and awesome power to alter—or even to destroy his environment. His skill and ingenuity in manipulating the environment have produced tremendous benefits to life, but these changes have in many instances been accompanied by frightening, and sometimes irrevocable changes in the ecological system of which he is an integral part. He has seriously depleted the world's natural resources and devastated much of the earth's surface. The waste

products of his technology and of his own biological processes have grossly polluted the air, land and water. Moreover, twentieth century man is beginning to discover that his basic social and physiological drives are increasingly frustarted by pressure of the artificial urbanizing world which he himself has constructed.

Human life has already been affected by the socio-psychic stress of an urbanized industrial environment and by the barrage of microbiological, chemical and physiological insults which man himself, is responsible for injecting into the environment. The insults that are already present could have a marked effect on future generations.

Man is responsible for having allowed this phenomenon to occur. This is largely due to a lack of involvement or might be determined on a lack of interest and coordination. Actions have been taken that conceivably would correct a specific problem but little thought was given as to how this action would fit the desires or goals of the total population. Self interest groups also must accept a large share of blame—land scars are evident in mining operations; manufacturers have not accepted resp onsibility to minimize air, water pollution and land developers have used undesirable areas for both residential and industrial development. Maximizing profits has usually been the primary goal. The private individual usually has no know ledge of or interest in the control of environmental problems and very often the adverse conditions do not materialize until a variety of individuals have all added their bits to the random growth of the community.

This frightening condition is not confined to any particular part of the world. Suppose we look at some examples that depict problems associated with urbanization :

Egypt has built the Aswan Dam. One factor that led to its construction was the need for increased electrical capacity by urban areas. The dam will produce the additional electrical capacity. Moreover, this has caused a slow down in the river's velocity. Six hundred miles down the river sand bars have stopped building up on the delta. The Mediterranean is flooding the delta and almost one million fertile acres have now been despoiled by salt water. The Nile no longer carries it's nutrient rich sediment out to sea. Fish are disappearing and this has resulted in fishing families moving into the slums of Cairo and Alexandria.

In Tokyo, traffic policemen take air oxygen breaks every half hour. Holland's agriculture needs water from the Rhine to flush the salt out of reclaimed area. The heavy concentration of people and industry along the Rhine has made it Europe's

filthiest, most contaminated river. Holland is now trapped between invasion from the sea and the filthy, polluted Rhine. Nearly four thousand Londoners died from the effects of smog during the Chirstmas seasons of 1951. Malaria in Borneo villages resulted in the World Health Organization's action to institute an antimalarial campaign. This set up a chain reaction – cockroaches killed by DDT which was used to kill mosquitoes, in turn were eaten by cats which died. Rat population increased and the inhabitants of the village had a silva-tic plague epidemic. Man's indiscriminate dumping of waste into water is reducing our plankton population which is in turn reducing oxygen production for our atmosphere. This condition is found world wide. Our population increase and the concentration of these people in our urban areas has created problems in solid waste, water and sewer areas. This phenomenon has also necessitated people living in inadequate structures, not only because of the sufficient numbers of structures but also due to the person's inability to obtain employment that would allow them to rent or purchase adequate housing in the event that it is available.

This is possibly sufficient to indicate that urbanization is creating environmental problems world wide. Possibly we should examine in more detail some of the components of concern.

Water

Water is affected both as to quantity and quality. The world's population and production increase have resulted in requirements for additional water not only for human consumption, but also for the greater quantities of water required by industrial and agricultural demands. This greater quantity of water involves not only the product production, but also ancillary demands, For example, additional water is needed for the dilution of waste products and for the reduction of high tempeatures created in the industrial process. However, dilution is no longer the solution to pollution ; clean waters available for dilution are getting even more scarce. This is well-illustrated by the problem of Holland and the Rhine River and of the Ural River in the Soviet Union.

Urban areas are particularly vulnerable since water systems were installed and predicated upon entirely different conditions than exist today. The source of water, the treatment provided, and the distribution system could today all be completely inadequate. Ill-conceived subdivision location or fringe development adds to the conglomeration of problems. Small water systems designed to serve small, discreet population groups are gradually over extended until a maze of inadequate systems

proliferates to serve the metropolitan fringe complex. Added to this intolerable situation is the reliance upon individual sewage disposal systems in built-up areas in which land resources can no longer accommodate such systems. Instances have been recorded where individual water supply systems have been rendered unfit by such crowding.

Technology exists which will do much to protect the available water. This certainly involves re-use of water. The only insurmountable aspect is the quantity that is available. The available water can be and often is, used and re-used but there are limitations, Each use and re-use has its effect. For this reason, there should be inaugurated a plan based upon the quantity available and the best possible use. No one should be allowed to degrade this commodity so that other person could not share in its use,

Urbanization is creating problems in the water field that must be recognized and corrective actions taken. An example of this was recently reported in newspapers, which clearly depicts conditions that can be found in all countries.

The Youth newspaper Komsomolskaya Pravda says the Ural River "is perishing" because of industrial poisons.

The river, which flows into the Caspian Sea, is one of the Soviet Union's mightiest rivers, and 200 years ago its stocks of fish seemed inexhaustible. The newspaper's article recalled that it once provided the chief income for Cossacks who supplied fish and caviar to Russian and foreign markets.

The article gave this account :

Orenburg daily dumps 575,000 cubic metres of waste water into the river.

Orsk discharges 130,000 cubic metres although its purification systems are capable of treating only 10,000 cubic metres of waste a day.

Construction of purification systems is behind the schedule because construction enterprisers do not like the work. The individual jobs are not big or profitable enough, specialists are scarce and the scale of pay is low.

A big smelting plant at Orsk was put into production despite a report by inspectors that its waste contained 150 to 300 times more poisonous phenol than the law permits.

The chairman of the state acceptance commission charged only a 10-rouble fine (11 dollars at the official rate of exchange) for this infraction of regulations. The regional fisheries board tried to impose a 50-rouble fine, but in a three-year court case the factory managers had this reduced to 10 roubles.

Komsomolskaya pravda commented :

'Unfortunately the organs of justice still deal too leniently with people who break the laws on preservation of nature. The lawbreakers do not suffer punishment but even get big bonuses for bringing new factories—certainly without filtering systems—into production ahead of plan."

The newspaper appealed for stops to rescue the river, saying : "In 10 years; time, if one does not take radical measures, there will be nothing to rescue, the Ural will be a dead body of water."

The Ural still has thirty-six varieties of fish and is an important spawning ground for the Soviet Union's diminishing supplies of caviar-producing sturgeon. "The prospects for development of the fisheries industry are very big", Komsomolskaya Pravda concluded, "but everyone knows, fish live in live waters,"

The pollution of our water available for our urbanizing areas is not the full story. Inadequate water systems also play a major role in produing problems. The urban population is increasing more rapidly than the rural population in most parts of the world, and the highest growth is observed in developing countries. While, during the present decade, the total population of the world (both urban and rural) is at a rate of about 1.7% annually, the world urban population is increasing at an average rate of 2.9%. In developing countries this rate is 3.4% and in some it goes even as high as 5% or 6%. Data made available to WHO by Member states indicate that the majority of urban water consumers must put up with intermittent delivery of one type or another from their water systems In addition, there are large numbers of persons without piped supplies in our urban areas. Intermittent delivery generally results in unsafe water, since periodic drops in water pressure permit the entrance of subsoil water through leaky pipes. Intermittent delivery also means that water is unavailable for much of the time to that part of the served population which does not have private storage facilities. For Member States in Asia and Africa, there is every reasonto believe that intermittent delivery in these areas is even more extensive than Member States of Latin America where about 41% of the urban population, and pro-

bably as much as 70% of the total population, have no access to piped water at all. The apparent greatest urban water need exists at present in Africa south of the Sahara, South Central Asia, Southeast Asia and East Asia. The worst conditions are apparently found in Southeast Asia and South Central Asia, where about two-thirds of the urban population have no piped water at all.

These conditions today depict a very real need, but consider the scope of the problem only a few years hence when the additional people are added to our urban areas.

Waste

Waste products, both liquid and solid, have a direct relationship to urbanization. Population increases are the prime factors but when this population concentrates itself into urban complexes the problems are greatly magnified. Industry, usually located near centres of population, contributes greatly to the waste problem. Solid waste from production, liquid waste as an ancillary or primary operation and in many cases, as in the use of water as a coolant, there is a need to return a product to its original normal condition. Industry is not the only aspect of the urban environment that generates wastes. The concentration of persons again is a governing factor. Waste materials are concentrated and new techniques are producing products that generate greater quantitities of waste. In many instances these wastes are not degradable. The use of aluminum cans for consumptive materials is an example. Tin or steel has a relative short life before degradation whereas aluminum products require many years. The use of paper products as containers has greatly increased in recent years. The greatest amount of waste production is occurring in the developed countries but a substantial rate of increase is found in all countries. Waste generation has almost doubled in the last thirty years with the present average annual per capita refuse varying from 500-650 lbs. in European cities to 1,400 lbs. in the United States of America.

Another complicating factor with relationship to urbanization is the population centres which are outside the area normally served by a collecting agency. In these areas there is usually indiscriminate dumping of waste products. This can and does create nuisances as well as health hazards.

Liquid wastes are also a major problem in urban areas. Paved streets and the concentration of buildings contribute to greater water run off and when the sewer system is combined with strom drainage, this adds difficulty to the treatment process.

This, during periods of heavy run off, results in under treatment of the wastes and therefore, greater pollution to the receiving waters.

Urbanization also creates problems even when the liquid wastes are treated. Since only a percentage of the pollutants can be removed by the treatment process now practiced, the large the populations the more pollutants that remain after treatment. From this it is quite clear that urban areas concentrate the wastes at a single point and this could so overload a receiving stream that it would be rendered unfit for other uses. Rivers, as described previously, are not the only receiving bodies of water that are perishing. Lake Erie in the United States has become so polluted that as many as 2,600 square miles of bottom water are utterly devoid of oxygen during the summer months or have reached levels below which even rough fish cannot live.

To quote a very recent publication : "Gone the fish, gone the boat rides, gone the sport fishing, gone the pleasant aspects of Lake Erie. Going as well is the water supply necessary to sustain the kind of population growth projected for the future".

"In order to preserve the quality of water, the rate of eutrophication must be drastically reduced. To make Lake Erie's water fit for recreation, for swimming, for boating and for a healthful environment for the return of gamefish, the geologic clock must be turned back many years." To not heed this message will assuredly result in the death of a lake.

Air Pollution

The pollution of our atmosphere also is to a large extent a product of the concentration of people in our urban areas. There are many aspects of this statement: that industry also is concentrated here but probably the most significant aspect is the pollution created by the exhaust of the internal combustion engines. Experiences which indicate the seriousness of air pollution have been evident for many years and there are several serious air pollution episodes which have been recorded in recent history (in the Meuse Valley and London in Europe ; in Donora, Pennsylvania and New York City in the United States). In the past month, the following events have been recorded. Tokyo, in the central city, has been giving their traffic policemen a half hour respite from their duties due to the high concentration of pollutions ; the entire eastern scaboard of the United States was subjected to a blanket of air pollution that remained in areas for almost one week, resulting in poor visibility and damage to the eyes and increased discomfort to persons with respiratory problems. Many U S. cities now are giving consideration to restrict the use of automobiles in certain

portions of the city ; and consideration is being given by states to require automobile manufactures to place anti-pollution devices on cars at their own expense. Since there is a concentration of automobiles in urban areas and since it is presently thought that nearly half of the present air pollution is attributable to the automobile and the by-products of other internal combustion engines, it can be expected that the problem will worsen as time elapses and the use of the internal combustion engine increases.

Air pollution contaminants from other sources is also of importance but there still remains many unknown areas. Corrective devices and operational procedures are being perfected where knowledge is already known, but still further corrective devices are needed This is prima·ily in the areas of intermixture of pollutants and the long term effects of all pollutants.

Housing

Housing is possibly the single most important element of the environment that directly relates to health and urbanization. This statement is predicated on the fact that no age group can escape its effects Housing people is also a universal problem. There is no country, either developed or underdeveloped, that is not at present faced with this problem. The problem is not a new one although mass exodus from the rural areas to the urban areas of the world have greatly magnified the difficulty. As early as 1870, J.B. Russell studied the effect of housing and people. He reached the conclusion that even though people were better rehoused the effect of the bad housing lasted for more than one generation. Many factors have contributed to there being an inadequate number of safe and healthful homes for the world population. The rapid rate of growth in population, the concentration of industrial growth in close proximity to urban areas, the increased efficiency of farming practices, the lack of finances and construction workers, and the lack of an adequate supply of materials at a price that can reach many of the people are some of the factors that are believed to be major contributors.

Suppose we examine the correlation of poor housing to health as depicted by Dr. Daniel Wilner. He has offerd the following classifications :

1. Acute respiratory infections (colds, bronchitis, grippe), related to multiple use of toilet and water facilities, inadequate heating or ventilation, inadequate and crowded sleeping arrangements.

2. Certain infectious diseases of childhood (measles, chickenpox and whooping couph), related to similar causal factors.

3. Minor digestive diseases and enteritis typhoid, dysentery, diarrhoea), to poor facilities for the cold storage of foods and inadequate washing and toilet facilities.

4. Injuries resulting from home accidents, related to crowded or inadequate kitchen, poor electrical connections and poorly lighted and unstable stairs.

5. Infections and non-infectious diseases in the skin, related to crowding and facilities for washing.

Other diseases that one may be confident can be caused by poor housing include pneumonia and tuberculosis.

On the other hand, living in poor housing itself influence self evaluation and motivation. Poor housing also may be a causal factor in a perception of oneself that leads to pessimism and passivity, stress to which the individual cannot adapt, and a state of dissatisfaction, pleasure in company but not in solitude, cynicism about people and organizations, a high degree of sexual stimulation without legitimate outlet and difficulty in household management and child rearing; and relationships that tend to spread out into the neighbourhood rather than deeply into the family. Most of these effects, in turn, place obstacles in the path of improving one's financial circumstances.

These are some of the effects that poor housing has on the occupants, but suppose we turn our sights on some other aspects. The following statistics are indicative of how slums affect the other segments of the population. In the United States of America, twenty per cent of the houses are classified as substandard, one third of our population live in slum areas, thirty-five per cent of the fire calls originate here; fifty per cent of the diseases occur in these areas; sixty per cent of the cases of tuberculosis are found here; forty-five per cent of the major crimes are committed here; fifty-five per cent of the juvenile delinquency occur here and fity per cent of all arrests are made in the slums and the city expends forty-five per cent of its service budget

here. These slums contribute only six per cent of revenues needed to support major public services.

There is one other very important aspect of housing as it relates to urbanization. This is squatter developments in urban areas. The principal reason for this occurring is that the world's cities have been experiencing an unprecedented growth in their population. Between 1800 and 1950, world population expanded about 2.6 times, while populations living in cities with 20.000 or more people went up twenty-three times. Though only 2.4 per cent of the world's people lived in cities in 1800, the proportion has increased to nearly 21 per cent by 1950.

There is as yet no sign either of a stabilization in the world's numbers or in a lessening of their drive to the cities. By the year 2000, the total world's population is expected to grow by 40 per cent, with the urban population doubling. One estimate is that the urban population of Africa will grow from 59 million in 1960 to 294 million in the year 2000; and that of Asia from 559 million to 3,444 million; and that of Latin America from 144 million to 650 million.

What are the motivational aspects that make people move to the urban areas even when it means living in inadequate housing and in some instances as squatters. Part of the reason is the very sharp increase in industrialization but this is not the whole picture. Also motivation stems from the desperate quest for heaven but neither the motivations nor the justifications follow a uniform pattern everywhere. War, and its aftermath, mass expulsion, fear of slaughter or banditry, hunger, oppressions and the need for refuge and survival share places in the catalogue of causes along with the less condonable motivations of opportunism and speculation. Some squatting in India and Pakistan followed the Partition, when millions of Hindus and Moslems fled for their lives to escape wholesale massacre. Philippine squatters fled toward the cities to escape the devastation of war or in fear of the Huks. The Chinese refugees who settled in Hong Kong fled privation and hunger, often travelling hundreds of miles by foot in quest of a precarious foothold on a hillside. In Taipei, Taiwan, squatters left the mainland to escape the Communists, but their number also included nearby peasants who sought the city's opportunities. The establishment of Pampas de Comas near Lima, Peru, a barriada with a population of 35,000 was preciptated by a slum clearance operation undertaken to make way for a block of office buildings and apartments. Here there was no alternative to squatting.

Most commonly however, squatting stems from internal migrations spurred by the growing privations of the rural hinterlands and the quest for the better life choices of the cities. The wide differential between the hinterland subsistance level and the urban wage is an important element. Interwoven into the decision may be the attractions of city life, the desire to trade, the presence of kinsmen who have already established their havens, the yearning for land, the hope of acquiring it, and the desire to train for a vocation or to give a child schooling. And as long as a city fails to provide land and housing then the newcomer will do whatever he can to acquire a haven.

There has not been an attempt here to portray all of the aspects of urbanization that have an influence on health. To do so would require a paper of considerable length. We have however, attempted to enumerate those items that have and will have a major impact.

The enumeration that has been evidenced here could conceivably be interpreted that each category is separate entity and can be treated as such. It is wished that this simple approach would correct the problem but such is not the case.

No urban and urbanizing area can isolate a problem and deal with it independently. Every action influences and is influenced by every other action. No urban area is so fortunate financially as to be able to correct all defects simultaneously, and to concentrate on a single defect alone could conceivably accelerate the degradation of the total urban area to a degree worse than ever.

Mathematical modelling has now become a science—why not adopt this as a method of determining a correct procedure to follow in attempting to gain correction of problems already existing as well as the building of new problems.

The use of modelling is gaining recognition since it is becoming more evident that urban and urbanizing areas are a dynamic functioning organism acting as an integrated whole. It is becoming more evident that the whole consists of interrelated, interacting and independent parts. A viable urban area is really a system of subsystems and as such through the use of modelling, each subsystem can be exmined independently and then plugged into the total system. This also makes possible giving full consideration to such items as user needs, socio-cultural factors, economics as well as physical aspects. It establishes a framework so that constraints and trade offs can be thoroughly considered.

The use of modelling theory permits the assessment of such inputs as existing environmental conditions, economic resources, scientific predictions and community preferences as they affect the possibility of obtaining a given environmental output. Thus, through the process of simulation, a community can ascertain the affects of a comprehensive environmental management scheme. Most significantly, the potential threats to effective planning and implementation can often be defined in the simulation process and corrected for in the final plan.

In the past, there has always been a philosophy that environmental health problems should be treated in isolation and in most instances only when and after the damage or problem occured. This has, as we are all aware, resulted in the degraded environment existent today. Should we not at this time re-evaluate our philosophy and recognize that the process of urbanizing necessitates a different approach if we are to improve our urban life ? Mathematical modelling will help achieve this goal since through the use of this technique cause and effect relationships in the total spectrum (social, cultural, economic and physical, as well as man himself) can be determined prior to the creation of new problems, as well as determining most appropriate actions to start elimination of existing environmental health problems.

BOOK REVIEW

INTERNATIONAL HISTOLOGICAL CLASSIFICATION OF TUMOURS: No 5

Histological Typing of Odontogenic Tumours, Jaw Cysts. and Allied Lesions, by J.J. Pindborg, I.R H. Kramer and H. Torloni. Geneva: World Health Organization, 1971 (Pp. 45, 12, 133 figs). Available through M/S Mirza Book Agancy, 65, Sharah Qaide Azam, Lahore.

The present volume is the fifth of a series of tumour classifications being published by the World Health Organizations. It is the outcome of five years' work by the WHO International Reference Centre for the Histological Definition and Classification of Odontogenic Tumours and Allied Lesions, established at the Department of Oral Pathology, Royal Dental College, Copenhagen, Denmark. Eighteen Pathologists from different countries collaborated during this work. Radiographic appearances where characteristic have been described because most of the lesions are intra-osseous.

The lesions have been grouped in three main categories: neoplasms and other tumours related to the odontogenic apparatus: neoplasms and other tumours related to the bone; epithelial cysts. The first group is subdivided into benign and malignant lesions, the second into osteogenic neoplasms and non-neoplastic bone lesions, and the third into developmental and inflammatory cysts. An introductory chapter explains the difficulties encountered in this work. The book is well illustrated and beautifully printed. The microphotographs are of excellent quality. This classification would help the pathologistst and others interested in odontogenic tumours, jaw cysts and allied lesions to compare their findings and to undertake collaborative research.

LUMBAR PUNCTURE AND RELATED TESTS

By

Jolly, U., SRN, SCM, DN. 1972. (Pp. 90, 45p) (Paper back)
London: Butterworths

This small book presents a good account of lumbar puncture and related tests. It is divided into five parts. The first part deals with the anatomy and physiology of the central nervous system. The second describes the lumbar puncture, its indications, contraindications, method, after care of the patient and equipment and a short account of the cerebrospinal fluid. The third and fourth chapters deal with the cisternal and ventricular punctures respectively with stress on the duties of ward and operation theatre nurses. The last chapter contains such tests as pneumoencephalography, ventriculography, myelography and Seintillation encephalography. The printing is good and illustrations are adequate.

It is an excellent book for the nursing profession and is strongly recommended.

Pak. Jour. Hlth.

ANATOMY FOR STUDENTS OF DENTISTRY

By

Scott, J.H., DSc, MD, LDS, FFD, RCSI and Dixon, A.D , DSc, PhD, MDS. Third Ed. 1972 (Pp. 606,£4.00) London & Edinburgh : Churchill Livingstone

The book has been completely revised and brought up-to-date. It presents detailed account of gross anatomy of Head anf Neck including development. Brief descriptions of the central nervous system, Thorax and Abdomen are also included. An ideal readable account has been presented for the undergraduate and postgraduate students of dentistry. The illustrations are of a high quality. It is certain to 'continue guiding the dental student in the study of anatomy'.

OCULAR PATHOLOGY by Green, C.H., MBBS, FRCPA, FRCPath. Second Ed. 1972 (Pp. 272,£ 500) London : Blackwell Scientific Publications.

This new edition has been extensively revised and brought up-to-date. The book is divided into fourteen chapters. The first 4 chapters deal with ocular inflammations. The next three chapters give an account of the eyelids, conjunctiva and cornea including pigmented lesions presented in a new way to clarify this often confusing topic. Pathology of lens-induced reactions, glaucoma, vascular disorders of the eye, neoplasms, accidental and surgical injuries to the eye are described in an excellent manner. The book is well illustrated. It is recommended to the Pathologist and postgraduate students of Ophthalmology.

ANATOMY AND PHYSIOLOGY : APPLIED FOR ORTHOPAEDIC NURSES by Rowe. J.W. SRN, SCM, ONC. & Weble, V.H., MA, BMBCh, FRCS. Third Ed. 1972. (Pp. 698,£3) London & Edinburgh : Churchill Livingstone.

The present edition has been thoroughly revised and brought up-to-date. The subjects of anatomy and physiology have been presented in a balanced manner. Simple and concise descriptions of topics are presented for the benefit of the paramedical personnel. The material is well chosen and illustrations are good. The book is divided into 3 parts. Part first is devoted to general principles of anatomy and physiology of the body as a whole. Part two is devoted to systematic anatomy and physiology. Part three deals with regional anatomy. It will be an excellent guide for the Orthopaedic nurses and Physiotherapists.

BACTERIOLOGY ILLUSTRATED

By

Gillies, R.R., MD, FRCPE, DPH, MRCPath. & Dodds, T C., FIMLT, FIIP. FRPS. 3rd Ed. 1973. Edinburgh & London : Churchill & Livingstone

This atlas of bacteriology has been revised, enlarged and brought up-to-date. The material is divided into five sections. The first section deals with the general aspects viz, morphology, staining techniques, cultivation of bacteria, their classification & identification and antigens and antibodies. Section 11 describes the characters of different groups of micro-organisms while the IIIrd gives the diagnostic methods. Sections IV and V deal with Protozoology and mycology respectively. The illustrations and microphotographs are of excellent quality. The printing is good. This book would be of great help to the medical students and is strongly recommended.

By

Zaffar-ul-Aziz

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