This reprint comes to you from the

VOLUNTARY HEALTH ASSOCIATION OF INDIA

C-14 Community Centre, SDA, New Delhi 110 016.
Phone : 652007, 652008 Grams : Volhealth
For a detailed catalogue please write to the Publications Officer.

Code H-16

Health Education—The Missing Link in Medical Care

Dr C.M.E. MATHEWS, Department of Community Health Christian Medical College, VELLORE.

Imagine that we are visiting a hospital and that when we ask these question we are given the following answers :

Q. Who does surgery here? Do you have a qualified surgeon?

A. Surgery? Oh we all do surgery - everyone takes his turn with the knife, from the medical officer right down to the most junior attendant. Surgery is very important.
No, they do not have any special training, its just common sense really. Even the medical officer does not have much training because as a student he was not interested in surgery and so he did not bother to attend those classes. Yes, he does regret it a little now.

Q. Are you thinking of getting a qualified surgeon to come and give you a course on surgery?

A. Well we might do that sometime, but we are all so busy that it is difficult to find the time for it.

Q. What sort of results do you get?

A. Occasionally it works out alright, but some are very difficult cases. The body is very obstinate and ignorant and just does not know how to heal itself or deliberately refuses to do so. So what can we do?

What would we think of a hospital where such a conver-

sation could take place? It could not happen we say. And yet if we substitute "health education" for "surgery" we find that such a conversation could easily take place in very many hospitals. Why the difference in attitude? Which is more important?

Consider the major health problems which affect large numbers of people in India. Let us take a few examples :

Tuberculosis
Leprosy
Malnutrition in children
Diarrhoea in children
Infant mortality
Overpopulation

Why are they problems? Is it because the medical solution is not known? Is it because medical services are not available? Or is it because the people do not use the services properly and do not follow the required behavior at home?

A tuberculosis patient will take treatment until he feels better and then he will see no point in continuing; later he may become resistant to available drugs and a threat not only to himself but to the community. A leprosy patient may be afraid to come for treatment at all, or in the early stages may just not realise he has a serious disease. Malnutrition although largely due to poverty also could be much reduced if mothers appreciated the importance of giving their children more food; vitamin A deficiency could be easily prevented by giving greens with negligible cost. Diarrhoea could be prevented by better hygiene but villagers do not think this is important; when the child is dehydrated they believe in the power of mantras alone and often do not seek medical care.

Infant mortality could be reduced by a better diet for pregnant woman and more antenatal care, but village women do not see the need for this. Family planning services are available but they are not fully used.

So what is needed? It is to change people's behavior, and this is difficult to do. We can say as in the conversation above that people are ignorant and obstinate so that nothing can be done. But this may be just a way of excusing our own faulty

technique. There is a science of behaviour and ways of bringing about change have been extensively studied.

Health education is not just giving talks and showing pictures. Would that be enough to change *your* behaviour? Nor is it only telling facts. Health education is based on the behavioural sciences - social psychology, sociology and anthropology. Insights obtained from studies in these fields can be applied to the problem of changing people's behaviour. Merely to hand out information by means of talks etc., is like handing out drugs without first making a diagnosis, and without relating the particular local symptoms to the physiology and pathology of the body as a whole.

The minds of the people to be educated are not just like blank pieces of paper on which we can write what we will. Their minds are more like an organ of the body which has certain fixed functions and whose structure and activities are all related to these functions. The "functions" depend on a person's goals and values. Therefore to change knowledge, attitudes or behaviour we must understand a person's goals and values and their system of beliefs. So the first principle of health education is :

1. *Know the culture*

That is we must know the customs, beliefs, goals, values, and way of life of the people we are trying to educate. Their culture may be different from our own not only because of national, state, or regional differences, but because of differences in class, caste, education, religion, and general background. There is usually a considerable cultural gap between say a doctor and a villager. Unless this is bridged in some way there will be little real communication, since communication depends on shared knowledge and attitudes.

The doctor may think he has explained everything, but it will not mean anything to the patient, and the doctor will, wrongly, conclude that the patient is stupid or obstinate. We cannot expect the patient himself to bridge this gap, we must go to meet him by learning about *his* ideas, before we can effectively teach him our own ideas.

2. *"Start from where they are."*

If we start with ideas that are quite unrelated to anything the patient already knows, then he will not be able to integrate what we are saying into his existing system of concepts and will probably reject it. We should try to introduce change gradually by building on what he has already. This takes us back to principle (1) because clearly we cannot do this without knowing the culture.

3. *Give people a learning experience*

Just giving information is usually not adequate to change behaviour. Doctors know all about the evidence that smoking causes lung cancer, but that does not stop them from smoking. A learning experience is much more effective. If the mother of a child with malnutrition *sees* her child improve with a better diet alone, she will be much more easily convinced than if someone merely tells her to give the child more food.

4. *Motivate by linking the required behavior with goals of groups and individuals.*

The action which we want the person to take must be related to some goal the persons has; the action should be seen as a way of reaching the goal. The goal may or may not be related to health. For example people may build a latrine because they think it will give them more prestige, or to imitate some important persons, and only afterwards they may discover its value for health.

5. *Suggest specific, easily carried out behavioural changes*

Studies have shown that people are more likely to follow advice given if it is quite specific and precise, and they know exactly what to do. Also there should not be too many barriers making it difficult for them to do it. If we say to a mother, "you should have your child immunised", she may agree but do nothing about it; if we say the following she is more likely to come; "bring your child to the clinic tomorrow at 3 p. m. to be immunised; it is quite near your house and it will not cost you more than (a small amount); your neighbour is coming and you can go with her".

6. *Work through leaders and use group influences*

Many studies have clearly shown the importance of group influence on a person's behaviour. A group discussion and decision is often more effective than a lecture. The social influence of the other members of the various groups to which people belong is very powerful. Reference groups, that is the groups with which people compare themselves also have an important influence.

Groups may often be influenced through their leaders. Leaders are people that others will listen to and imitate, they need not have any official position. They may be people who have more communication with others than the average or they may be powerful because they have more resources than others, or more education. If we do not use them, they may work against the project and prevent any progress being made. If we can involve them and make them feel it is their own project, they are more likely to carry on with it even when we are not there.

7. *Obtain participation of the community at all stages*

The community should be involved even in the planning stages of a project. Only if they are fully involved will they take a real interest in what is to be done. It has been said that we cannot give health to people, they must achieve it for themselves. We must act as catalysts and stimulate them to do this. One way is to form a health committee and get them to discuss their health problems and decide their own priorities and what help they want from us.

8. *Meet felt needs first*

If people do not have enough to eat, e.g. no spare cash to buy food to-morrow and no prospect of work, they will not be very interested when we talk to them about long term preventive measures such as immunisation or family planning which may only help in the remote future. Health programmes and community development programmes should be much more closely linked so that felt needs can be met.

There is not enough space in this paper to describe the various theories on which health education is based. The

above are just a few principles which will give some idea of the scope and methods of health education. Those who are interested and have time for further study can become familiar with the behaviour sciences, and themselves try out different ways of applying them; others can be use the services of a qualified health educator.

In my opinion, only when education becomes as important a subject in medical practice as for example surgery is at present, will many of the health problems of India be solved.

BIBLIOGRAPHY

1. Selected papers on health education. CHEB Training Series I, March 1960. Central Health Education Bureau, New Delhi.
2. Social Psychology, Kuppuswamy B. Asia Publishing House 1961.
3. Havighurst R.J., The learning process. Amer. J. Pub. Health *51,* 1964, 1961.
4. Cartwright D., Some principles of mass persuasion. Human Relations 2, 253; 1949.
5. The process and effects of mass communication. Ed. W. Schramm. University of Illionis Press, USA 1965 p. 116.
6. Health culture and community,Ed. Paul, B.D. Russell Sage Foundation 1955.
7. Human problems in technological change. Spicer, E.H. Russell Sage Foundation, 1952.
8. Lionberger, H.F.. Adoption of ideas and practices. Iowa State University Press, Ames, Iowa. USA 1960.
9. Rogers, E.M. Difusion of innovations. Free press of Glencoe, New York 1962.
10. Ranganathan, K.V. Srinivasan, K. and Mathew, B. Role of community leaders in promoting family planning in rural India. Action Research Monograph No. I, Inst. Pub. Health and Family Planning, Gandhigram 1965.
11. Nutrition education in public health programmes - what we have learned. Amer. J. Pub. Health 51, 1715. 1961.
12. Community development in India. Mukerji, B. Orient Longman, 1961.

From Indian Paediatrics Vol. 10. 347-9, 1973.

Code Ch-09

Nutrition Education or Education in Child Care

by J.P. Greaves, M.A., Ph.D.
FAO/UNICEF Nutrition Officer,
UNICEF, New Delhi

The Planning Commission of the Government of India, in discussing the problem of malnutrition in its Approach to the Fifth Plan (January 1973), speaks of the need to integrate feeding programmes "with heath care, immunization and nutrition education to form a package". In the belief that education component of the package would be better described as "Education in Child Care", this note sets out proposals for what this might mean; in particular for what might be:

I. eight basic universal messages (i.e. messages generally applicable throughout India, in rural and urban situations);

II. in elaboration of these, twenty universal components of the packet of messages that need to be communicated to village women;

III. local modifications of some of these components identified in list II by letters in parenthesis.

The "messages" listed represent ideas, and some need more specific identification. They have been kept deliberately as few and as simple as possible. The ideas are not expressed

in the terms which are supposed to be necessarily the most appropriate for getting them across. Once the ideas themselves have been agreed, this aspect—part of the "how" of communication—will need much thought. Probably the advice of those familiar with social customs and beliefs regarding illness, and with food habits and tabus should be sought. Marked regional variation in these respects may mean that basically universal mesages should be communicated in different ways in different parts of the country. Valuable assistance in these regards could be given by the Central Health Education Bureau.

The packet of messages or ideas represents "that every mother needs to know". Every father, too. But all village and block level workers with whom she comes in contact, including balsevikas, gram sevikas, mukhya sevikas, and also nurses. ANMs and PHC doctors, who will need training or at least "orientation" in the integrated package programme, should also be awar of, and sympathetic to, this packet, so that the messages will be reinforced at various levels and the mother will not be subjected to conflicting advice. In other words, all should speak with same voice. This means that the training given in on-going programmes, such as the Applied Nutrition Programme, needs to be reviewed with this packet of messages in mind.

Based on these messages a simple "Manual on Child Care, for village level workers", might be developed. Such a manual shoud be written in the local language with local modifications and adaptations of the messages. It should be complemented with a "Manual on Child Care, for Block/District level supervisors", and perhaps one for State level coordinators and training institution staff. Successive manuals, and training syllabi, should be developed *from bottom up*, by seeking answers to questions such as, "Who will teach the mothers/supervisors/teachers?" "What do they need to know in order to do this job properly?" However, *implementation of* the training should of course proceed *from the top down*. Throughout, as much emphasis shoud be placed on *how* messages should be communicated as on *what* these messages should be.

Child Care Education

1. *Basic universal messages.*

1. Breast feed as long as possible

2. Introduce semi solid food from 5 to 6 months
3. Feed young children 5 or 6 times a day
4. Don't reduce food in illness
5. Use the health services available
6. Get children immunised
7. Keep yourself and your surroundings clean; drink clean water
8. Have no more than 2 or 3 children, 2 to 3 years apart.

II. *Universal components*

1. Mother-to-be :

(i) eat more than usual amount of cereal and pulse, and plenty of dark green and yellow vegetables and fruits; (A)

(ii) visit PHC doctor/ANM during last three months of pregnancy.

2 New baby :

(I) Mother's milk is best—don't discard colostrum

(II) If you feed additional liquids, use a traditional feeding vessel, *never* a spoon.

3. Keep on breast feeding as long as possible. But this is not sufficient by itself after the age of 5 to 6 months.

4. While breast feeding the child:

(1) mother should eat more than usual amount of cereal and pulse, and plenty of dark green and yellow vegetables and fruits(A).

(2) visit the doctor/ANM for check up.

5. Start semi-solid food (local staple or mashed up ready-to-eat foods) after 5 to 6 months, and also undiluted cow's milk if you can. These foods must be prepared carefully milk if you can. These foods must be prepared carefully (3).

   Give what you would normally give later, much earlier. And add vegetables and fruits.

6. As the child grows the amount and variety of foods should be increased. By the time he is one year old he should be fed similar food to the rest of the family - cereal, pulses, green vegetables, perhaps supplemented by processed ready-to-eat foods - but in order to get as much as he needs he should be fed these solid foods 3 or 4 times a day (A).

7. When you are unable to feed the child with your own milk, solid food which may include supplementary ready-to-eat foods should be given 5 or 6 times a day. Also, if possible, undiluted cow's milk or buffallo's milk or miltone. (Miltone is 50% milk extender from vegetable sources).

8. Do not use excessive water for cooking rice and vegetables. If you drain the water after cooking do not discard it. It is good for you and should be consumed.

9. To prevent the child getting some diseases he should be immunised. This will probably make him a little ill, but will prevent him getting terrible scares later and perhaps dying.

10. To prevent him getting other diseases he should be kept clean and his surroundings should be as clean as possible. Don't spit cough.

11. Do not let excreta lie around where your baby may be playing. Remove it quickly to a place outside his reach. After baby defaecates wash him clean with soap and wash your hands. Your child may get sick if he puts dirty hands in his mouth.

12. Hands should be washed before eating and before preparing food, and before holding and feeding the baby.

13. Kitchen and feeding utensils should be kept clean and not allowed to attract flies. Flies mean dirt means danger.

14. Food should be kept covered from flies and dust.

15. Only the safest available water should be drunk. A child needs plenty of water (C)

16. Learn to recognise signs of common diseases: cough, diarrhoea, dehydration, fever, running ear, skin diseases, sore eyes and poor sight. Learn their management and how to deal with accidents in the home, and when to seek advice from ANM/doctor.

17. When the child is ill with fever or diarrhoea continue to feed him as before, but you may have to prepare the food more appetisingly. You may have to force him a little He will get better quicker if he eats plenty of cereal, pulse, green vegetables. (A)

18. Encourage the child to play with simple household articles and things he can gather in the neighbourhood.

19. Children cared for in this way are likely to be alert and curious and grow well (E).

20. Children cared for in this way are likely to survive much better than those who are not. You may not then want so many children - family planning can show you how to achieve this, and how to space those you do have by 2 or 3 years.

III. Some local modifications:

(a) Give examples of particular cereals, pulses and vegetables, and methods of their preparation. If it is customary to eat animal foods such as eggs, meat or fish, and these can readily be obtained, they should be referred to.

(b) Give examples of suitable recipes from local foods.

(c) Source of this water to be discussed in detail.

(d) (i) If there are local schemes for the provision of Vitamin A capsules, or iron/folic acid tablets, explain how these can be obtained, and why.

(ii) If rickets is a problem (parts of Central India?) explain importance of allowing child some exposure to sunlight.

(e) "Will grow well" if the mother is likely to come in contact with a centre using record/weight charts, these should be referred to and explained.

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-14, Community Centre, Safdarjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

54.3 D190 W.3

E-18

VILLAGE SANITATION IMPROVEMENT SCHEME, INDIA

by S.B. Watt, ITDG Water Consultant

The National Environmental Engineering Research Institute (NEERI), Nagpur, India , has a long and successful history of developing techniques in public health engineering appropriate to Indian conditions. These techniques include simple methods of large scale sewerage treatment suitable for townships with piped and water borne wastes, but they are also trying to find ways to help the majority of people who live in small villages and isolated hamlets.

Toilet facilities for many people in India are very poor and contribute greatly to ill health amongst the population. Modern, piped sewerage systems are expensive and are usually outside the ability of the local users to maintain without constant attention and advice. World wide experience with village sanitation improvement schemes demonstrates that unless the users of the system are involved in the planning and construction work, they will not take responsibility for the upkeep of the installation. Engineers at NEERI are supporting a small sanitation improvement scheme at a village near Nagpur, called Mahalagoan. They are providing the toilet bowls and another local organization is providing the materials to construct the toilets. The local people have these materials free of charge, and are shown how to do the construction work. All the work up to ground level is paid for, and the users of the toilet then construct a hut over the base plate as and when they have the materials or resources to do so.

It is well known that man is the reservoir of most of the diseases that cause him to be ill, and the basic strategy of any sanitation programme is therefore to carefully control the disease-causing bacteria in his excreta, to prevent them from contaminating foods, drinking water etc. Improved sanitation is a fundamental step towards improved well being, but without educating the users of the toilet in the need for hygiene and care, the full benefits of any scheme will not be achieved.

There are many methods of collecting and treating excreta from simple pit privies to large scale water borne , piped systems. The method described below was evolved in Ceylon, and has the advantages of a water seal closet which prevents flies and odours, low cost, and easy removal of the decomposed excreta. It cannot safely be used, however, in areas which are regularly flooded, in impermeable or frozen soils, or near to wells which provide water for drinking.

The excreta is flushed through the water seal into the soakage pit by the 1 or 2 litres of water used for anal cleansing. The liquids in the pit soak slowly into the soil, and the solids decompose into gases and humus. The gases diffuse slowly through the soil causing no nuisance, and every 2 or 3 years the pit is uncovered and the humus removed.

Method of construction

1. The most important step is to convince the people who will use the toilet of the need for improved sanitation. Without their full support the toilet will probably be neglected and abused.

2. Choose the site very carefully. It should be located in a convenient position to the household who are to use it, and the soakage pit should be easy to empty. Check most carefully that the infiltrating liquids from the soakage pit do not percolate into any nearby water wells. The toilet must always be downhill of the well, and at least 15m away. If the rock or soil around the well is fissured or broken, take special care that the liquids from the soakage pit do not reach the well water before they have been purified in the soil.

3. Excavate the hole for the soakage pit adjacent to the site that the user has chosen for his toilet. Clear the ground for privy slab, excavate for the water seal trap, and dig a trench for the pipe which connects the water seal trap to the soakage pit.

4. The water seal trap must be pre-cast from sand/cement mortar. A specially prepared mould is needed for this, but it is not a difficult job to do. Full and lengthy instructions on how to make the water seal trap may be obtained from VITA publications - the address is given at the end of this article. To help prevent debris and rubbish from blocking the water seal and pipe, design the narrowest part of the toilet to be next to the bowl.

5. Wall up the inside of the soakage pit with bricks, leaving small gaps between the bricks for the liquids to escape. Lay and joint the pipe between the soakage pit and the water seal trap. Connect the water seal trap to the pipe, and fill around the trap with weak concrete to hold the trap steady in position.

6. Cast the privy base slab around the water seal trap, and trowel the surface smooth. Build up the foot rests, and make sure that all washing water will run into the trap. Alternatively if several privies are to be built, construct a simple mould to precast the slabs.

7. Lay the pre-cast cement cover over the soakage pit and cover this with soil. The cover is made from mortar (1 cement, 4 sand) at least 5 cms thick. Include steel reinforcement if this is available.

8. The toilet is now ready for use, and the owner may use any materials that he has available to construct a hut around the squatting plate.

9. Stress the importance of correct maintenance. If too much water is used, the pit will flood. Debris and garbage will block the water seal and will be difficult to remove. When the pit is full, it should be allowed to stand unused for 1 or 2 months to kill the bacteria, before it is emptied. During this period, the toilet user will need to arrange

for his family to share a neighbours privy. The excreta that has decomposed will then be safe to use as fertiliser.

Like all toilet facilities, the water seal privy needs careful use and regular cleaning. It is absolutely essential that education in hygiene is considered to be part of the toilet construction programme. Preferably, hygiene education should come first, leading to a demand for improved sanitation.

For further information:-

1. The National EnvironmentalEngineering Research Institute, Nagpur 440020 Maharashtra State, India, have many excellent publications on low cost water and sewage treatment methods.

2. VITA publications: 3706 Rhode Island Avenue, Mt. Rainier, Maryland, USA 20822. For instructions and drawings of water seal traps etc.

3. Excreta Disposal for Rural Areas and Small Communities, by E.G. Wanger and J.N. Laroix. World Health Organisation Monograph Series No. 39. WHO SEARO, 36 Ring Road, New Delhi - 110001. One of the best books available on low cost sanitation.

4. Guide to Simple Sanitary Measures for the Control of Enteric Diseases S. Rajagopalan MA Shiffman, WHO, 1974. Describes low cost sanitary measures that can be implemented with limited resources to control enteric diseases.

5. Water Treatment and Sanitation H. Mann and D. Williamson. Rev. ed. 1976. Intermediate Technology Publications, 9 King Street, London WC2E 8HN, U.K.

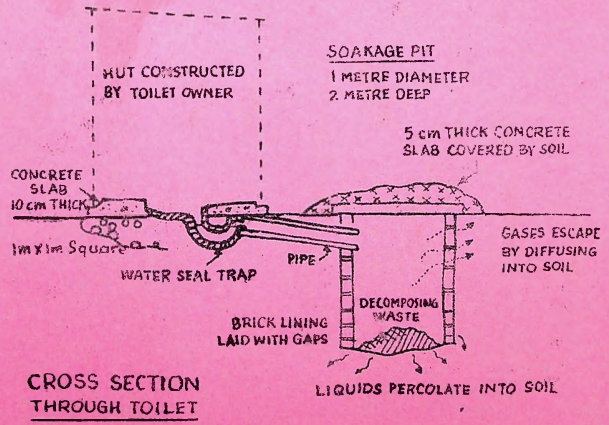
Illustration on reverse side.

Acknowledgement

We are grateful for permission to reproduce this article from Appropriate Technology 2, 4 p.15-16 1976.

E - 18 E - 18

Illustration



CROSS SECTION THROUGH TOILET

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-14, Community Centre, Safdarjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

N90 4.4

YOU CAN PREVENT LATHYRISM

A 16 leaves Flip Chart in specially simplified Hindi, designed to inform peripheral health workers and the public about danger of Matra (Kesari dal), Lathyrism and its control.

Quality reproduction of black and white photographs on art paper/card.
Size (approximately) 28 cms x 22 cms.
Price Rs. 15/- (tentative)
Spiral binding.

Contents

The idea is not to stop the poor from consuming matra but to continue to do so in a form that is safe. Matra can be detoxified by a very simple home process and the general population must be made aware of this. The contents include :

- What is Lathyrism?
- Cause of Lathyrism.
- Early signs of Lathyrism.
- Stages of damage.
- Method of detoxifying matra at home.
- Prevention and control of Lathyrism.

By Whom

The text and pictures of this flip chart were evolved at the Gandhian Non-formal and Adult Education Centre, Rewa, Madhya Pradesh.
The flip chart is designed and planned by Vikram Parchure, formerly of the National Institute of Design, Ahmedabad, under the guidance and with the help of pictures taken by Prof. M P Dwivedi, Professor and Head of the Department of Preventive and Social Medicine.

Why the Urgency

This year has been one of severe drought and doctors fear another outbreak of lathyrism on a scale comparable to that of 1974. Unless the people are made aware and some action taken, hundreds more will be crippled for life.

Aim of VHAI Flip Charts/Flash Cards

VHAI flip charts/flash cards are high quality field level learning/teaching materials. These can be effectively used by frontline health workers and adult educators. These can be used as :

- a visual aid in teaching groups
- learning aid during training
- an aid to memory in their work
- a source of pictures and important health messages for posters, health campaigns, etc.

Simple language and pretested illustrations used.

COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road
BANGALORE - 560 001

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-14, Community Centre, Safdarjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

E-19 WQ 4.5

A SIMPLIFIED APPROACH TO AQUA PRIVY CONSTRUCTION

P.A. Oluwande,
Senior Lecturer ,
University of Ibadan, Nigeria

The aqua privy may be correctly described as the intermediate method for excreta disposal from the point of view of the pit latrine on one hand and the septic tank on the other. Figure 1 illustrates the differences and similarities between the pit latrine, the aqua privy and the septic tank systems.

The pit latrine is not popular among many people in the developing countries for many reasons. Many people cannot use the septic tank system because it is expensive to construct and to operate, for houses have to be connected to a constant water source for proper operation. In Table 1 the costs of the three systems are compared.

The aqua privy has great potential for use in the developing countries. If it is properly designed, well constructed and well maintained, it will function without odour and fly breeding - the two main objections to the pit latrine. Since it does not require water for flushing faeces into it, it can be operated satisfactorily in houses which obtain water from public stand taps, or houses in communities without pipe borne water supply. Since it does not involve much pipe system, materials like pieces of wood, cob of maize and objects other than toilet paper may be used for anal cleaning without blocking the system. Such solids, however, shorten the intervals between desludging the tanks.

Unfortunately, the aqua privy system is not as commonly used in many developing countries as the pit latrine and the septic tank. Investigations carried out by the author in many countries show that construction of the different components of both the pit latrine and the septic tank systems has been standardised and perfected. This cannot be said of the aqua privy, which is totally unknown in many communities that can benefit most from its use. The main reason why the aqua privy is not as common as it should be in many developing countries is because its construction, especially incorporating the drop pipe through the floor slab, has not been sufficiently simplified. The techniques suggested in many publications involve the use of complicated moulds which are not easy to produce (Wanger and Lanois, 1958; Macdonald, 1952). Some workers have used metal for the drop pipe (Vincent et al., 1961). But metal sheets which can be folded to form drop pipes are not readily available in areas where the aqua privy is most needed. Moreover, welding the metal to the correct shape requires qualified welders, who may also not be readily available.

There is therefore a need to simplify the construction of the aqua privy to enable any semi-skilled person to build it.

General features of the aqua privy

As shown in Figure 1, the aqua privy consists of four main components: the tank, the floor, the superstructure of the house and the soak-away or seepage pit. All these components, except the floor, are similar to the corresponding features in a septic tank system. The methods and and materials employed for their construction for the septic tank can be adopted for the aqua privy system.

Aqua privy floor slab

The main difference between the floor slab of a pit latrine and that of the aqua privy is the inlet drop pipe which the latter carried. Once a simple method of incorporating the inlet drop pipe to the floor slab is available, the construction of the aqua privy floor slab becomes as simple and straightforward as the construction of the common pit latrine floor slab.

Construction methods

Three simple but related approaches have been employed for casting the floor slab for the aqua privy. These are :

a. the trench method
b. the hole method
c. the raised platform method.

For any of the three methods, materials like metal, wood, bamboo and asbestos cement may be employed for the inlet drop pipe. The two materials which the author has employed most are 15 cm diameter. For individual construction of the aqua privy floor slab in the rural areas of the developing countries where asbestos cement pipe may not be readily available, bamboo is very useful indeed.

The trench method

The sequence of four steps for this method is as follows (Oluwande, 1975):

i) A trench about 15 cm deeper than the length of the inlet pipe and 75 cm wide is dug (see Figure IIa). The length of the trench will depend on the number of slabs to be cast at a time. The length of the drop pipe recommended is 75 cm. This will ensure that the free end is sufficiently inside the water in the aqua privy tank and that the distance between the top water level and floor of the slab is enough to prevent water splashing on the users.

ii) Planks about 2.5 cm thick and 30 cm wide are cut into pieces one metre long. Four such pieces will be required for a floor slab 90 cm square. The pieces are placed side by side on

the trench and a circular hole 20 cm in diameter is cut through the two pieces in the middle to accommodate the drop pipe (see Figure IIb).

iii) A piece 75 cm long is cut from a 15 cm diameter asbestos cement pipe or from bamboo. Four holes with diameters big enough for 10 cm long nails are made equally spaced on the circumference of the pipe. The centre line of the four holes must be about 2.5 cm from the end of the pipe. Nails 10 cm long are passed through the holes with their big ends inside the pipe (see Figure IIc).

iv) The platform planks are arranged over the trench and sheets of newspaper or cement bags are laid over them. The portion of paper over the middle hole is removed. The free end of the prepared drop pipe is passed through the central hole until the pipe is supported on the platform by the nails. The steel reinforcing rods for the floor slab are arranged so that they pass under the nails. A special wooden cover is made for the top end of the pipe. The main mould for the slab is placed in position. A concrete mix of 1:2:4 is used to cast the slab. In some cases, the aqua privy tank may serve as the the trench but extra care must be taken when removing the platform planks later. Otherwise the floor may drop into the tank.

The hole method

This is similar to the trench method except that a hole 20 cm in diameter replaces the trench. The depth of this hole should be about 3.8 cm shorter than the length of the drop pipe. The hole should be dug where the surface of the ground is level because platform planks are not necessary and the slab is to be cast on the surface. All other procedures are as described for the trench method (see Figure IVa). The number of holes will depend on the number of slabs to be cast at a time.

Raised platform method

This is also similar to the trench method except that the slab is cast on a raised platform instead of on the ground (see Figure IVb).

The choice of the three methods will depend on many factors such as the nature of the ground, the funds available and the availability of men to carry the slab. The hole method is the cheapest and simplest but requires at least four men to lift the slab from the hole. When bamboo or metal is used for the inlet drop pipe, it should be painted with tar or other anti-corrosion substance.

See section through a typical slab in Figure 6. The mould for casting the slab can be removed after

24 hours. The slab should then be covered with sand and other suitable material like sacking and cured for at least two days before it is placed over the aqua privy tank.

TABLE I

Cost of Pit Latrine, Aqua Privy and Septic Tanks Compared (1973)

	Items	Pit Latrine Rs	Aqua Privy Rs	Septic Tank Rs
1.	Labour for digging	90.00	180.00	180.00
2.	Cement	12.00	180.00	180.00
3.	Gravel	12.00	36.00	36.00
4.	Sand	6.00	48.00	48.00
5.	Bricklayer's Labour	24.00	108.00	144.00
6.	Pipe fittings	-	36.00	210.00
7.	Water closet flush tank and seat	-	-	252.00
8.	Plumbers Labour	-	-	90.00
9.	Super structure (if separate from house)	123.00	123.00	123.00
	Total	273.00	711.00	1263.00

References:

Macdonald, O.J.S. (1952) Small Sewage Disposal System Harrison and Crosfield Ltd., London.

Oluwande, P.A. (1975) Development of Aqua Privy for Urban Sanitation in proc. of 2nd International Conference on Water Waste and Health in Hot Climate, pp.110-122, Loughborough University, U.K.

Vincent, L.J. Algie, W.E. and Marair, G.V.R. (1961) A System of Sanitation for Low Cost High Density Housing in Symposium on Hygiene and Sanitation in relation to Housing CCTA/WHO, Niamey 1961.

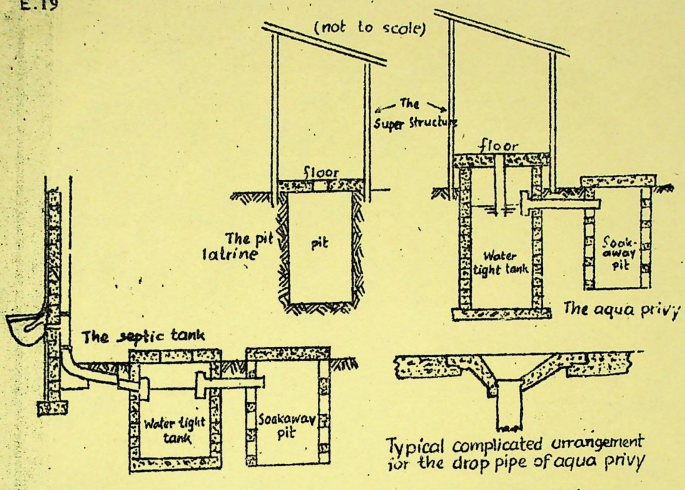
Wanger, E.G. and Lanoix, J.N. (1958) Excreta Disposal for Rural Areas and Small Communities: WHO Monograph series.

Acknowledgement

We are grateful for permission to reproduce this article from Appropriate Technology 3, 3 p 26-28 1976.

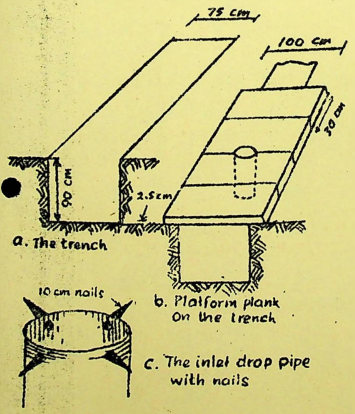
(for Figure I, II & IV see next page)

Figure I.



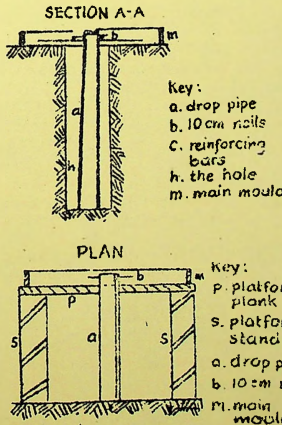
Pit latrine, aqua privy and septic tank systems compared

Figure II



Sketches showing trench method of aqua privy floor slab construction

Figure IV



THE RAISED PLATFORM METHOD

54. 6

Voluntary Health Association of India

C-14, Community Centre
Safdarjung Development Area
New Delhi-110016

Telegrams : VOLHEALTH
New Delhi-110016
Phone : 652007, 652008

NGO 4. b

Management Of Common Snake-Bite Poisoning

4

Dr J Jacob, M.B., M.R.C.P.(Lond)

Tiruvalla Medical Mission has long experience in managing snake bite poisoning. This hospital is the only one around about 20 km. radius that is accepting and treating snake bite patients. We have accumulated a wealth of experience in this line because we could not rightly evade this great problem of fatal snake bite poisoning in our neighbourhood.

Most of the cases we come across in our hospital are caused by snakes belonging to the Viper family. We have been able to develop an effective system by trial and error for treating patients who are admitted with snake bite poisoning. In 1968 and before, we used to give two ampules of antivenom irrespective of the condition of the patient. We never gave any anti-histamine or heparin or Cortisone. Our retrospective study then, showed a mortality of 25 per cent out of which 89 per cent was caused by acute renal shut down. We did a prospective study at that time and increased the number of antivenom to an average of 10 vials per patient. At the end of the study, we found that we are able to reduce the mortality from 25 per cent to 6.7 per cent. We were convinced then that adequate antivenom was the basis of treatment.

At that time the major problem appeared to be occasional peripheral circulatory failure, CNS damage and rare secondary haemorrhage. We still have not understood the problem of shock and CNS damage. The problem of secondary bleeding is now well known to be caused by disseminated intravascular coagulation (DIC). Subsequently, for a time, we instituted heparin in every patient who, we felt, had significant envenomation.

Our recent retrospective study showed that our method of giving large amount of antivenom as bolus injection intravenously is not as efficacious as giving smaller amount of antivenom in a slightly longer period of time. We understood that the tendency for bleeding was definitely due to an anticoagulant and/or the effect of a procoagulant. Animal study as well as studies on victims of bite have clearly shown that there is an on-going DIC which in most cases is controlled by antivenom. In the light of this finding, we have for the last one year stopped the routine use of the heparin.

We find that the difficulty in managing patients admitted with snake bite is the problem of evaluating the extent of envenomation. The only parameter that we have in our hospital apart from the physical condition of the patient, is the coagulation profile, namely bleeding and clotting time.

It is found that for any significant bite bleeding and clotting time will be prolonged. However, some patients who were brought with an efficient tourniquet could have normal clotting time initially but developed prolonged clotting time and proteinuria after releasing the tourniquet.

So far our understanding of the adverse effect of venom are

1. Cerebral damage
2. Excessive bleeding tendency
3. Renal shut down
4. Peripheral circulatory failure.

CNS damage still stands as an enigma. There has been no clear cut description of the pathophysiology to account for it. While it is possible that the central nervous system damage may be due to the direct effect of the venom the most likely cause is either generalised or localised haemorrhage or thrombosis due to DIC.

1. Excessive bleeding tendency is now clearly proved to be due to consumption coagulopathy. The treatment for all patients is adequate antivenom. The proteinuria and the acute renal shut down have always been felt to be due to the direct toxic effect (necrotising) of the venom. Whether or not there is also additional damage to the kidney by blood clots by the ongoing DIC is not clear. Many patients have haematuria along with proteinuria but the haematuria, in our experience, has always come 12 to 16 hours after the bite. But the proteinuria manifests itself even as early as the first half hour after the bite depending on the extent of the envenomation.

2. Acute peripheral circulatory failure which happens in patients quite unexpectedly, has not been successfully explained by any one so far. It could be mediated through the effect of the venom at the brainstem level. The mechanism of action should be the same as septic shock.

Mode of treatment

We divide the patients into tourniquet and the non-tourniquet group. For non-tourniquet group after doing a complete physical examination and doing haemoglobin, clotting time and urine tests, we start a five per cent dextrose water IV drip and give an injection of antihistamine. When there is no obvious signs of envenomation such as bleeding from site, swelling or shock, we wait for the lab result before starting any special treatment. If the result is abnormal we start four ampules of antivenom in a 100 c.c. of 5 per cent dextrose and water and give it within a period of one hour. At the end of an hour after the antivenom infusion another clotting time is done; if it is still prolonged, we give another four ampules in two hours.

3. Two hours after completion of the second four ampules of antivenom, clotting time is repeated. If normal, no more specific treatment is given. If prolonged, another four ampules are given in three hours time. Three hours after completion of that clotting time is repeated. In case where the clotting time is still prolonged, we would consider treatment of DIC and start heparin 5000 units over four-six hours and then do a platelet count. If platelet count is very low, we give 250 ml of fresh blood in siliconised bottle. When the blood results return to normal, we stop giving antivenom. We do not advocate giving more than 16 ampules of antivenom to any patient. Ordinarily we give a maximum dose of twelve ampules only. In exceptional cases we give another four ampules. We have found that in the case of most patients (90 per cent) the clotting time comes back to normal by 12 ampules of antivenom.

There would be some patients who have a normal clotting time and no proteinuria initially. For them the lab test is repeated after one hour. If the clotting time is still normal, the test is repeated again after another two hours. If it is still unchanged, then we repeat the test three hours after that to be absolutely certain. There will be a rate patient who develop prolonged clotting time five to eight hours after bite and many develop renal failure.

For the patients who have a tight tourniquet our policy now is to give two ampules in 100 c.c. even if the initial clotting time is normal. After that the tourniquet is released and we wait for an hour to do a clotting time. If that is prolonged, then we give them four ampules and continue the regime as for any poisonous bite. If the clotting time is normal, then we wait for two hours and repeat it and then three hours after that. By giving patients two ampules of antivenom as a routine we certainly do give it to a few patients who do not require any antivenom at all but the danger of the CNS damage that can occur can be devastating on the release of tourniquet without proper coverage, with antivenom. We therefore, feel justified in giving antivenom to an occasional patient who does not require it.

Patients who are brought within the first four hours after the bite have the maximum chance of survival without complication such as peripheral circulatory failure (shock) or acute renal shut down. Even to patients who are brought later, we still give the antivenom if the clotting time is prolonged. If they have only heavy albuminuria, they are treated with manitol 150 c.c. twice daily and lasix 80 - 200 mg. IV to avoid renal shut down.

We have found the best way to handle the patients in a state of shock is to give them fresh blood. This is particularly because most of the patients in circulatory failure already are anuric on account of the delay in getting to the hospital. Giving 250 to 300 ml.

of whole blood is safer than giving salt solution which is otherwise the method of treatment. Whenever we have used small amount of fresh blood taken in siliconised bottle, the blood pressure came to normal gradually. We have also used in such patients fairly heavy doses of cortisone. Patients who are adequately treated with antivenom in the hospital seem to improve with blood and cortisone in this situation. Our greatest mortality is in shock patients and most of those are the patients who are brought late to the hospital after native treatment or who were treated inadequately with antivenom elsewhere.

The percentage of patients with complication such as shock and renal shut down varies according to the degree of envenomation. But our statistics show that moderate to severe bite causes shock if not treated adequately to have 70 to 80 per cent of the patients with inadequate treatment will require some mode of treatment for acute renal shut down either conservatively or by dialysis. 15 to 20 per cent will require treatment for shock or treatment for CNS damage. The mortality is over 80 per cent. Even if these survive, they usually have some mode of deficit which in time tends to clear up to some extend.

We have found peritonial dialysis to be more useful than haemo dialysis. This has been the experience of other people in the field of dialysis.

I have not mentioned anything about Cobra bite. Patients with severe Cobra bite never reach the hospital. Moderate bites will require antivenom till they are out of their neurological deficit, which is quite obvious. In these patients blood and urinary findings are all normal but we can easily make out a Cobra poisonous bite by such findings as drooping of the eye lids, dysphonia and dysarthia etc. If not adequately treated immediately, they develop respiratory paralysis.

Summary

The routine management of snake bite poisoning is explained in detail in this paper. This work is the result of our experience at this hospital for the past 15 years or more. Some discussion of the major complication of the snake bite poisoning has also been included.

Excerpt from
'The Journal Of The Christian
Medical Association Of India'
Vol. LV March 1982 No. 3

This reprint comes to you from the

VOLUNTARY HEALTH ASSOCIATION OF INDIA

C-14 Community Centre, SDA, New Delhi 110 016.
Phone : 652007, 652008 Grams : Volhealth
For a detailed catalogue please write to the Publications Officer.

Code H-16

Health Education—The Missing Link in Medical Care

Dr C.M.E. MATHEWS, Department of Community Health Christian Medical College, VELLORE.

Imagine that we are visiting a hospital and that when we ask these question we are given the following answers :

Q. Who does surgery here? Do you have a qualified surgeon?

A. Surgery? Oh we all do surgery - everyone takes his turn with the knife, from the medical officer right down to the most junior attendant. Surgery is very important.
No, they do not have any special training, its just common sense really. Even the medical officer does not have much training because as a student he was not interested in surgery and so he did not bother to attend those classes. Yes, he does regret it a little now.

Q. Are you thinking of getting a qualified surgeon to come and give you a course on surgery?

A. Well we might do that sometime, but we are all so busy that it is difficult to find the time for it.

Q. What sort of results do you get?

A. Occasionally it works out alright, but some are very difficult cases. The body is very obstinate and ignorant and just does not know how to heal itself or deliberately refuses to do so. So what can we do?

What would we think of a hospital where such a conver-

sation could take place? It could not happen we say. And yet if we substitute "health education" for "surgery" we find that such a conversation could easily take place in very many hospitals. Why the difference in attitude? Which is more important?

Consider the major health problems which affect large numbers of people in India. Let us take a few examples:

Tuberculosis
Leprosy
Malnutrition in children
Diarrhoea in children
Infant mortality
Overpopulation

Why are they problems? Is it because the medical solution is not known? Is it because medical services are not available? Or is it because the people do not use the services properly and do not follow the required behavior at home?

A tuberculosis patient will take treatment until he feels better and then he will see no point in continuing; later he may become resistant to available drugs and a threat not only to himself but to the community. A leprosy patient may be afraid to come for treatment at all, or in the early stages may just not realise he has a serious disease. Malnutrition although largely due to poverty also could be much reduced if mothers appreciated the importance of giving their children more food; vitamin A deficiency could be easily prevented by giving greens with negligible cost. Diarrhoea could be prevented by better hygiene but villagers do not think this is important; when the child is dehydrated they believe in the power of mantras alone and often do not seek medical care.

Infant mortality could be reduced by a better diet for pregnant woman and more antenatal care, but village women do not see the need for this. Family planning services are available but they are not fully used.

So what is needed? It is to change people's behavior, and this is difficult to do. We can say as in the conversation above that people are ignorant and obstinate so that nothing can be done. But this may be just a way of excusing our own faulty

technique. There is a science of behaviour and ways of bringing about change have been extensively studied.

Health education is not just giving talks and showing pictures. Would that be enough to change *your* behaviour? Nor is it only telling facts. Health education is based on the behavioural sciences - social psychology, sociology and anthropology. Insights obtained from studies in these fields can be applied to the problem of changing people's behaviour. Merely to hand out information by means of talks etc., is like handing out drugs without first making a diagnosis, and without relating the particular local symptoms to the physiology and pathology of the body as a whole.

The minds of the people to be educated are not just like blank pieces of paper on which we can write what we will. Their minds are more like an organ of the body which has certain fixed functions and whose structure and activities are all related to these functions. The "functions" depend on a person's goals and values. Therefore to change knowledge, attitudes or behaviour we must understand a person's goals and values and their system of beliefs. So the first principle of health education is:

1. *Know the culture*

That is we must know the customs, beliefs, goals, values, and way of life of the people we are trying to educate. Their culture may be different from our own not only because of national, state, or regional differences, but because of differences in class, caste, education, religion, and general background. There is usually a considerable cultural gap between say a doctor and a villager. Unless this is bridged in some way there will be little real communication, since communication depends on shared knowledge and attitudes.

The doctor may think he has explained everything, but it will not mean anything to the patient, and the doctor will, wrongly, conclude that the patient is stupid or obstinate. We cannot expect the patient himself to bridge this gap, we must go to meet him by learning about *his* ideas, before we can effectively teach him our own ideas.

2. *"Start from where they are."*

If we start with ideas that are quite unrelated to anything the patient already knows, then he will not be able to integrate what we are saying into his existing system of concepts and will probably reject it. We should try to introduce change gradually by building on what he has already. This takes us back to principle (1) because clearly we cannot do this without knowing the culture.

3. *Give people a learning experience*

Just giving information is usually not adequate to change behaviour. Doctors know all about the evidence that smoking causes lung cancer, but that does not stop them from smoking. A learning experience is much more effective. If the mother of a child with malnutrition *sees* her child improve with a better diet alone, she will be much more easily convinced than if someone merely tells her to give the child more food.

4. *Motivate by linking the required behavior with goals of groups and individuals.*

The action which we want the person to take must be related to some goal the persons has; the action should be seen as a way of reaching the goal. The goal may or may not be related to health. For example people may build a latrine because they think it will give them more prestige, or to imitate some important persons, and only afterwards they may discover its value for health.

5. *Suggest specific, easily carried out behavioural changes*

Studies have shown that people are more likely to follow advice given if it is quite specific and precise, and they know exactly what to do. Also there should not be too many barriers making it difficult for them to do it. If we say to a mother, "you should have your child immunised", she may agree but do nothing about it; if we say the following she is more likely to come; "bring your child to the clinic tomorrow at 3 p. m. to be immunised; it is quite near your house and it will not cost you more than (a small amount); your neighbour is coming and you can go with her".

6. *Work through leaders and use group influences*

Many studies have clearly shown the importance of group influence on a person's behaviour. A group discussion and decision is often more effective than a lecture. The social influence of the other members of the various groups to which people belong is very powerful. Reference groups, that is the groups with which people compare themselves also have an important influence.

Groups may often be influenced through their leaders. Leaders are people that others will listen to and imitate, they need not have any official position. They may be people who have more communication with others than the average or they may be powerful because they have more resources than others, or more education. If we do not use them, they may work against the project and prevent any progress being made. If we can involve them and make them feel it is their own project, they are more likely to carry on with it even when we are not there.

7. *Obtain participation of the community at all stages*

The community should be involved even in the planning stages of a project. Only if they are fully involved will they take a real interest in what is to be done. It has been said that we cannot give health to people, they must achieve it for themselves. We must act as catalysts and stimulate them to do this. One way is to form a health committee and get them to discuss their health problems and decide their own priorities and what help they want from us.

8. *Meet felt needs first*

If people do not have enough to eat, e.g. no spare cash to buy food to-morrow and no prospect of work, they will not be very interested when we talk to them about long term preventive measures such as immunisation or family planning which may only help in the remote future. Health programmes and community development programmes should be much more closely linked so that felt needs can be met.

There is not enough space in this paper to describe the various theories on which health education is based. The

above are just a few principles which will give some idea of the scope and methods of health education. Those who are interested and have time for further study can become familiar with the behaviour sciences, and themselves try out different ways of applying them; others can be use the services of a qualified health educator.

In my opinion, only when education becomes as important a subject in medical practice as for example surgery is at present, will many of the health problems of India be solved.

BIBLIOGRAPHY

1. Selected papers on health education. CHEB Training Series I, March 1960. Central Health Education Bureau, New Delhi.
2. Social Psychology, Kuppuswamy B. Asia Publishing House 1961.
3. Havighurst R.J., The learning process. Amer. J. Pub. Health *51*, 1964, 1961.
4. Cartwright D., Some principles of mass persuasion. Human Relations 2, 253; 1949.
5. The process and effects of mass communication. Ed. W. Schramm. University of Illionis Press, USA 1965 p. 116.
6. Health culture and community,Ed. Paul, B.D. Russell Sage Foundation 1955.
7. Human problems in technological change. Spicer, E.H. Russell Sage Foundation, 1952.
8. Lionberger, H.F.. Adoption of ideas and practices. Iowa State University Press, Ames, Iowa. USA 1960.
9. Rogers, E.M. Difusion of innovations. Free press of Glencoe, New York 1962.
10. Ranganathan, K.V. Srinivasan, K. and Mathew, B. Role of community leaders in promoting family planning in rural India. Action Research Monograph No. I, Inst. Pub. Health and Family Planning, Gandhigram 1965.
11. Nutrition education in public health programmes - what we have learned. Amer. J. Pub. Health 51, 1715. 1961.
12. Community development in India. Mukerji, B. Orient Longman, 1961.

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-14, Community Centre, Safdarjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

E-16

AN INTERMITTENT WATER FILTER

Professor N.M. Merchant, Professor of Environmental Health, Department of Community Medicine, Pahlavi University, Shiraz, Iran. Reprinted from the Journal of Indian Waterworks Association, Volume VIII Number 2, April/June 1976.

Iran is an oil rich country which enjoys the unique position of being rich in history, culture, population, resources and wealth; but is faced with the problems of water shortage and pollution of available water resources, especially in the rural areas.

About 60% of the country's 32 million population live in villages[1]. Of the more than 55,000 villages scattered across the country about 27,000 have a population of less than 100. With such a large number of small communities spread out in arid areas, provision of piped water supply and other health facilities are rather difficult to provide. As a result water resources remain heavily polluted, unprotected and the source of a number of infections among rural communities.

A survey on the water situation conducted by the author among 32 selected villages around Shiraz has revealed the following results:

- 40% of all the available water supply sources were open ditches or streams which served almost 74% of the population (total population in the sample 21,065) in the villages surveyed.
- 39% of the sources were deep wells which served only 7.4% of the population.
- 12% of the sources were ponds or artificial catchments which served 61% of the population.
- 8.7% of the sources were natural springs serving 4% of the population.
- only 3.5% of the sources was a piped water supply available only in two communities and serving 8.1% of the total population.

In the rural areas, water is usually drawn from nearby deep wells or collected from ditches or other sources which in time become contaminated from human and animal droppings. Other village water resources were found contaminated with industrial and household chemicals.

According to the official health statistics on reported cases of communicable diseases in the country, diarrhoea was the most frequent occurrence during the year 1972-73. The first ten most common infections included typhoid and hepatitus. Laboratory examinations of drinking water samples taken at the time of routine collection taken from individual household 'masks' (leather bags) revealed the presence of Escheritia coli at a non-acceptable level in 75% of the cases. The source was primarily contamination , poor handling and storage of water and lack of personal hygiene among people[3].

As part of its programme for community service the Department of Community Medicine at the Pahlavi University is engaged in sanitation improvement activities in the villages near Shiraz. During this course of activities and training, this filter system was developed and tested[4].

Materials and methodology

A galvanised iron drum, 42 cms in diameter and 76 cms in height, with cover, was fitted into a tap, 1.5 cms diameter opening. The cover had an opening of 15 cms diameter with a lid (Fig.1).

The drum was filled with layers of material. First , with gravel of sizes varying between 5 cms and 20 cms in diameter, previously washed to remove dust and dirt attached. The height of this layer was approximately 25 cms. A layer of coarse sand (also washed) with size of particle varying from 0.5 to 2 cms in diameter was placed on the gravel to a thickness of approximately 25 cms. This layer of sand was covered with a bed of charcoal, previously washed. The size of charcoal pieces ranged between 2 to 15 cms inlength of 0.5 to 6 cms in diameter. The thickness of charcoal bed was 15 cms approximately. This layer was again covered with a thin layer of gravel, but to a thickness of 5 to 10 cms, just to keep the charcoal pieces from floating and in position. Thus, about 2/3 to 3/4 of the drum capacity was filled with the filter medium.

Turbid water from the surface source was poured in to the top of the drum and filtered water was drawn through the tap at the bottom.

The efficiency of the filter beds was tested at regular intervals of four weeks after the initial and subsequent refills of water, during a period of four months after the first assembly.

Results

Table 1 shows the recorded findings of the turbid water quality as tested at the time of sample collections. Suspended solid materials responsible for turbidity were measured in milligrammes per litre of water. Bacteriological analysis was performed on three counts, namely Coliform Bacilli, Fecal Coliform and Fecal Streptococci. The bacterial counts were recorded in MPN (Most Probably Number) following the standard Methods[5] for examination of drinking waters.

Fig. 1 on reverse of page 3

A gradual increase in the efficiency of the intermittent filter was noted as the filter became 'matured'. The turbidity decreased by 19% after one week and reached up to 97.3% upon maturation after 17 weeks. Similarly the Coliform Bacilli count decreased by 95% of the initial count in raw water. The Fecal Coliform count likewise was reduced by up to 97% of the original content and the Fecal Streptococci count decreased by up to 87% of the original number.

The matured 'intermittent filter' maintained its efficiency for another six to ten weeks and thereafter reached exhaustion with reduction in filter speed and efficiency. At that point the drum was emptied and the filtering material (gravel, charcoal and sand) was spread on the ground to be dried under the sun, dusted and washed to remove the dried films of plankton material. It was then ready for refilling.

Discussion

The role of sand and gravel has been well recognised and utilised in the construction of rapid and slow sand filters in conventional water treatment plants. The use of charcoal has also been recognised in removing colour, odour, taste and certain dissolved material from polluted water. All these materials are readily available at little or no cost in all the villages of southern Iran. The method of construction is simple and the filter easy to maintain. Individual households, institutions like schools, mosques and village health clinics are encouraged to install an 'intermittend filter' to provide clean water for drinking purposes. It is advisable to add a few drops of chlorine solution (5.25%) to a jug of water as a disinfectant.

Conclusion

As a simple solution to the widely spread problem of polluted waters in Southern Iran, an 'Intermittent Water Filter' was constructed, installed and tested for efficiency, simplicity and economy. Preliminary tests have been successful in demonstrating removal of suspended material and harmful bacteria to a level satisfactory for human consumption.

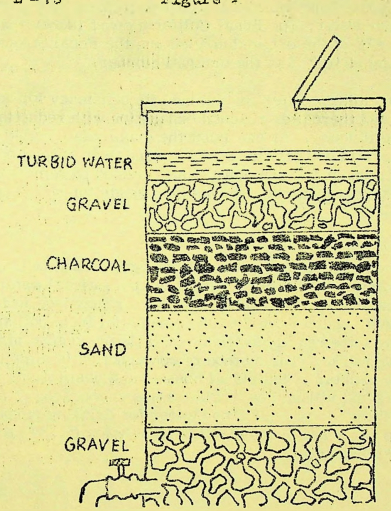
References

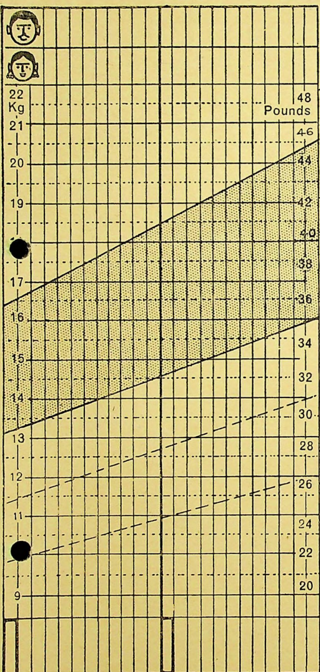
1. Anon, Iran Almanac. The Echo Publishers, Tehran, 1974.
2. Merchant, N.M. 'Sanitation Survey in villages near Shiraz'. Unpublished report, 1974.
3. Merchant, N.M., Behfarouz N.C., 'Bacteriological Analysis of drinking water in villages near Shiraz'. Survey report, 1974.
4. Ronaghy, H.A., Solter, S.L. 'The Auxiliary Health Worker in Iran', The Lancet, August 25, 1973.
5. Anon. Standard Methods for Examination of Water, American Public Health Association, 13th edition, Washington, DC.

Acknowledgement

We are grateful for permission to reproduce this article from Appropriate Technology 3 3 p.22-23 1976.

E - 16 Figure 1





5 th YEAR
पाँचवां साल

6 th YEAR
छटा साल

The mother keeps this card in a strong plastic envelope
ماں کو یہ کارڈ پلاسٹک کے لفافے میں حفاظت سے رکھنا چاہیے

Voluntary Health Association of India,
C-14, Community Centre, S.D.A., New Delhi-16

CHILD HEALTH RECORD
0 - 6 YEARS
बच्चों का स्वास्थ्य रिकार्ड
بچوں کا صحت کا ریکارڈ

CLINIC सेन्टर سنٹر	CHILD'S NUMBER बच्चे का नम्बर
CHILD'S NAME बच्चे का नाम بچے	M F
MOTHER'S NAME माँ का नाम ماں کا نام	OCCUPATION व्यवसाय
FATHER'S NAME पिता का नाम باپ کا نام	OCCUPATION व्यवसाय
DATE OF BIRTH जन्म तिथि MONTH मास YEAR वर्ष	CASTE OR COMMUNITY जाति या कबीला
HOUSE NO. मकान नं०	गली/गाँव STREET/VILLAGE
TOWN P.O. शहर डाकघर	TEHSIL. TALUK तहसील, DIST. जिला

BIRTH ORDER जन्म क्रमश:	NAMES OF BROTHERS & SISTERS भाई/बहन के नाम	M / F AGE आयु	SEEN YES/NO हाँ/नहीं	STATE OF HEALTH स्वास्थ्य صحت کیسی ہے
1				
2				
3				
4				
5				
6				
7				
8				

दी गई तारीख लिखो WRITE DATE GIVEN	1	2	3	4	5
B C G against TB तपेदिक का टीका تپ دق کا ٹیکہ			Mantoux test		result
Smallpox चेचक (माता) چیچک					
Polio प्रधरंग (पोलियो) ادھرنگ					
Triple (DPT) काली खांसी, धुनक (दन्दन)					
TAB टाइफाइड ٹائیفائیڈ					
Other दूसरे					
Other दूसरे					

Date तारीख Hb.	PROBLEMS समस्या	TREATMENT इलाज

HR—I HINDI, ENGLISH

8 '25

FAMILY PLANNING ATTITUDES

परिवार नियोजन विचार

REASONS FOR SPECIAL CARE

ध्यान योग्य कारण

ROAD TO HEALTH

स्वास्थ्य का मार्ग

वजन किलोग्राम WEIGHT IN KILOGRAMS

Kg

Pounds

I°

II°

III°

पहला साल
1st YEAR

दूसरा साल
2nd YEAR

तीसरा साल
3rd YEAR

चौथा साल
4th YEAR

एक सन्दुरुस्त बच्चा 18 महीने तक माँ का दूध पीयेगा। चार महीने बाद सूजी, दलिया केला या आलू को दूध में मिलाकर खिलाना शुरु करेगी। 6 महीने की उमर के बाद दाल, मटर और खिलाना शुरु करना चाहिए। 10 महीने के बाद बच्चे को घिसा मिर्च वाली दाल और रोटी खिलायें। 18 महीने के बाद माँ का दूध कम हो जाता है। एक गाय या भैंस खिली गाय या भैंस का दूध एक या दो बार दो। 4 महीने के बाद थोड़ा और मोट का सूप दे सकते हो।

STARTING AT FOURTH MONTH, START FEEDING THESE FOODS IN ORDER SO THAT CHILD IS EATING ALL FAMILY FOOD BY 18. MONTHS चौथे महीने से क्रमशः यह भोजन खिलाना शुरु करें ताकि 18 महीने तक बच्चा साधारण भोजन खा सके।

चौथे महीने से इस क्रम से भोजन खिलाना शुरु करें ताकि 18 महीने तक बच्चा सामान्य भोजन खाने लगे।

1	2	3	4	5	6	7	8	9	10
सूजी दलिया	आलू	केला	अंडा	खिचड़ी	पालक	हरा सब्जियां	मूंगफली	फलियां	गाय का दूध
Sun Dalia	Potato	Banana	Eggs	Khichari	Spinach	Green Vegetable	Groundnut	Beans	Milk

Keep breast feeding as long as possible but add other foods from 4th month

UNIT VI PREVENTION OF BLINDNESS

PROJECT GOALS & PRIORITIES	STEP 1 BROAD OBJECTIVES	STEP 2 WORK to be DONE by VHWs	STEP 3 What VHWs need to KNOW FEEL & DO	STEP 4 SPECIFIC OBJECTIVES-What VHWs DO in the Village	STEP 5 CURRICULUM	
					Course Outline	Messages to be learned by VHWs.
GOAL: To improve the Health of the villages in the areas						
PRIORITIES: 1. Care of Under-Fives	To dispel the sense of shame or guilt given to blind people because of misconceptions of the causes of blindness.	Help by their own behavior and knowledge to lessen shame and misconception about blindness.	VHW's need to show sympathy, understanding, and an attitude of acceptance toward blind people.	a. Gives accurate information to people on causes and treatment of eye diseases and blindness. b. Shows her understanding and sympathy through her behaviour toward eye patients and the incurably blind.	I. Social Aspects of Blindness A. Difficulties and problems of patients. B. Misconceptions about the cause and treatment of eye diseases and blindness. C. Treatment, prevention and care will lessen the problems.	1. Blindness is caused by untreated infection and injuries. 2. Lack of certain foods in the diet can cause blindness. 3. Blindness is preventable by control of infections, proper diet and preventing injuries. 4. Incurably blind people are victims of ignorance and need our care and sympathy.
2. Prevention of Malnutrition in Children						
3. Antenatal Maternity, and Postnatal care	To lessen the incidence and spread of eye infections.	Identify cases of eye infections and persuade them to take treatment.		c. Recognizes symptoms of eye infections and begins treatment, and teaches others. d. Brings serious cases of eye infections to the Health Team for further treatment.	II. Infections of eyes A. Kinds 1. Conjunctivitis 2. Trachoma 3. Other B. Symptoms C. Serious symptoms to be referred to Health Team. D. Prevention of spread of infections E. Medication	5. Infections of the eyes can be cured quickly if early symptoms are recognized and treated. 6. More serious infections are dangerous and can cause blindness if not treated. 7. Spread of eye *infections to well* people can be prevented. ★
4. Family Planning						
5. Control of Leprosy						
6. Prevention of Blindness	To lessen incidence of eye diseases due to nutritional deficiences.	Give accurate information to others on cause and prevention of eye disease caused by nutritional deficiencies.	VHW's Need to know facts about the kinds of eye diseases, their cause, prevention and treatment.	e. Recognizes symptoms of eye conditions due to deficiencies in food. f. Teaches others about causes and prevention of nutritional blindness.	III. Nutritional Eye Disease and Blindness A. Symptoms B. Cause C. Prevention D. Medication	8. If you look you will see things which can tell you a person has night blindness. ★ 9. Lack of some kinds of food in the diet causes night blindness and even complete loss of sight. 10. Eat yellow and green vegetables and fruits to prevent nutritional blindness. 11. Vitamin A Capsules treat and prevent nutritional blindness.
7. Control of Tuberculosis	To prevent blindness due to injuries, accidents and neglect.	Give advice on prevention and treatment of injuries to the eye.		g. Knows common causes of eye injuries. h. Teaches others about the prevention of injuries of the eyes.	IV. Injuries to the eye A. Foreign Bodies 1. Symptoms 2. Prevention B. Measles & small pox 1. Symptoms 2. Prevention C. Accidents D. Wrong treatments	
		Identify cases of cataract and glaucoma.		i. Recognises symptoms of cataract and glaucoma	V. Other conditions A. Cataract B. Glaucoma	12. Immediate First Aid treatment is necessary in eye injuries to prevent further damage. ★ 13. Injuries to the eye can be prevented.
	To provide treatment for all patients with eye conditions.	Recognize and treat eye conditions in the early stages and send those who need referral to the Health Team.	VHW's need to learn how to give treatments and care to the blind and those with eye conditions, and to help in their rehabilitation.	j. Gives first aid in cases of eye injuries. k. Carries out treatment of the eye: eyewash, ointment, eye drops, Vitamin A l. Demonstrates preparation of foods necessary for healthy eyes.	VI. Treatment and Care A. Eye wash B. Ointments C. Eye drops D. Fomentation E. Food and Vitamin A	14. Cataract and glaucoma cases who are treated will be saved from blindness. 15. Prompt attention and care of eye conditions will cure them. 16. Mothers can learn to care for their families eyes.
	To provide necessary care, and opportunities for lessening the dependency of the blind on the charity of others.	Assist in rehabilitation of the blind by referring and recommending needy cases to the Health Team. Make sure the patients in her village are being cared for, and helped in rehabilitation.		m. Recommends cases of cataract or glaucoma or blindness for the rehabilitation schemes. n. Helps in teaching new skills to blind patients. o. Provides care to blind patients if required. p. Enlists the community organizations in rehabilitation.	VII Rehabilitation A. Cures of Temporary blindness 1. Cataract 2. Glaucoma 3. Nutritional B. Use of Glasses C. Crafts and skills for partially and completely blind D Rehabilitation Scheme E. Community Responsibilities	17. Many people who are not permanantly blind can be helped to see again. 18. The blind can learn new skills that help them to become economically independent, and give them pride and dignity again. 19. The Community has responsibility in rehabilitating its blind members.

Development of unit from the Selection of Priority to the Messages to be taught to Village Health Workers UNIT VI. Prevention of Blindness

UNIT V. CONTROL OF LEPROSY

PROJECT GOALS & PRIORITIES	STEP 1 BROAD OBJECTIVES	STEP 2 WORK to be DONE by VHWs	STEP 3 What VHWs need to KNOW FEEL & DO	STEP 4 SPECIFIC OBJECTIVES-What VHWs DO in the Village	STEP 5 CURRICULUM	
					Course Outline	Messages to be learned by VHWs.
GOAL: To improve the Health of the villages in the areas						
1. Care of Under-Fives 2. Prevention of Malnutrition in Children 3. Antenatal Maternity, and Postnatal care 4. Family Planning 5. Control of Leprosy 6. Prevention of Blindness 7. Control of Tuberculosis	1. Lessen the social ostracism faced by Leprosy patients.	Help by their own behavior and knowledge to dispel fear and ostracism of Leprosy patients.	VHW's need to show, sympathy understanding, and an attitude of acceptance toward Leprosy patients and their families.	a. Gives accurate information to the people about the causes and treatment of Leprosy and its control. b. Shows her own lack of fear of the patients through her attitudes and behavior toward them.	I. Social Aspects of Leprosy A. Difficulties and problems of patients B. Misconceptions about cause and contagiousness of Leprosy. C. Early Treatment and cure.	1. Leprosy is caused by germs which can be killed by taking medicines. 2. Taking treatment early will prevent increased symptoms. 3. Care of hands and feet will prevent deformity. 4. Leprosy is not very contagious. 5. Learning about Leprosy lessens fear.
	2. Locate all cases of Leprosy in the villages of the Project	Identify all the Leprosy patients in her own village.		c. Recognizes early signs and symptoms of Leprosy	II. Signs and Symptoms of Leprosy A. Early symptoms B. Later symptoms and Deformities.	6. Early recognition of symptoms, and early treatment can cure Leprosy. 7. Later symptoms can be prevented, but these patients need more care.
	3. Bring all Leprosy cases in the area under treatment.	Persuade Leprosy patients to take regular treatment.	VHW's need to know facts about Leprosy, and information related to its treatment and control.	d. Brings people she suspects of having Leprosy for examination and diagnosis.	C. How the Leprosy paramedical does the tests for Leprosy.	8. Suspected patients should be persuaded to go for examination and laboratory tests. 9. Diagnosis depends on observing symptoms and laboratory tests.
	4. Prevent the spread of Leprosy to new cases.	Locate contacts and make sure they also take treatment. Give health education on leprosy.		e. Persuades Leprosy patients and contacts to start and continue treatment. f. Uses social pressure through village leaders to make sure all cases are following treatment.	D. Treatment with DDS and Lamprin. 1. Importance of early treatment. 2. Importance of continuous treatment. 3. Treatment of contacts as a protection to the community. 4. Recognition of reactions.	10. DDS or Lamprin tablets are used to treat Leprosy. 11. When a patient has a reaction to DDS, he must stop medication and be taken to the hospital for treatment. 12. Contacts of patients shuuld also take medication.
	5. Prevent deformities occurring in patients.	Learn how to prevent deformities and teach patients.		g. Teaches and demonstrates to Leprosy patients how they should care for hands, feet and eyes to prevent deformities. h. Supervises the patients to make sure they carry out instructions to prevent deformities.	III. Prevention and Care of Deformities. A. Causes of Deformities. B. How to care for vulnerable parts of the body to prevent deformities.	13. Ulcers and deformities can be prevented * 14. Injury to feet and hands must be avoided. * 15. Eyes that can not be closed need special care
	6. Provide care for patients already having deformities.	Care for patients with deformities.	VHW's need to learn how to give care to Leprosy patients and help in their rehabilitation.	i. Does the daily dressings for ulcers or wounds of Leprosy patients. j. Provides care such as cooking for, or feeding patients who are incapacitated.	C. Dressing of ulcers.	16. An ulcer must be kept clean and covered.
					D. Caring for incapacitated patients.	17. Incapacitated patients need to be given special care.
	7. Help Leprosy patients to become economically independent.	Assist the project Directors in rehabilitation of Leprosy patients.		k. Assists in rehabilitation programs by bringing needy cases to the attention of the Health Team. l. Makes sure patients under treatment take the medications regularly as ordered so they are eligible for the rehabilitation program.	IV. Rehabilitation of Leprosy patients. A. Goat Scheme B. Employment programs. C. Community action in Farmers' Clubs and womens' organizations	18. Patients who have no income or family should be recommended for a rehabilitation or employment scheme. 19. Prejudice can be broken down through Farmer's Clubs and Womens' Organizations.

Development of Unit from the Selection of Priorities to the Messages to be Taught to the Village Health Workers UNIT V. Control of Leprosy.

UNIT II PREVENTION OF MALNUTRITION IN CHILDREN

PROJECT GOALS & PRIORITIES	STEP 1 BROAD OBJECTIVES	STEP 2 WORK to be DONE by VHWs	STEP 3 What VHWs need to KNOW FEEL & DO	STEP 4 SPECIFIC OBJECTIVES-What VHWs DO in the Village	STEP 5 CURRICULUM	
					Course Outline	Messages to be learned by VHWs.
GOAL: To improve the Health of the villages in the areas	To create awareness of the seriousness of the problems caused by malnutrition and deficiency diseases in children.	Help to inform the people about the part malnutrition plays in increasing illness and death in children. Help to determine the nutritional status of the children in her village.	The VHW needs to know the effects of malnutrition on the health of children. Know the symptoms of malnutrition and deficiency disease in children. Understand and be concerned about the causes of malnutrition and the children who are suffering from it.	a. Recognizes illnesses in which lack of proper or sufficient food is a major cause or makes them more serious. b. Identifies malnourished children by recognizing symptoms of deficient or poor diet c. Informs parents about the causes of poor nourishment in children. d. Assists in identifying the nutritional status of the children in the village.	I. The problem of Malnutrition in Children A. Most important cause of illness and death. B. Symptoms of malnutrition— 1. Weight charts 2. Bangle test, arm circumference for malnutrition 3. Physical and mental effects. C. Causes 1. Poverty 2. Poor nutrition of mother 3. Too many children 4. Taboos and misconceptions. 5. Lack of knowledge of needs of children.	1. A child who dose not get enough of the right kind of food, very often is sick with colds and fever. 2. Malnutrition causes lack of proper growth, anemia and vitamin deficiency. 3. Nutritional diarrhoea and other more serious conditions can result from too little, or poor quality food. 4. Symptoms of malnutrition are very common among children, especially in poor families. 5. Malnutrition is a problem which must be the concern of the whole community. 6. The proper use of available foods will help to prevent malnutrition in children.
PRIORITIES: 1. Care of Under-Fives 2. Prevention of Malnutrition in Children 3. Antenatal Maternity, and Postnatal care 4. Family Planning 5. Control of Leprosy 6. Prevention of Blindness 7. Control of Tuberculosis	To lessen the incidence of malnutrition among children by improving the feeding of infants and Under Fives. (To organize a feeding program for children, if necessary.)	Give nutrition education to parents of infants and young children. Act as a good example, following suggestions for improving the feeding of children in her own family. (Help in planning and carrying out the feeding program).	The VHW needs to know about the best ways to provide the nutritional needs of children with the available foods. Accept in her own family the new ideas Demonstrate the correct feeding of children of various ages.	e. Teaches and demonstrates to mothers how to give water as well as breast milk to the newborn baby. f. Teaches the importance of good nutrition for the mother who is nursing her baby, as well as in the antenatal period." g. Teaches with demonstration, the feeding of semi-solid and solid foods beginning gradually from the fourth month after birth. h. Encourages breast feeding until the child is two years, stopping gradually if the mother becomes pregnant. i. Teaches mothers to give the same foods as are given to adults by the time the child is 15 months old.	II. Diet Requirements of Children A. Infants and Under-fives. 1. Breast milk and water (other milk only if necessary and given in adequate amounts) 2. Starting other foods from fourth month. 3. Normal adult diet in addition to mother's milk from 15 months. 4. Weaning a child gradually. B. Planning with community leaders for feeding the village children.	7. Breast milk is the best food for infants. ★ 8. Start breast feeding immediately after birth and supplement with boiled water between feedings. ★ 9. Soft solid foods should be given to the baby starting gradually from about the fourth month. ★ 10. Soft solids, such as ground rice, dals, potatoes, green vegetables may be given to the baby by nine months 11. Porridge made of mixed grains and dals is better than single grains given at one time. 12. Breast feeding until the 24th month, or until the next child is born is a good practice. 13. All under five children need an adequate diet to build healthy bodies.
	To prevent deficiency diseases among children.	Teach parents about foods necessary to prevent children (as well as adults) from contracting common deficiency diseases. Assist in identifying and treating cases of deficiency in food requirements.	The VHW needs to know foods which prevent the common deficiency diseases. Know the best ways to use *available* foods to provide nutritional requirements in the child's diet. Be able to teach through demonstration, how to prepare good quality foods for children. Know symptoms of serious deficiency conditions.	j. Selects and prepares the best foods available to prevent deficiency diseases. k. Teaches mothers how to prepare food that will prevent the child from beginning symptoms of deficiency. l. Recognizes early symptoms of deficiency diseases and advises the mothers on what to give to the child. m. *Identifies* children with symptoms of serious deficiencies, and refers these to the Health Team for diagnosis and treatment. n. Follows up on the treatment ordered in deficiency disease patients.	III. Nutritional Deficiency Disease. A. Causes and Prevention of : 1. Anemia 2. (PCM) Marasmus Kwashiorkor 3. Goitre 4. Nutritional Blindness** 5. Other Deficiencies B. Symptoms of each of these. C. Preparations of Foods for prevention and treatment of deficiency diseases. D. Serious symptoms requiring referral. E. Medications required in the treatment or prevention of these diseases.	14. Important and common foods which help prevent several diseases are: ● "Super-porridge" or kanji of mixed cereals. 15. ● Green leafy vegetables 16. ● Dals or pulses 17. ● Peanuts and other nuts or dried fruits 18. ● Yellow vegetables and fruits 19. Leafy vegetables are good for preventing anemia and bad eyes. 20. Yellow fruits and vegetables help prevent bad eyes. 21. Dals, pulses, peanuts, mixed grains and dried fish prevent serious deficiency diseases. 22. Symptoms of these diseases need to be recognized early. 23. Medicines may be needed for serious symptoms, and need to be followed up. Examples: Vitamin A Iodine in salt Iron, Calcium Extra vitamins Protein food Powdered milk 24. Other illnesses and infection may cause nutritional deficiency because of lack of food or proper digestion.

Notes: *See Unit III: Antenatal Care, Messages 5-7

**See Unit VI: Prevention of Blindness, Messages 8-11

UNIT-1: CARE OF UNDERFIVES

PROJECT GOALS & PRIORITIES	STEP 1 BROAD OBJECTIVES	STEP 2 WORK to be DONE by VHWs	STEP 3 What VHWs need to KNOW FEEL & DO	STEP 4 SPECIFIC OBJECTIVES What VHWs DO in the Village	STEP 5 CURRICULUM	
					Course Outline	Messages to be learned by VHWs

GOAL
To improve the health of the villages in the area

PRIORITIES
1. Care of Under-Fives
2. Prevention of Malnutrition in Children.
3. Antenatal Maternity, and Postnatal Care
4. Family Planning
5. Control of Leprosy
6. Prevention of Blindness
7. Control of Tuberculosis

To lessen the incidence of malnutrition and prevent deficiency diseases (This Objective is of such major importance that we decided to treat as Priority No. II).

To protect all of the children from those communicable diseases preventable through immunizations

- Motivate village people to have their children immunized against communicable diseases
- Assist in planning and carrying out immunization campaigns.

VHWs need to know which diseases can be prevented by immunizations:
- Accept immunizations for her own family.
- Teach and persuade others immunizations
- Help organize immunization campaigns

a. Gives accurate information to people about which diseases can be prevented by immunization
b. Persuades people that prevention is much less costly than having the illness.
c. Arranges for smallpox vaccinations to be given to newborns, as well as others who have not yet taken them.
d. Motivates mothers and arranges for Triple Vaccine and Polio to be given to all children.
e. Helps motivate and arrange with the village leaders, for cholera and typhoid immunizations during epidemic seasons.

I- Prevention of Communicable Diseases.
A. Cause and spread of these Diseases
B. Immunization to prevent
- Smallpox
- Tuberculosis
- Tetanus
- Whooping cough
- Diphtheria
- Poliomyelitis
Cholera & Typhoid
C. Cost of having the sickness (rather than immunization)
- cost in money
- cost in time, worry
- permanent injury, or disfigurement
D. Care of child after immunization
- of vaccination spot
- lessen pain, fever (if any)

1. Many dangerous diseases of childhood can be prevented by giving a particular injection or dose of medicine (immunization)
2. Immunization is a very low cost in money and time compared to having the disease.
3. Protection from these diseases also prevents many complications and permanent injuries to the child's body.
4. The little fever and pain caused by some immunization injections can be lessened by giving medicine and other care.
5. Smallpox and BCG (against tuberculosis) should be given to the baby soon after birth, and again when the child comes to school age.
6. DPT (Triple vaccine against Diphtheria, Whooping Cough and Tetanus) and Polio vaccine should be given after the second month.
7. Typhoid and cholera injections should be given to children (as well as adults) if these diseases start in the area.

To lessen incidence of common disease conditions and prevent serious illnesses and infections

- Help prevent illnesses in children.
- Recognize and teach others the early symptoms of common disorders.
- Give care and treatment to children with minor disorders in order to prevent serious symptoms and complications.
- Teach and assist mothers in caring for ill children.

The VHW needs to
- know the most common causes of illnesses and death in children and how to prevent them.
- show concern for the unnecessary illness and death among children and assist in their prevention.
- Teach mothers how to prevent common diseases and help care for minor ailments and diseases in their children.

f. Knows early symptoms and teaches mothers how to recognize when her child is getting sick.
g. Teaches mothers to give her child nutritious food, prepared in a clean way and protected from flies.
h. Teaches mothers to prevent and treat dehydration by giving the child plenty of clean water or rehydration fluid to drink.
i. Demonstrates how to prepare and give easily digested, nutritious food to the child who is sick.
j. Gives correct medicines to treat diarrhoea or worms when necessary.

II- Treatment and Prevention of common Childhood Ailments.
A. Common symptoms
1. Early
2. Serious
B. Common ailments
1. Diarrhoea
- Causes:
Improper diet
infections
intestinal worms
- Dehydration
importance of fluids
symptoms
treatment with rehydration fluid
- Nutrition in diarrhoea
- Medicines
- Prevention.

8. Early recognition of symptoms, and proper care at home, will help prevent diseases from becoming serious.
9. Diarrhoea is a symptom of the wrong kind of diet and infections caused by germs or intestinal worms.
10. Symptoms of dehydration should be recognized by every mother.
11. Dehydration is a serious condition caused by diarrhoea which can be prevented by giving plenty of water.
12. "Medicine water" (rehydration fluid) can save the life of a child with dehydration.
13. Water given to a child should be from a clean source.
14. Water for drinking can be made clean (or purified) in the home.
15. A child with diarrhoea needs nourishing and easily digested food.
16. Food should be kept clean by using clean dishes, hands, and preventing flies from sitting on it.
17. Medicines are needed to kill the germs and worms that cause diarrhoea.

k. Knows and recognizes symptoms of each of the common conditions which cause fever in children.
l. Demonstrates and teaches mothers how to recognize symptoms of illnesses causing fever.
m. Cares for children with fever, and demonstrates
- giving fluids.
- cool sponge
- preparation and giving of diet
- inhalation with steam
n. Recognizes and gives specific medicines in the correct dosage, to lower fever or treat particular symptoms or conditions.

C. Fevers
1. Good nutrition as prevention.
2. Fever symptoms in
- malaria
- typhoid
- cold cough
- sore throat
- ear infection
measles and chickenpox
flu and pneumonia
- mumps
3. Care
- increase fluids
- easily digested food
- cooling body
- tepid sponge
- fresh air
- light cover
- inhalation for breathing difficulty (or humid room)
4. Medication
- to lower fever
- for pain
- treat cause of infection
- kinds & dosage

18. A child who has enough food of the right kind gets sick much less than one with poor nutrition.
19. Fever is an early symptom of many diseases (e.g. malaria, typhoid, cold, cough, sore throat, ear infection, measles, chicken pox, flu, pneumonia, mumps)
20. A child with fever should have lots of water to drink and easily digested food.
21. Wiping the body gently with a cloth wet in cool water helps to lower the fever.
22. A child with fever should be covered with only a light cover, and needs fresh air.
23. Breathing difficulty and pneumonia can be lessened by steam from water boiled in the room (or inhalation)
24. Fever and pain can be lessened by giving some medicines.
25. Some fevers need to be treated with special medicines (e.g. malaria).

o. Recognizes symptoms and gives required care to a child with measles.
p. Teaches mothers about care needed by the child with measles to prevent complications.
q. Recognizes and refers serious symptoms and complications for advice or care, to the health team.

D. Measles
1. Symptoms, including fever
2. Care
- control fever
- rest
- protection of eyes
- skin rash - to keep clean, stop itching
prevent outside infection
- prevent pneumonia, cough
3. Medications
- for fever
prevent other infections
- lotions for skin
4. Serious symptoms or complications to be referred
- little response to care
- eye or ear infection
increase

26. Measles is a dangerous disease in children because of bad after effects (complications).
27. A child with measles needs to be kept in bed (or lying down) in a room with only a little light.
28. A child with measles may need to have an eyewash done (see UNIT VI)
29. To prevent pneumonia and to make breathing easier, boil some water so there is steam in the room.
30. Medicines may be needed to prevent other infections from starting in the child with measles.
31. A child with serious symptoms or complications should be shown to the health team (e.g. high fever more than three days, cough more than a week, difficult breathing not helped by steam inhalation etc)

To lessen serious disabilities and death by prevention and First Aid treatment of emergencies and accidents.

- Help in the prevention of accidents
- Give immediate first aid care necessary in common accidents and emergencies.
- Help to lessen the harmful effects of mistaken ideas of treatment necessary.
- Help prevent unnecessary complications and disabilities resulting from inadequate first aid measures.

The VHW needs to
- know what to do in emergencies and accidents to children, to stop further damage & treat the condition
- know when the child needs further care by the health team and how to transport the patient
- plan with others in the village on measures to prevent accidents.

r. Treats new burn cases with cold water on the burned area.
s. Helps to plan ways to prevent burns in and around the home.
t. Does clean dressings for clean and infected cuts and wounds.
u. Makes sure that those with cuts, wounds or serious burns have immunizations for tetanus.
v. Knows how to give artificial respiration to a child who stops breathing, and carries out the procedure if necessary.
w. Immobilizes a fractured bone, and transports the patient safely.
x. Uses the tourniquette safely.
y. Persuades those with animal bites, snake bite or stings to take further treatment when necessary.
z. Carries out measures necessary to prevent shock.

III. First Aid in Emergencies
A. Immediate treatment
1. Burns
- treat immediately with cold water, then
- treat as a wound if the skin is destroyed
- Prevention.
2. Cuts and Wounds
- Treatment of a fresh cut
- Prevention
- Treatment of an infected wound
- immunization against tetanus
- send to another health team member.
3. Stopping of Breathing
- artificial respiration for a child
4. Fractures
- immobilization
- transportation
5. Hemmorrhage
- use of a tourniquette
6. Snake, scorpion or dog bite
- tourniquette
- prevention of shock
- treatment
B. When to take each of the above to the Health Team members or center.

32. Treat burns by placing the burned part in cold water for at least ten minutes.
33. Prevent burns by safe practices with fire, lamps, hot stoves, etc.
34. Cuts and wounds should be kept clean and dry to help them heal quickly.
35. Cuts and wounds should be prevented by keeping dangerous cutting instruments out of children's reach, and removing broken glass and sharp stones.
36. If a cut or wound is infected it should be soaked and cleaned several times a day.
37. Make sure that a child (or adult) with a wound has been immunized against tetanus.
38. If a child stops breathing, IMMEDIATE treatment is necessary.
39. A broken bone should be bandaged in a way to prevent movement before taking the child to the health team.
40. If there is serious bleeding external-it should be controlled before taking to the health team.
41. Bites, snakes bites or scorpion stings need to be treated quickly to prevent the poison spreading in the body, and to prevent shock.

* NOTE: Only common conditions and the general treatment are included here. These or other conditions which are serious problems in any particular area may be enlarged upon as we have done for measles in Specific Objectives, o,p,q, and Messages 26-31 (For example scabies and other skin infections)

COMMUNITY HEALTH CELL
#71, (First Floor) St. Marks Road
BANGALORE - 560 001

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-14, Community Centre, Safdarjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

E-15

SIMPLE BACTERIOLOGICAL ANALYSIS OF DRINKING WATER SUPPLIES

Duncan Mara, Department of Civil Engineering,
University of Dundee, and
Member of ITDG's Water Panel .

The rationale of bacteriological analysis

If a drinking water supply, such as a stream or a shallow well, becomes polluted with human wastes (faeces, night soil, sewage, even some sewage effluents), it may serve as a vehicle of transmission of such water borne diseases as typhoid, cholera and dysentery or of such water-based diseases as schistosomiasis and guinea worm. This argument assumes that the waste contains the organisms which cause these diseases. The very high incidence of intestinal diseases and parasitic infestations in hot climates means that in practice the chances that human wastes do contain disease-causing organisms are also very high. Water supplies which become contaminated with human wastes are therefore always regarded as very real health hazards.

The number of disease-causing organisms that have been isolated from polluted waters is very large indeed. It is simply not possible to examine a water sample for the presence or absence of all of these organisms. Moreover, they mayoften be only irregularly present in a water, even though the water is being polluted continuously. Therefore we look for the presence or absence of a special bacterium which is always present in faeces and whose normal habit is the intestine of man and higher mammals - a bacterium which is therefore an indicator of faecal pollution. One such bacterium is Escherichia coli (E. coli), which itself is normally harmless to man. A simple method for estimating the numbers of E. coli in drinking water samples is described in the next section.

If a water sample is shown to contain E. coli, then we know that the body of water from which it was obtained has been polluted with human or animal wastes. The water may therefore contain disease-causing organisms. An attempt should therefore be made to protect the water from further contamination or to develop an alternative source of supply. Advice on water source protection and the development of new supplies is given in Water Treatment and Sanitation by H.T. Mann and D. Williamson (2nd edition) published by Intermediate Technology Publications.

Bacteriological Analysis

The tests described in this section are best suited for use in small towns

of not less than about 20,000 population. Such towns would normally have a water distribution system including both private connections and public standpipes. They would also have mains electricity, which is needed to carry out the tests. These towns should also serve as a centre for the collection and analysis of water samples from neighbouring villages.

The collection and analysis of water samples is described below as a series of simple instructions to a laboratory technician. Reasons for the choice of the methods recommended are given in the Technical Appendix on page

Sample collection

Samples must only be collected in sterile bottles; see the next section for details of how to sterilize the sampling bottles.

Sampling from a tap

1. Make sure the tap is clean, especially on the inside.

2. Turn the tap full on and allow the water to run to waste for 1 minute.

3. Close the tap until only a slow trickle of water is coming out.

4. Carefully open the sampling bottle. You must not touch the screw thread at the top of the bottle nor the inside of the cap. (If you should touch these parts of the bottle by accident, discard the bottle and use another one; the first one must be sterilised before it is used again. You should always carry a spare sampling bottle).

5. Fill the sampling bottle with the water and carefully replace the cap. Screw it tightly.

Sampling from a stream

1. Stand in the middle of the stream and face upstream. If necessary wear waterproof boots and gloves to protect yourself against schistosomiasis.

2. Carefully remove the cap from the bottle and, with the mouth of the bottle facing upstream, lower the bottle into the stream and allow it to fill. Tilt the bottle upwards to let it fill completely. Carefully replace the cap.

Sampling from a well

1. Tie a sample bottle on to a weighted length of rope or strong string. Use a stone or piece of metal weighing about 500 g as the weight and attach the bottle just above the weight. A convenient arrangement is shown in Figure 1.

2. Carefully remove the cap from the bottle and lower the bottle in to the well to a depth of about 1 m. When no more air bubbles rise to the surface, raise the bottle out of the well and carefully replace the cap.

Frequency of sampling

The frequency at which a water supply is sampled depends on the population it serves. The following table provides a rough guide:

Population served	Maximum desirable interval between successive samples
Under 100	2 months
1000-5000	1 month
5000-10000	2 weeks
10000-50000	1 week
Above 50000	3 days

Samples should be taken on each occasion at the point of abstraction, as the water leaves the works (if any) and at various points in the distribution system (private connections and public standpipes). The minimum number of samples to be taken from within the distribution system also depends on the population served; one sample should be taken each month for every 5000 people supplied.

Preparation for the test

Making up MacConkey broth

Mac Conkey broth is a special mixture of chemicals in water (properly called a 'medium') which is used to determine whether Escherichia coli is present in a water sample or not . To prepare 500 ml of double strength MacConkey broth (sufficient for 10 tests), proceed as follows:

1. Weigh out 40 grams of dehydrated Oxoid 'MacConkey broth (purple)' powder. This powder is available through Chemicals de Cen tre, 3/15 Asaf Ali Marg, New Delhi 110002 (among other places) and costs Rs. 272 for 500 grams.

   Indian manufactured MacConkey's broth powder is also available from Centron Research Laboratories - a division of Centron Agro Industries Pvt. Ltd., 103 Adhyaru Industrial Estate, New Sun Mill Compound, Lower Parel, Bombay 400013 at Rs. 180 for 500 grams.

2. Fill up a graduated 1 litre beaker to the 500 ml level with clear drinking water and add the 40 grams of MacConkey broth powder. Stir to dissolve.

   It is of course possible to make up MacConkey broth from the

individual constituents. But this is a tedious process and it is not usually possible to ensure that each batch of medium is identical - this can lead to significant errors in the test results. Dehydrated media overcome these disadvantages.

3. When the powder has dissolved, measure 10 ml of MacConkey broth into each of 50 1-oz (28 ml) screwcapped bottles (either 'universal containers' or 'McCartney bottles'). A 10 ml tilting pipette is a convenient means of dispensing the solution.

4. Add to each bottle an inverted Durham tube; this is a small test tube which is used to detect gas production (see figure 2). Make sure that the open end of the Durham tube is at the bottom of the bottle.

5. Screw the caps on to the bottles. Do NOT tighten the caps but leave them loose. Sterilize the bottles as described below.

Sterilization

Before a water sample can be analysed all the bacteria present in the glassware and the MacConkey broth must be killed; if they were not, they would interfere with the test on the sample - we are only interested in the bacteria in the water sample, not those on the surface of the glassware or those on your hands. The process of killing bacteria is called sterilization.

The following items need to be sterilised:

a. Sampling bottles
b. Screw-capped bottles containing Durham tubes and MacConkey broth.
c. 10 ml measuring cylinders and 10 ml beakers - these are used to transfer 10 ml of the water sample to each screw-capped bottle (see next section on Test Procedure); the 10 ml beaker is placed over the open end of the cylinder in order to protect the inside of the cylinder from becoming contaminated after it has been sterilised.

An ordinary domestic pressure cooker is recommended as the sterilizer. The temperature of the steam inside the pressure cooker reaches 120°C which, when maintained for 15 minutes, kills all the bacteria which are likely to interfere with the test.

To use the pressure cooker, follow the manufacturer's instructions. The items should "cooked" for 15 minutes at 120°C (this temperature is achieved at a steam pressure of 15 pounds per square inch). Bottle caps should only be screwed on loosely - otherwise they may explode. Make sure that the 10 ml cylinders are fitted with 10 ml beakers. When the bottles have cooled after being sterilised, screw the caps down tightly.

General cleanliness

The work area set aside for analysing water samples should always be kept very clean. Try to choose an area free from both dust and draughts. Always wash your own hands before you start to analyse a sample. Rinse out all glassware with clean water immediately after use.

Test procedures

There are two tests: The 5 x 10 ml test and the 5 x 1 ml test. They are very similar - the only difference being the range of counting: the 5 x 10 ml test can count up to 16 E. coli bacteria per 100 ml whereas the 5 x 1 ml test can count up to 160 per ml. Always use the 5 x 10 ml test first and only use the 5 x 1 ml on subsequent samples from the same source if the E. coli count is more than 16 per 100 ml (see below for further details).

It is not always necessary to do the 5 x 1 ml test and your laboratory may not have the extra equipment required for it. The 5 x 10 ml test is the more important one.

The 5 x 10 ml test

1. Vigorously shake the sampling bottle to mix its contents thoroughly.

2. Pour the sample into a sterile 10 ml measuring cylinder to the 10 ml mark. Remember not to touch the top of the sampling bottle, nor the top of the cylinder.

3. Add this 10 ml of the sample to a screw-capped bottle which contains sterile double strength MacConkey broth and an inverted Durham tube.

4. Using the same measuring cylinder repeat steps 2 and 3 four more times. You should now have 5 screw-capped bottles each with 10 ml of the sample.

5. Make sure that the inverted Durham tube is full of liquid. If there is any air trapped inside it, tighten the bottle cap and turn the whole bottle upside down. The air will now rise up out of the Durham tube; when this happened quickly turn the bottle upright again.

6. Place the 5 bottles in a bottle rack (such as the homemade one shown in Figure 3) and place the rack in a water bath which has been set at exactly 44°c. The caps on the bottles should only be screwed on loosely.

7. After 24 hours remove the rack from the water bath and

examine each bottle for the production of acid and gas.

Acid production: If acid has been produced the colour of the MacConkey broth will have changed from red or purple to yellow.

Gas production: If gas has been produced, some of it will have been trapped in the Durham tube where it will be visible (Figure 2c). If necessary tilt the bottle so that the Durham tube is next to the bottle wall - this allows you to see the gas more easily.

8. Count the number of bottles in which both acid and gas have been produced. Read off the most likely E. coli count from the following table (this count is often called the 'most probable number' or 'MPN' of E. coli in 100 ml of the sample):

Number of positive bottles (acid and gas production*)	Most likely E. coli count per 100 ml of the water sample.
0	0
1	2
2	5
3	8
4	16
5	infinite**

* Acid production without gas production is a negative result

** Record the result as "greater than 16 per 100 ml". See paragraph 10.

9. Sterilize all the bottles and their contents before cleaning them. This is to ensure that large numbers of live bacteria do not excape into the environment.

10. If all 5 bottles are positive it is not possible to obtain an E. coli count. Use the 5 x 1 ml test for the next sample to be taken from the same source.

The 5 x 1 ml test

This test is identical to the 5 x 10 ml test except that 1 ml quantities of the sample are added (by means of sterile 1 ml pipette) to screw-capped bottles which contain 5 ml of single strength MacConkey broth (the bottles are also fitted with smaller Durham tubes).

Single strength MacConkey broth is most conveniently obtained by mixing together equal parts of the double strength broth and water before sterilization.

The 1 ml pipettes should be individually wrapped in aluminium foil and placed in the oven of a domestic electric or gas cooker oven for 1 hour at 166°C. If such a cooker is not available, then pre-sterilized disposable pipettes must be used (Sterilin Ltd, 43 Broad Street, Teddington, England). When you use the pipette, be careful not to touch its tip or any part which comes in contact with the water sample.

The test procedure is otherwise the same as that for the 5 x 10 ml test. The E. coli count is obtained from the following table:

Number of positive bottles (acid and gas production*)	Most likely E.coli count per 100 ml of the water sample
0	0
1	20
2	50
3	90
4	160
5	Infinite**

* Acid production without gas production is a negative result.
** Record the count as "greater than 160 per 100 ml".

Interpretation of Test Results

5 x 10 ml test

Ideally all five bottles should be negative as drinking water should not contain any E.coli in 100 ml; E. coli count is the standard recommended by the World Health Organisation (International Standards for Drinking Water, 3rd edition, 1971). This ideal is not always reached however and in practice we often have to be content with a water which contains some E. coli. It is extremely difficult to set realistic standards for drinking water quality. For sophisticated water supply schemes, such as those found in large cities, it is both financially and technically feasible to insist on the absence of E.Coli. But in rural areas, villages and small towns the provision of drinking water with zero E. coli is often impossible, especially if waters from rivers and lakes are used for the supply.

Standards are a necessary part of water supply engineering; but they are almost always controversial - for example if it is accepted that the WHO standard of zero E.coli is unattainable in a particular area, and that therefore some less stringent standards need to be established, it is almost impossible to obtain agreement on what the new standard should be. Ideally each country should establish standards suitable for its own circumstances. This is however another ideal unlikely to be achieved in the immediate future and so, as a realistic basis for the preliminary evaluation of bacteriological water quality, we offer the following interim 'standards' for use in conjunction with the 5 x 10 ml test:

Unchlorinated supplies

a. In any twelve month period the average number of positive bottles in each test (on samples from the same source) should not be more than three ; i.e. the average E. coli count should be less than 10 per 100 ml.

b. In not less than eight tenths of the number of tests done over a twelve month period there should not be more than two positive bottles in each test, i.e. for 80% of the time the E.coli count should be less than 5 per 100 ml.

c. In no test should there be five positive bottles.

Cholorinated supplies (samples taken before entering the distribution system)

a. In not less than nine tenths of the number of tests done over a twelve month period , there should be no positive bottles in each test ; i.e. for 90% of the time E. coli should be absent.

b. In no test should there be more than one positive bottle, i.e. the E.coli count should never exceed 2 per 100 ml.

Chlorinated supplies (samples taken from within the distribution system)

a. In not less than nine tenths of the number of tests done over a twelve month period, there should be no positive bottles in each test; i.e. for 90% of the time E.coli should be absent.

b. In no test should there be more than two positive bottles; i.e. the E.coli count should never exceed 5 per 100 ml.

The local Water Engineer should be informed about all waters which consistently fail to satisfy these standards. He will then be able to investigate the cause of the pollution and thus be in a better position to improve the quality of the water in question.

5 x 1 ml test

The very fact that this test has been done on a water means that it is known to be badly polluted. The actual count obtained will be useful to the local Water Engineer in helping him assess the extent of the pollution involved.

If all five bottles in this test are positive, the local Medical Officer of Health should also be informed so that he can , if he so wishes, arrange for a more detailed bacteriological analysis to be done on the water.

Equipment

The room in which the tests are done must be provided with electricity (to operate the pressure cooker and the water bath) . It should also be

provided with a sink and cold water (to wash glassware after use). The equipment required for the tests is listed below.

The most important piece of equipment is the water-bath; it is essential to maintain the incubation temperature to within 1/2° of 44°C. The electric hotplate is not essential ; for example a simple charcoal stove is a perfectly satisfactory alternative.

Costs

The equipment costs are from £ 143 to £ 202 depending whether a balance is bought and facilities for the 5 x1 ml test are provided. The running costs (Mac Conkey broth only) are 3.5 pence per test for the 5 x 10 ml test (UK price in March 1976).

Technical appendix

Method

The 5-tube MPN method is chosen because of its simplicity and low cost. Membrane filtration is too complicated a method for a person with no previous experience in practical bacteriology; moreover its running costs are much higher (its capital cost being only slightly less)

Medium

MacConkey broth is chosen because of its wide availability and time-proven reliability. Glutamate media (such as Oxoid's Minerals modified glutamate medium) require pH checking after sterilization; but facilities for doing this are unlikely to be available. Medium A-1 of Andrews and Presnell (Applied Microbiology 23(3) 521: 1972) is more satisfactory for direct E.coli counts at 44°C than other media including Mac Conkey broth, but it is not available dehydrated.

Incubation temperature

Too many saprophytic lactose -fermenting bacteria grow from tropical water samples if the incubation temperature is 35-37°C. These organisms have no sanitary significance and to avoid a high incidence of false positive results an incubation temperature of 44°C is chosen. At this temperature false positive reactions can occur due to the growth of anaerobic spore-forming bacteria, but the incidence of these false reactions is likely to be significantly less than those occurring at the lower temperatures. Pre-incubation for 2-6 hours at 30-35°C is not considered necessary for tropical water samples.

The method, medium and incubation temperature recommended here for water samples are essentially the same as those used by Quadri, Buckle and Edwards (Journal of applied Bacteriology 37(1), 7: 1974) for determining the degree of faecal contamination of oysters.

List of Equipment required for Bacteriological Analysis of Drinking Water Samples

Operation	Qty.	Item	Source	Cost
Sampling	30	125 ml. glass bottles[a]	Corning[b]	Rs 20.85 each
			Sigcol[c]	Rs 4.00 "
			Nutex[d]	Rs 1.70 "
Media preparation	1	Balance	Avery or Blue Star[e]	Rs.500.00 approx
	3	250 ml. glass beakers	Corning	Rs. 4.35 each
			Sigcol	Rs. 3.20 "
			Nutex	Rs. 1. 95 "
	3	1000 ml glass beakers	Corning	Rs 16.30 "
			Sigcol	Rs 10.50 "
			Nutex	Rs 5.55 "
	3	10 ml pipettes	Corning	Rs 9.70 "
	3	5 ml Pipettes	Corning	Rs 9.25 "
	1 gross[g]	1 oz McCartney bottles	Any scientific supply house.	Rs 1.50 "
	1 gross[g]	Durham tubes	"	Rs 10.00 per gross
Sterilization	1	Pressure cooker (5-6 liter)	Any electrical Appliance shop	Rs 185 to Rs 225
	1	Electric Hot Plate (1000 watt)	"	Rs 80 to Rs 120
Inoculation	20	10 ml measuring cylinder	Corning	Rs 11.95 each
	20	10 ml glass beaker	"	Rs 4.65 "
	20	1 ml pipettes	"	Rs 7.65 "
Incubation	1	Water bath with lid	Scientific Supply House[f]	
		12"x10"x4"		Rs. 300.00
		12x12"x4"		Rs. 350.00
		16"x12"x4"		Rs. 400.00
	3	Thermometers	"	Rs 6.00 each

a. Polypropylene products are not yet readily available in India but they are coming soon.

b. Borosil Glass Works Ltd, 44 Khanna Construction House, Khan Abdul Gaffar Khan Road, Worli, Bombay - 400018.

also: Dabriwala House, 10 Middleton Row, Calcutta 700071; 19/90 Connaught Circus, New Delhi 110001; 23/24 Second Line Beach, Madras-600001.

c. The Scientific Indian Glass Co. Ltd., Calcutta

d. Marketed in India by: The Republic Scientific Supply Co., Munshi Niketan, Asaf Ali Road, New Delhi 1.

E-15

e. Avery India Ltd
1 Ansari Road
Darya Ganj
Delhi 110006

Blue Star Ltd
34 Mahatma Gandhi Marg
Lajpat Nagar Part IV
New Delhi 110024

f. such as :

Widsons Scientific Works
10 West Sadar Thana Road
Delhi 6.

Mercantile Engineers
4/5 Jhandewalan Extn.
New Delhi 55.

Scientific Equipment Works,
Nicholson Road,
Delhi 6.

g. Minimum quantities available (1 gross = 144). These items could of course be shared between several laboratories.

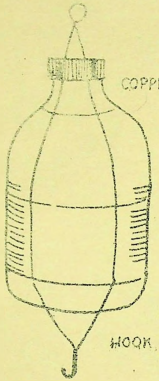
Acknowledgement

1. We are grateful for permission to reproduce this article from Appropriate Technology Vol. 3 no. 3, Nov. 1976, p. 7-10.

2. We are grateful to Sr. Barbara Ann, Pathology Department, Holy Family Hospital for details of local suppliers.

5/77-200

Figures 1 & 2



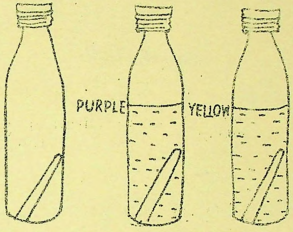


Figure 3.

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-14, Community Centre, Safderjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

E-17

LOW COST TUBE WELLS

A. Denis N. Fernando
Senior Deputy Director Planning,
Ministry of Irrigation, Power and Highways,
Sri Lanka

Synopsis

While I was in India in 1973 as a guest of the Indian National Academy, I heard of the bamboo tube wells of Bihar, originally frowned upon by the technical bureaucrats, but which had served to provide water to the drought-stricken farmer. In this instance he used a drilling machine to bore the whole and placed it in a cheap bamboo and coir tube instead of the expensive steel and PVC (polyvinylchloride) tubing and filter, and drew the water with the aid of a pump for the requirements of his farm. Details of the bamboo tube well are given in this article.

In Sri Lanka we are not in the happy position of having many drilling rigs. The few that we have are under the control of the bureaucracy. Having been trained as a soil surveyor in the early part of my career, it occurred to me that an alternative solution could be to use a simple hand auger and bore the hole by manual methods. This was the birth of the idea of the low cost tube well. Once the hole is dug in the ground it is necessary to use locally available materials to construct the tube well to keep the hole from collapsing and enable the farmer to draw water with a suitable pumping device.

These low cost tube wells can be constructed in soft rock and semi-consolidated formations like alluvium, colluvium, valley fills and sedimentary rocks, including weathered rocks where the soil can be excavated with iron implements. In Sri Lanka we have constructed them in almost all parts of the country and they give about 1,000 gallons per hour, and can be used to irrigate 1-1 1/2 acres (1/2 hectare) of land. In addition the well is a hygienic source of water for domestic consumption. Wells can be constructed by the village youth, the local potter and the village smith, making the village community self-reliant.

Low cost drilling kit for boring holes in sand and soft rock

The method adopted is a simple manual method. The diameter of the bore hole would naturally depend on the diameter of the tube well. In this instance the tube wells have an average internal diameter of 3-1/2", while the bore hole is 8" in diameter.

A device called a hand auger (see Fig.1) is used to remove the soil. This auger is trapizoidal in section so that when rammed into the ground it compresses and contains the soil, enabling the soil to be brought to

the surface. This auger can be extended to any desired length with the help of threaded connecting stems and sockets. Likewise, if the soil is hard or the rock weathered, then we use a crowbar threaded at the top so that it can be attached to connecting rods to break up the rock or soften the soil. When we reach water the soil is moist and the auger will not hold the soil. Then we use a gadget like a flattened fan with the axis vertical, the stem of which if also threaded so that connectors can be attached. When this is rotated it traps the moistened soil, which can then be brought to the surface. At this point if the wall of the cylindrical hole being dug starts to collapse it is necessary to introduce a cylindrical casing into the hole (see Fig. 2). The casing is 8" in diameter and is let down by steel cables or strong rope attached to the upper end of the casing. The longer the casing the better, preferably 20 feet, since if shorter casings are used the subsequent casings to be inserted into the well will have to be progressively smaller in diameter. Thus the second casing would have to be 7" and the third casing 6" in diameter. Moreover if we use more casings, in addition to problems of retrieval, there is also the problem of water seeping through the joints which makes physical excavation more difficult. When the casing is introduced, the fan excavator is generally used first. At this stage a piston and cylinder with a valve arrangement at the bottom are used to excavate the soil and water. The piston and cylinder are controlled from the top by an arrangement of ropes and can be manipulated so that when the piston is raised with a jerk the mixed soil and water enters through the valve and is trapped. This operation is continued until the cylinder is reasonably full of soil and it is then brought to the surface and emptied. At the same time the casing is progressively pushed down from the top with the help of connecting rods and by applying pressure to the top of casing. If hard material is encountered below the water level it is generally not necessary to have a casing. However, if alternating layers collapse a casing has to be used. It is sometimes more convenient to have a more solid cylinder plus the valve arrangement with provision to attach connecting rods at the top, so that when pushed from the top the moist soil gets trapped and then brought out to the surface when the cylinder is full. This has a disadvantage as the connecting rods have to be disconnected each time the cylinder is emptied. The material in the casing is removed progressively until a depth of about 20 feet in water is excavated.

At this stage, one of the different types of tube well is positioned in the hole, the casing gradually removed and coarse gravel inserted between the tube well and the casing, which is then completely withdrawn.

A suction tube is inserted into the tube well, and the water pumped out for some time to clear and develop the well. Once this is done a permanent pump is installed, whether it is a hand pump, electric pump, fuel pump or windmill pump, with a maximum rating of 1,000 gallons per hour.

Cost of drilling

The cost of fabricating one drilling kit by the village smith is around Rs 1,000 and this kit can be used to drill over 50 wells. The depreciation works out (including minor repairs) at about Rs 30 per 30 ft. well.

The well can be dug by three able-bodied youths in one or two days depending on the materials encountered. The cost of labour and depreciation on the drilling equipment is about Rs 120 for a 30 foot tube well or about Rs 4 per foot of manual digging.

Materials for low cost tube well

I shall now describe the four types of low cost tube wells that can be constructed : Bamboo, Hollowed Arecanut Tree Trunk, Terracotta (clay pipe) and PVC (polyvinylchloride)

Bamboo tube wells

Basically a bamboo tube well is constructed by binding strips of bamboo around iron rings of specific diameter sufficient to take a suctiontube to draw the water out of the well. For the purpose of the bamboo tube well that we constructed we used 4" iron rings. The bamboo strips are tied together as close as possible to form a continuous pipe to the length desired. If it is long it can be constructed as it is being lowered down. The bottom is sealed unless artesian conditions make it necessary for it to be open. The bamboo strips that have been put together in the form of cylindrical tube are tied with a layer of coir rope wrapped round the bamboo strips like string tied round the handle of a cricket bat. This tube is gradually lowered into the hole that has already been made.

Bamboo tube well cost:

Two 25ft lengths of bamboo	Rs 10)	
Iron rings	Rs 20)	- cost per foot Rs 2
Coir rope	Rs 15)	
Labour	Rs 15)	

Hollowed Arecanut tree trunk tube well

In this case the Arecanut tree trunk is split into two parts and the pulp removed from the centre. Cuts are made in the base ends of each half, and the two halves are put together again and tied with coir rope at intervals of 1-1/2 ft along the length of the tree trunk. Further cuts are made in the trunk at intervals and wooden wedges inserted into the slits to keep them open a tenth of an inch. The base of the tree trunk is sealed, and, the hole having already been made, the completed tree trunk tube is lowered into it.

Arecanut tree trunk tube well cost:

30 ft Arecanut tree	Rs 10)	
Coir rope	Rs 5)	- cost per foot Rs 1
Cleaning and preparation	Rs 15)	

Terracotta (clay pipe) tube well

In this case perforated clay pipes have to be specially made by the village potter. They should be 3-1/2" in diameter and 1-1/2 feet in length, with alternating longitudinal slits 4" long and up to 1/10" wide, spaced evenly round the circumference of the pipe. The pipes are made with a socket and joint arrangement for one pipe to fit into the next, and the inside surface should be straight and smooth. The clay pipes are then sun dried and fired. Blank clay pipes without perforations are also necessary for the upper end of the tube well.

When the whole has been made to the desired depth, the introduction of the pipes is a simple operation using a tripod arrangement above the hole. The bottom of the first pipe is closed with a piece of hard wood, and the pipe placed vertically above the hole. It is kept vertical with the aid of three ropes and coir cord attached round the pipe. The second pipe is placed on the first and lowered, the third placed on top and the process continued until all the pipes are one above the other in the hole. It is not necessary to use perforated pipes for the upper end of the well, and in fact it is best to use unperforated pipes above water level so that seepage of unhygienic water from the surface into the pipes is prevented. In practice, we use five unperforated pipes at the top of the column.

Clay pipe tube well cost:

1-1/2 foot pipe	Rs. 2.50)	
Three 30 foot coir cords	Rs.15.00)	- cost per foot Rs. 2.50
Coir rope for tying	Rs. 5.00)	

PVC tube well

In this instance we need the 3" diameter PVC tubing that is normally used for rainwater gutters in modern houses. This is usually about 1/10" think. The section of pipe that would be under water is perforated with a hand saw at an angle of about 45° (a vertical slit is better, if possible). The slits should be about 3/4" apart. The lower end of the pipe is plugged either with wood or a PVC cap and inserted into the hole.

Cost:

PVC per foot	Rs. 15)	
Cost of perforation of the tube well	Rs. 1.0)	- cost per foot Rs 16

Coarse gravel

Coarse gravel is required to fill the gap between the excavated hole and the low cost tube well. It is preferable that well-graded rounded gravel about 2/10" - 3/10" in diameter (about three times the width of the slit) be used. About 10 cubic feet of this material is required. If rounded gravel is not available then metal or rock of the same size can be used . If this material is also not available , then baked clay could

be broken up into small pieces of this size and used. The cost of coarse gravel is about Rs 20 for each tube well. Locally excavated material can be used to fill the space where the unperforated pipes are used.

Comparative costs of low cost tube well

In the decentralised operation where the local smith, the potter and the village youth are mobilised for the construction of low cost tube wells, the cost could be around Rs 500 per well inclusive of the hand pump.

Cost of 30 foot low cost tube wells:

	Bamboo	Arecanut	Terracotta	PVC
Materials:				
a) Tube well	60	30	75	430
b) Coarse sand	20	20	20	20
Drilling	120	120	120	120
Hand pump and suction tube	250	250	250	250
Contingencies	50	50	50	50
Total	500	470	515	920

However since the PVC tube well involves foreign exchange we discourage its use, in addition it is much more expensive. In principle any tree trunk where the centre can be dug out could be used. Since bamboo and Arecanut trunk tube wells decay relatively quickly we discourage them too. The terracotta tube well is advocated as it is permanent and can be constructed and maintained by the village community. Moreover the hand pump can be fabricated by the village smith.

The average discharge from each of these tube wells is about 15 gallons per minute or 1,000 gallons per hour. This is sufficient to cultivate 3/4 acre of paddy or 1-1/2 acres of subsidiary food crops and is sufficient for the small farmer..

If hand pumps are used in these tube wells then the discharge is limited by the pump to about 400 gallons per hour and the cost of lifting 1,000 gallons works out at Rs 2/40 (hiring a man at a rate of Rs 10 for a 6 hour shift)..

If we use a small electric pump (capital cost about Rs 1,500) the cost of lifting 1,000 gallons of water works out at about Rs 4.25.

Whereas if we use a small capacity windmill pump, with hand pump incorporated (capital cost about Rs 2,000), the cost of lifting water is nominal, but for practical purposes could be rated as Rs 2.15 for 1,000 gallons.

The use of petrol and fossil fuel pumps are discouraged as the capital cost and maintenance is prohibitive.

It is clear that when the tube well is deeper than 28 feet it would be necessaryto have medium deep well pump, whether hand-, electric-, or wind-powered. The cost of which would be approximately in proportion to its depth. This type of tube well has been designed to go down to about 75 feet.

The cost is also doubled when we have a centralised tube well construction programme, as much money is spent on men for idle time and the cost of transport of men and materials is exhorbitant. The decentralised operation brings technology to the people who are in a position to construct and maintain these wells with local resources, mobilising the local skills of the smith and the potter.

Acknowledgement

We are grateful for permission to reproduce this article from Appropriate Technology 2, 4 p.15-16 1976.

(For Figure 1, 2 & 3 see next page)

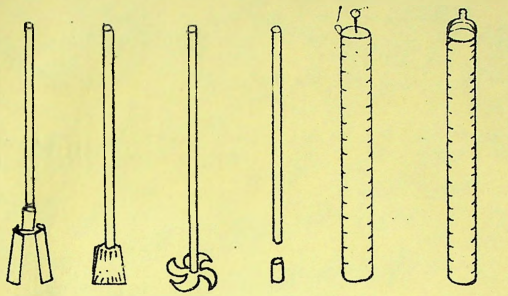
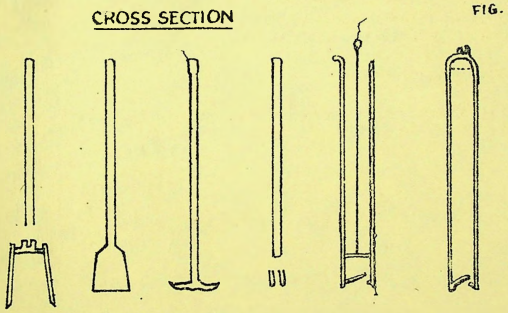


FIG. 1

CROSS SECTION



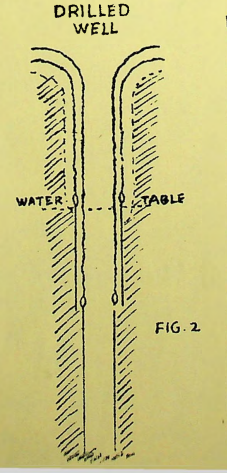


FIG. 2

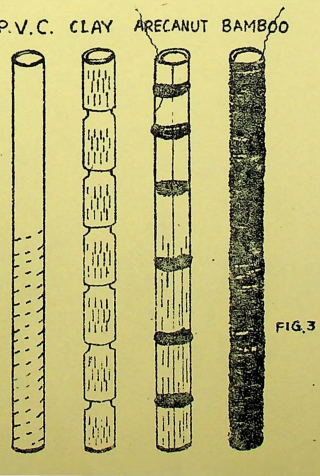


FIG. 3

VOLUNTARY HEALTH ASSOCIATION OF INDIA

C-14, Commuinty Centre, Safdarjung Development Area, New Delhi-110016
Phone : 652007, 652008 Telegrams : VOLHEALTH New Delhi-110016

VHAI - 222.

PREVENTION OF TETANUS IN THE NEWBORN BY A STERILE DELIVERY PACK.

Helen Gideon & Murray Laugesen.

How common is tetanus of the newborn?

Tetanus is commoner in rural areas, in male babies and in certain States. In Punjab it kills about one baby per 1000 population per year. In the Khanna Study in that State about one quarter of the first month deaths were due to tetanus.

Most women get neither hospital delivery nor tetanus toxoid. If the dai uses a dirty or unflamed knife to cut the cord, tetanus may occur. If the dai puts ashes or cowdung on the cut end of the cord, the baby may get tetanus.

Tetanus almost never occurs in hospital deliveries. Of all women given antenatal care only a third may deliver in hospital. Some antenatal women get at least two tetanus toxoid injections and so their newborn is protected from tetanus even if they deliver at home.

Tetanus usually starts between the 6th and 12th day of life; village people are aware of the disease and have their own name for it, e.g. it is known as "the jaw disease" (jabrae ki bimari) in Hindi, as a skin infection (alti) in Oriya, as "tanakvar" in Punjabi, as "the bowstring disease" (opisthotones) in Rajasthani dialect.

Packs prepared for use at delivery are useful in preventing tetanus. These are simple to make and can be used by attendant at delivery.

Preparing the Packs.

1. Use the sample* supplied as a guide.

   (a) Take a piece of string and razor blade and wrap in clean cloth and autoclave.

   (b) Put some aqueous iodine 1% solution into a boiled or autoclaved empty penicillin bottle, and seal with candle-wax.

   (c) Put (a) and (b) into a plastic bag and seal the bag with the flame of a candle (or with electric sealing machine**).

2. Write the instructions for the use of the pack in the local language; The following can be a guide:

   (a) Wash hands properly with soap.

   (b) Deliver the baby on to a clean sheet, towel or cloth.

   (c) Wash hands again and open the pack.

This reprint comes to you from the

VOLUNTARY HEALTH ASSOCIATION OF INDIA

C-14 Community Centre, SDA, New Delhi 110 016.
Phone : 652007, 652008 Grams : Volhealth
For a detailed catalogue please write to the Publications Officer.

Code H-20

How to Scientifically Prepare own Flashcard Sets

Health education begins with local beliefs.

1. Choose an important local health problem (for which no visual aids already exist).

2. Collect local beliefs and practice about this problem. Write out these questions in the local language.

   What are all the local words and names used to describe this disease ? List them all. Find out what each word means.

   What do they think causes it ?

   What do people usually do when this disease comes ?

   What do people think usually makes it get better ?

   What do people usually think makes it get worse ?

   Is anything forbidden as part of the treatment ?

Write the answer exactly as said in the local language, or use a casette tape recorder to note all their answers. In interviewing village women especially.

If there are tribals interview some of them also.

Try and get the ideas of at least 20 women.

Collect all the answers together. Do not interpret or summmarise.

3. Write down which of these beliefs and practices are *harmful, harmless or helpful.*

   Write down what minimum essential changes are needed to replace the harmful practices. These changes become our teaching objectives.

4. Write a flashcard story that teaches these points. To do this, we start with their existing beliefs which are harmless or helpful. For example:

Present helpful belief :

tuberculosis spreads from person to person.
(flashcard story begins with this)

(1)

Present harmful practice

they spit on the ground

Teaching objectives:

that they will know that spitting spreads tuberculosis.
(flashcard story gose on to teach this. Some may know this already).

(2)

Teaching objectives:

that they will spit into a rag or handkerchief but not on the ground.
(flashcard story goes on to teach)

Note: We only mention germs or bacilli if necessary to achieve our teaching objectives. If we have to mention germs, we do so after first mentioning their present beliefs.

5. Describe illustrations needed and numbers these. Divide up the story into say 10-15 pictures, and number one part of the story for each picture.

6. Sketch and colour the picture, 22x26 cm. will be economy size.

7. Next day test the pictures on a group of women.

   (a) What dose the story teach them ?
   Are these things the same as in (3) above ?
   If so the story is clear.

   (b) Do the pictures help to tell the same story?
   If they say so, then the pictures are helpful. (But check whether they recognise the different things in the pictures).

8. Then if you can afford it, get a good local artist to improve the pictures.
9. Write the story you usually tell on the back of each picture in your own language. Number the back of each picture clearly.
10. Mount the pictures on strong cardboard and cover with clear X-ray film or plastic to keep dry in the rains. Put them all in a cardboard box, such as X-rays come in.
11. Make a copy of the set, and send one set to Voluntary Health Association of India, C-14 Community Centre, SDA, New Delhi 110 016, who may be able to get it printed if the idea is good, so that others will benefit.

Reference: H-16 Health Education - the missing link Christine Mathews, J. of Christ. Med. Ass. of India, July 1974.

This reprint comes to you from the

VOLUNTARY HEALTH ASSOCIATION OF INDIA

C-14 Community Centre, SDA, New Delhi 110 016.
Phone : 652007, 652008 Grams : Volhealth
For a detailed catalogue please write to the Publications Officer.

Code H-43

Fifty Universal Health Messages

Murray Laugesen

These are universal messages because they apply to most parts of India and nearby countries.

These are health messages because if they are adopted they will result in control of diseases and improvement in health.

These messages, like telegrams, say the most important things in as few words as possible. But like telegrams their meaning may not be clear to the receiver. So each message has to be translated into commonly used village words and communicated slightly differently for each area, using different arguments, stories and jokes to suit people of that area. In some areas, special messages for that area will have to be added. Some examples are given.

These universal health messages are mant to clarify what needs to be taught, to state in simple words and ideas what people in villages need to know for their own good health.

They will be found useful as check lists for all health workers, teachers and extension workers and those writing training manuals and teaching materials.

The people who finally hear these messages are not just the women and children of the villages, the people in power. What changes are they willing for? For each message taught,

resources shoud be available. If we recommend immunization, we must have sufficient vaccine, transport and staff to immunise whole villages.

FOR A HEALTHIER VILLAGE — WHAT THE PEOPLE CAN DO FOR THEMSELVES.

WHAT FAMILIES CAN DO

1. Dig a pit for rubbish. Compost this rubbish into valuable manure.
2. Grow a vegetable garden, using the manure from the rubbish pit, and the waste water from the house.
3. Make a better latrine that the people will like to use, especially in all new houses.

WHAT THE VILLAGE CAN DO TOGETHER

4. By group discussion, get group decision for group health actions (to begin with, choose a problem where success is assured).
5. Clean village wells and keep them clean. Protect them by building up their sides.
6. Control the worst of the village pests - snakes, stray dogs, lice, flies, bed bugs, scabies, mosquitoes, rats.
7. Make family planning methods known and available outside of clinics and health workers.
8. Plan now to feed the very thinnest of the toddler children with extra food per day during the leanest months of the year.
9. Arrange with the nearest health centre to immunise all the children.
10. Get someone in the village trained in simple health care, and get her supervised regularly. Get at least one village dai trained also.

CHILD CARE

11. Breast feed as long as possible.
12. Introduce semi-solid food from five to six months.
13. Feed young children five or six times a day.
14. Continue giving food in illness.
15. Use the health service available.
16. Get children immunized.

17. Keep yourself and your surroundings clean.
18. Drink clean water.
19. Have no more than two or three children.
20. Have children two or three years apart.

CARE OF MOTHERS

21. A woman who is pregnant or breast feeding, should eat more food than she normally eats. And she should eat some green leafy vegetables daily.
22. A woman who is pregnant or breast feeding needs at least one iron tablet daily, especially if she is tired or pale.
23. Pregnant women and women with young babies need special care. They shoud visit a trained health worker each month.
24. A pregnant woman should have the delivery of her baby done by a trained health worker. A trained health worker washes her hands frequently. This protects the mother from fever afterwards.
25. Cut the cord of the newborn baby with a clean knife first held in the flame. This will protect the baby from tetanus.

CARE OF THE EYES

26. For healthy eyes, eat green vegetables, and plant a kitchen garden.
27. Stop infection spreading from eye to eye. (Trachoma and pus spreads from one eye to the next by mother's sari, common towel, kajal or surma).
28. See a trained health worker if a person

    - cannot see clearly in both eyes
    - cannot see at night
    - has pain in one or both eyes.

29. If something has got into the eye, or if it is sticky, wash out the eye immediately with plenty of water. Then show to a trained health worker.
30. Cataract is curable if operation is done early enough. Get operations done only by eye doctors from well known hospitals.

TUBERCULOSIS

31. Tuberculosis is a dangerous disease if it is not treated properly.

32. Proper treatment for tuberculosis means treatment for at least a year.
33. If the patient stops treatment as soon as he feels better, the disease will surely return. This time cure will be difficult and very expensive.
34. Take treatment only from trained health workers.
35. Special foods are not necessary, but regular treatment is essential.
36. Regular treatment soon makes the person non-infectious.
37. Tuberculosis is a disease which is spread by sputum and cough.
38. Stop the disease from spreading.
    Cover the mouth when coughing. Do not spit on the floor. Keep a special container for sputum, and burn it in the fire.
39. If there is cough with sputum lasting more than 2 weeks, it might be tuberculosis. Get the sputum tested at the nearest health centre. Show any thin child with cough to the health worker; it might be tuberculosis.
40. Protect all children from tuberculosis by BCG injection.

LEPROSY

41. Leprosy is not hereditary. It is a disease, and not a curse from God. It is not a venereal disease.
42. Do not be afraid of people with deformity. Usually they do not have infectious leprosy.
43. Leprosy can be cured with regular treatement.
44. Take treatment only from trained heath workers.
45. Start treatment as soon as possible.
46. Patients on treatment soon become non-infectious.
47. Stay on regular treatment.
48. Start treatment early before deformity or ulcer occurs.
49. Deformity can often be cured with surgery.
50. Inspect unfeeling hands and feet each day for injury or burns; wear shoes to prevent injury to the feet.

SPECIAL MESSAGES FOR CERTAIN AREAS

Here are *some examples* of extra message for certain areas and local problems. Each person knows his own area best: the message has to be short and clear.

Western Orissa where violent massage is practised.	Do not message the baby's abdomen after birth. This is harmful to the baby.
Many rural areas where tetanus is common despite branding of the skin.	Do not brand the baby's abdomen after birth. Instead brand the end of the cord and prevent tetanus.
Areas where goitre is common as in hill areas of Assam & Bhutan	Iodised salt prevents goitre (If iodised salt is available)
In Rajasthan where water is scarce	Purify wells weekly with bleaching powder.
In Assam where wood is plentiful	Boil all drinking water.

ACKNOWLEDGEMENT

For a healthier village is radically adapted from Nine do-it-yourself health actions by Dr. Sam Street WHO, Ethiopia in UNICEF News 87/1976/1.

Child care—is from Child Care Education—basic universal messages by Dr. Peter Greaves FAO/UNICEF Regional Adviser in Nutrition, card published by UNICEF Information Service, New Delhi.

We are indebted to Dr. Greaves for the concept of Universal Health Messages.

Care of mothers is adapted from Simple Nutrition Messages by VHAI.

Care of Eyes, tuberculosis and leprosy sections are adapted from the relevant patient retained health records published by VHAI, and from pamphlets on leprosy published by Dr. R. Thangaraj, Leprosy Hospital, Salur, A.P.

HEALTH EDUCATION AND COMMUNITY HEALTH BEHAVIOUR

By

D. BANERJI

Chairman & Professor

Centre of Social Medicine & Community Health

Jawaharlal Nehru University

New Delhi - 110057

VOLUNTARY HEALTH ASSOCIATION OF INDIA

C-14, Community Centre, Safdarjung Development Area, N. Delhi-16

Phones : 652007, 652008 Telegrams : VOLHEALTH New Delhi-16

Theory and Practice of Health Education

Health educators have taken great pains in asserting that health education is fundamentally different from propaganda or high pressure salesmanship; they also do not consider it to be synonymous with mass communication. Health education, according to them, seeks to bring about changes within a person in relation to his individual and community health goals.

Every community, responding to the health problems faced by it, formulates its own health goals which determine the pattern of its health behaviour. Changes in the health goals of a community and of individuals are required when there is a gap between the pre-existing health goals and the goals they ought to have in the context of the current knowledge concerning the health problems and the accessibility and availability to the community of services that are based on such knowledge.

Three considerations emerge from the above approach to health education :

Firstly, as it involves persuading individuals and communities to shift from some of the pre-existing health goals to newer health goals that the health educators consider to be more desirable for them, it involves value considerations. There is thus always a danger of health educators becoming, unwittingly or otherwise, instrumental in imposing certain preconceived values which may not necessarily be in the best interests of the individuals or of the community.

Secondly, as there are almost constant changes in the nature of health problems, changes in the body of the knowledge for dealing with them and changes in the services that are made accessible and available to the people, health education has to be a continuous process.

Thirdly, as almost all health practices have been developed in the cultural, social, political and economic settings of western countries, which are often diametrically opposite of what are prevailing in a developing country like India, health educators in such countries have to take an extra precaution of ensuring that the natural science essentials of health practices are separated from what are called the social, cultural and political overcoatings which these practices have acquired in the course of their development in the western countries. It is the responsibility of the healh educators to ensure that the natural science essentials of the health practices are inserted into a new "envelope" or "coating" that will harmonise better with the social, cultural and economic environment of India.

Because of the above considerations, a sound understanding of the response of communities to their health problems and their response to the various services that are made available to them is of crucial importance for formulating a strategy of health education. Unfortunately, this cardinal principle—the principle of basing a health education strategy on community diagnosis—has not received due attention in the actual practice of health education in India.

For instance, health educators in India very willingly and actively participated on a massive scale in "selling" family planning to the masses—to a hungry and poverty stricken population with very poor health status (particularly of mothers and children) and with extensive unemployment, social exploitation and illiteracy[1]. Neither the health educators in India nor the numerous health education consultants from abroad made any significant efforts to base the family planning health education strategy on sound community diagnosis. Again, in the case of practice of health education in the Indian tuberculosis programme, instead of

making community diagnosis, health educators chose the easier and much more "rewarding" path of imitating their western counterparts and kept on the refrain of "educating the ignorant, superstitious and illiterate" public of India about tuberculosis. Later on, a community diagnosis, which was made for some other purpose, revealed that because of weaknesses in the services, a very large number of tuberculosis cases, who were actively seeking help, were not even being diagnosed as cases of tuberculosis and are being turned back with a bottle of useless cough mixture[2]. These findings indicated that much more than the tuberculosis patients, it was the organisers of tuberculosis services who ought to have been "educated". Similarly, studies of treatment default in tuberculosis programmes indicated that organisational, managerial and technological lapses, rather than lapses on the part of patients account for the bulk of the problem. Yet health educators kept the focus only on the lapses of the patients and were thus instrumental in diverting attention from the far more serious lapses in the services.

Health educators in India have a tendency of imitating the approaches that have been developed in western countries and of almost blindly rushing in to take upon themselves the task of rectifying the "faults" of the community, without fully questioning the adequacy of the services that are being provided. In considering health services to be something sacred, something which is to be accepted without question, health educators in India have taken a very untenable value position. Findings from a recent study of health behaviour of rural populations in India[3] appear to be very relevant in the context of the present crisis in the practice of health education in India. This effective study has provided data for developing a more effective framework for the practice of health education in India.

Health Behaviour of Rural Populations in India

Considering the activities of a primary health centre as a purposive intervention to change for the better some aspects of the pre-existing health culture of the community served by it, a research study was designed to examine the current status and the nature of this interaction between the health services that are introduced through the PHCs and the pre-existing culture of rural population in India. A report on this study has been published elsewhere[3]. Only a broad outline of the study design and the principal findings are being summarised here.

In order to get data on health behaviour of rural populations under relatively more favourable conditions, a deliberate effort was made to select, in the first instance, primary health centres and villages which are much above the average. The study has been completed in 19 villages, 11 of which also serve as the headquarter village of a Primary Health Centre. These primary health centres are from seven states of the country which belong to the different regions.

Considerable care was taken to develop a methodological approach that was specially tailored for studying the health behaviour of villagers (including their behaviour in relation to the primary health centre services) against the background of the total village culture. Research investigators lived in these villages for three to five months. Apart from making special efforts to get themselves accepted by *all* the segments of the village community and collecting data through village informants, the investigators identified informants and some "ordinary" members from *each segment* of the village community and made observations and conducted depth interviews to understand the health culture of *each segment* of the village against the background of its total culture. They also prepared case reports to provide a deeper insight into the response of the different segments to health problems in the fields of medical care, family planning, maternal and child health, communicable diseases, environmental sanitation, etc. Work instructions, check lists and other documents had been prepared to enable all the investigators to cover uniformly all the major areas in relation to these problems.

The investigators' stay in the village also enabled them to make direct observations, followed by depth interviews, of the actual behaviour of the villagers when they encountered certain specific health problems. They could also study the interaction between the primary health centre personnel and the villagers, both when the former visited the village and when the villagers visited the primary health centre. Apart from these efforts to ensure that in-depth qualitative data are obtained from all the segments of the entire village community according to well defined work procedures and check lists and that they were, as far as possible, checked and cross-checked, a quantitative dimension was given to the main qualitative data by framing an unstructured interview schedule on the basis of these data and administering it to a twenty percent stratified random sample of the village households.

As an additional safeguard, after completion of the field work in the villages of a primary health centre, some of the data concerning the health behaviour of the community were cross-checked with the personnel of the primary health centre and the concerned personnel at the level of the corresponding seven state directorates of health services. An additional four states were added to the original seven to examine how far the findings from these seven were applicable to the others. These eleven states covered over 80 percent of the population of the country. Recognising that the complex nature of the problem for this study calls for a new and rather exacting methodological approach, an effective monitoring system was developed by the research director to ensure that the data collected by all the investigators were of a minimum accepted quality.

Taking into account the social and economic status of the people, the epidemiology of health problems and the nature of the health services available, it was not surprising that problems of medical care should be by far the most urgent concern among the health problems in rural populations. But the surprising finding was that the *response to the major medical care problems was very much in favour of western (allopathic) system of medicine, irrespective of social, economic, occupational and regional considerations*. Accessibility of such services and capacity of patients to meet the expenses were the two major constraining factors. These findings seriously call into question the prevailing views of social scientists and health educators on this subject.

On the whole, the dispensary of the primary health centre projected a very unflattering image. Because of this and because of its limited capacity, it was unable to satisfy a very substantial proportion of the demand of the villagers for medical care services. This enormous unmet felt need for medical care services has been the main motive force in the creation of a very large number of the so-called Registered Medical Practitioners (RMPs) or "quacks". The RMPs are thus in effect *created* as a result of the inability of the physicians of the primary health centre dispensary of other qualified practitioners of western medicine in the villages to meet the demands for medical care services in the villages. Without taking these basic issues into consideration, health educators in India have promptly condemned the villagers for patronising such "quacks". It is worth noting that almost all these RMPs use allopathic medicines rather than aurvedic or unani medicines. When these RMPs prove ineffective, depending on the economic status of the individuals and the gravity of his illness, villagers actively sought help from government and private medical agencies in the adjoining (or even distant) towns and cities.

There were, however, numerous instances of adoption of healing practices from qualified or non-qualified practitioners of the different Indian systems of medicine and homeopathy and from other non-professional healers. This aspect of health behaviour has received much more than its due share of attention from health educators and social scientists. In their preoccupation with writing in details about some of the "exotic" aspects of health behaviour, they seem to have over-

looked the fact that among those who suffer from major illnesses, only a very tiny fraction *preferentially adopted these practices, by positively rejecting facilities of the western system of medicine which are more efficatious and which are easily accessible and available to them.* Usually these practices and home remedies were adopted : (i) side by side with western medicine; (ii) after western medicine failed to give relief; (iii) when western medical services were not accessible or available to them due to various reasons; and, (iv) most frequently, when the illness was of minor nature.

Another very significant finding of this study is that the family planning programme had ended up in projecting an image which was just the opposite of what was actually intended by health educators and social scientists. The image of the family planning workers in rural areas was that of persons who use coercion and other kinds of pressure tactics and who offer bribes to entice people into accepting vasectomy or tubectomy. Because of this approach to family planning and failure of family planning workers to develop a rapport with the villagers, sometimes the villagers were unable to meet their needs for family planning services. There were several instances of mothers who, failing to get suitable family planning services from the primary health centre, took recourse to induced abortions to get rid of unwanted pregnancies. This not only pointed to the failure of the programme to meet felt need of individuals for family planning services but it also draws attention to the failure of the programme to offer suitable abortion services to mothers with unwanted pregnancies, despite the passage of the abortion bill. Ironically, services of health educators and social scientists had been mobilised on a very large scale to provide "support" for such a family planning programme.

Another significant finding of this study is that there was considerable unmet felt need for services of the Auxiliary Nurse Midwife (ANM) at the time of child birth. Villagers were keen to have the ANM's services because they considered her to be more skilled than the traditional *dai*. Wherever the ANMs provided the services, the *dai's* role had become less significant. However, the overall image of the ANM in villages, particularly in north India, was that of a person who is distant from them—meant only for special people or for those who can pay for her services. She is not for the poor. She can be called only when there are complications and then also she should be paid. Because of the inability of the ANMs, the majority of the deliveries even in the villages where the primary health centre is located were conducted by *dais* and relatives and neighbours. In villages with no primary health centre, their sway was almost complete.

As in the case of the Registered Medical Practitioners, confinement by relatives and friends and by indigenous *dais* was popular among the villagers *not* because of their intrinsic merits but in the absence of suitable services from the ANM/Lady Doctors, they were compelled to settle for something which they considered to be inferior but which was all that was accessible to them.

The only two programmes which can be stated to have reached the grass-roots level in the villages were those concerning malaria and smallpox. Despite several complaints regarding the sincerity of these workers, there was almost a universal agreement among the villagers that these workers did pay visits to them. A significant finding was that *these workers did not encounter any major obstacle in getting participation of the community in these programmes.* Except when there were understandable compulsions, such as prospect of a poverty stricken mother losing wages for 4-5 days at the peak agricultural season due to the child's vaccination reactions, and some cases of orthodoxy, their was general acceptance of smallpox vaccination in village communities. The number of children who were left unvaccinated due to lapses of the parents appear to be a very small fraction of those who remained unvaccinated due to lapses of the vaccinators and their supervisors.

Patients suffering from tuberculosis, leprosy and trachoma got very little services from the corresponding national programme. It was remarkable that despite this,

these patients actively sought help from elsewhere—from the nearby towns or even big cities. Such help was not only much more expensive and bothersome but it was also much less efficacious, both clinically as well as epidemiologically. Other preventive measures for these diseases, of course, were almost non-existent.

Although, by far the great majority of the villagers still went to the fields for defecatior; significantly, impelled by sheer felt need, a number of them had incurred considerable expenditure to get latrines of various types installed in their homes. They got little encouragement or help in any form from the primary health centre. This was another instance of the health institutions falling behind even the already existing felt need for preventive services in the community.

There were no sustained efforts to deal with such diseases as cholera, diphtheria and guineaworm and bookworm infestations as public health problems. When, however, epidemics of cholera and diphtheria struck separately three of the study villages when the field work was going on, the primary health centre and the district health authorities encountered little difficulty in getting community participation in the anti-epidemic measures. There were also instances of villagers, on their own, seeking triple antigen immunization from the primary health centre. Very often even this need was not met by the primary health centre.

Extensive prevalence of adjectpoverty, as a result of which more than half of the population was unable to meet even the minimum dietetic calorie needs, and appalling conditions of sanitation, water supply, housing and education presented an ecological setting which was conducive to a widespread prevalence to various types of health problems in the community. These health problems formed only a component of the overall gloomy picture of the way of life in Indian villages. Ignorance, superstition, suspicion, apathy and fatalism should thrive in such a milieu. It is, therefore, a tribute to the strength of the culture of the rural populations in India, that despite these overwhelming odds, their health behaviour has retained so much of rationality. It is doubly unfortunate that health educators overlooked these obvious realities and uncritically set out to "educate" the people of the country at the behest of equally uninformed health administrators.

As in the country as a whole, as indeed in the international fields, in the villages also, the conditions of acute poverty and helplessness was associated with a political system which was dominated by a tiny group of highly privileged persons. This political power, in turn, vested this group with additional power to further exploit the weaker sections. Over and above, they got support and sustenance from similar power elites higher up in the hierarchy which extended right into the international arena. Each one of the villages studied thus presented a picture of a rather stable equilibrium in which a vast majority of the village population was kept effectively subdued by a small privileged group which had acquired political power by controlling land, trade, cooperatives, industry, money lending, education and the law and order and the judicial systems. Experience had taught the persons belonging these weaker sections that efforts to stand up to the prevailing order would invite very deterrent punishment. They had thus learnt to live with the system, thus giving it the appearance of "stability". Health Education professionals allowed themselves to become an instrument of the power elites for maintaining such an inequitous stability.

Because of their urban orientation, it was observed that workers of rural health and other developmental agencies generally had a strong distaste for rural life. This distaste was for the entire way of life and not simply for the very poor facilities available there. Health workers, including health educators, tended to keep a distance from the rural population as a whole. However as they were *required to work* for rural populations, they took advantage of the village power structure and confined themselves, as far as possible, to satisfying the privileged gentry of the village. In doing so they (a) won approbations and rewards from

the so-called community leaders who had the ear of their superior officers and of the political leaders at the higher scales; (b) dealt with the least disagreeable segment of the village community; and (c) got a free hand to "tackle" the rest of the community.

The findings of this study brought out a number of key issues which are of far reaching significance for the future development of a sound strategy for the practice of health education in the country :

1. It brings out clearly that there is no significant cultural resistance to acceptance of modern medicine as long as they are efficacious and they are accessible and available to them. This finding, therefore, seriously calls into question the belief of a very significant sector of health administrators, social scientists and health educators that there is considerable cultural resistance to the acceptance of modern medical practices in rural populations in India;
2. That the existing health services are working at a grossly low level of efficieancy, which has led to considerable under-utilisation of these services. Priority should, therefore, be given to ensuring that this problem is overcome;
3. There is also considerable scope for bringing about qualitative improvements in the existing health services and bringing it more in tune with the social and cultural setting of the village communities; and
4. Finally, after ensuring a reasonable level of utilisation of the existing capacities and after bringing about the required qualitative changes, there is a case for making quantitative expansion of the health services to meet the requirements of rural populations. This will imply rectification of the existing imbalance in allocation of resources : this will imply a shift in providing services from the privileged to the underprivileged.

Basis for an Alternate Approach to Health Education

The findings from this study raise a number of issues which should have important bearing on the entire field of health education in India—on education, training, practice and research : in Health Education in India.

1. There is clear evidence that individuals and groups belonging to all the segments of rural populations from the different regions of the country have, on their own, brought about significant changes in their health behaviour in curative, preventive as well as promotive fields when the health services that were available to them had fallen far short of the requirements.
2. These remarkable shifts in health goals of the community and of individuals had been brought about without any intervention of health educators. If anything, health educators have to take the blame for being instrumental in diverting attention away from the central issues of community diagnosis by raising issues which are peripheral, if not blatantly counter-productive and irrelevant.
3. The most urgent task before health educators in India will, therefore, be to "catch up" with the already accepted individual and community health goals by emphasising that the needed services be made available to them.
4. As more effective health services are made available on a larger scale, health educators will be called upon to motivate people to make more effective use of these services. Motivating patients of tuberculosis and leprosy to take the medicines regularly, dispelling rumours concerning

alleged illeffects of contraceptives and ensuring adequate coverage of the different immunisation programmes, are instances of such fields of action.

5. As additional resources are made available to the people, health educators will be required to promote more effective participation in the more extensive programmes that are developed in such fields as maternal and child health services, environmental sanitation and control of communicable diseases.

6. These changes in the role of health educators will require fundamental changes in the entire field of health education in India—in developing the content of health education and in the fields of education, training and research. Practice of health education will no longer be confined merely to implementing "Instructions" that are handed down by programme administrators, as has generally been the case thus far. Health education will be an integral part of an elaborate interdisciplinary effort for formulating and implementing effective community health services for the country and for evaluating them. Acting as a "spokesman" for the community, practitioners of health education will be called upon to marshal the relevant social science data and fit them into the bigger process of programme formulation so that it is possible to promote participation of the community in these programmes.

References

1. Banerji, D. (1971) : *Family Planning in India : A Critique and a Perspective*, New Delhi, Peoples' Publishing House, pp. 31-35.

2. Banerji, D. (1971) : *Tuberculosis : A Problem of Social Planning in Developing Countries*, NIHAE Bulletin, Vol. 4, No. 1, pp. 9-25.

3. Banerji, D. (1974) : *Health Behaviour of Rural Populations in India : Impact of the Primary Health Centres*, Economic and Political Weekly, Vol. XIII, pp. 2261-2263.

Acknowledgement

Permission from Dr. Banerji to reproduce this article is gratefully acknowledged.

N90 4.16

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-45 South Extension Part II
New Delhi - 110049.

54.20

*SELECTION OF VILLAGE HEALTH WORKERS

1 Who selects the VHW ?

THE VILLAGE HEALTH WORKER IS CHOSEN BY THE PEOPLE OF HER NEIGHBOURHOOD

This is only right and proper, if we wish the village to support the worker. The village people can make a good choice, if they know what kind of person to select.

.2 What kind of VHW is needed ?

The most suitable person is usually a woman who is active and well respected in the community. She is the sort of person whom other women like to talk to, and the person they would turn to for help in time of trouble. She is often illiterate, and though this is some handicap, literacy is not the most important quality needed. The most important thing is that she is well-trusted and respected person, and one who will work intelligently and energetically. In villages where often only 10% of the women have learnt to read, there are many intelligent, hard-working women among the illiterates. Many of these women have good memory, are good at conversation and good listeners.

Women are best for this work, as most illness and unnecessary deaths occur among small children and women. It is easier for women workers to reach the women, and give them advice and teaching. "They have access to the kitchen where the traditional policy of nutrition and child rearing of the family are determined by the dominating grandmother or mother-in-law". They are able to talk to women in their own terms.

For most village women already understand from experience about married life, children, the necessity for family limitation, childbirth, death, the dangers of tetanus, measles and other serious diseases.

Most married women thus have many advantages over a single, shy and lonely young auxiliary nurse, on her first assignment in a strange village, with no husband or brothers to help her and guard her reputation.

Single village girls who have left school and are awaiting marriage are also not ideal, because they find it difficult to advise older women about family planning and children with any authority. Sometimes a younger married woman is chosen by the village because of her personal qualities. Usually it is an active but mature woman. Sometimes it will be a widow in need of the salary. Women with children growing up, naturally have more time for part-time work. Health workers may be of various castes, but in villages where is purdah, or strong caste restriction, the dais or their daughters, having freedom of movement that other women do not have, should be considered for this work.

In remote areas where travel is hazardous for women, men may be employed for this work in the beginning.

3. How to select the VHW.

It is not enough to just ask the Sarpanch, Pradhan or headman. He usually represents the leading caste or community. Minority groups must be consulted, not forgetting the women. We then tell them what type of woman is needed for this work. All this is best done by house to house calls, on say every tenth house, not forgetting the minority groups living on the edge of the village. We ask them, which woman would they consult if they felt ill or depressed. Usually the same names will be suggested by many people. This information is then given to the village council for decision. If the VHW chosen proves unsuitable, this can be discussed again, and another appointed by the village council.

* Extracted from "Village Health Workers for Basic Health Care" published by Voluntary Health Association of India, VHAI-125 Dec. 1975 p. 18 &.

TRAINING VILLAGE HEALTH WORKERS

1. Who can train village health workers ?

Health professionals as trainers.

Health professionals at present training village health workers in India include public health specialists, MBBS doctors, public health nurses, registered and auxiliary nurses and social workers. Training of VHWs is best shared between doctors and nurses, so that the training does not collapse, should the only trainer go on leave. Also pharmacists and laboratory technicians can participate in training the workers, while the best artist for preparing visual aids for their training may be unemployed and uneducated, living in a nearby village. Village doctors will prefer an experienced doctor as trainer.

2. VHWs learn from each other.

Village health workers learn most of all from each other, according to 17 village health workers interviewed at Jamkhed. The village health workers said that most of their learning was informally, from more experienced village health workers. Between them these women were in weekly contact with the deaths, births and diseases of some 20,000 village people. So, over a few years, if they keep sharing their experiences, they can obviously learn much from each other.

Training the trainers.

Orientation - Seeing is believing.

Orientation is best done by a visit to scheme successfully using village health workers. An experienced doctor or nurse may grasp it all in a few days; some might need several weeks or months.

Revision of attitudes.

Most trainers need correct attitudes and training in how to communicate.

Professional superiority complex can prevent many doctors and nurses from receiving vital feedback about the villages and the programme. Can the supervisor respectfully listen to and accept the felt health needs of the village as expressed by illiterate village leaders ? Will the trainer listen to the village health workers suggestions on what they need to learn next ?

Is the trainer committed to excellence in medical care at any price - at a price few can pay ? Or does he need to recommit himself to some basic health care for all the people ?

Does the trainer have enough sympathy for village people, or does he privately look down on them, for being tribals, low caste or not from from his own State ? Would he blame the patients for coming late in the illness, or blame himself for not having organised some health education earlier ?

For most doctors and nurses, village health is so different from hospital medicine, that years of self orientation are needed. But this can be much speeded up by in-depth orientation seminars, conducted periodically by State Voluntary Health Associations and others on community health and social justice themes.

CHANGE HAS TO BEGIN WITH US AND NOT WITH THEM

3. How much training is needed ?

Initial training period

* If we insist on regular weekly training, it is not as important to have a long initial training period to start with.

* It is often more useful to spread the initial training in the form of weekly training sessions, rather than a concentrated training period.

* Married women, dais, indigenous practitioners and school-teachers are groups that usually prefer to be trained in groups separate from each other.

* An oral examination can be held at the end of the initial training.

Village Women Health Workers

For most village women we need to arrange training when they are not busy in the fields. This may be for 2 weeks (Palghar) or upto 5 weeks (Kathmandu). This may however be impossible unless the women can bring their young children with them.

Village teachers may agree to come for 1 month in their annual vacation. Where bus services are good or the villages close by, workers can attend the course daily.

Village indigenous medical practitioners may not wish to lost income and thus may prefer a shorter intensive course.

Village midwives also may not be ready to be long away from their patients. Thus a 4-day course for medical workers may be all that is possible.

Many institutions will want to provide free food and shelter for the trainees, though we may also give the villagers the chance to pay for this. They could being grain or produce as 'fee' and should cook for themselves as a group. There may be a school hostel building unused for many weeks of the year.

Two training centres in easter India have taken village people out of the village to a training centre with hostel for one year's thorough training. This made them thoroughly accustomed to the comforts of hostel life, and they did not wish to return to village life.

HEALTH WORKER SHOULD NOT BE OVER TRAINED SO THAT SHE LEAVES THE AREA WHERE SHE IS MOST NEEDED

-13th axiom of Maurice King, adapted

Regular on-going training at the health centre

* This is a key feature for the success of non-professional workers. Non-professionals can be put to work with little initial training, but they do require years of in-service training.

* The amount of in-service training suggested is -

one day per week
or two days per fortnight
or four days per month, where distances are great or roads few as in mountainous areas.

This may be reinforced by training camps in villages in the slack agricultural season.

VILLAGE HEALTH WORKERS NEED REGULAR INSERVICE TRAINING

* Regular examinations every 3 months are useful in encouraging interest in on-going training from trainer and trainees.

The weekly training session at the health centre is, for village women health workers, the social event of the week. They come dressed in their best. This was observed in Maharashtra and in Orssa where the VHWs, though illiterate, are treated with respect by the doctor and nurse trainers.

Training the VHW in the village

Training the VHW is repeated whenever the supervisor-trainer visits her in the village. The more regular the supervisors visits, the more regular the training.

* In the village the trainer can give individual attention to the VHW, for the problems she is facing in that village.

* Encouragement should be specific and with feeling, such as, "I liked the way you talked sympathetically to that worried mother".

* The VHW must not lose "face" or status in front of the people if the supervisor wants her to be effective with these people. Patients coming for second opinion should be clearly told by the supervisor that the VHW's advice was correct, or that he will see the patient again, with the VHW also present.

* The village is rich in living examples of health problems. For example, if a child with chickenpox is seen, the rash is compared with the colour photograph of smallpox to check the diagnosis. If a child is seen with anaemia, this is demonstrated to all present, and treated.

PROGRAMME OF WORK FOR THE VILLAGE HEALTH WORKER.

1. Planning the work

Planning of the week's work can be done each week or fortnight, when the supervisor visits the health worker in her village.

For monthly visits, the village can be divided into 4 parts, and each week a different part of the village is visited for the monthly visits now due.

Special risk patients who are not improving will need weekly visits.

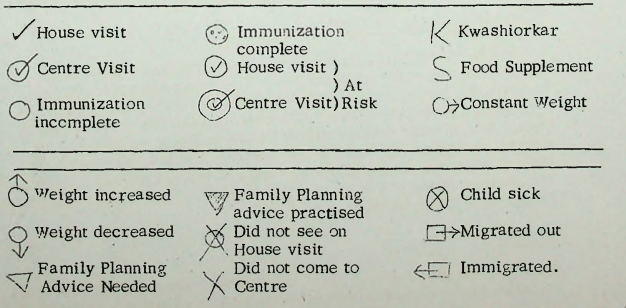
Small work cards, postcards size, are used in the Palghar (6) to summarise the work to be done each month in each part of the village health workers area. These cards are taken on house visits and symbols are used, so that semi-illiterate workers can fill them in rapidly.

(Actual size 13 X 20cm in regional language) to illustrate 1.

VHW'S WORK CARD

Village ---------- ----------Primary Health Centre

S.No.	Name	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec



2. Recording the work done

by literate workers

Work is recorded on work cards (see 1) or in a health workers note book. Each have similar columns for name, remarks and month of the year.

by illiterate workers.

In villages where very few women are illiterate, it will be necessary to recruit illiterate but intelligent women. As part of their training they will hopefully learn to read, write and count. But until then, either son , relative, student volunteer must record on work cards, or supervisor, using an interview form, must record her work for her. To make it easier for illiterate workers, it may be necessary to simplify the methods used, for example, use a bangle for arm circumference, instead of tape measure, or weight - growth chart, for toddler malnutrition.

3. How many people can a VHW care for?

In one Bangladesh programme peoples healers each care for the simplest health needs of 20-40 families.

In Manali in mountainous Himachal Pradesh each VHW cares for 250 people or so, so that there is one worker for each isolated village.

In Jamkhed each worker cares for about 1000 people.

In Palghar also in Maharashtra one worker cares for mothers and children among 2500 people.

When more than one worker is employed in the same village it is important to define each ones area of responsibility.

If a workers area is scattered she has more walking to do and can take care of less people.

EACH WORKER SHOULD KNOW ALL THE PEOPLE SHE SERVES

4. Work assignments for VHWs.

These are adapted from these in use in the Palghar and Jamkhed programmes in rural Maharashtra. The assignments are derived from the health priorities of the programme, which are derived in turn from the observed and felt health needs of the people of that area. So, in some areas, village health workers may be given no leprosy assignments, but malaria assignments instead. Feeding programmes are not so necessary after a good monsoon. Smallpox vaccination should not be necessary by 1977. Thus these assignments change with place and time.

Census

Take census with the help of the supervisor, using the sample house to house form or using a simplified method for illiterate workers,

using picture drawings and strokes or ticks. This is done at the beginning of the programme and at the end of it, and possibly each year as well. If the VHW is illiterate take the help of an educated person.

Vital Statistics.

Record births, deaths, families moving in and out; or notify these orally to the supervisor, each week , or fortnightly at least. This helps the census up to date.

5. VHW's work assignments for Healthier Children

Children at risk : identification and home visits.

VHW lists all children at special risk. She visits them monthly at least. Indicators of high risk, adapted from (6) are

* Weight below 60% of standard, or bangle of 4 cm diameter passes above the elbow in child over 1 year old.

* Failure to gain weight in 3 successive months.

* Loss of weight during 2 successive months.

* Birth weight was less than 1.5. kg.

* Recent acute illness such as measles or gastroenteritis.

* Other reasons for special care may include no mother or no father, congenital abnormality, tuberculosis in the family, recurrent malaria, severe anaemia, night blindness.

Supervision of growth.

Weigh all preschool children monthly and chart on the growth chart. Advise mother according to the child's progress, on how to feed the child. Or , use a 4 cm diameter bangle for screening all toddler children monthly. Keep in the feeding programme all these children on whom the bangle goes above the elbow.

Anaemia.

VHW checks all children every 6 months for pallor of lips and tongue. This can be aided with the use of colour photographs. VHW motivates all such to eat green leafy vegetables, and treats all such with oral iron.

Night blindness

VHW records all complaining of night blindness and gives them each Vitamin A, 200,000 units six monthly, and starts them on green leafy vegetables, daily.

Illness care of pre-school children

Under the supervision of the ANM or supervisor, she examines and treats children, and this helps her when she has to see and treat children on her own during the rest of the week.

Referral

VHW refers very sick children to the doctor, and notes whom she has referred , and discusses these with the supervisor.

6. VHW's work assignments for healthier mother.

Care of all pregnancies.

Visitall married women every one one to three months fill up their home based health record, detect early pregnancy. start antenatal care, especially iron and folic tablets for anaemia and tetanus toxoid. Continue this after delivery.

Identify 'at risk mothers.

'At risk ' mothers needing special care include previous difficult delivery, or stillbirth, previous bleeding prior during or after delivery, small pelvis or height less than 145 cm, weight of mother less than 40 Kg near term, first baby or fifth baby or more, swelling of hands or face, and pallor. Mothers with several such factors present, are advised to deliver at the health centre.

Clean deliveries

To preventtetanus of the new born and puerperal sepsis of the mother, VHW, dai and ANM must all promote clean delivery. VHWs promote clean deliveries by befriending and persuading untrained dais to

* wash their hands
* use sterile delivery kits supplied by VHWs
* come to training courses.

Where relatives instead of dais conduct the deliveries. VHWs can be trained to conduct clean deliveries.

Family Planning

The VHw advises parents on family planning and issues pills and condoms. Condoms can be issued through her brothers or husband. She lists all those in the village who have had sterilisation or who are using loop, pill or condom. She refers to the health centre all wishing to have loop and sterilisation.

7. VHWs Work Assignments for a clean village, with control of blindness and spreading disease.

Motivation for mass campaigns.

Once the village peoples priorities are known the VHW motivates for the next mass campaign such as immunisation, pest control, village clean-up. She distributed deworming medicine, Vitamin A, nutrition supplements and other mass treatments.

Blindness

VHW records all blind people who can not count fingers at 1 metre. These are referred to the next mobile eye hospital for possible cure and followed up after.

Tuberculosis

VHW records all with sputum and cough. She gets sputum on to a slide with a match flame, then sends, it labelled to the laboratory. VHW suspects other tuberculosis cases such as toddlers from TB families, with cough, fever or malnutrition. VHW refers such cases and follows up all patients on treatmen t and especially visits defaulters.

Leprosy.

VHW suspects likely cases with patches and refers them to the supervisor VHW follows up by visiting homes of those with leprosy each month to ensure that drugs are taken, families encouraged, anaesthetic hands and feed protected, and contacts diagnosed at first sight. VHW records suspected cases and those on treatment and whether they take their drugs each month.

Malaria,

VHWs can assist Government workers by obtaining blood smears on all fever cases and starting all positive cases on treatment. Once such positive cases are reported malaria staff are called to spray insecticides.

8. VHWs work assignments for care of accidents and illness.

First aid for accidents.

VHW cleans all cuts and injuries immediately, applies antiseptic and bandage.

VHW performs mouth to mouth rescuscitation for drowning

VHW cools burnt skin immediately with water, apply antiseptic and covers from flies and dust. She then refers all burns and gaping, crush and deep wounds to the doctor.

Treatment of simple illness

She treats symptoms with the drugs provided.

Recognition and referral of all serious illness.

Standing instructions are needed for this.

VOLUNTARY HEALTH ASSOCIATION OF INDIA
C-45, SOUTH EXTENSION PART-II, NEW DELHI-110049
Phone : 616308, 78433 Telegrams : 'VOLHEALTH New Delhi-49'

N90 4-15

5419

VHAI - 251

VILLAGE HEALTH WORKERS (VHWs) SCHEME

Ingredients for Success.

DEFINITION

* A village health worker is any health worker who works for the people of his or her own neighbourhood to improve their health.

* A village health worker is one of the people chosen by the people, to work for the people, of that neighbourhood.

* A village health worker is regularly guided and supervised to work with the people of the neighbourhood, and regularly trained by health professionals.

THE INGREDIENTS OF SUCCESS IN VHW SCHEMES

1. Involvement of the community. Many people now believe that community participation is a "must", if the goal is not just health but total development . Total development cannot happen without involvement of the people in planning and determining their own destiny. When the people are fully consulted and involved, only then are their full energies released.

   The projects now using village health workers have all involved some degree of community participation. But the degree of this community participation should now be carefully evaluated for each project and compared with the project outcomes such as extent of change in birth and death rates.

   My own impression is that success is greater where community involvement has been greater.

2. Respect for the VHW's as persons. Widows, Harijans and women without issue have found fulfilment and work. This has awakened hidden talents.

   Comments from VHW's (at Jamkhed)

   > "They (the project leaders) believed in us. That was what got us started. Before I did not have any ideas. Now I have so many ideas about improving my village that I cannot go to sleep at night".

   These VHW's like new flowers must not be crushed but allowed to flower fully.

Psychologically crushing the village volunteers, destroys the scheme. The Tumkur project near Bangalore used hundreds of volunteer workers to control T.B. a few years ago. According to a leading person in National T.B. Programme, this volunteer involvement failed mainly because the doctors and other professionals were unable to accord proper respect and unable to listen to any ideas from the volunteers. There was an authoritarian relationship resented by the volunteers.

3. Financial plan of support.

" There is no need to form them into a cadre and pay them a remuneration from public funds. It would be desirable to leave them to work on a self employment and part time basis"

--Report of the Group on Medical Education & Support Manpower, Ministry of Health & Family Planning, New Delhi April 1975.

Unfortunately, very few villages have been found willing to support such workers and Panchayats in some States cannot legally use their funds for such purposes. Thus the project or PHC must pay the VHW, with all the dangers that the chance for local participation in the scheme and necessary for consulting the village will disappear.

In another area last year a small scheme using VHWs failed to control TB and other diseases as hoped by the doctor in charge. He had excellent rapport with the village people but supervision was not effective due to lack of community support (Panch was weak) and project did not pay the health worker . So there was no control from either village or project over the VHW.

GOOD LEADERSHIP AND ADMINISTRATION - HEALTH PROJECT MANAGEMENT

There is an old saying that if one wants a new and difficult job done, one should find an experienced and trained hand for the job.

Frequently a young doctor at age 25 with no previous experience of administration is placed in charge of 40 staff in a Primary Health Centre or health project.

If an inexperienced young manager is also expected to start village health worker schemes, which could add on up to 100 workers per PHC to supervise, the results will not be good.

Already serious project failures have occurred, traceable to inexperienced doctors without suitable training.

One project had a doctor who had not learnt to share his medical knowledge with lay people, and so when a village health worker brought a patient with TB, he did not tell the patient or the village health worker about the diagnosis. Consequently they could not cooperate with him in keeping the patient on treatment.

Another project had a doctor, who was not familiar with high risk, under-fives, third degree malnutrition, tetanus toxoid in pregnancy, and other community health concepts. He also had difficulties relating to the nurse, in accepting that a nurse had useful ideas. Such difficulties are bad enough in a clinic, but in village health worker schemes, they make for certain failure.

Those projects which have succeeded so far, have succeeded because top management has been sound, and has personally taken part in training of the nurses and village health workers.

TRAINING IN HEALTH PROJECT MANAGEMENT.

For expansion of programmes it will be necessary to give wider and broader training to PHC or health project doctor, or special administrators from management or social science backgrounds may be recruited .

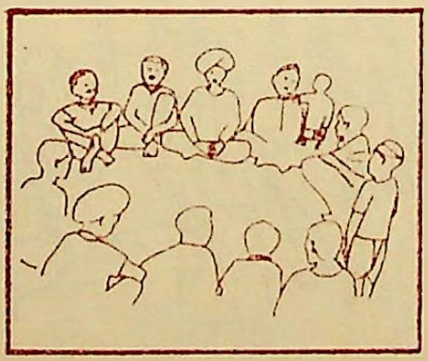
All project managers will need training in several areas beside public health, so that the necessary knowledge attitudes and skills are acquired. Some suggested topics -

Management.	Decision making, problem solving, use of time, management by objectives, project formulation, costing, cost and benefit, personnel management, budgeting, management of physical plant, vehicles and materials, control, evaluation, organisation structure, leadership styles, patticipatory management.
Sociology	Economic causes of ill health, socio economic analysis of a village, village expectations of outside agencies, village profiles of land, water, literacy, power, health, caste, crops and markets, food taboos. Local leaders of various caste or community groups could be asked to tell about their own villages.
Communication	Art of listening, known village perceptions of health programmes, exact local meanings of certain words used for disease, making visual aids locally, transactional analysis as an aid to better inter personal communication in the health team, how to conduct a meeting and elicit all points of view .
Training.	Writing learning objectives, writing lesson plans, designing curriculum to suit local conditions and priorities, teaching methods for training village health workers.
Public Health	Community diagnosis, survey, selection of priorities, community participation, census and population projections for the local area , writing objectives, writing detailed plans for control of local diseases and pests, organisation of mass campaigns, health records, information system and built in evaluation.

.....

This was a paper presented to the Nov 76 Seminar on "Community Leadership - Education of Agents for Health Care" by Dr. Murray Laugesen, Community Health Consultant at VHAI. The Seminar was sponsored by the Indian Association for Advancement of Medical Education, ICSSR, AIIMS & NIHAE

VHAI
assists
in making
health
a reality
for all
the people
of India
with their
involvement
and
participation
through
the
voluntary
health
sector



VHAI is for all of India

It is a federation of fifteen voluntary health associations in fifteen States/ Regions. These include Andhra Pradesh, Bihar, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, North-western Region (Punjab, Jammu and Kashmir, Himachal Pradesh and Haryana), Orissa, Rajasthan, Tamilnadu, Uttar Pradesh and West Bengal. Its services are available also for other States, not yet officially affiliated.

VHAI is

a non-profit registered society.
Its constitution is SECULAR.

Open to all

Membership in VHAI and opportunity for its services are in principle open to all health institutions in the voluntary non-profit sector of health care irrespective of religious affiliation.

Community health

is VHAI's main thrust.

VHAI conducts seminars, workshops, and other education programmes on community health. VHAI also assists other associations with seminars in this field.

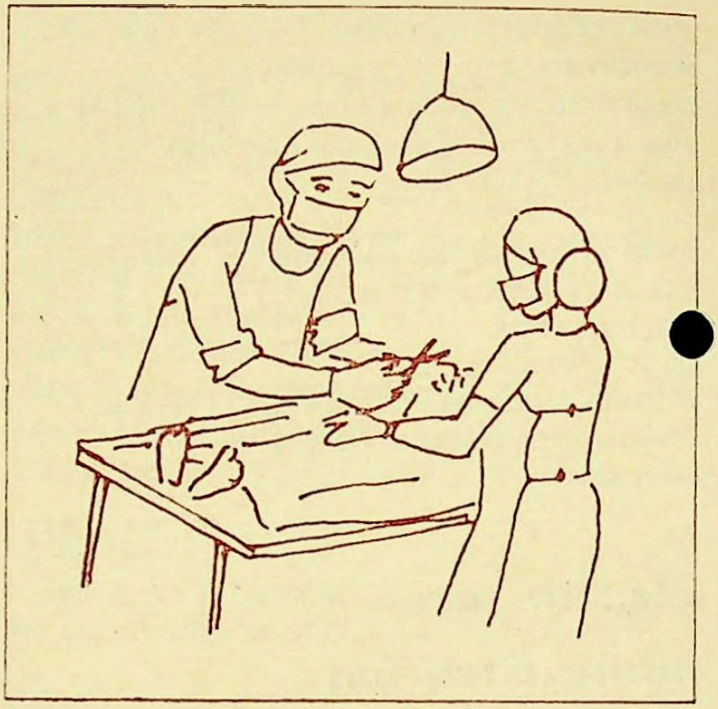
VHAI promotes the education of village based COMMUNITY HEALTH VOLUNTEERS.

VHAI helps people to develop or extend community health services and programmes.

Health care administration

courses are VHAI's way of imparting managerial skills to hospital and health centre personnel.

VHAI conducts seminars and workshops on Hospital Administration, Community Building, Hospital Finance, Accounting, Communications, Planned Change in Hospitals.



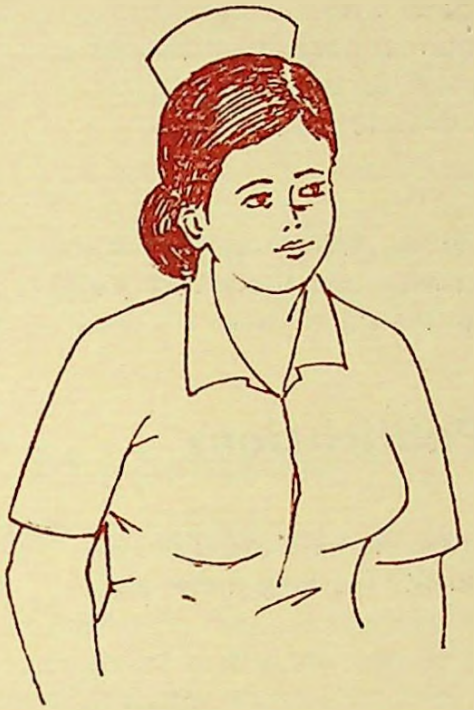
VHAI also gives on the job training by a CORRESPONDENCE COURSE and Residency programme in Health Care Administration.

VHAI assists nurses

to assume new roles in the community. VHAI is involved in the revision of syllabi for nursing personnel to include more community health and the preparing of teaching aids and materials.

VHAI shares expertise with schools of nursing and other organisations in continuing education, by workshops on

* Nursing management and supervision
* Improving patient care
* Improving written and practical exams
* Health education.



VHAI provides a unique fifteen month

Anaesthesia course for nurses

The purpose is to make this medical science available at lower levels, so that smaller rural hospitals may have the benefit of a qualified nurse anaesthetist. Our nurse anaesthesia graduates can also assist in larger hospitals. After the academic course, there is an additional year of residency in the nurse's own hospital, for her to gain facility and greater confidence.

Liaison

with Government and other agencies comes naturally to VHAI.

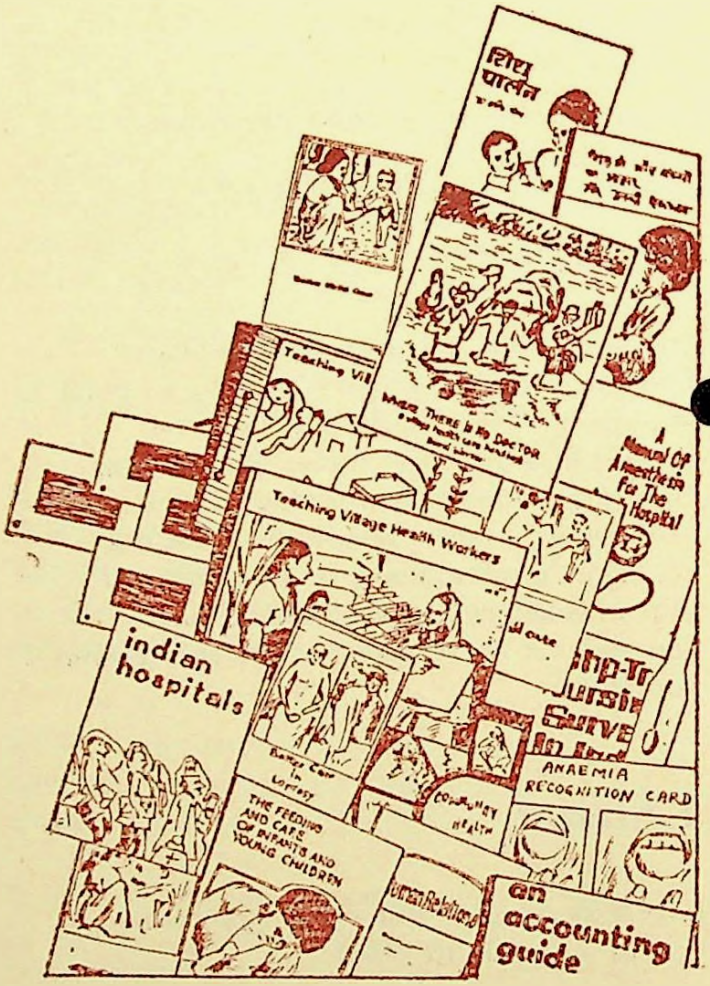
VHAI's personnel habitually visit Government Ministries and offices to get information for our members, to follow up their petitions, and promote good health care legislation.

We keep in contact with numerous national and international organizations, and encourage the formation of associations similar to ours in other countries.

Co-ordinators from VHAI's central office keep in contact with the State VHA's and assist them with their activities.

Health Publications

VHAI puts together its field experiences in the form of health learning materials.



VHAI publishes books, pamphlets, flash cards, flannelgraphs, film strips and slides.

VHAI collects, sifts, screens and distributes suitable health learning materials from all over the world.

VHAI publishes its official magazine, "Health for the Millions" every two months. This keeps its people up to date with what's happening in the field of health care.

VHAI provides information

to its members. We have a data bank and personnel to provide members and interested public with useful facts, statistics, materials for seminars, and addresses pertaining to the voluntary sector of health care.

It all began

in Bangalore, in January, 1969, with a conference of leaders of voluntary hospitals and health associations. VHAI was organized on a national basis with its present name at a meeting in Madras, September, 1974.

VHAI is governed

by a General Body in which there are representatives of the constituent State or Regional members. There is an Executive Board which manages affairs between general body meetings. There is a central office with staff in Delhi. Supervision of the central office is in care of an Executive Director. He is appointed by the Executive Board.

The Philosophy of VHAI

What is our NEW VISION of health care? What makes it appealing? All we have to say is contained in the simple words: "COMMUNITY HEALTH". We begin with the community. Our goal is a healthy community. Our aim is to maintain the health of the community.

We promote SOCIAL JUSTICE in the provision and distribution of health care.

We believe in PEOPLE. We work with people. We believe that people grow better when they are encouraged to do whatever they can for themselves. We hope that good health may become a reality for all the people of India.

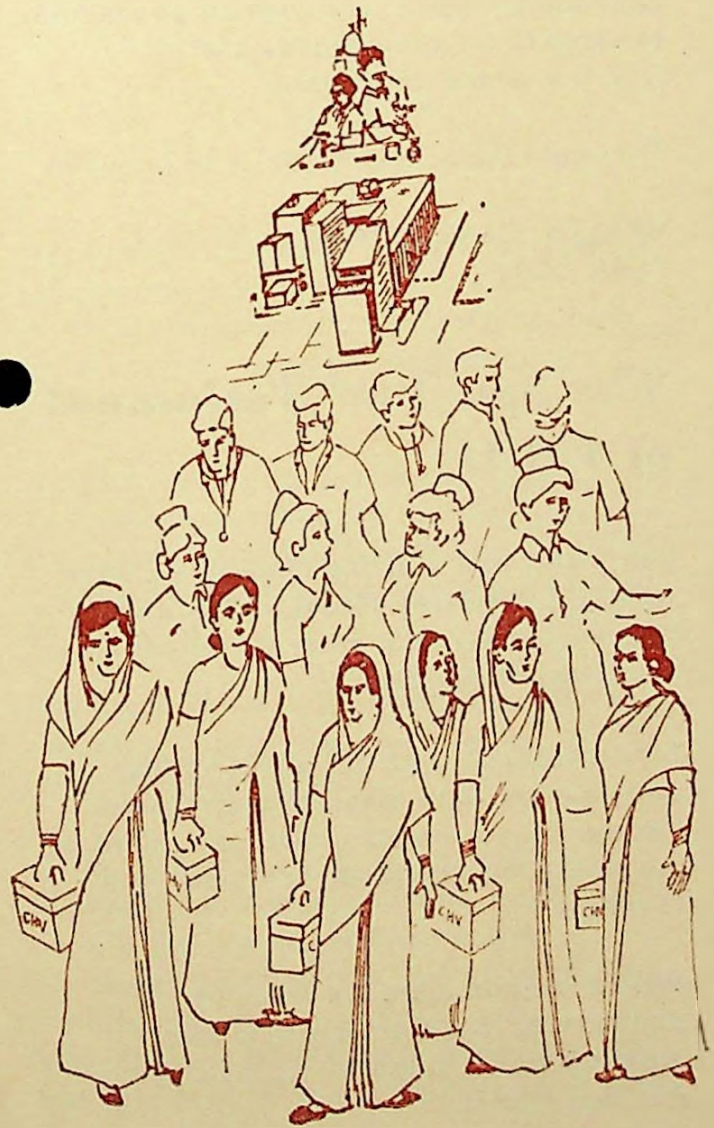
We say that TAX MONEY marked for health must be reasonably shared with all the people. It is mainly the Government's duty to provide health services for the people.

Persons and associations classed as VOLUNTARY have a great opportunity to help people see the value of good health.

We help them to want health services. It is good for us to encourage people to demand health services as a HUMAN RIGHT.

The health services we speak of are mainly basic or primary. These most commonly meet the needs of the largest number of people.

We believe in a REFERRAL SYSTEM. Primary health care is the base of the pyramid. This is most important. But it rises towards hospitals and medical education.



We believe also in RESEARCH, higher knowledge and the advancement of health science.

But our first faith is in SHARING. We emphasize health service for the poor and neglected. They are in greater need. We know enough already to provide all citizens with simple health care. If the poor do not have health, it is not because we do not have sufficient knowledge. It is because we as the organized people of India lack the will. Our OLD HEALTH SERVICES have been built to favour the educated, the privileged and the powerful.

Our NEW VISION is community and community health. We wish all goods and services to be more equally shared with the whole community.

The world community joins us to proclaim:

HEALTH CARE FOR ALL BY THE YEAR 2000 !

The Spiritual Testament of VHAI

Can VHAI, due to being open to all, have NOBLE SPIRITUAL IDEALS? The answer is a resounding YES. From the beginning our principle has been to

EMPHASIZE AREAS OF AGREEMENT and de-emphasize areas of controversy. People are not merely individuals. All of us are also social, political, economic and religious.

Within religion there are areas of controversy. But there are also large areas on which virtually ALL GOOD PEOPLE AGREE.

Such areas are the practice of virtue, such as love, friendship, charity, justice, including social justice, mercy, prudence, courage, temperance, service of neighbour, especially of the poor, the deprived, the weak, decency, humility, personal and family fidelity, observance of reasonable laws, repentance and spiritual healing, the building of community, reaching out to world community.

Even prayer, meditation and contemplation can be common. Some prayers are particular to one person or religion, but others can be generally accepted by everybody.

If we would try to estimate what is common to all religions, especially the larger and more developed ones, we could surmise that a very high percentage would be common

It is certain that all the above beautiful aspirations are agreed upon as part of the idealism of all religions.

We in VHAI, following our principle of emphasizing what is common, inspire our members to the ideals listed above. Our working together is always religiously inspiring. We do not compare our religions. We do not try to prove that one is better than the other. Each of us,

both singly and in groups, brings the best of our religious heritage to bear upon the goals we jointly pursue. Each of us is free individually and socially to practice fully and to join with members of his/her own religion in all religious exercises of one's choice.

Our way of life is a noble religious expression. We join hands and hearts to do all we can together. We encourage the freedom of cach one's personal call.

We are upon to the highest spiritual accomplishment and commitment.

Interested persons are invited to write for further information as desired.

You may ask for a syllabus for the Correspondence Course in Health Care Administration,

or for the Anaesthesia course for Nurses. A catalogue of our Publications is available free on request.

You may inquire about a particular type of seminar that may interest you.

Address:

The Voluntary Health Association of India
C-14, Community Centre, SDA
New Delhi 110016

Phone numbers : 652 007, 652 008
Residence of Executive Director 652466

Printed May, 1981