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DENTAL HEALTH EDUCATION: ITS ROLE AND APPLICATION IN THE DENTISTRY OF DEVELOPING COUNTRIES

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INTRODUCTION

Dental and periodontal disease is considered to be one of the most widespread diseases. For years, the dental practitioners have been engaged in a struggle for reduction of the dental caries to manageable proportions. The biggest problem that made this effort so difficult was the fact that the aetiology of both caries and periodontal disease was nebulous, and up to this date the research has not established it with finality. Progress has however been made to a degree when it is possible to prevent this disease greatly (Reade 1979), providing that certain conditions are met. The biggest obstacle in achieving this, is men's own behaviour, and habits.

The dental profession has been striving to educate the population and point out the cause of the disease and the ways how to prevent it. Unfortunately, this effort has not been very successful, mostly - as has been discovered - because of wrong and little efficient methods employed. The recent research, particularly in the field of behavioural sciences, pointed out in the right direction and improvement in the success rate can be expected.

Developing countries face many difficulties in the development of their dental services, the biggest problem being often tremendous shortage of staff and need to overcome harmful habits, customs and superstitions that cause or greatly contribute to the traditional - periodontal disease, and also to mitigate the effects of imported

problems, that is the change of diet, that brought with it an increase - often of epidemic proportions - and sometimes even introduction, of dental decay.

This work will attempt to analyse possibilities that an introduction of dental health education carried out on a large scale, could bring in the conditions of the developing countries.

1 CURRENT THEORIES OF AETIOLOGY OF CARIES AND PERIODONTAL DISEASE

1.1 CARIES

By the end of the last century an American dentist W.D. Miller brought forward a theory that the caries was caused by acid dissolution of the enamel. The acid was a product of metabolism by certain oral bacteria of the dietary carbohydrates.

It was the research of the last 35 years that confirmed basic validity of Miller's theory and showed the actual mechanism of the carious process. It showed that certain conditions have to be maintained for the acid creation and for its interaction with the enamel.

1.1.1 Aetiological variables

There are many aetiological variables that affect the inclination of the dental tissues to pathosis. These variables can be divided into two groups, the intrinsic factors, and the extrinsic factors.

Beside the variations in mineralisation, which by some authors is not an important variable (Levine 1977), it is a presence of different trace elements that affect the enamel solubility. This has been proved in case of fluoride, importance of other trace elements (Se, Mo, V, Mn, B, Sr, Li) has been investigated.

Other intrinsic factors, such as enamel microstructure and tooth

morphology do not seem to have great importance with exception of pit and fissure morphology, and resulting food stagnation factor.

Of the extrinsic factors the most important, as seen today, is plaque and its bacterial flora and metabolism. The caries has been explained as a demineralisation of enamel due to passage of mineral ions from enamel, which had been seen as a one way process. Only recently it has become clear that the ions are constantly being exchanged between enamel and plaque (Levine 1977).

This discovery prompted a development of the "ionic see-saw" concept which envisages an ionic balance and disruption of this balance by falling pH which facilitates diffusion in the plaque of the enamel mineral ions.

Saliva with its buffering effect neutralises this acid and ions return back onto the enamel crystal surfaces. The extra ions which escape into saliva during the acid phase may become a permanent loss, and, if happened repeatedly, may lead to an overall demineralisation and initiation of caries (Levine 1977). The acquired pellicle protects the surface of enamel and the initial demineralisation occurs beneath this surface layer, which can be up to 70 mμ thick (Featherstone 1977). The mechanism of ion exchange is affected by free calcium and phosphate ions of the plaque under normal conditions. High concentration increases tendency of the ions to move from the plaque into the enamel.

Presence of fluoride then intensifies this movement due to the fact

that fluoride causes precipitation of calcium and phosphate ions from the solution. This process is located between the plaque and enamel surfaces and its intensity is ruled by other extrinsic factors, oral microbial flora, namely presence of cariogenic streptococci - *C. mutans* and *S. salivarius*.

Diet increases or decreases caries susceptibility by supplying carbohydrates as cariogenic component, and calcium and phosphate ions and other as yet unidentified ions (plus fluoride) as anti-cariogenic components.

Saliva, its quality and quantity and particularly its buffering properties is of great importance also. Presence of immunoglobulins in the saliva has been proved and their relationship to caries resistance has been under investigation (Pearce 1977). Oral hygiene which determines or at least greatly influences presence or absence of plaque and to a certain degree the microbial flora has been recently questioned as an effective aid to caries reduction (Town 1979).

1.2 PERIODONTAL DISEASE

Periodontal disease is next to the caries the second most frequent cause of loss of the teeth and in some countries presents a serious problem (Camrass 1973). Barmes (1977) warns that unless we develop effective measures for the prevention of periodontal disease we are doomed to see dentitions free of caries being mutilated by those diseases in the later decades of life.

1.2.1 The causative factor is dental plaque and unlike in the case of caries it has a sole responsibility for the presence of the disease. Plaque initially forms at the tooth-gingiva junction, between the teeth and in the fissures and pits of the teeth.

Grigsby and Sabiston (1976) in their review article on the periodontal disease process state that for the periodontal disease to be initiated, several oral and environmental components must be present:

- periodontal tissues
- bacteria
- nutrient materials

Presence of the periodontal tissues is of course essential. Bacteria are thought to be essential. Some observations emphasise importance of *Actinomyces viscous*, *Actinomyces bacterionema*, *Streptococcus mutans*, and *Streptococcus salivarius*. On the other hand, Wirthlin et al (1977) reached the conclusion that there was no clear relationship of presence of *S. mutans* in the plaque and gingival inflamation. Grigsby and Sabiston (1976) further state that other works showed in germ free mice infrabony pockets, round cell infiltration, apical migration of epithelial attachment, osteoclastic cementum resorption and alveolar bone loss. However the effect of bacteria is better explainable and more understandable. Presence and effect of bacteria is dependent on supply of nutrients, in this case of dental plaque.

In the presence of all three components the stages of the periodontal disease development follow in this order:

a) The inoculative, or bacterial attachment phase:

- interaction between bacteria and acquired pellicle
- interaction between bacteria and tooth substance
- bacterial colonisation of gingival tissues

b) The proliferative and increasing cell number phase:

- cell division
- attachment of opportunistic bacteria

c) The stationary, or cell equilibrium phase:

- metabolically active stationary phase - nutrients available
- maintenance stationary phase - nutrients minimal

d) The destruction, or periodontal injury phase:

- either viable bacteria invasion of periodontal tissues
- or effect of bacterial metabolites

no clear evidence preferring either is yet available

e) The iterative or repetitive phase - repetition of the first four phases after each plaque removal and subsequent reappearance.

Löe et al (1978) carried out a longitudinal study of the development of periodontal disease and resultant tooth loss. The study involved a group of 565 male Norwegians, 17-30+ years old, and 480 male Sri Lankans, 15-30+ years old. It lasted for 6 years and 3 months in Norway and 7 years and 6 months in Sri Lanka.

Norwegians had excellent oral hygiene but frequent deficiencies in restorations. Sri Lankans had poor oral hygiene and nonexistent

caries and restorations. The mean loss of attachment at the age of 30+ was less than 1 mm in Norwegians and more than 3 mm in Sri Lankans with substantial amount of teeth having lost more than 10 mm of attachment.

Olsson (1978) in his survey of 1,700 Ethiopians found a close relationship between oral cleanliness and periodontal disease. Beal (1979) had the same result with Scottish children aged 12-14. Fischman (1975) emphasises importance of calculus. Effect of improper treatment (badly contoured fillings, badly fitting partial dentures) and irregularities and crowding of the teeth have been mentioned by other authors. Nyman et al (1975) discovered that the standard of oral hygiene necessary to maintain the results after periodontal surgery is so high that not all of the patients were able to keep up and the treatment failed. From the results of the latest studies it is obvious that even though more knowledge about aetiology of the dental and periodontal disease had been obtained, the science is still uncertain about its many finer facets. Some new opinions have been brought forward, particularly a question of effect of tooth-brushing on prevention of caries.

2 PREVENTION

Prevention in dentistry is, by the W.H.O. (1970) definition, divided into three major groups, primary, secondary, and tertiary prevention. These groups, and they could be also called lines of defence, are defined by a stage in which they come into effect.

2.1 PRIMARY PREVENTION

Primary prevention is the truly preventive stage, where the disease is prevented from occurring by use of different means.

2.1.1 Health promotion

Health promotion is concerned with maintenance of good health standards. This includes good nutrition in all phases of life, induction towards seeking regular and periodical professional attention and advice, genetic counselling, particularly as a means of reducing developmental oral malformations, and dental health education, that can in theory encompass the whole of the primary prevention.

2.1.2 Specific protection

Specific protection is concerned with creating physical condition whereby the organism increases its resistance, or special steps are taken as to decrease the danger of the dental or periodontal disease appearing.

An increase of resistance is achieved through dietary controls, particularly fluoride supplements, and professional or individual

application of topical fluoride. Other means, namely use of sealants, are employed as well.

Maintenance of good oral hygiene, protection against professional hazards and sport injuries, and protection from carcinogenes have an aim of decreasing the danger of the disease.

2.2 SECONDARY PREVENTION

Secondary prevention as a second line of defence utilises early diagnosis and treatment. Here it is presupposed that the primary prevention was nonexistent or failed in providing expected protection. Prevention at this stage is understood by active steps taken in detection, such as dental recall system, screening surveys for an early detection of oral cancer, radiographic detection at certain stages of development of dentition.

2.2.2 Early treatment

In case that oral pathosis or a state that can lead to its development is detected, the next step is provision of treatment or removal of a state leading to the possibility of disease.

This means professional removal of plaque and calculus, recontouring of deficient fillings, redesigning of badly constructed dentures and other restorations, etc.

When there is an indication of first stages of carious process chemical treatment of lesion can be carried out whenever applicable (Craig and Powell 1979) or a filling can be made.

Orthodontic procedures, such as serial extractions or provision of space maintainers and other orthodontic appliances also belongs to this category.

2.3 TERTIARY PREVENTION

Finally, the tertiary prevention deals with situation where the disease is fully developed. In this case stopping of the process and mitigation of its effect, and possible restoration of appearance and function come into consideration. Rehabilitation is sought through education of pre and post-surgery patients and in use and maintenance of dentures.

Despite the fact that D.H.E. is designated a place within the primary prevention, it is obvious that actual education involves all sections of just described prevention and that it should be thus considered. While it is not always needed for people to be actively engaged in preventive activities, it is always vitally important to have their consent and cooperation for a successive conclusion of the preventive programmes. This can be clearly demonstrated on difficulties of dental authorities in persuasion of some communities in accepting introduction of fluoride into reticulated water sources.

3 DENTAL HEALTH EDUCATION

In spite of recent developments in theoretical and clinical dentistry, the dental and oral disease still remains a major problem. According to Barmes (1977) the Oral Health Unit of W.H.O. has been able to develop a global picture of dental caries prevalence from which it is clear that populations in highly developed countries almost always have high or very high prevalence of dental caries. Even more striking has been a situation in the developing countries, which had low or even extremely low prevalence of the disease, but are suffering rapid and unmanageable increase in prevalence.

At the same time high to very high prevalence of periodontal disease persists in all populations, but this problem seems to be most serious in developing countries.

In majority of the 151 W.H.O. member countries there is a vast gap between what is needed and what is provided or what is possible to provide in the health sector. These countries have still biggest priority in suppressing communicable diseases, removing environmental hazards, improving state of nutrition, decreasing neonatal and postnatal mortality rate, etc. The oral health programmes have always had to compete with these priority problems and as a consequence suffered from a lack of appropriate attention.

"Only in the last three years has the urgent and growing need for prevention and control in the oral health sector been

recognised and the importance for W.H.O. of the development of an active programme in this field and in related activities has been accepted." (Barmes 1979)

Prior to this several W.H.O. expert committees and groups dealt with the thematics of dental health education (D.H.E.), and produced reports and made recommendations.

The recommendations concerned:

- promotion of dental health services within the context of general public health programmes
- collaboration between W.H.O. and other organisations
- support and promotion of research relevant to dental health education
- provision of funds and facilities for training and research

The motivation for this sudden recognition and promotion of D.H.E. on the global basis was finding that as a whole, the effort of many communities to educate population in the principles of oral health has been a disappointment. Even in the countries that provide adequately staffed and free dental services, many people fail to utilise these services (Young 1969).

Many studies that followed these findings were concerned with finding the reason for these failures. They examined many different aspects of human behaviour and came to interesting and important conclusions and even offered some solutions as to how to remedy this unsatisfactory situation.

3.1 BEHAVIOURAL STUDIES AND ANALYSIS OF THE SITUATION

3.1.1 Analysis of attitudes and general dental knowledge

One group of studies examined the attitudes of people towards oral health and their knowledge of basic principles of oral hygiene and oral health.

Moyle et al (1979) in the study of industrial workers in Dunedin found that the knowledge of the dental and periodontal disease was sparse and that the dental profession did not seem to be a sufficient source of information and awareness. Rural Maori population investigated by Verboeket (1976) showed reluctance and hesitancy to seek dental treatment with exception of urgent need (pain, need for dentures, etc.) Kegels (1974) found no obvious relation between perception of susceptibility to dental caries and either visiting dentist or brushing teeth to prevent caries.

Most people do not see dental problems as interfering greatly with anything important to them.

American studies concluded that in some instances the knowledge of the ways how to care for the teeth was higher than the dental attitudes or behaviour. There was a dissatisfaction with the appearance of the teeth, and females were seeking dental care more than males (Richards and Cohen, p.242).

Kruger and Simmonds (1957) testing public knowledge found that the respondents thought that pregnancy results in loss of teeth, realised importance of toothbrushing, valued natural teeth, and

considered dentists as the greatest influence on their attitudes towards dental health. Epstein et al (1974) reported relationship between the age of respondents and their dental health knowledge.

3.1.2 Factors influencing people's attitude towards dental health

Socioeconomic status, social norms, and education were found to be of substantial importance by Rayner (1974), Tijmstra et al (1978), Blinkhorn (1978), and Calquhoun (1977). Chambers (1977) however stresses that although the socioeconomic status is a useful sign, it should not be understood as synonymous with or as a cause of susceptibility to preventive dental health education. Quereshi (1974) states:

> "Contrary to some popular beliefs, economic factors are not a chief reason for avoidance of dental care and treatment."

Nikias et al (1977) in her study of adults in New York points out that a restorative care, necessitating the use of dentist's services is directly related to economic status, while problems that can be influenced not only by professional care but also by person's own oral hygiene habits are mostly affected by education.

Within certain traditional cultures dental disease is not an illness but simply a pain, something to be removed by extraction or by painting of the tooth with a balm (Fuller 1972). Other peoples even purposely mutilate their teeth as a part of the traditional ceremonies (Ana 1976, Akpabio 1966, Quereshi 1972).

To many individuals dental treatment is associated with pain and

anxiety. The fear usually arose during childhood, and causes were various, some felt claustrophobic, some were frightened by their parents who used dentist as a method of persuasion.

Various studies reported fear of pain in up to 54% of cases (Richards and Cohen, pp.250-1).

Young (1969), W.H.O. (1970), Rayner (1974), Becker and Green (1975), Galant (1976) bring to attention family and parental involvement and particularly the one of the mother (Haefner 1974). Signorile et al (1968) maintain that mother's own childhood attitudes toward brushing were the same as the children's current patterns. According to Haynes and Mathews (1974), when child is born, it is completely dependent for his well being on the adults who care for him. As he grows older, he becomes able to carry out some of the skills necessary for him to live. He is rewarded for good behaviour and is likely to be punished for bad behaviour. He begins to differentiate between desirable and undesirable behaviour as defined by his family and peers.

> "Thus he learns and acquires habits and makes choices before he understands the full impact of the choices, that is, he adopts the values of significant others before he has cognitive understanding of them."

Although the need for and importance of parental education is widely and strongly supported, there is no general agreement on the appropriate content of such programmes or on the best method to use (W.H.O. 1970).

This statement, as many others before and after, shows that present concept of efforts to increase motivation of the population towards better oral health lacks orchestration.

The Report of W.H.O. Expert Committee on Dental Health Education (1970) emphasises that the dental health is an integral part of general health and dental health programmes should be viewed as essential components of overall health programmes. In dentistry, D.H.E. is viewed as a part of primary preventive practices and therefore will have to be considered within the framework of these practices. If D.H.E. activities are to be efficiently developed, the whole community must be considered.

3.2 CURRENT DEFINITIONS OF D.H.E.

Before we analyse the methods and various approaches to currently practised D.H.E., let's attempt to formulate what the D.H.E. means to the profession.

Different people and institutions offer different opinion. W.H.O. Expert Committee on Planning and Evaluation of Health Services (1969):

> "The focus of health education is on people and on action. In general its aims are to persuade the people to adopt and sustain healthful life practices, to use judiciously and wisely the health services available to them, and to take their own decisions, both individually and collectively, to improve their health status and environment."

Young (1969):

> "In its broadest interpretation health education includes all experiences of an individual, group or community that influence beliefs, attitudes and behaviour with respect to health, as well as the processes and efforts of producing change when this is necessary for optimal health."

Quereshi (1974) defines D.H.E. as:

> "Providing information and experience for people as to influence attitudes and to motivate them to do those things that will help them to achieve better dental health."

Finally Maddick (1973) states that:

> "Health education is concerned with providing information to enable people to make decisions while propagandist is only concerned in that people make a decision which is in line with his own thinking."

Recently, it has become obvious that it may be necessary to employ some of the methods that the propagandists use.

3.3 METHODS OF D.H.E. - GENERAL

To judge the effect of translation of these definitions into practice in the past, we could use the conclusion drawn from the survey of O'Shea and Gray (1968) of 1,500 adults' view of preventive dental health; beliefs in efficacy of dental visits and

toothbrushing were universally held, but these beliefs seemed to have relatively little effect on actual behaviour.

Analysis as to why this has happened found a deficiency in the "wholly didactive" and outdated methods that actually interfered with acceptance of the information (Counsel 1970, Ripley 1975). Haefner (1974) thought that simple presentation tended to have positive effect only on individuals with predisposition towards active utilisation of the offered information.

Wong Hee Dong (1973) holds a view that poor dental health is just as much an educational problem as treatment problem.

Then why is so much emphasis placed on the health education? We can perhaps use Horowitz's (1978) summary to answer this question.

He states that past studies showed that improved nutrition, public sanitation, personal hygiene and changed behaviour have had far greater impact on health than medicines, vaccines or the application of the medical technology, that the harmful personal lifestyles are primarily responsible for most ill health and that changing personal behaviour is a key to improved health.

Löe (1978), even if he does not fully agree with this opinion, admits that there is evidence for effectiveness of personal dental services in changing the long term oral hygiene behaviour.

Williams (1975) puts the blame on the inadequacies of communication socialisation and education for our inability to effectively use our

knowledge and therefore to deal with health problems.

Thus, despite vital importance of medical services for the health of the people, their active cooperation based on the knowledge of the preventive methods and voluntary change of detrimental behavioural patterns is essential for success in improving the general health.

The importance of the health and dental health education is not only in informing and teaching the people to implement basic preventive methods, but in enticing them to change their habits, and reinforcing these newly acquired habits.

3.3.1 Role of Behavioural Sciences

A comparatively new entity to the health and dental health education is thus emerging. It is knowledge of human behaviour and its utilisation that can make our teaching successful. Haynes and Mathews (1974) support this view. They maintain that the human behaviour has been increasingly implicated in the aetiology of modern health problems. Therefore health promotion has become more and more dependent on people's knowledge, understanding and decision to modify their living habits.

Haynes and Mathews (1974) further say that "human values that underlie lifestyle are critical determinants of behaviour and, therefore a significant concept for study and understanding by all who are concerned with health education". This is a fundamental departure from the classical method of education which is concerned with purely presenting information and leaving it up to the

recipient whether he is going to utilise it or not.

This approach goes so far as to, expressed by words of Boek (1965), "get people to do what they do not want to do". From this point of view the modern health education would rather suit Madick's interpretation of propaganda.

3.3.1.1 Theoretical concept of creating behavioural change

There are certain principles that have to be considered in planning actions that are to lead to ultimate change of behaviour. Many behavioural scientists have developed many theories. Matthews (1975) summarised these theories in the following table.

Stage	Cartwright	Rosenberg	Lionberger	Saxena & Kumar	Matthews
1.	Cognitive structure	Potency of action	Awareness	Awareness	Probability of reaching goal
2.			Interest	Conflict	
3.	Motivat-ional structure	Importance of value	Evaluation	Evaluation	Importance of goal
4.				Decision	
5.	Action		Trial	Action	Resources required
6.			Adoption	Committal acceptance	

Matthews' hypothesis states that probability that the desired action will be taken depends on the product of perceived probability that the action will lead to a certain goal, the perceived importance of that goal and the perceived effort of resources required to take the action.

Having a working hypothesis as to what the D.H.E. should achieve and theoretical background for a framework of the procedures, it is now necessary to work out the steps to be made towards attaining this goal.

Before we concentrate on this thematic, one thing must be emphasised. Although the D.H.E. has been treated as a discipline of dentistry, except as a part of preventive dentistry, where it belongs by definition, no subject of this type is taught in dental schools. Some schools for dental therapists include communication and D.H.E., but even there the main objective is dissemination of information rather than behavioural change induction. This statement has to be qualified by the fact that not all countries have dental therapist programme developed, and even the existing programmes vary in their approach to D.H.E.

The truth is then, that within the profession the responsibility for D.H.E. rests on the shoulders of in this respect poorly trained dentist.

Admittedly, most of the dental schools teach principles of prevention, some even teach basics of behavioural sciences and communication, but combination of subjects into D.H.E. has not been officially, to my knowledge, made as yet. Thus it is left upon individual workers to pioneer their own devices and methods. Some countries, Australia for instance, established foundations solely dedicated to practice of D.H.E. and publishing materials and devising methods for the use by the profession.

3.3.2 Dentist-patient relationship

So far, out of necessity, dentistry has been based on interaction of dentist, who provides relief from disease and the patient who, physically and mentally affected by his complaint, seeks out the dentist with an aim of obtaining relief or improvement of his state. Therefore the matter, greatly influencing success of D.H.E. is the quality of dentist-patient relationship. It has been stated earlier that many people neglected to get dental treatment. One of the chief reasons for this failure is a fact that the patient is afraid of the treatment, "he does not like the dentist", "he hates going to the dentist". Often reason for this "dislike" is an insensitivity of a dentist to his patient's fear and pain, lack of dentist's interest in the patient's problems, and fear of the patient that the dentist will attempt to carry out unnecessary and expensive treatment.

Although the importance of this relationship has been acknowledged, there has been minimal amount of research carried out in this field. Whatever work has been done has been concerned mainly with feelings of patients about the treatment itself, not with the circumstances under which this treatment has been carried out.

Another shortcoming is the lack of studies concerned with the very people who avoid the dental treatment and have it at best only if it is absolutely necessary. Admittedly, it is more difficult to seek out these people, but as they make a considerable proportion of the population, some research should be carried out. The more so, because these people represent a group in greatest need of treatment and prevention and naturally are a prime target of D.H.E.

One of the main reasons for neglecting psychological aspects of dentistry and patient's mentality was the attitude of majority of teaching institutions based on almost exclusive insistence on technical excellence. Rationale for this emphasis on techniques was that if a dentist had manual skills, he would deliver adequate dental care. Gold (1974) points at this attitude in his description of assessment of the dental students in the Dental School of California.

In the third year, the student is allocated about thirty five patients. To measure the progress, he is given points for technical procedures and for teaching preventive dentistry. The points for preventive dentistry make about 5% of the total clinical point requirements. Due to this students often experience a conflict of responsibilities between prevention and technical procedures. This leads to increase of pressures in the final year when this kind of evaluation forces the students to see patient as representing the teeth which in turn represent the points vital for graduation.

Needless to say that once the student is forced and actually sees in the patient only a means to achieve success, it is quite possible that after graduation he will continue in exercising this attitude and thus indirectly or even directly contribute towards a decrease in trust of the patients in the dental profession.

Recently, this concept came under review and there can be seen certain amount of positive thinking in regard to the kind of attitude which is to be sought in dental professionals.

Kurtzman (1976) advocates attitude testing of the applicants for dental course. He says that the type of applicant accepted will affect the type of graduate of the dental school. Although the technical competence is a prerequisite for delivery of adequate care, there is a discrepancy between the technical competence of a dentist and quality of care he may deliver.

The Guidelines for Minimal Preventive Action in Dental Practice developed by the section on Community and Preventive Dentistry of the American Association of Dental Schools (1975) recommended inclusion in the dental curriculum of components devoted to establishing the philosophy of prevention in graduates.

Dworkin (1974) maintains that the behavioural sciences are of big importance for the health sciences. He wants to humanise the dental profession so that the dentist would be able to connect the behaviour of his patient with the psychological theory. The dentist should be able to manipulate the psychological and physical environment in which he will provide care so that the patient's total oral health needs are met with maximum comfort and efficiency.

3.4 CURRENT METHODOLOGY

A considerable amount of work published on health and dental health education deals with methodology or direct application of the principles of education and behavioural change. All of this material can be divided into several groups according to the problematics it deals with. The division can be made according to

the type and amount of the people to be educated at the same time, or according to the method used. As this kind of division modes can be exclusive of one another, we shall describe them separately also.

Division according to the amount of people educated:

- mass education
- group education
- individual education

Division according to the type of people to be educated:

- education of children
- education of adults
- education of special groups

The separation of children and adult education is important in one aspect. Generally speaking, the education of the children can be regarded here as a creation of habits and behavioural patterns, while the adult education must be regarded as an attempt to change behaviour and habits already developed and well entrenched.

Individual, group, and mass education are then means of reaching the objectives. There are many derivations from this scheme, but this division is a simplest workable scheme.

3.4.1 Mass education

This method which can be more or less described as purely informative, where the recipient assumes a passive role. It can be organised on a scale varying from a public lecture to a nationwide TV or radio broadcast.

As the lecture is on a borderline between mass and group education, we shall concentrate on the methods utilising the mass media, press, radio and television broadcast. Investigation of these methods has been described in the works of Ramadasmurthy et al (1975), Gibson (1979), Boyd (1975), Thornton (1974), and Wegener (1975).

These authors maintain that certain aspects must be taken into consideration in selection of particular type of mass media. This concerns namely the question of whether the message can reach the target population. Thus, for example, we have to consider literacy or rather lack of it in use of printed matter, although a pictorial form of communication can also be used. TV broadcast will have limitation represented by range of reception of the TV signal, thus the rural areas will most probably not be included, as well as the poor part of population who cannot afford to buy a TV set. The radio broadcast has the biggest chance of success in reaching remote communities and is not affected by illiteracy. The economic problem with the poor will be present again, especially in the countries where the poor represent majority of the population. However, as the transistor radio becomes a status symbol in these communities, this problem need not be so pronounced.

Ramadasmurthy et al (1975) carried out an experiment involving radio broadcast in India. The target group were women. There were 3 groups of women in the study, defined by their socio-economic status: 1 - executive group, 2 - clerical group, 3 - attendants and workers group. There were 5 broadcasts of 5 minutes duration. People in the groups were informed in advance about the time of broadcast, the topic and also that they would be interviewed about different aspects of the broadcast.

The subsequent survey found out that about 40% in classes 1 and 2 listened to the broadcast, while in the 3rd class there were only about 20% listeners. Nearly 50% of the information could be retained. Consistently higher scores were obtained with successive broadcasts.

The Colgate Co, in Papua New Guinea, promoted sales of their product in a radio broadcast with the help of a jingle sung on a popular melody. The words of the jingle were an actual instruction how to clean the teeth. The jingle was very popular with the children who learned the words very fast. Unfortunately, no evaluation survey followed and thus it remains uncertain whether the words of the jingle had been followed by actual brushing or were at all utilised for teaching prevention, for example by the school teachers during the school radio broadcasts.

Fehrsen (1979) had a similar experience in South Africa. Boyd (1975) experimented with a dental health column in a local newspaper. He had 32% response to his questionnaires sent to the regular subscribers of the paper. Of the respondents 86% noticed

the column, 31% read it regularly, 61% occasionally. Of those who read the column 94% thought the column to be worthwhile, 93% claimed to have learned something. Boyd concludes that the column can be useful. It should be short, about 200 words with a simple vocabulary. The topic should vary widely.

There are other means of utilisation of printed matter - posters and leaflets, which can be also utilised in the more personal and thus perhaps more effective manner.

Usefulness of the just described mass method of education rests primarily in the amount of population that it can reach at the same time, and perhaps the assured quality and quantity as much as planned regularity that it can give to this population.

Disadvantage is however in its passive way of educating. The information is offered and it is up to the recipient of this information to decide whether it is going to be gainfully utilised. Another shortcoming is that the effect of this method cannot be as readily evaluated as in the case of the other methods.

We can therefore assume that the information will be utilised mostly by the people who have an inclination towards seeking out the information themselves and thus towards preventive behaviour.

Matthews (1975) sees the value of mass media only for initial stages of adoption of new practices. Personal influence is more important for the final adoption.

Swinehart (1975) states her opinion of the value of this type of D.H.E. in her work criticising Thorton's paper dealing with a public D.H.E. campaign. She says that Thorton is charitable in saying that they (D.H.E. campaigns) have probably been successful, but as he notes the evidence for this judgment is slight. In fact, most probably fail to attain a "threshold" level of exposure.

3.4.2 Group learning systems

3.4.2.1 Children

Most of the research concerned with a group application of D.H.E. has been carried out in the school environment, because, logically, the school captive population offers the best conditions for conducting surveys of this type. D.H.E. in schools is typified by a paragraph in a W.H.O. Report (1970), which states:

> "An analysis of the literature on school health education reveals that schools in many countries have attempted over the years to conduct dental health education programmes. These programmes have been essentially of the 'information giving' type, and their informational content has almost always been the same. Furthermore, programmes of teacher education focused on improving the status of dental health education have employed the same approach. In spite of the overwhelming evidence that providing teachers and children with information about health is not an effective method of obtaining behavioral change, this approach has continued to predominate."

Clark et al (1974), Pinkham (1975), and Boyer (1976) were involved in the studies where the educator was mostly a teacher. Although these studies showed increased awareness of need for maintaining good oral hygiene, and also showed improved oral hygiene (Friedman 1974), opinion about long term effect tended to vary.

Camrass (1974) is enthusiastic in his description of effect of school tooth brushing programme in Western Samoa. Clark et al (1974) marks the same results obtained with school children in Cleveland. This particular study used eight month period of instruction and weekly reinforcement in dental hygiene during which the oral hygiene scores dropped. These scores stayed low after another 6 months without further teaching and reinforcements and continued to stay low after 19 months.

On the other hand a three year survey conducted by Horowitz (1977) had somewhat different outcome. After two school years of supervised daily plaque removal programme in school, the treatment group showed significant improvement. The difference between the treatment and the control group however virtually disappeared during the school holidays. The increment of dental caries was lower in the treatment group but the reduction was not statistically significant. The study concluded with the statement that although there was a degree of improvement, the drawbacks of the regimen limited its value.

Pinkham (1975) attempted to use classroom leaders as example setters in the oral hygiene programmes. There were four groups.

In two of them there were as the example setters children who were selected by a special ballot as classroom leaders, the other two had as example setters the least popular children. A discrete observation of the test group was made and the number of children who cleaned their teeth was taken. This study was inconclusive, as the participation in toothbrushing was in all groups similar. This could have been attributable to the "novelty of the behaviour", which declined during the second week of experiment. Obviously, it is possible to expect certain degree of improvement of oral hygiene after running of a carefully designed school programme. However, as there are virtually no studies which would in their numbers predominantly point out in either direction, the ruling about usefulness can be described only as mildly positive. It has to be hoped that development of new programmes based on new teaching methods may bring more promise (Cormier et al, 1976).

3.4.2.2 Adults

A study with the D.H.E. of adults was conducted by Bakdash et al (1978). He used a pamphlet published by the A.D.A. in conjunction with slide-tape presentation. The results were hopeful, 39% of the people of the experimental group of 254 had taken a positive action. Unfortunately, this publication does not state what kind of positive action was taken.

Goins (1977) describes a D.H.E. programme in the prenatal clinic, but no survey of its effect has been attempted. Kanaaneh (1979) and Fehrsen (1979) deal with education of groups of adults with help of the local ethnic modes of communication. These works will be described later.

3.4.3 Individual teaching

The individual D.H.E. is basically carried out in several different environments:

- at home, where the educator is the parent, most usually mother
- at health institution or a facility, usually a dental surgery, where the educator is a dentist, dental auxiliary or a doctor
- anywhere, where the suitable circumstances can result in a situation leading towards acquisition of a positive health preventive habit or behaviour

While the previously described methods of education had more or less general character in order to be useful for majority of participants, the individual approach is highly personal, adjusted precisely to the needs of an individual. Its effect is enhanced by the fact that in the eyes of the recipient the educator is obviously preoccupied with the health and welfare of the other person.

3.4.3.1 Education of children

Education of children commences soon after birth. Frank (1966) postulates that human infant is highly susceptible to lifelong patterning by his early experiences. These early experiences operate as a "forgotten childhood" to govern his subsequent learning and especially interpersonal relations.

Freud describes the infant's initial mode of response as the

Primary Process. During this process repeated experiences cause him to become aware of and to expect the recurrence of feeding, bathing, and cleansing and forms some kind of interpersonal contacts with tactile, visual and auditory messages. Thus a foundation can be laid already in this early age for the future health habits and behavioural patterns.

As the child develops, and starts using more complicated symbols and later language, these foundations can be broadened, particularly when the dentition starts appearing. Thus the child can be conditioned for further acquisition and utilisation of important health preventive information. What is then later necessary is to maintain a supply of this information throughout the life and the individual should continue to absorb and utilise this information as described in the previous chapters.

3.4.3.2 Education of adults

Induction of a behavioural change in adults is basically influenced by a set of values of the recipient. These values influence how a particular behaviour or event is perceived (Haynes and Mathews 1974). The authors further state that if a person's behaviour has clearly defined consequences for the value maintenance or goal attainment of the perceiver, the perception will proceed from a different premise then if behaviour has no relevant consequences, e.g., unless data about the health hazards of smoking are experienced as jeopardising to goal attainment, the data are likely to be perceived as statistical averages that are unrelated to the individual's own behaviour and health values. One may believe the data, but not act on it. Sometimes the change of

behaviour will mean a replacement of the old, traditional beliefs. Thus for instance Matthews (1975) describes a belief, that he found in one Indian village, that lack of food can cause disease.

Because preventive behaviour does not have to have an immediate positive effect, in some instances it is not easy to demonstrate the relationship between the two things. Therefore in developing the educational programmes it is essential that the methods are selected, which have clear demonstrative character, e.g. Plaque Disclosing Tunel etc.

3.4.3.3 Education of special groups

Special group education is concerned with education of groups or individuals with special conditions or in special conditions that need a specialised type of attention that is not normally required.

This group includes either healthy people working in conditions inductive to development of dental or oral disease or people with different conditions (xerostomia, epilepsy), that either aggravates danger, or where good oral health is essential for maintenance of status quo (rheumatic fever). To this group can be attached cases undergoing extensive surgery, etc.

3.5 EVALUATION

The last important component of the educational programme is evaluation.

It is possible to carry out evaluation of one programme or action or make survey of the effect of whole series of programmes.

Several methods have been worked out, aimed at different aspects of effect of D.H.E. The methods can be concerned with more general results, such as public knowledge of the basics of dental health, frequency of utilisation of dental service, etc.

Plasschaert and König (1974) designed a special study lasting two years, to test the information, and motivation towards dental health.

Others (Love et al, 1975, Pilot 1968) worked out methods and systems of measurements of oral hygiene in the region previously exposed to some form of D.H.E.

Wright and Pack (1979) tested a new educational project directly in the classroom and measured the oral hygiene status before, just after and 10 weeks after the programme. Generally it is possible to say that each method of D.H.E. application should or could have a special method of evaluation, and that while designing new educational programme, its evaluation and its method should be worked out at the same time.

It has to be borne in mind that as the teaching programmes cost

money to put into practice, so do the evaluation programmes.

Therefore it will depend on the "purchasing" ability of different dental services what the evaluation policies will be like. Often the fastest and cheapest method is to test the project on a small scale, in controlled conditions, before it is put into the practice.

At other times it requires a long time to be able to detect a measurable change.

There are however several standard internationally accepted methods, such as WHO Combined Oral Health and Treatment Assessment method, Dental Fluorosis Classification and Index, The Simplified Oral Hygiene Index, Russell's Periodontal Index, etc.

These methods had been designed in order to set a basic point of reference, and set standard criteria for measurements in order to facilitate multiple or even international comparison.

4 DEVELOPING COUNTRIES

Developing countries have several mutual characteristics. Majority of them gained their independence within the last 30-35 years. Their population is much more varied than in advanced countries. This had often been caused, among other reasons, by the artificial borders of the former colonies, whereby the colonial powers, while acquiring new territories have created borders in accordance with their ability to defend and administer them. This often resulted in lumping of many smaller nations together, particularly in the territories populated by a multitude of tribes.

Traditional belligerence had been suppressed by force of arms and intermingling of population had been encouraged. In some cases whole communities had been imported in a form of indentured labour.

These practices had not been entirely successful, and after gaining of independence, many of these countries suffered from civil unrest, and even civil war, and some of them had in consequence been divided into smaller countries.

Many of the developing countries adopted the political system, form of government and administration that had been introduced by the former colonisers, and to a degree adapted them to their needs.

With exception of the oil producing countries, they are not even approaching economical self-sufficiency, and heavily depend on foreign help.

The economy is mostly based on agriculture with the bulk of the population living in rural areas. The population density is often very low. The communications and transport are often inadequate and are usually confined to more developed areas. Literacy is low but is on the increase as a part of political and social development. This development is forcing a change which, due to lagging economic development, causes many problems. Urbanisation, urban drift and alien new way of life clashes with the traditional way based on family. Problems not before encountered, such as unemployment, increasing criminal rate, prostitution and alcoholism, appear and grow into alarming proportions.

Patterns of disease are changing. Modern medicine and improved nutrition caused a rapid fall in neonatal mortality, which then in turn caused in many instances almost runaway population growth (Quereshi 1972), as the society did not have time to adjust.

Accelerated social change and understandable increase in nationalism created strong demand for national professionals who are supposed to take over many responsible positions. This situation caused a sudden drain on the resources of manpower. The already present group of professionals were placed into more or less administrative positions, and this increased pressures particularly in the services, such as the health services.

5 HEALTH SERVICES IN DEVELOPING COUNTRIES

As already stated, the majority of the developing countries have taken over the administration system and services of their former rulers and to a certain degree adapted them according to their requirements.

5.1 TYPE OF SERVICES

In most of the health services the public assistance system has been retained. Basically it is a system of services for the underprivileged.

Financing is provided by the general taxation. In some instances this is supplemented by collection of small fees; in others it is fully provided from the revenue obtained by export as it is in the case of mineral resource rich countries, such as the oil producing countries.

Perhaps with the exception of the latter, the system and its facilities are generally underfinanced, overcrowded and have insufficient personnel. Since physicians' salaries are generally low, they seek to supplement them through other positions or through private practice (Terris 1978). Thus the system is being continuously depleted of the manpower with small hope for replenishment due to a small output of the local schools.

All these countries have a small group of private practitioners who look after the health needs of a well to do group.

5.2 PRIORITIES

Main objectives of the health services have been reduction and eradication of epidemic diseases, such as malaria and TB, reduction of neonatal mortality and improving general state of nutrition, and removing problems of sanitation, hygiene and water supplies.

Often the priority is in making a change within the very person who is supposed to institute a change leading to improving health conditions. Because of difference in cultural and ethical background, the omnipresent situation is that the health workers are trying to compromise between the tradition and the knowledge acquired during the educational course (Browne 1972). On top of this he has to compete with the traditional medicine which is still widely practised and even officially supported in some countries.

6 DENTAL SERVICES

6.1 GENERAL SITUATION

In the dental services the situation has been even worse. Recent studies (Bezroukov 1977) showed that there are not only differences between the developed and developing countries in the physician-population ratio, but while there is roughly a ratio of 1:3 - 1:5 of dentist to physician in advanced countries, in the developing countries this ratio is close to 1:10.

Analysis of the West African situation (Ana 1976) shows figures of dentist-population ratio from 1:66 000 in Liberia to 1:1 935 000 in Tchad with more than half of the countries having a ratio of more than 1:200 000, the most populated country, Nigeria, having one dentist per 489 000 people.

The Asian Region figures varied in 1973 between 1:100 000 in Laos to 1:7 800 in the Philippines.

The services, expected to be provided by the dental profession within the framework of the public health services, should be education, preventive and curative services, provided through government, organised community efforts or individuals to maintain and improve dental health of individuals and communities (Sundram 1973). Instead, in many instances the average hospital dental clinic functions as an "extraction centre" (Fernando 1971, Taljaard 1977).

Some countries have managed to establish and some are in the process of establishing school dental services in an attempt to curb dental and oral disease in the most threatened part of their population - school children.

6.2 DENTAL EDUCATION

The school dental services are predominantly staffed by the school dental nurse or dental therapist, who is an operating auxiliary, originally modelled on the New Zealand School Dental Nurse system. This system was first introduced outside New Zealand in 1949 in Malaysia.

In 1958 the W.H.O. recommended training of two types of dental auxiliaries as a first stage of development of dental services of the developing countries. The two types were to be an operating and non-operating auxiliary. In 1962 another W.H.O. recommendation emphasised the necessity of adjusting the objectives of dental education to the needs of the country.

Dental auxiliaries were to be recruited with an educational standard of not less than two years of full secondary school followed by two years of special training. Since then, some countries, such as P.N.G., had to raise the required educational standard to four years of secondary school. This need for change in educational standards requirements has been verified (Bezroukov 1977, Sundram 1973).

In many of the countries which have been using the traditional type

of dental education of the developed countries, a need was felt for a national review and adaptation of dental education to the special needs of the concerned countries (Sheiham 1977). To what degree these changes have been implemented remains to be seen.

Fuller (1972) says that the experience has shown a reluctancy of the dental educators and planners to abandon or change the long entrenched and conventional systems, and to adapt to the local needs, although the data gathered made these requirements obvious and even government may have been inclined to respond to professional advice. This opinion is shared by Galan (1976).

Such a situation is brought about by either the foreign teaching staff who do not know the local conditions well enough to feel that change is warranted or, as Sheiham (1977) explains, by desire of some dental educators to have their graduates recognised in the developed countries.

Thus, dental professors from Great Britain are frequently invited to act as examiners in dental schools in former colonies. This situation can be typified by a following episode described by Sheiham:

"A British dental educator was asked by a professor from a developing country if he could send him extracted teeth with proximal caries so that his students could practice cavity preparation because he could not obtain them in his country, as dental caries was very uncommon. Being asked why he was

interested in teaching them this procedure, he answered he felt that his students had to be capable of doing complex restoration to satisfy their foreign examiners."

This situation creates very serious problems and causes frustration on all sides.

Fortunately, there seem to be signs of change appearing recently and some schools have changed their way of thinking in order to make their curricula more acceptable for use under local conditions (Deubert 1978).

6.3 DENTAL NEEDS

What the local needs in the way of dental status were was ascertained relatively recently. It was not until the 1960's that more studies concerning dental problems of developing countries were produced.

6.3.1 Caries

It has been found that these countries had traditionally low or very low prevalence of caries but that a definite trend towards an increase existed, in prevalence and incidence, particularly where urbanisation was on the rapid advance (Barmes 1977).

Within these countries there exist great differences between the dental caries prevalence of ethnic groups (Fuller 1972, Quereshi 1972).

The rapidity of increase can be demonstrated on several examples of comparison of D.M.F. counts taken in interval of several years (Barmes 1977): age 12

Uganda: 0.4 in 1966 - 1.5 in 1972

Iraq: 0.7 in 1967 - 3.5 in 1976

Thailand: 0.7 in 1960 - 4.5 in 1975

French Polynesia: 0 in about 1900 - 8.0 in 1970

In Tonga the DMF rose between 1966 and 1971 from 2.9% to 42.5% (Fuller 1972).

In average, the DMF figures in the developing countries are still lower than in advanced ones, where the figure is 7-12 DMF (Barmes 1977). This rapid increase presents, however, serious problems for the planning of the dental services of these countries and for the staffing and funding in particular.

This increase is directly attributable to change of diet and introduction of refined carbohydrates with little change in oral hygiene habits.

6.3.2 Periodontal disease

Periodontal disease is widespread (Ana 1976, Akpabio 1966, Soofi 1976, Fuller 1972, Camrass 1973, Hollis 1973). Barmes (1977) considers this situation very serious and says that although the prevention and control of increases in caries is important, unless the effective measures of prevention of periodontal diseases are

developed, "we are doomed to see dentitions free of caries being mutilated by those diseases in the later decades of life". This was also a conclusion of research carried out by Löe et al (1978).

6.3.3 Associated problems

Ignorance of the majority of population of general origins of oral and dental disease, and basically any disease, ignorance of the basics of hygiene, sanitation and correct nutrition and ignorance of methods of prevention of these diseases presents a major obstacle to the success of the endeavour of the health staff of developing countries. In many instances the ignorance goes even that far that the population is unaware of possibility of getting certain types of treatment.

This type of ignorance is one of the causes of tremendous incidence in the developing countries of diseases, that have been eradicated or vastly suppressed in the advanced countries. Ana expresses it when writing about dentistry in West Africa:

> "It is widespread ignorance together with poverty, superstition, and the ready acceptance in some rural areas of dental diseases as inevitable consequence of growing up or age which makes this vast developing community of 122 000 000 people a fertile field for dental health education programmes."

Apathy is mentioned by Nuruddin (1968). Many of the children in certain ethnic groups lack drive and assurance. They are timid, shy, and need constant coaxing and direction.

Analysing the presented facts we can see that planning of delivery of dental care in the developing countries faces a major difficulty, which is a question of how to deliver this care with the minimal staff in a situation of the widespread and rapidly increasing incidence of the oral and dental disease, particularly of caries.

This is further aggravated by a changing pattern of population distribution in age groups, where the most endangered part of the population, pre-school, school and teenage group is growing most rapidly (Fuller 1972). Thus for instance it is estimated that 50% of Nigerians are under 20 years of age (Ana 1976).

This already bad situation is worsened by communication difficulties, shortage of equipment and often high attrition rate of equipment that had not been designed for the type of conditions it is being used in. Maintenance services are limited or non-existent, spare parts difficult to obtain. The distribution of population and limited financial and manpower resources cause that the school services are provided by mobile teams. For this type of work a special type of equipment is necessary but in some cases it has to be designed, developed and sometimes even manufactured directly in the place of its use. Diversity of environment makes standardisation of such equipment very difficult.

6.4 DENTAL HEALTH EDUCATION

The biggest hurdle in assessment of an effect of D.H.E. in developing countries is a fact that it is de-facto non-existent or is in initial stages of its introduction and development.

Secondly there exists a great scarcity of published work, which deals with developing countries generally, and with their dental services in particular. The few works that have been published are usually first of its kind in dealing with a particular country or topic and are often unobtainable. Many of them are consultant's reports, designed for internal use of one country, and as such are not available for general publication. The published works are difficult to assess, as there is virtually no comparison.

Therefore while considering application, effect, structure, and other aspects of the D.H.E. in relation to developing countries, it is necessary to draw on works based on research in the advanced countries and modify its implementation according to the prevailing conditions of the individual countries.

This work needs a great amount of research, comparison, and preparation in order to ascertain what model can be used, what modifications have to be made, and what results can be expected.

In respect of what had been outlined in the previous chapters several things will have become obvious. Due to great diversity in the historical, cultural, social and political background, most of the countries will have to use an individual approach in defining their objectives and framework of their D.H.E. systems and national programmes.

In this some additional factors will have to be taken into consideration. These factors are:

6.4.1 Influencing factors, barriers

6.4.1.1 Way of life

In many of the countries in consideration, majority of the population lives still in the traditional way, retaining old customs, culture and superstitions, which are in some instances officially supported by the governments striving to preserve national identity, so important in the initial stages of the national development.

6.4.1.2 Values

Due to this, majority of the population lives in the conditions, by standards of developed countries, and generally any standards, of extreme poverty. Thus the values, so essential in application of effective change of behaviour, will differ vastly from the previously examined norms (Nuruddin 1968).

6.4.1.3 Literacy

Low degree of literacy, particularly in the older generations, will have to be taken into account.

6.4.1.4 Ignorance, lack of awareness

All of these factors result in an enormous degree of lack of awareness within the population of the possibilities of the newly introduced science and namely services, in this case dental

services. This, together with the economic factors is a cause of the small demand for the dental treatment and for perseverance of the quantity and scope of dental diseases experienced by the population of these countries.

Considering the objectives that the D.H.E. should have in the developing countries, we have to realise that these just discussed barriers will have to be overcome first, before it is possible to start with the D.H.E. proper. Some of the health services will have to realise this, and make the D.H.E. an integral part of their health education, particularly in the initial stages of its introduction. In this context, it will not be a question of what is the role of D.H.E. within the dental services, but what role the D.H.E. has in the maintenance of good general health.

6.4.2 Initial objectives

Most important issues that will have to be dealt with at the beginning will be:

6.4.2.1 Oral hygiene

Oral hygiene is practically non-existent, although Manley et al (1975) and Olsson (1978) reported use of chewing stick in Africa, Christen and Swanson (1978) mention tongue scraping in India and Far East.

6.4.2.2 Malnutrition

Malnutrition is very common, of both quantitative and qualitative types. Seitz (1976) writes about still widely practised tradition

in Kenya, that children don't need special food. Because they are little, they can get by on anything. Matthews (1975) noted lack of food supplements to children in India who are breast fed for long periods.

6.4.2.3 Traditional habits

Traditional habits have either form of extractions or mutilations.

The traditional extractions have been practised in parts of Africa (Akpabio 1966), and in parts of Papua New Guinea. The extractions were originally carried out as a means of facilitating feeding of the people with an attack of tetanus, which was common.

The extractions in Papua New Guinea were part of marriage ceremony.

Tribal mutilations were reported mostly from Africa (Ana 1976, Akpabio 1966).

6.4.2.4 Ignorance

In order to be able to teach people how to prevent disease, it is essential to make them first aware even of the existence of the disease and how to recognise its certain important symptoms, and also that it is possible to cure this ailment and where it is possible to obtain medical help. However, Ana (1976) mentions C. Davies' warning that large scale education programmes should not be started if there are no adequate physical facilities and manpower to deal with the resultant demand for care. The writer had a similar experience. During the posting on one of the P.N.G.

islands one of the councillors demanded that as the TB service had done previously, the dental unit transports the X-ray machine around the island, and takes an X-ray picture of all of the island's 50 000 inhabitants.

Thus a great deal of deliberation has to be given to not only how much should the people know, but also when, and what rate of exposure to this knowledge is optimal.

While using the educational methods developed in advanced countries, another matter needs attention. Majority of educational systems and consequently the health and dental health education systems, work with understanding that the effect of their education will be facilitated by the example in the rest of the community, where many people already have certain amount of knowledge, and have some good health habits developed. This effect should become most obvious again in the parent-child relationship and the peer relations.

In the developing countries this situation has not as yet developed, and therefore cannot be utilised. This makes the role of education the more difficult. In this case it is often necessary to start with explanation of symbols and meaning and even introduce new words into the language. From this point of view the initial establishment of the educational practice is the most difficult part of the whole programme. It presupposes introduction of ideas alien to the way of thinking of many people, and sometimes these ideas may be directly contrary to the tradition and customs. As we shall deal mostly with rural population, even a study of a

hierarchical system of these small communities will have its importance.

In these groups of people leadership has much more retained importance. The opinion of the leader often becomes a rule. Yet other communities use entirely different, diffused type of authority (Piddington 1963, pp.230-231). It is in this stage where an initial careful and detailed assessment of the situation is crucial for the outcome of the whole programme.

6.4.3 Organisational framework

In considering organisation and structure of the D.H.E. some basic factors will have to be borne in mind. These factors will be short and long term objectives and limitations in provision of the means for achieving these objectives.

6.4.3.1 Objectives

Long term objectives should be a decrease in incidence and prevalence of dental and oral diseases by means of curative and preventive methods instigated by the use of dental health promotion through active application of D.H.E.

Short term objectives should aim at filling the gap between the dental needs and ability of the system to provide dental services through an extensive use of health promotion methods.

Within this general definition, the short term objectives should achieve ceasing of the traditional habits, increase in awareness of

dangers of neoplasms, particularly cancer, improvement in nutrition, improvement in oral hygiene, governmental regulation of introduction and sale of "rubbish food" and introduction through norms and standards of decreased sugar content in soft drinks with possible substitution of sucrose. Many of the developing countries have to import sugar anyway (Ana 1976). At this stage the increase of utilisation of dental services is not desirable.

6.4.3.2 Limitations in provision of the means

In setting the framework for the D.H.E. the limited means on hand will have to be considered. These limitations concern in the first place availability of suitably qualified staff, in the second the limited logistic support.

Here we can utilise with advantage the principles for training and utilisation of auxiliary personnel for rural health teams in developing countries, as set out in a report of a W.H.O. Expert committee published in 1979. The structure would be three tiered.

6.4.3.3 The central unit

This unit would be concerned with planning of strategies on the national level, education of the professional staff, distribution of the latest professional information to the field, retraining and organisation of refresher courses for the field staff, research, and evaluation of the results gathered in the field. This unit would also provide always important political, legal, professional and institutional support as well as the general support of the community. This unit would also provide liaison between other related professions on the theoretical level.

6.4.3.4 The field executive staff

The health education worker on this level would have a most important role in the whole system. This worker would be schooled in all relevant disciplines as to be able to independently assess the local needs, design right type of educational programme, select, train and supervise sufficient staff, and make evaluation of the results of these programmes.

6.4.3.5 The field dental health educator

This worker would work directly within the community. He should be preferably selected from this community so that he would be familiar with the culture, language, and would be also acceptable to this community. As we can see, this worker does not necessarily have to be a health worker, and his selection will chiefly depend on his function within the educational programme.

The structure in the field may be more or less loose and be determined by momentary needs and programmes. Thus it can be expected that the workers will be health professionals, captive workers, such as teachers (Smith 1975), who will do this work within the scope of their teaching programmes, and voluntary workers (Ratcliff 1976), who in the condition of developing countries may constitute a big part of the field education team.

6.4.3.6 Communication

Continuous communication between all levels should be established and maintained. This would serve not only as a means of supervision but would also serve for updating of information and would

prevent the feeling of helpless isolation in the remote rural areas.

6.4.4 Methods

In analysis of methods that can and should be utilised in D.H.E. in developing countries, we shall concentrate on two important aspects, assessment, and communication methods.

6.4.4.1 Assessment

As has already been repeatedly stressed, the most important part of the teaching programmes preparation is a preliminary assessment of needs, but in education more important behaviour, mentality, social and materialistic patterns and system of values.

Mead (1976) says that we have to recognise that our knowledge of ourselves and of the universe within which we live comes not from a single source but, instead, from two sources - from our capacity to explore human responses to events in which we and others participate through introspection and empathy, as well as from our capacity to make objective observations on physical and animate nature. She further stresses that the data of the human sciences are in great part derived from time-consuming shared experiences that cannot be replicated.

It is obvious that not all of the field D.H.E. workers will be trained in social sciences, neither is it necessary. Skillful utilisation of the people who have this shared experience will, in many cases, suffice, not only in making correct conslusions, but it will be direct means in communicating the message in the most acceptable way.

Values will be, under these conditions, greatly influenced by socio-economic and even geographic conditions.

6.4.4.2 Communication methods

Methods of mass communication as described in the previous chapters have a great value in the D.H.E. in the developing countries if judiciously used. Their effect may be even enhanced by their novelty. There are some other, traditional methods of communication, that may be utilised with advantage in the traditional societies. Kanaaneh (1979) describes two mass communication channels that may be highly effective in carrying out D.H.E. in the environment of Arab village culture. One is the Friday noon prayer attended by most of the population. A mandatory part of the prayer is a sermon (as in Christian religion) by the village religious leader or a learned member of the community. This sermon must deal with a matter of concern to the community's spiritual or social welfare. The mere mention of an item in the sermon guarantees its immediate spread in the village.

Kanaaneh maintains that the imam's active support of a project or a new idea goes far to establish its acceptance among members of the community, particularly the elderly, who are often the hardest to persuade of the need for change.

The second traditional mode of communication is use of songs. Use of this practice is also supported by work of Fehrsen et al (1979) who studied this method in the African community. It is used during weddings, visit of a traditional doctor, informal and formal gatherings.

Fehrsen's article relates to the results of a workshop dealing with application of these methods in the D.H.E. The participants of this workshop would assess the target group as to the everyday problems, preoccupations, and the vocabulary. These findings would then be discussed within the workshop group and songs would be composed to the melodies of well known traditional tunes. The content of the song would be a statement of a complaint and possible solution.

Different programmes had been set up for different audiences. These songs were then introduced among more general songs, and preceded by a short note that they contained a message important for the listener's health.

The advantage of these programmes was that the people had been able to actively participate in singing and dancing. Spontaneous repetition indicated retention of the content, which was, in some instances, present even one month later after only one exposure.

It must be stressed again and again that this type of success in communication can only be achieved through perfect knowledge of the conditions and circumstances during which this communication will take place, and thus of course, the mentality, customs, beliefs and other facets of behaviour of the people we want to communicate with.

6.4.5 Evaluation

In evaluating effects of D.H.E. in developing countries it is important to bear in mind that the first results may take a long time to manifest themselves, as many of them will be directly

dependent on the socio-economic development of the community. In this stage, many significant results may be achieved on the higher, political, platform. Through cooperation with the community, political and professional leaders, it may be possible to institute changes of the more general character, particularly in the field of nutrition, where a vast improvement can be achieved through governmental planning of agriculture, imports of food, and even legislation. This concerns mostly dealing with sale of so called "rubbish" kinds of food, sale of alcohol and many other matters.

Thus it can be said that the first evaluation will be concerned with assessing of official approval, support and cooperation.

Next we shall concentrate on evaluation of immediate effects of the D.H.E. This includes evaluation of presence of development of health preventive habits, particularly oral hygiene, methods of which had been discussed in 3.5. This will represent localised type of evaluation, which will concern, chiefly due to the expenses concerned, only a small part of population. This can be then considered as a short-term effect evaluation.

The last, long-term effect evaluation will concern a survey of general state of dental and oral health measured on a nationwide scale, where the data collected on the incidence and prevalence of the disease will point at success or failure of the educational programmes.

Another, more or less long-term type of evaluation, would be

monitoring of services rendered (within the government services), sales of "rubbish" kinds of food and sugar. Change, or considerable change of dentist-population ratio, is not envisaged at this stage and therefore is not included in the evaluation.

7 SUMMARY

It had been demonstrated that despite the existence of D.H.E. for some time, numerous surveys showed that the way in which it was practised had little effect on dental and oral health.

The chief cause for this poor success has been mainly the more or less informative character and obsolete methods of the education endeavour.

The information reached the recipient but in the majority of cases it failed to have a desired effect. The most substantial impact had been noted on the people who had natural inclinations towards preventive behaviour.

A new category of sciences has been employed to analyse the situation. The social and behavioural science workers designed and carried out many studies that probed into the problem from the angles previously not thought of. The resulting findings showed that due to lack of knowledge by the dental profession of the principles of human behaviour and consequent lack of application of its laws, the D.H.E. could not achieve any positive results.

Perhaps the most important finding was that a mere giving of correct information was not sufficient for induction of positive preventive action, if it had not been presented in a manner that would emphasise value of this action for the recipient, and elevate it far above the value that was needed to be suppressed.

Shortly, we strive not only for induction of health preventive behaviour, but once it has developed also for its permanent retention, which thus means an institution of behavioural change.

It is still better if it is not necessary to make this change, which at times may be difficult to achieve, especially at older age. This can be avoided by affecting behavioural patterns at the time when they are created, that is during early childhood. At this time, if we even will not directly establish the desired pattern, we will at least prepare receptive ground for its introduction later.

Discussion of the topic dealing with the qualification of the D.H.E. personnel revealed that the designers and coordinators of the teaching programmes ought to be well oriented in psychology, social and behavioural sciences, teaching methods, communication methods, and nutrition, and have working knowledge of political, law, and legislative systems of their countries. Thus it would seem that this would call at least expanded course in public health or rather a master's degree in public health or even higher degree.

Of course, at the same time there is a need perceived for more humanitarian approach in curricula of the undergraduate courses. The current dental graduates do not get enough training in the fundamentals of the public health, although they get instruction in the mechanics of preventive dentistry. Some schools introduced courses in behavioural sciences, but the way of thinking of many of the dental schools is still primarily oriented towards acquisition

of technical skills, and little attention is given to ascertaining that this excellence will manifest itself in a form of delivery of excellent dental care through positive motivation of the dental personnel.

Developing countries

Scarcity of available information presents a difficulty in assessment of the situation within the health and dental services of these countries. Whatever material is available indicates very clearly that developing countries face a multitude of problems in the general and dental health services. Their economy usually does not allow them to allocate enough funds to satisfy all needs, their educational system does not produce enough of qualified staff to satisfy the manpower shortages. Thus at this stage geographic and communication situation worsens the chance of many people to get medical help, especially if they have to travel long distances through badly accessible country or across the sea.

For this reason they have to work with a system of priorities, and it often happens that dentistry is not given enough priority.

Shortages of staff caused by cultural, academic and economic factors do not give much promise for improvement in the future.

In many countries the ratio of operator-population is of such magnitude, that even if the staffing situation started improving now, it would take many years to decrease this ratio to manageable levels.

To compromise and overcome lack of students suitable for the university levels of education, many countries introduced a relatively new type of dental operator - the operating dental auxiliary - to provide service for the most threatened part of the population - the school children. Their primary function is carrying out secondary prevention programmes to which are attached, to a certain degree, components of primary prevention. Shortages in staffing cause however that within the given priorities, primary prevention, D.H.E. particularly, is not given enough time and resources.

The biggest problem that faces advanced countries, dental caries, is in many developing countries so far comparatively small. Change of the lifestyle has brought however an increase in the caries rate, which, having been still well below the levels of the advanced countries, presents a threat that has to be averted. Some countries, such as French Polynesia, where the increase had reached epidemic proportions, became a stern warning to the other developing countries.

Periodontal disease that has been in these countries always present is a source of another worry, as it involves majority of the adult population, and seems to be a main reason of loss of teeth after the age of 40 years.

Other problems, such as ignorance or unawareness of the people of possibility of curing, and even preventing many of the general and dental, and oral diseases had been also discussed.

A question had been asked, whether in the case of developing countries the problems of shortage of dental staff, capable of providing adequate curative dental services, could be at least partially solved by introduction of dental health educational programme, which would show to the people how to prevent dental and oral diseases.

A great advantage of this programme would be the fact that not all of the workers employed within their framework would have to be dental or even medical professionals and thus the demand for qualified manpower should be minimal for the amount of effect it would be expected to achieve.

The biggest difficulties would primarily concern selection and training of workers of the central unit and the field executive staff. The central unit would not necessarily consist of only dentists but would include all related professions. Field executive staff should consist of dentists, dental health educators or health educators. This team of workers would be responsible for initial surveys and pilot programmes. The team should predominantly consist of nationals of the country and where necessary, of the expatriates with a long experience of work within the country.

Second type of problems would be related with a development of a programme that would apply the not yet proven new principles of D.H.E. in the principally unchartered conditions of developing countries. Complexity of change of life of the people in the

developing countries shows that the task of developing of this type of a programme could be enormous.

The D.H.E. under these circumstances would have to be more a part of a general health education and only the more advanced stages of the programmes would be of purely dental character. Therefore the structure would be more or less modular, designed for different stages, and types of population.

While designing the educational modules, great deal of attention should be given to research of the social, cultural customary, hierarchic background, all of which will have to be taken into consideration.

Liaison with the allied fields of science should be maintained at all times, and the latest findings, related to development or implementation of D.H.E., should be utilised with expediency. We must not forget that it was unchanging and unimaginative use of outdated methods that was mainly responsible for stagnation and inefficiency of D.H.E. in the past.

The D.H.E. should be carried out by a team of workers headed by a full time dental educator. This person would select his team from other dental and health workers, as well as from the school teachers, religious workers, and voluntary helpers.

The dental health educator would have to train some of these people himself.

With the help of this team, which would be somewhat related to the rural health team, the educator should be able to gather enough information to be able to design effective educational programmes.

These programmes, often based on small group learning programmes, would be designed for maximal participation of all concerned in the learning. Ideally the outcome of any D.H.E. programme would be not only adoption of the desired behaviour or habits but also their further dissemination, as it is with instruction of the parents, particularly of infants and children up to school age.

For implementation of some of these programmes locally recruited staff should be most effective, as it would be well known, and trusted person with a knowledge of the customs and language of the people.

The dental health educator would not be involved with carrying out of the individual programmes, but would supervise them, and assess reaction of the population to them so that necessary improvement could be made.

The role of the educator would also consist of maintaining communication links between the central unit and the field, and also between different field locations and their staff. Evaluation of the educational results would be carried out at all levels.

In conclusion, it is thought that the dental health education, which is an integral part of a successful provision of the dental

health services can play an important role in the dental health systems of developing countries in particular. Skillful employment of the basic principles of psychology, behavioural sciences and teaching methods can not only bring a general improvement of dental and oral health, but it can also bring relief of demand on manpower, which is in short supply.

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