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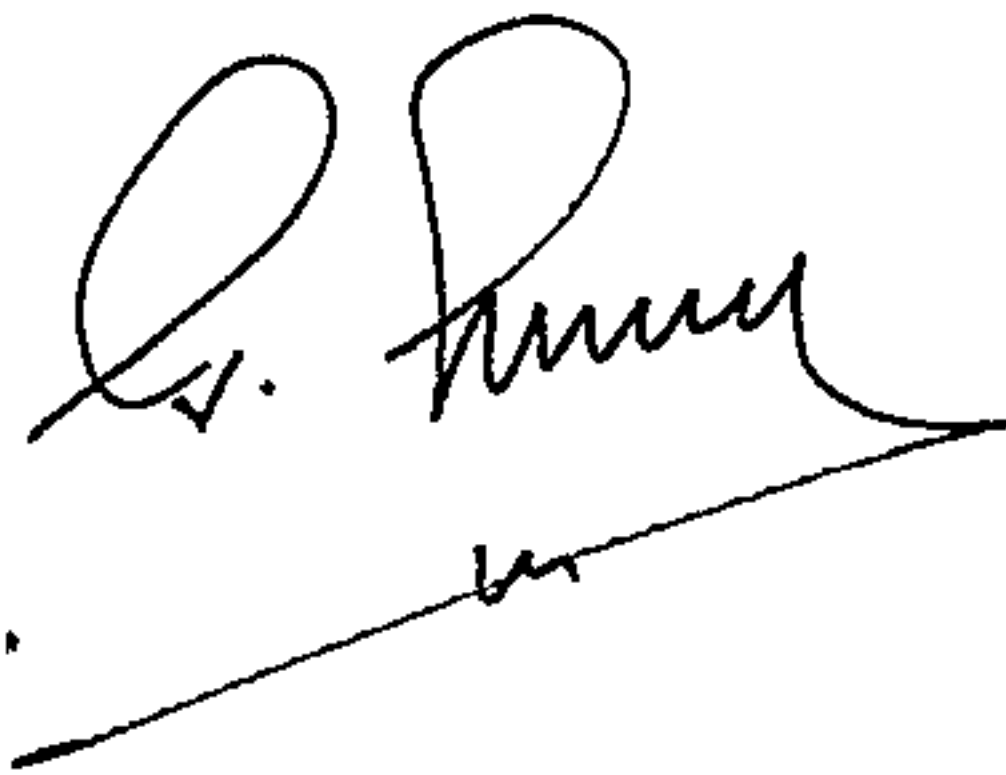
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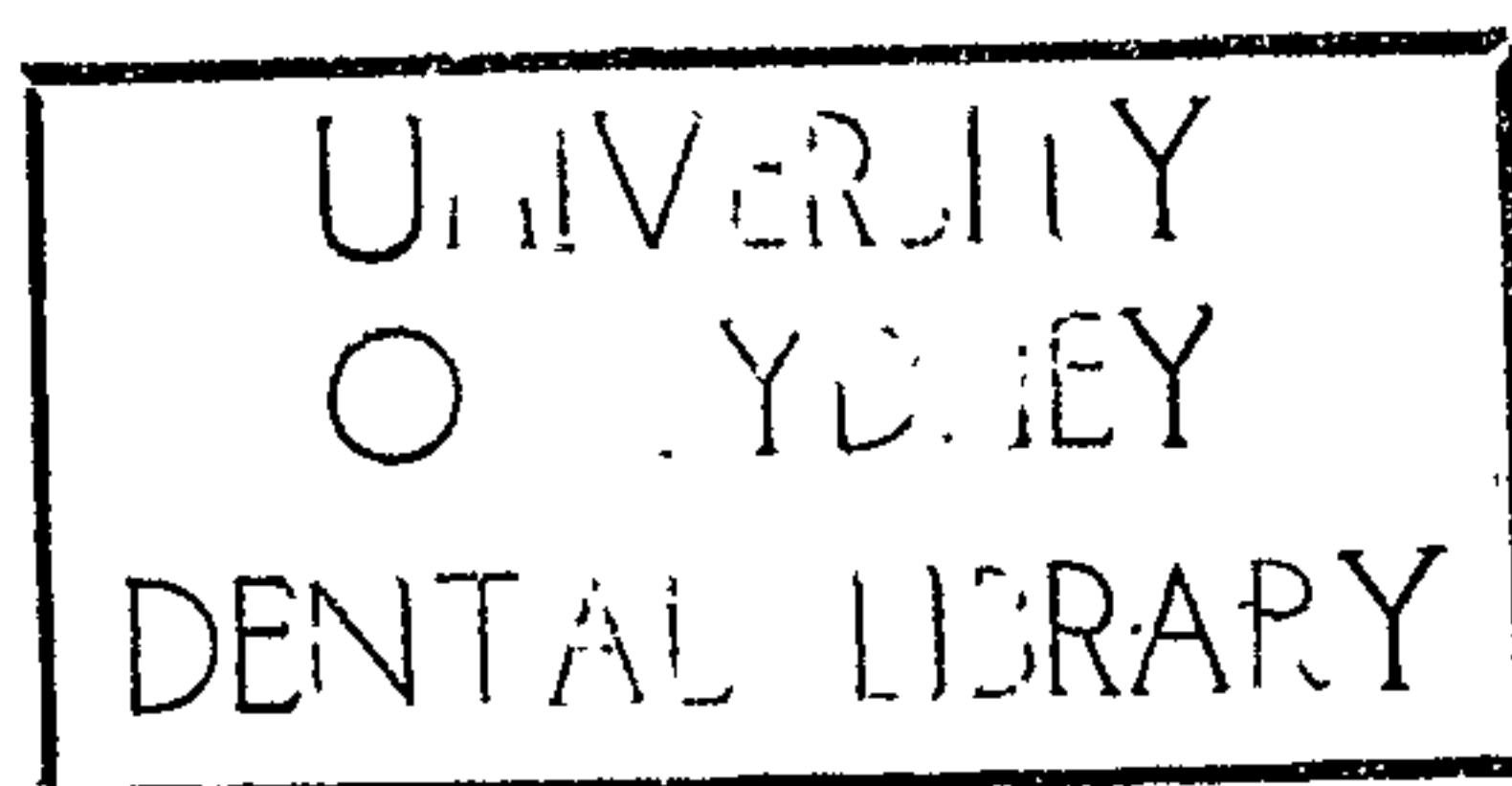
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DENTAL HEALTH EDUCATION IN THE PREVENTION
AND CONTROL OF PERIODONTAL DISEASE IN
MALAYSIA

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A Thesis Submitted in Partial
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Public Health Dentistry



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(i)

Dedicated to my beloved family,
wife, Jit, son Kevin and daughter
Harin, for their constant support,
patience and understanding.

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TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGEMENTS	(ii)
TABLE OF CONTENTS	(iii)
LIST OF TABLES	(vii)
LIST OF FIGURES	(ix)
1. INTRODUCTION	1
2. MALAYSIA AND ITS PEOPLE	13
2.1 Climate	13
2.2 People/Population	15
2.2.1 The Malays	15
2.2.2 The Chinese	17
2.2.3 The Indians/Pakistanis	17
2.2.4 Other communities	17
2.3 Diet of the People	18
2.4 Education	19
2.4.1 Kindergarten	19
2.4.2 Primary education	19
2.4.3 Secondary education	19
2.4.4 Tertiary education	19
2.5 Medical, Health, and Dental Services	20
2.5.1 Medical services	20
2.5.2 Health services	21
2.5.3 School health services	22

2.5.4	Dental services	23
2.5.4.1	Background	23
2.5.4.2	Organisation	23
2.5.4.3	Programmes	24
2.5.4.4	Manpower resources	28
2.5.4.5	Types of dental clinics	33
3.	EPIDEMIOLOGICAL SURVEY OF DENTAL DISEASES	37
3.1	Origin of Survey	37
3.2	Dental Survey of School Children in West Malaysia	38
3.3	Results of the Dental Survey	39
3.3.1	Materia alba	39
3.3.2	Calculus	39
3.3.3	Inflammation of gingiva	40
3.4	Dental Survey of adults	49
3.5	Results of Dental Survey of adults	51
3.5.1	Tooth cleansing habit	51
3.5.2	Tooth cleansing habit vs education	51
3.5.3	Periodontal disease status	52
3.5.4	Subjects with one or more teeth with pockets > 3mm	52
3.5.5	Teeth with or without pockets > 3mm	52
4.	DENTAL HEALTH EDUCATION - A PREVENTIVE MEASURE	65
4.1	Dental Health Education in Malaysia	69
4.1.1	Dental Health Education Unit (D.H.E.U.)	71
4.2	Dental Health Education Team	74
4.2.1	The dentist	77
4.2.2	The school dental nurse (New Zealand type)	80

4.2.3	The dental hygienist	82
4.2.4	Health personnel	84
4.2.5	Classroom teacher	87
4.2.6	Others	90
4.3	Categories of communities/levels of prevention	91
4.3.1	Primary prevention	93
4.3.2	Secondary prevention	94
4.3.3	Tertiary prevention	95
4.4	Target Groups	96
4.4.1	School children - primary and secondary	97
4.4.1.1	Urban school dental service	99
4.4.1.2	Rural school dental service	101
4.4.2	Pre-school children	104
4.4.3	Pre-natal and nursing mothers	106
4.4.4	General public	109
4.5	Methods and techniques of Dental Health Education	114
4.5.1	Dental health education talks and materials	114
4.5.1.1	Plaque control	115
4.5.1.2	Oral hygiene	124
4.5.1.3	Diet counselling	128
4.5.1.4	Fluorides	130
4.5.1.5	Seeking early treatment	132
4.6	Dental Health Education Media	134
4.6.1	Audio-visual aids	134
4.6.1.1	Motion pictures	135
4.6.1.2	Posters	138
4.6.1.3	Charts	139
4.6.1.4	Flannel boards	139

4.7	Mass Media	140
4.7.1	Pamphlets	141
4.7.2	Newspapers	142
4.7.3	Radio and television	142
4.7.4	Government information service	143
4.8	Dental Exhibitions and Campaigns	144
4.9	Problems in the Delivery of Dental Health Education	147
4.9.1	Behaviour	147
4.9.2	Attitude	152
4.9.3	Traditions and superstitions	154
4.9.4	Motivation	155
4.10	Dental Health Education Resources	159
4.10.1	Government resources	159
4.10.2	Commercial resources	161
4.10.3	Voluntary organisations	162
4.11	Evaluation	164
5.	DISCUSSION	167
6.	SUMMARY	185
7.	CONCLUSION	202
	REFERENCES	205

LIST OF TABLES

<u>Table No.</u>		<u>page</u>
Table 1	Children with materia alba by age and by ethnic group.	41
Table 2	Children with calculus by age and by type-all groups.	42
Table 3	Children with inflammation of gingiva by age and by ethnic group.	43
Table 4	Number of inflammed gingival units per child by age and by ethnic group.	44
Table 5	Distribution of children by number per child by age and by ethnic group.	45
Table 6	Tooth cleansing habits by age group, sex and ethnic group.	53
Table 7a	Tooth cleansing habits vs education by age group.	54
Table 7b	Tooth cleansing habits vs education by age group.	55
Table 8a	Periodontal disease by age group and ethnic group.	56
Table 8b	Periodontal disease by age group and ethnic group.	57
Table 9a	Periodontal disease - subjects with one or more teeth with pockets > 3mm by age and ethnic group.	58
Table 9b	Periodontal disease - subjects with one or more teeth with pockets > 3mm by age and ethnic group.	59
Table 10a	Periodontal disease - teeth with or without pockets > 3mm indicated for extraction by age group and ethnic group.	60

Table 10b	Periodontal disease - teeth with or without pockets > 3mm indicated for extraction by age group and ethnic group.	61
Table 11	Health education requirement for periodontal disease in different categories of the community.	92

LIST OF FIGURES

<u>Figure No.</u>		<u>page</u>
Figure I	Map of Malaysia	14
Figure II	Population by age group - Peninsular Malaysia	16
Figure III	Dental Division National level	25
Figure IV	Dental Division State level	26
Figure V	Total Number of dental surgeons as in 1980	30
Figure VI	Professional manpower (1970-1980)	31
Figure VII	Trained dental personnel in government service	32
Figure VIII	Facilities	34
Figure IX	Percentage of children with materia alba by age and by ethnic group	46
Figure X	Percentage of children with calculus by age and ethnic group	47
Figure XI	Children with inflammation of gingiva by age and by ethnic group	48
Figure XII	Tooth cleansing habits - by age group and ethnic group	62
Figure XIII	Periodontal disease - percentage affected by age group for all ethnic groups	63
Figure XIV	Periodontal disease - percentage of subjects with pockets greater than 3mm by age and ethnic group	64

1. INTRODUCTION

Periodontal disease is one of the most widely spread diseases of mankind. No nation and no area of the world is free from it, and in most it has a high prevalence, affecting in some degree approximately half the child population and almost the entire adult population (W.H.O., 1961a).

Currently, it has been estimated that 67 million adults in the United States have periodontal disease and more than 20 million people have lost their natural teeth because of it. Two thirds of the young adults, 80 per cent of the middle-aged, and 90 per cent of the persons over 65 suffer from periodontal disorders. Of the 90 million men and women in the United States with at least one permanent tooth, three out of four have some form of periodontal disease (Glickman and Jarome, 1974).

Epidemiological studies in countries of Asian and South Pacific areas have shown that periodontal disease is pandemic in these countries and occur early in the lives of most individuals. Periodontal disease is also widely prevalent in developing and underdeveloped countries such as India and Africa. Poverty and lack of dental personnel and treatment facilities have thought to have contributed for the poor dental health of the people (Wong, 1975).

Periodontal disease is the major cause of tooth loss in the adult population. Tooth decay is responsible for most tooth extractions up to the age of approximately 35, but after that, periodontal disease becomes the major cause of tooth mortality. Approximately 60 to 70 percent of the teeth lost in the United States after 40 years of age are lost because of periodontal disease and in other countries such

as India the figure is as high as 80 per cent. Of all teeth lost after the age of 15 periodontal disease is responsible for approximately 50 per cent and tooth decay for about 37 per cent (Glickman and Jarome, 1974.).

The United States is a major developed country in the world. However, in spite of all the skills, technology and research facilities, it has not been able to overcome dental disease and this is expressed in the following comment made as a result of a nationwide survey into dentistry (Slack, 1962). "The shamefully low level of dental health of the American people becomes particularly apparent when viewed in the light of the economic capacity of the nation and the technical achievement in dentistry Dental health is more a problem of public conscience than statistics; not merely that a vast amount of dental disease exists, but that the American Society has resources to control these diseases and is not using them to the fullest."

Loss of teeth due to periodontal disease presents a threat to general health, oral function and esthetics of the individual (Goldman and Cohen, 1968). Teeth like any other part of the body are supposed to last the lifetime of a person if cared for properly. Just as the loss of an arm, leg or an eye virtually cripples an individual, similarly, the inevitable consequence of loss of the dental organ results in the virtual mutilation of the person (Barnard, 1970).

Periodontal disease undoubtedly existed in some form or the other in ancient man (Coolidge and Hine, 1958). Although the dental profession has recognised periodontology as a separate speciality only comparatively in recent times, the history of periodontal disease and attempts to treat it are as old as mankind.

Old Chinese medical records written about 2500 B.C. refer to "Ya Kon" (disease of the soft investing tissues) and "Ya Fong" (inflammatory condition) (Glickman, 1964a) . They prescribed herbal medicines for periodontal disease and also realised the importance of oral hygiene by advocating chew sticks to clean their teeth.

In India in 3000 B.C. loose teeth were being ligated and calculus removed (Blake and Trott, 1962a).

Hipocrates, the father of modern medicine, described in some detail eruption and functions of the teeth and etiology of periodontal disease. He believed the accumulation of calculus or "pituita" was responsible for the inflammation of the gums. The Romans and the Egyptians too recognised this disease and used many medicinal remedies to treat it.

Progress in dentistry marked time during the medieval times. However, in the sixteenth century, Ambrose Pare (Rayan, 1982), a pioneer in modern surgery used the term "pyorrhoea" alviolaris. He writes "if the teeth grow loose by means of decaying gums, the disease is then incurable".

The foundations of modern periodontology were becoming to be laid down around the early eighteenth century, coinciding with the rebirth of science. During the mid-nineteenth century, an American, John M. Riggs (1810-1885) is credited with the birth of modern periodontology (Blake and Trott, 1962b). For the first time in history there was someone who claimed that periodontal disease was curable and indeed he went on to prove it.

With the advent of the twentieth century, there developed a prolific group of clinicians and scientists throughout the world whose major interest was in the periodontal field. Dentists and members of the allied medical field organised in societies devoted to furthering knowledge in periodontology, and world-wide interchange of ideas regarding periodontal problems was fostered by periodontal journals and international congresses.

Today, dental science has made tremendous progress in the field of periodontal disease. Ironically, more is known about periodontal disease than about most chronic diseases, and although a great deal of research is still needed, sufficient knowledge exists to affect a large measure of control over the disease (Manson, 1970a).

Periodontal disease is the disease of the gums affecting the periodontal tissues namely the gingiva, periodontal ligament, cementum and the alveolar bone. It is invasive in nature and affects the epithelium lining the sulcus, destroys the gingival fibres and progresses apically in approximation of the tooth root, causing pockets and destruction of the underlying bone. It may affect only the gingiva when it is called gingivitis or may invade the deeper structures causing pockets between the teeth and the gingiva. When the deeper tissues, including bone are involved, it is named periodontosis (Prichard, 1972). As the name suggests they are inflammatory diseases. Tooth mobility and eventual loss are the terminal stages of the disease (Grant, 1975a). The nature of this progress is insidious, and so lacking in painful symptoms, it seems to have become accepted as a fact of life by a large proportion of the public (Altman and Wendon, 1974a).

The paradox of the situation is that most periodontal disease is preventable and controllable to a large degree (Grant et al., 1972). It is caused by local irritants in the oral cavity that are accessible, correctable and controllable. The principle local factors are bacteria, dental plaque, calculus, materia alba, food impaction and mechanical, chemical and thermal extremes (Glickman and Jerome, 1974). Poor oral hygiene, which permits local irritants to accumulate on the teeth, overshadows all other factors responsible for periodontal disease. In essence, periodontal disease is a disease of neglect - neglect of the healthy mouth that permits disease to occur and neglect of early disease that permits it to advance and destroy supporting tissues of the tooth.

The individuals systemic condition undoubtedly affects the periodontal tissues. Systemic factors such as pregnancy, diabetes, nutritional deficiencies and blood dyscrasias reduce the resistance of the periodontal tissues to the presence of plaque.

Other factors such as faulty restorations, partial dentures, unopposed teeth also foster plaque retention leading to periodontal disease (Grant, 1975b).

Immune reactions of the gingivae have long been suspected, and it seemed possible that some means may be found to stimulate them and thus "immunize" the individual against periodontal disease (McHugh, 1981). Present information suggest that immunology and host resistance play some role in gingivitis and periodontitis and to appreciate this an understanding of the protective and destructive host response is necessary (Russel, 1977).

It has been shown that immunological responses have both protective and destructive potential. Both cellular and humoral immunity provide protection against bacteria and their antigens, activated macrophages, have increased bacteriocidal activity and antibodies can neutralize bacterial toxins. However, the host tissue may over-react, and this 'hypersensitivity' can cause more inflammatory destruction than the bacteria can induce directly (Nisengard and Beutner, 1970). In a preliminary investigation patients with renal transplants using drugs effective for immunosuppression was associated with a lack of gingival inflammation, whereas, most of those patients who were only partially immunosuppressed showed gingival disease (Lehner, 1975).

Immunologic studies of periodontal disease constitute a major area of research. Although many details are still missing relating to immunology or host response in periodontal disease, several broad principles have been established (Page and Schroeder, 1981).

1. Periodontitis without exception, is caused by bacteria, but the mere presence of bacteria is insufficient; interaction of bacteria with the hosts' response systems is essential if the disease is to progress.
2. The host defence system is a two-edged sword in that it not only provides protection against the microbial challenge, but also is an active participant in the tissue destruction observed in chronic inflammatory diseases such as periodontitis.
3. Both protective and destructive processes are activated simultaneously. When the destructive activity outweighs the protection provided, a variable degree of destruction results.

The ravages of periodontal disease has not spared the Malaysian populace. Prevention and control of periodontal disease in Malaysia is further made difficult due to the socio-economic, cultural and literacy variation of the multi-racial structure of the Malaysian community. Besides, almost 60 per cent of the population live in rural areas and have only recently been exposed to modern medicine and due to the elaborate setup of the rural health services since Independence (Rahman, 1972).

According to a dental epidemiological survey of school children in West Malaysia, (Ministry of Health, 1972a) 59.9 per cent of the school children examined between the age of 6-18 years suffered from gingival inflammation. The mean number of inflamed gingival units per child was 2.8. Dental caries was prevalent in 88.9 per cent.

According to another survey carried out in 1974-1975 on 15 years and above in West Malaysia, it was found that 72.4 per cent had periodontal disease. 29 per cent had periodontal pockets > 3mm. Caries was prevalent in 95.5 per cent (Ministry of Health, 1977a).

Owing to the magnitude of the prevalence of periodontal disease in the Malaysian community, coupled with the acute shortage of manpower, the Dental Division of the Ministry of Health realised that curative measures alone will not help to minimise dental disease. Hence, it embarked upon an intensive preventive programme of dental health education of the community. This resulted in the setting up of a Dental Health Education Unit at the national level in 1979. Since then each of the 13 states of Malaysia has set up a Dental Health Education Unit. The main objective of the Dental Health Education Unit is to instill dental consciousness and to attain behavioural changes for the

improvement and maintenance of the dental health of the child, the family and the community through their own and organised community efforts.

It can be said that a very great part of the Malaysian population is unaware what periodontal disease is. The generally poor oral health in the Malaysian community is mainly due to apathy on the part of the public towards dental health and this apathy is the result of ignorance, superstitions, misconceptions and old traditions. Many of them believe even today that the bleeding of gums is a normal phenomenon and that it is the disease of old age. Hence, it is not surprising when a patient walks into the surgery and says "Dr, I don't know why my teeth are becoming loose. I have no holes in my teeth and my gums bleed when I brush my teeth." On examination one will find deep pockets with calculus deposits. When the patient is told that he has periodontal disease, and may eventually lose his teeth, he is surprised he has to lose teeth due to the disease which he has never heard of but has lived with it for many many years.

As the medical and dental welfare of its people is the responsibility of the Government, it has a tremendous task, though not an impossible one, to mobilise all the agencies at its disposal towards an effective Dental Health Education Programme, in the prevention and control of periodontal disease in the community. The task is indeed an uphill one as the diversity of the Malaysian society, each with different culture, beliefs, values and traditions, which are till today held on to firmly. The responsibility therefore falls on the dental profession and health educators, to create a behavioural change,

motivate the community, create awareness and ultimately educate them towards care and maintenance of their oral hygiene through the dental health education programmes.

With the advent of the seventies, prevention in dentistry became the trend the world over. The role of dental health education has been recognised as the second major means of prevention of dental disease on a larger scale, next only to fluoridation as in caries. This is evidenced by the numerous conferences, workshops that were held on dental health education in Malaysia, Singapore, the South Pacific region and other parts of the world under the auspices of the World Health Organisation.

Various organisations, committees, and commissions have been set up the world over to deal with dental health education in an attempt to improve oral hygiene. One such foundation which has achieved tremendous success is the Dental Health Education and Research Foundation of Sydney, founded in 1962. It has "striven to educate the community and especially school children in the principles of dental health" (Wooley, 1982).

A World Health Organisation expert committee on dental health education which met in Geneva in 1969 is of the opinion that effective utilization of the educational approach is central to any widespread improvement in oral and dental health (W.H.O., 1970a).

The World Oral Bank data on periodontal diseases maintained by W.H.O. has ample evidence that the disease is prevalent world wide. Hence, one has simply to examine the statistics relevant in the prevalence of periodontal disease to visualise the magnitude of the problem

which faces the dental profession today. Coupled with the relative decreased manpower, and the growth of the population, the dental profession has no other solution for such a problem than directing major efforts and attention towards prevention. Prevention, not therapy is today's question and hopefully tomorrow's answer (Zaki, 1969).

This opinion was also voiced by Dr M.G. Chandau (W.H.O., 1961b) when the expert committee on Dental Health met in Geneva on 17th August 1960 to discuss periodontal disease. In his opening address he said "in the past periodontal disease had been largely overshadowed by dental caries It was essential to ensure that the gains achieved in the prevention and treatment of dental caries were not offset in later life by the ravages of periodontal disease". He stressed that "the orientation of dental education and dental health services towards prevention and early treatment and an intensification of Dental Health Education and dental research were required if the problems arising from periodontal disease were to be successfully countered".

In recent studies it was shown that most dental diseases can be controlled and prevented through proper preparation of today's dentist and through an effective dental health education programme for the public. Education, therefore, should be of prime importance, for the dental profession onto which a sound preventive programme can be built. Teaching is not just imparting information. It is a process of moulding theory into practice, concepts into actions, and abstracts into concrete behaviour.

Epidemiological surveys conducted in 1971 and 1975 in West Malaysia reveal that periodontal disease is widely prevalent in the Malaysian community both in the younger age group and the adults. The existing manpower cannot cope with it and it is beyond the economic means of the country to provide curative care for all to tackle the disease. Hence, the answer lies in a well planned dental health education programme for the community. Singapore has achieved some measure of success through its intensive dental health education programmes since the establishment of its D.H.E. Unit in 1969.

The Malaysian community, particularly those in the rural areas who form 60% of the population need to be made aware of the ravages of periodontal disease. They need to be motivated and conscious of the importance of maintaining proper oral hygiene through dental health education. This can be achieved through activities which include oral hygiene instructions, dental health talks, lectures, tooth brushing drills, flouride mouth rinsing drills, campaigns, exhibitions and other activities. These activities can be carried out by knowledgeable and well trained dental personnel, allied health personnel, teachers, health educators and others. Through these activities it is hoped to motivate the community to seek, attain, and maintain optimum dental health. The public will then come to appreciate the dental service rendered to them and above all help to correct unfavourable attitudes that exist because of misinformation and superstitions.

Dental health education programmes should endeavour to reach the whole Malaysian community. This may not be feasible initially and hence a target group should comprise the following groups:

- (a) Expectant mothers
- (b) Pre-school children
- (c) Primary school and secondary school children.

However, once the dental health programmes are well underway, and with the increase in dental manpower and other trained personnel, the adult population and the general public at large should be included.

In the words of Jennifer Sardo Inferri (Inferri, 1981), "periodontal disease - affecting the gums - is one disease none of us need to have. Although difficult and costly to cure in the advanced state, it can be prevented cheaply, and preventive programmes are within reach of all societies".

The aim of this thesis is therefore:

1. To discuss the methods and techniques of bringing awareness of periodontal disease to the Malaysian community through Dental Health Education.
2. To review literature on the methods and techniques of Dental Health Education.
3. To make suggestions with the view of minimising the prevalence of periodontal disease in Malaysia.

2. MALAYSIA AND ITS PEOPLE

The country of Malaysia is made up of two distinct regions - the peninsular portion referred to as West Malaysia. The two regions are separated by 330 miles of the South China Sea (Ministry of Information, 1981). Malaysia is a Federation of 13 states and the Federal Territory (Figure 1).

Malaysia has a total area of approximately 332,660 square kilometres land area (128,000 square miles). Peninsular Malaysia has an area of 131,313 square kilometres (50,694 square miles), whilst Sabah and Sarawak have a combined area of 201,320 square kilometres (77,638 square miles).

Located in the heart of South East Asia, Malaysia lies near the Equator between latitudes 1° and 7° North and longitudes 100° and 119° East.

2.1 CLIMATE

Malaysia is subjected to maritime influence and the interplay of wind systems which originate in the Indian Ocean and the South China Sea. Very few towns in Malaysia have less than 80 inches of rainfall annually.

Owing to the year round rainfall, the air in the country is nearly always humid. The relative humidity is high, usually more than 75 per cent. The average daily temperature throughout Malaysia varies from 21°C to 32°C (70°F to 90°F) though in higher terrain, temperatures are lower (Ministry of Health. 1977b).

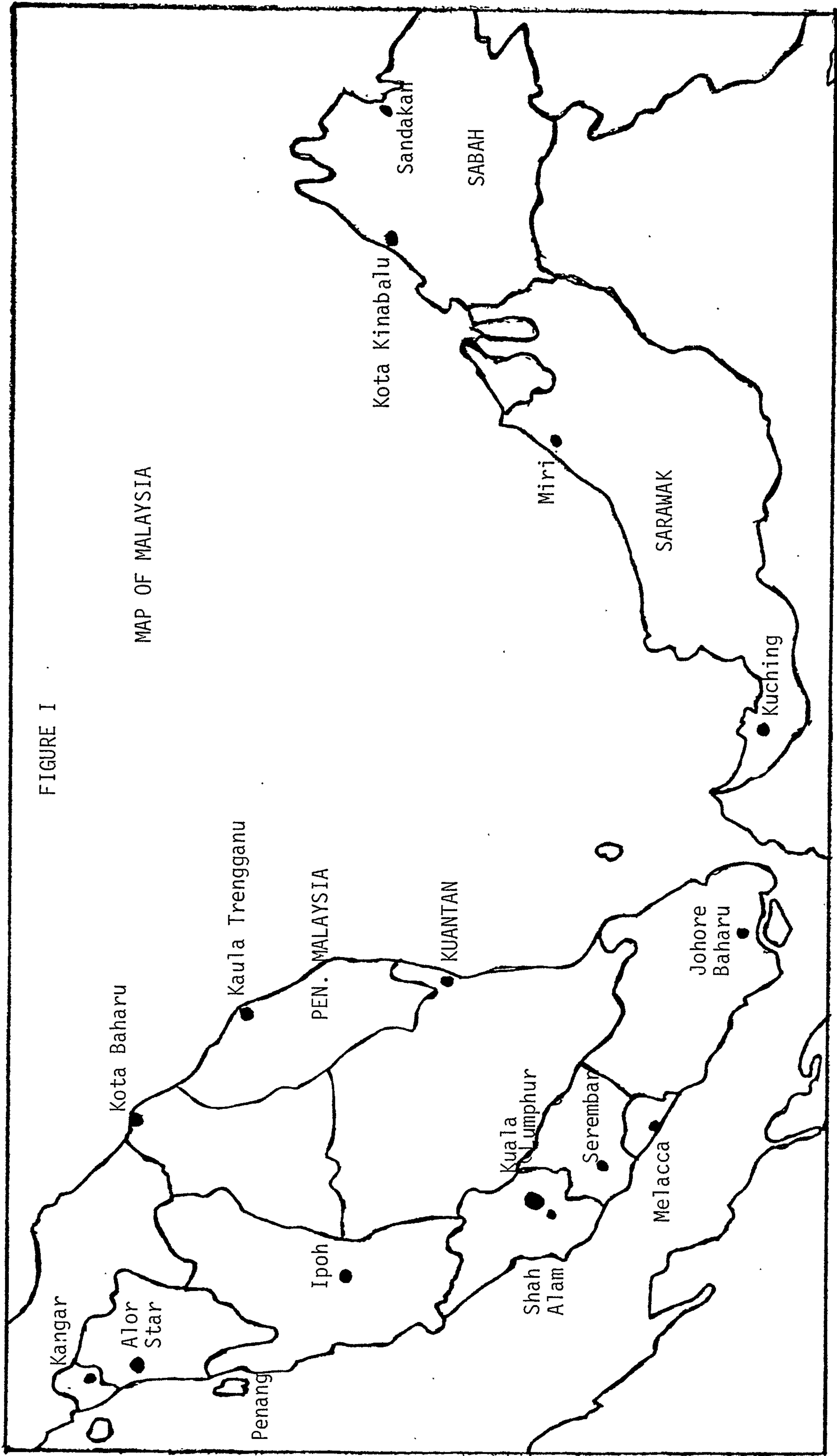


FIGURE I

Source: Dental Division, Ministry of Health, Malaysia.

2.2 THE PEOPLE/POPULATION

Malaysia has the diversity of different ethnic groups in a population of 13,435,588. Peninsular Malaysia has a population of 11,138,227; Sabah, 1,002,608; and Sarawak, 1,294,753 (1980 Census) (Statistic Department, West Malaysia, 1980)(Figure II).

Peninsular Malaysia has three major population groups, namely the Malays, Chinese, Indians/Pakistanis, each with its own cultural, linguistic and religious background. The Malays represent 50 per cent of the population, the Chinese 37 per cent and the Indians 11 per cent. The remaining 2 per cent comprise the Eurasians, Europeans, and the aborigines.

In Sarawak, the major population groups include the Chinese, Malays, Land Dayaks, Sea Dayaks, and Melanaus, while in Sabah they include the Kadazans, Chinese, Muruts, Bajaus and Malays (Ministry of Health, 1981b).

Malaysia has a relatively young population. Approximately 50 per cent are less than 20 years of age.

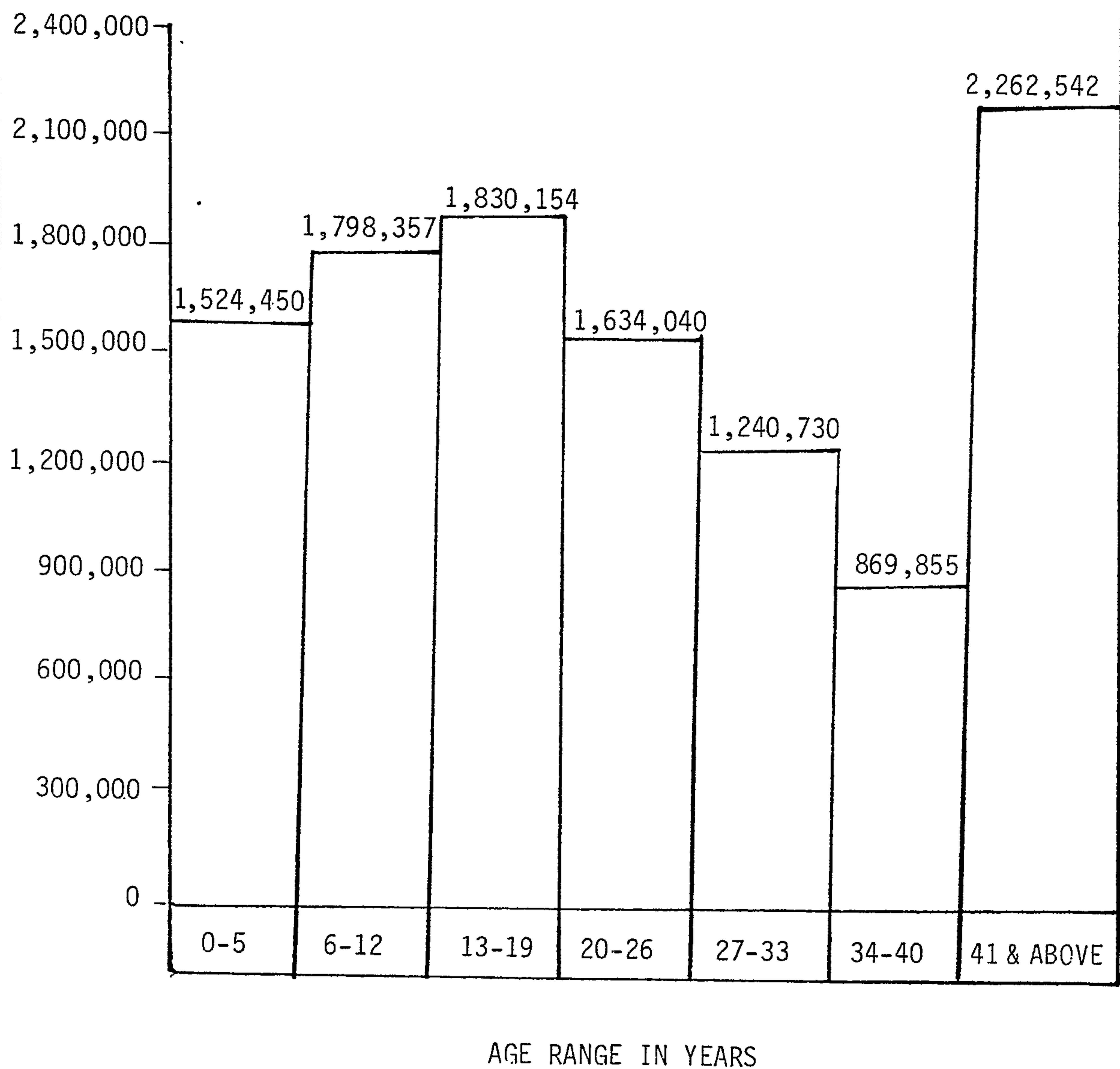
2.2.1 The Malays

About 60 per cent of the Malay population live in the rural areas and in the East Coast of Peninsular Malaysia. There is a gradual urban drift in recent years due to industrialization with its concomitant job opportunities. However, a large proportion of this ethnic group still remain in rural areas, devoting their lives to their original agricultural pursuits. Nevertheless they also form a large part of the executive civil service.

FIGURE II

POPULATION BY AGE GROUP - PENINSULAR MALAYSIA

ACTUAL TOTAL POPULATION : 11,138,227 (1980)



Source: Dental Division, Ministry of Health, Malaysia.

2.2.2 The Chinese

Almost two-thirds of the urban population is Chinese, active in every form of commercial enterprise and industry.

2.2.3 The Indians/Pakistanis

The Indian/Pakistanis are either town dwellers or workers in rubber estates. The better educated of these include doctors, lawyers, school teachers, civil servants, merchants and landed proprietors.

2.2.4 Other Communities

These include Eurasians, Europeans, and aborigines. The aborigines mostly live in the forest fringes near developed areas.

2.3 DIET OF THE PEOPLE

The staple food is rice for all the three major ethnic groups in the country. There is ample sea foods, vegetables, poultry, eggs and meat. Local fruits are eaten depending on availability. The Malays in the rural areas, with their low economic status consume less refined carbohydrates such as chocolates, toffee and ice-cream. The Chinese, on the other hand, consume appreciable quantities of refined carbohydrates. The Indians take highly spiced curry and eat more overcooked vegetables.

The variety, as well as the amount of food in the household of the rural people, is often dictated by their economic circumstances, religious and sometimes superstitious, beliefs and their ethnic and individual likes and dislikes.

There is high consumption of sugar among almost all the three ethnic groups in Malaysia. This has prompted the Government to conduct campaigns urging the people to cut down the consumption of sugar over T.V. and other mass media. In 1980 the Malaysian Dental Association conducted a sugar campaign urging the people to cut down sucrose consumption that not only affect the teeth but the general health as well.

2.4 EDUCATION

Malaysia has the following set-up of education in the country:

2.4.1 Kindergarten

Many privately administered kindergarten schools have mushroomed all over the country in recent years. These schools privately administered by organisations have introduced nursery and kindergarten classes for children below the official school going age.

2.4.2 Primary Education

Primary education of six years' duration is free for children between the ages of 6 and 12 years at all national type schools where the medium of instruction is the national language. In privately-run schools, other mediums of instruction are permitted.

2.4.3 Secondary Education

This is of five years' duration. After three years of lower secondary education those who make the grade are channelled into either the academic, technical or vocational streams depending on their performance. Those who perform well in the upper secondary classes may proceed to the pre-university classes (Ministry of Education, 1981).

2.4.4 Tertiary Education

Tertiary education may be pursued at any one of the five existing universities or other institutions of higher learning in the country or abroad.

2.5 MEDICAL HEALTH AND DENTAL SERVICES

In Malaysia, the Government plays a major role in the provision of medical, health and dental services for the population, through a network of hospitals, health centres and dental clinics. Since independence in 1957, these facilities have grown and spread and have penetrated into the remote areas of the country. The objective of the government health services has always been to provide the population with the highest attainable standard of health, medical and dental care, with special emphasis given to the rural population (Ministry of Health, 1981c).

2.5.1 The Medical Services

The medical service provides general patient care in all the district hospitals and general hospitals in the country. Their activities include all the different kinds of specialist services, such as general surgical, obstetrics and gynaecology, ophthalmological, dermatological, ENT, orthopaedic, urological, paediatric, plastic surgery services as well as other specialist services and supportive medical care services.

In the capital of each of the 13 states of Malaysia and the Federal Territory, is located a general hospital with full range of specialist services. In most of the other districts, especially in Peninsular Malaysia, there is a district hospital. In the larger districts the level of service has been upgraded to include basic specialities, e.g. medicine, surgery, obstetric and gynaecology, anesthesia and radiology.

2.5.2 The Health Services

The health services in Malaysia have been extended to the various parts of the country, through the various Malaysia Plans. Basic medical, health and dental services, once not easily obtainable in the more rural areas of the country, are now accessible to a larger segment of the population, through the expansion of Rural Health Service.

To implement the activities under the Public Health Programme, there exists a network of infrastructure at each health district in the country. Each district has a health office under the charge of a health officer who is responsible for the rural health unit which comprises a main health centre, several health sub-centres, maternal and child health centre, many more rural clinics, and midwife clinics, as well as mobile health teams that provide health services to the rural population.

Preventive health programmes to control or eradicate debilitating diseases endemic in Malaysia have also been intensified.

2.5.3 School Health Service

The School Health Unit is run by the Ministry of Education. It is responsible for planning, organisation and administration of all activities connected with health education at school and teacher training colleges. Emphasis is given to the activities relating to school health programme. This programme covers various activities pertaining to evaluation, counselling and guidance given to pupils. Pupils are encouraged to develop good attitudes and habits of oral health.

In the Joint School Health Programme, the Ministry of Education and the Ministry of Health work together towards achieving the aims of the School Health Programme. This unit is also responsible for the preparation of Health Education Syllabi and the organisation of inservice courses for teachers involved in health education.

It is also responsible for the implementation of the Applied Food and Nutrition Programme.

2.5.4 Dental Services

In Malaysia, dental care is provided both by private and government dental clinics as well as the Dental Faculty of the University of Malaya. The government dental clinics include clinics under the Ministry of Health as well as those in the Ministry of Defence and Orang Asli (Aborigines) Department.

The objective of the government dental service is to raise the dental health status of the population of Malaysia through the provision of promotive, preventive, curative and rehabilitative dental services with special emphasis on the less fortunate groups so that the health status of the nation will continuously be in conformity with the socio-economic progress of the country.

2.5.4.1 Background

The government dental service in Malaysia started essentially as a school dental service. Since its inception five decades ago, it has grown and expanded with the other components of the health services. The present day dental service includes dental care for the whole population. However, the priorities earlier accorded to school children, pre-school children and expectant mothers continue to be maintained.

2.5.4.2 Organisation

The organisation of the dental services consists of two parts.

- (i) National level
- (ii) State level.

At the national level the Dental Division in the Ministry of Health is headed by the Director of Dental Services and assisted by a Deputy Director, two Assistant Directors and one Principal Dental Matron, one Dental Sister, one Superscale Dental Technician, and supported by a core of clerical administrative staff. The formulation of policies and coordination of services are carried out at national level (see Figure III).

At state level the State Dental Director is responsible to run the dental service. He has with him the senior dental officers, and dental officers, dental specialists, dental matron, dental sisters, staff nurses, para dental staff and a core of clerical staff (see Figure IV).

2.5.4.3 Programmes

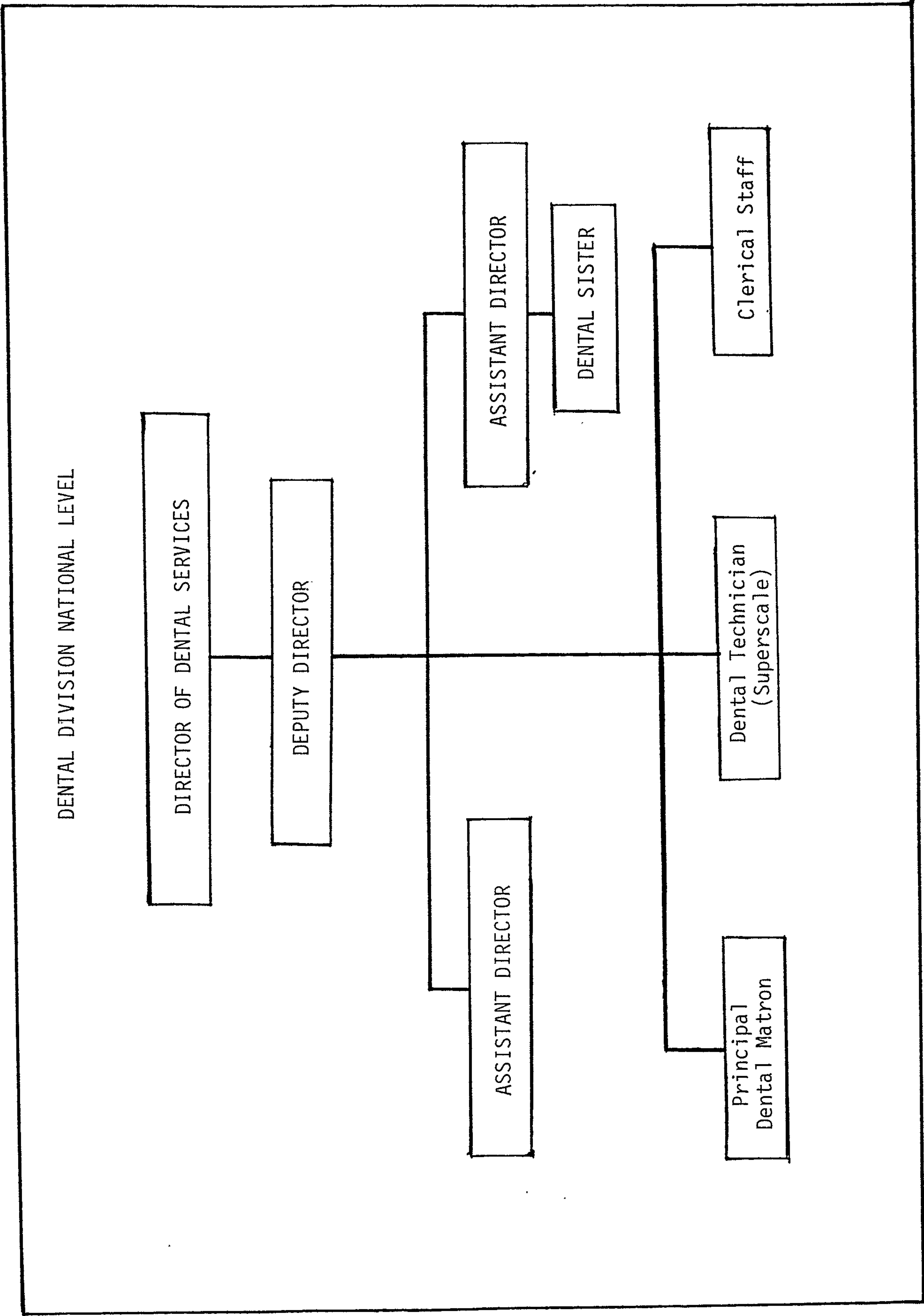
There are two main types of dental service programmes i.e. preventive and curative.

(i) Preventive Programme.

The general objective of this programme is to provide preventive and promotional dental services. There are two subprogrammes, namely Flouridation and Dental Health Education.

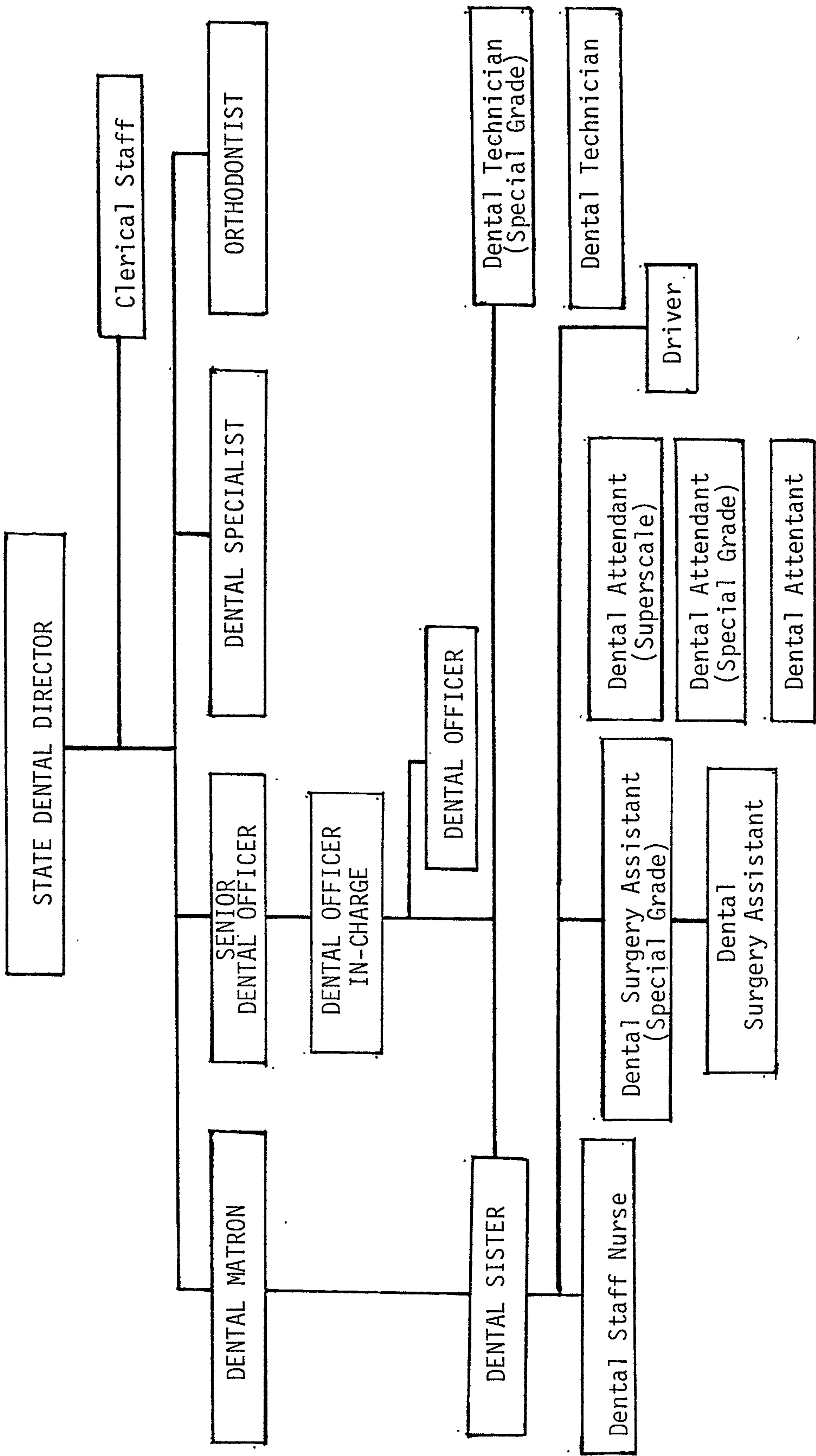
- (a) Flouridation - Since the implementation of the flouridation programme in 1969, there are now 77 plants installed in West Malaysia and 15 in Sarawak, benefiting 6 million people. The target of this programme is to install flouridation plants at all water treatment plants throughout the country, where feasible. The optimal level is maintained at 0.7 ppm and the monitoring of flouride content is carried out at the treatment plant and at the reticulation points by

FIGURE III



Source: Dental Division, Ministry of Health, Malaysia.

FIGURE IV
DENTAL DIVISION STATE LEVEL



Source: Dental Division, Ministry of Health.

senior dental officers in the district and by the Chemistry Department.

- (b) Dental Health Education Programme. The objective of the Dental Health Education Programme is to instill dental consciousness and attain behavioural changes for the improvement and maintenance of the dental health of the community.

To achieve this objective the National Dental Health Education Unit was formed in 1979 with the main function of formulating policies for the programme and coordinating activities in the states. Dental Health Units have also been set up in the various states to ensure that the various activities will be carried out at the ground level.

DHE activities include oral health instructions, tooth brushing drills, talks, lectures, flouride mouth rinsing drills, campaigns, exhibitions and others.

- (ii) Curative Dental Service.

Curative dental care is available in all dental clinics and emphasis is given to the treatment of school children, pre-school children and ante-natal mothers.

Treatment of primary school children is carried out at the school dental clinic, the mobile dental clinic, and mobile dental squad, or they may be brought for treatment at the main dental clinics and dental clinics in the health centres. Bulk of this treatment is carried out by the dental nurses. Secondary school children are encouraged to seek dental treatment at the various dental clinics and are given systematic and comprehensive treatment.

Treatment for ante-natal mothers is also being reemphasized to provide for a more comprehensive treatment.

Adequate treatment is also given to the general public for the relief of pain and provision of dentures.

Dental clinics with the services of a consultant dental surgeon are present in all the general hospitals and many of the district hospitals in the main town throughout Malaysia. Orthodontic treatment is provided by the consultant orthodontist based mainly in the capital towns.

Periodontal clinics will be set up in the near future, one in each of the capital towns.

2.5.4.4 Manpower Resources

There has been a steady increase in manpower resources due to further expansion of the government dental service and increased public awareness of dental health.

(i) Dental Surgeons

There are 736 dentists in Malaysia of which 386 are in the government service, 28 with the armed forces, 32 with the University of Malaya and 290 in the private practice (Ministry of Health, 1981d). The dentist : population ratio is 1:18,000. Prior to the establishment of the Dental Faculty in the University of Malaya, in Kuala Lumpur, the main bulk of the supply of dentists were the graduates from the University of Malaya in Singapore. The rest of the supply comes from other recognised universities mainly from the

Commonwealth countries. Since 1976 the Univeristy of Malaya produces 30 dentists per year. The figure will increase to 46 in 1983 and 64 in 1986 (see Figure V, Figure VI).

The other sources of dentists are from the approved list of Universities in India and Taiwan.

(ii) Dental Nurses (New Zealand type)

These are the only operative dental auxilliaries in Malaysia, and are trained at the Dental Training School in Penang over a period of two years. They basically follow the New Zealand type of dental nursing. On completion they work only for the government under the supervision of dental officers. The total number of dental nurses as of 1980 was 647 (Figure VII).

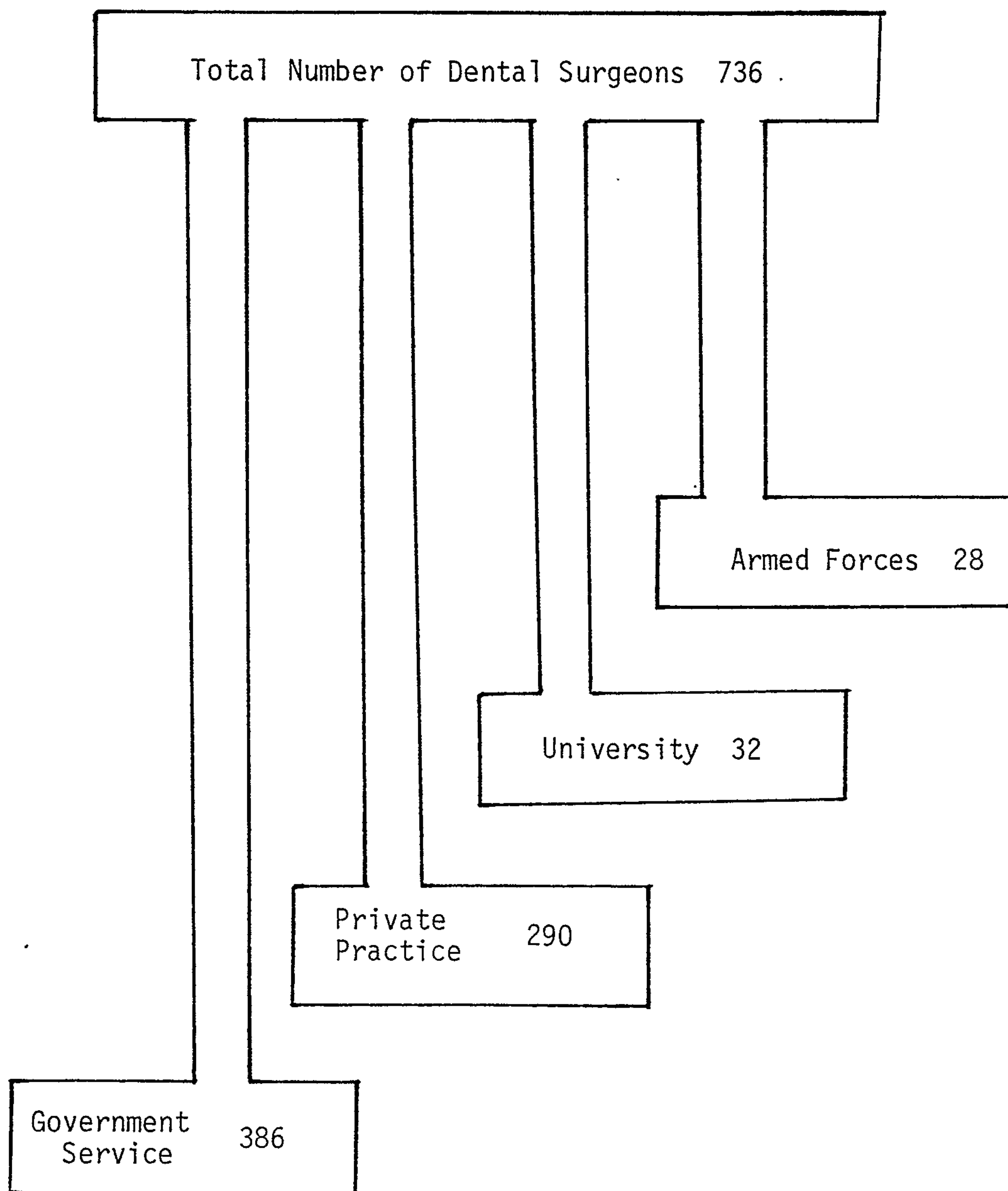
(iii) Dental Technicians

They are also trained at the Dental Training School in Penang, over a period of two years. The present annual output is 25. As of 1980, the total number in government service was 184.

(iv) Dental Surgery Assistants

In the past, training of dental surgery assistant has been an in-service programme carried out in each state under the supervision of the State Dental Directors. However, from now on they will also be trained at the Dental Nurses Training School in Penang.

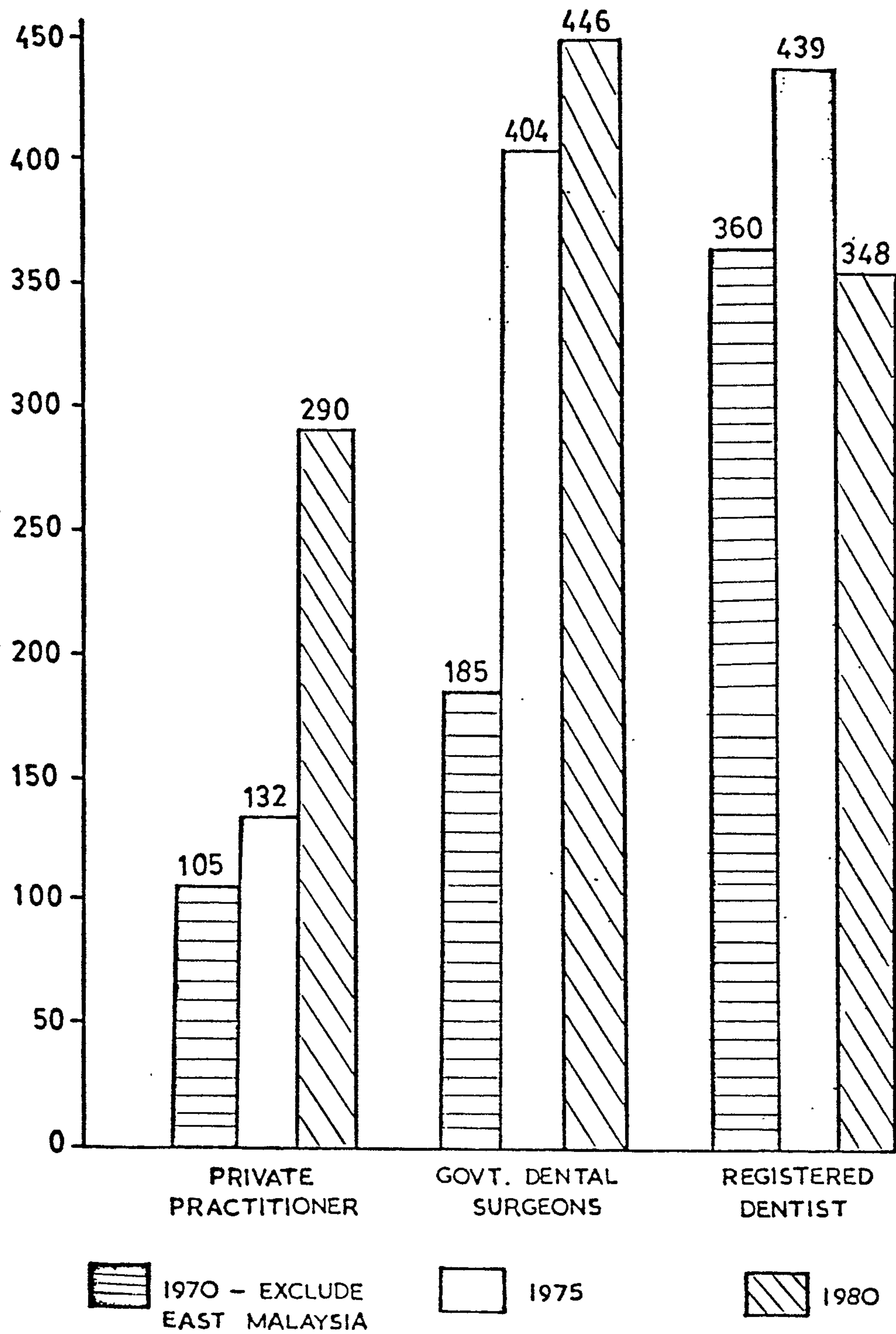
TOTAL NUMBER OF DENTAL SURGEONS
AS IN 1980
FOR THE WHOLE OF MALAYSIA



Dental Surgeon : population — 1 : 18,000

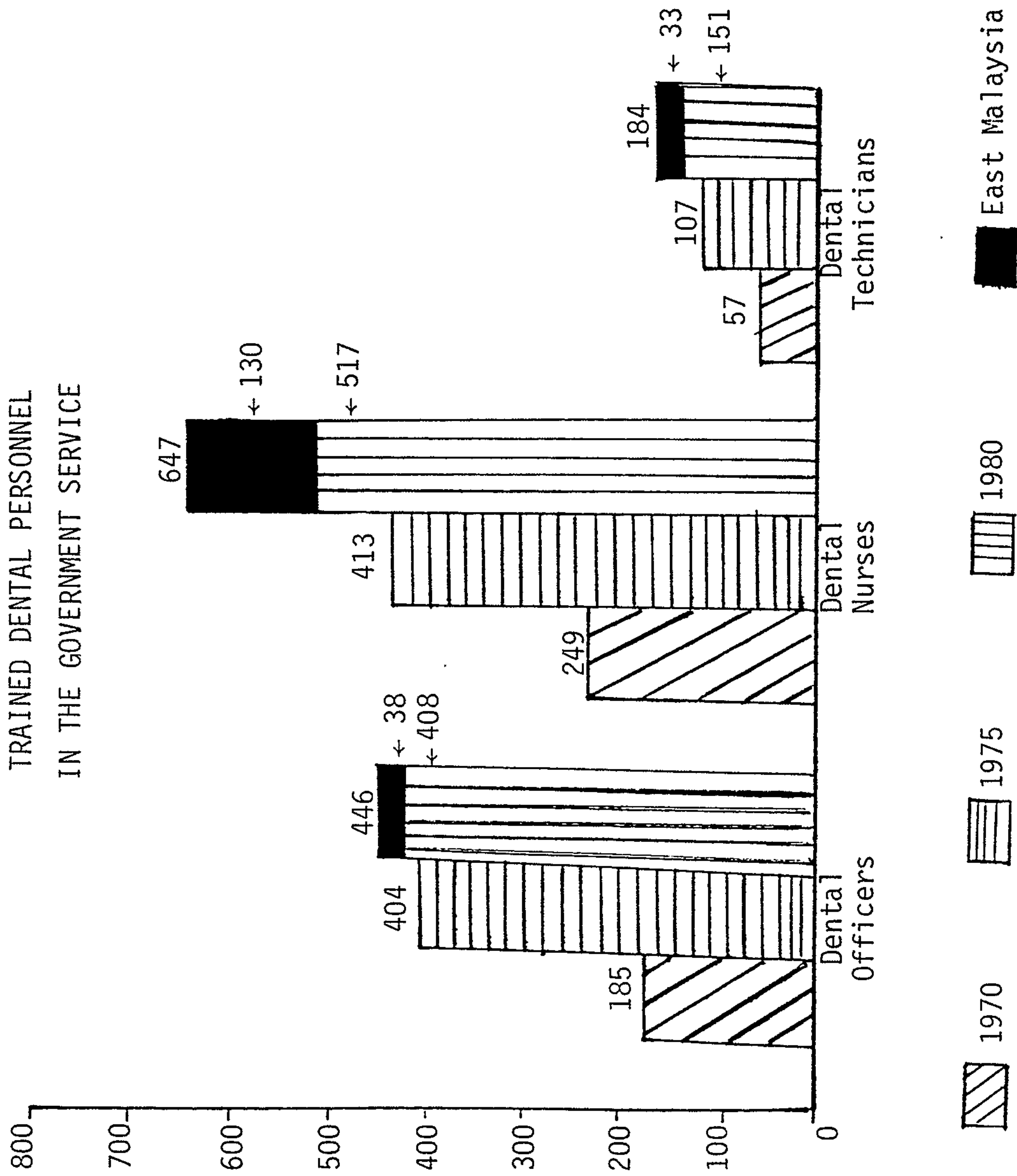
FIGURE VI

PROFESSIONAL MANPOWER
(1970 - 1980)



Source: Dental Division, Ministry of Health, Malaysia.

FIGURE VII



Source: Dental Division, Ministry of Health, Malaysia.

2.5.4.5 Types of Dental Clinics

Dental treatment is provided through a network of dental clinics in the urban and rural areas. They are of the following types: (Figure VIII).

(i) Main Dental Clinic

It is an urban clinic with dental officers and dental nurses with facilities for all types of dental treatment. Usually one in each district.

(ii) Decentralised Dental Clinic

Urban clinic with dental officers and dental nurses with facilities for all types of dental treatment. It is located in a large town and provides treatment for a specific area within the town.

(iii) Hospital Dental Clinic

Located within a hospital building with services of a consultant dental surgeon providing treatment for inpatients of the hospital, maxillo-facial cases and referrals.

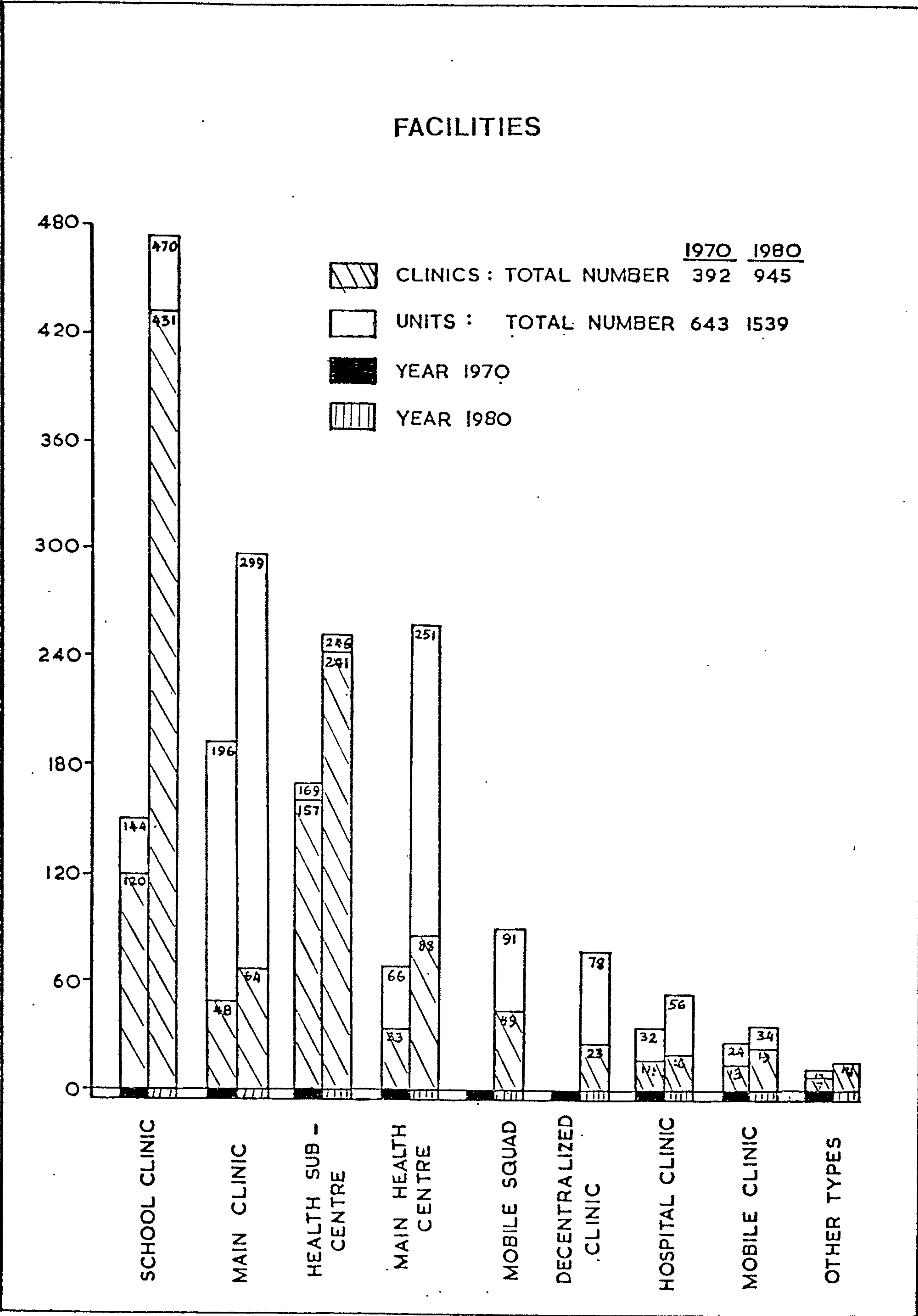
(iv) School Dental Clinic

This is a dental clinic located within a school building with full time dental nurses mainly in primary schools. Some secondary school clinics are served by dental officers.

(v) Dental Clinics in Health Centres

The Health Centres are generally located in small towns without a hospital or in rural areas. They provide health and dental care to the people living in these areas. There are two types of health centres:

FIGURE VIII



Source: Dental Division, Ministry of Health, Malaysia.

(a) Main health centres

(b) Sub-health centres.

- (a) These centres are usually staffed by a full-time medical officer and other paramedical staff. All referral cases are sent to the nearest hospital.

The dental clinic in a main health centre is staffed by a full-time dental officer and dental nurses who serve the rural population. They have other back-up para-dental staff such as dental surgery assistants and drivers.

- (b) These centres are located generally further in the rural areas and are staffed by a hospital assistant, staff nurses and other para-medical staff on a full-time basis, providing health services and mid-wifery services to the rural people.

Each sub-health centre has a dental room with a dental chair and minimal dental equipment. The dental officers and dental nurses visit these centres once a week or once a fortnight depending on the need to provide dental treatment. Some sub-health centres do have a full-time dental nurse providing dental treatment to the nearby schools in the area.

(vi) Mobile Dental Clinics

A large van converted into a dental clinic with one or more dental units in it. It provides dental treatment to schools not within easy reach of other clinics.

(vii) Mobile Dental Squads

These comprise a team of dental officers and dental nurses providing dental services to schools with small enrolment in remote rural areas which are not receiving treatment from any other clinic. Utilizing portable equipment, the team is mainly concerned with the preservation of the permanent dentition and the relief of pain.

Private Dental Practice

Dental practice in the private sector is also available in the country. However, the private practitioners are mainly concentrated in the more thickly populated urban areas. They are mainly general practitioners providing a wide range of dental treatment.

Dental Programmes under the Fourth Malaysia Plan

Under the Fourth Malaysia Plan (1981-1985) development of the dental programmes will be stepped up through increased provision of preventive services and better dental care for the population. All proposed health centres will have a dental component. More dental clinics, school dental clinics and mobile squads are planned for the country. Twelve periodontal centres to look into the curative and preventive aspects of given diseases will be set up during the Fourth Malaysia Plan. Flouridation of water in 17 public water supply schemes, benefiting two million people, will also be carried out (Fourth Malaysia Plan, 1981).

3. EPIDEMIOLOGICAL SURVEY OF DENTAL DISEASES

Prior to 1970, no dental epidemiological survey had ever been carried out in Malaysia. This was chiefly due to the shortage of adequately trained personnel for the project. However, to date three dental epidemiological surveys relating to dental diseases in the Malaysian community have been carried out successfully. They are:

1. Dental epidemiological survey of school children in West Malaysia, 1970-1975.
2. Dental epidemiological survey of adults in Peninsular Malaysia, 1974-1975.
3. Dental epidemiological survey of school children in Sarawak, 1981.

3.1 ORIGIN OF THE SURVEY

The need for a dental survey to gather valuable and properly documented data on dental diseases in Malaysia has long been felt. In 1963 Col. J. Ferris Fuller, the Dental Consultant for the W.H.O. Western Pacific Region visited Malaysia and recommended that selected officers be sent for training in dental epidemiological methods and to look into the possibility of conducting a national survey. By 1969 five such officers were available for the survey.

In 1967 Brigadier Fuller visited Malaysia again and urged the Ministry of Health to expedite the planning of the dental survey. Hence, a Dental Epidemiological Survey Committee was set up in mid-1969 and by August 1970 the dental survey team was set to go to the field.

3.2 DENTAL SURVEY OF SCHOOL CHILDREN IN WEST MALAYSIA

The first dental epidemiological survey in Malaysia was conducted on the school children in West Malaysia by the Dental Division of the Ministry of Health. The objective of the survey was to have a reliable estimate of the dental health problems among school children in the country. A sample of 15,197 children from 47 schools were examined. A stratified cluster random sampling design was employed.

The survey revealed that about 60 per cent of all children examined suffer from inflammation of the gingiva. In different age groups more than 50 per cent of the children are affected, the peak being at 11 years of age where it is 17 per cent. Among the three major ethnic groups, the Chinese show the highest prevalence (63.9%) and Indians/Pakistanis (52.9%) (Ministry of Health, 1972b).

3.3 RESULTS OF THE DENTAL SURVEY

The results of the dental epidemiological survey of school children in West Malaysia conducted in 1970 pertaining to the periodontal status are summarized below.

3.3.1 Materia Alba

More than 50 per cent of children between the age of 7 and 13 years showed materia alba accumulations. After the age of 13 years there is a gradual decline. There is no appreciable difference in materia alba accumulations between the three major ethnic groups in the lower age groups, but in the 15-18 year olds, the Indian/Pakistanis have relatively greater numbers showing the presence of materia alba (Table 1 and Figure IX).

3.3.2 Calculus

The survey revealed that the number of children with calculus deposits increases progressively with age. It was found that even at the age of 6 years, 32.1 per cent of children are affected. From 6 to 10 years of age, children have supragingival calculus, whereas from age 11 onwards the combination of supra and subgingival calculus is more evident.

The number of Chinese children (36.7%) with calculus deposits is considerably less than that found in Malays (59.2%) and Indians/Pakistanis (56.3%), the difference being more marked in younger age groups (Table 2 and Figure X).

3.3.3 Inflammation of Gingiva

About 60 per cent of the children examined suffer from inflammation of the gingiva. In the different age groups more than 50 per cent of the children are affected, the peak being at 11 years of age where it is 67 per cent. Among the three major ethnic groups, the Chinese show the highest prevalence (63.9%) of gingivitis as compared to the Malays (55.2%) and Indians/Pakistanis (52.9%) (Table 3 and Figure XI).

The mean number of inflamed gingival units for all ethnic groups between the age of 6 to 18 is 2.8. There are no marked differences between the means of the three major ethnic groups, Malays having 2.9, Chinese 2.8, and the Indians/Pakistanis 2.1.

The highest number of inflamed gingival units per child occurs among the 14 year olds for the Malays (3.8), the 12 year olds for the Chinese (3.9) and the 18 year olds for the Indians/Pakistanis (4.7).

About 40 per cent of the school children examined are free from inflammation of the gingiva. 40 per cent of them have one to five inflamed gingival units and the remaining 20 per cent have six or more inflamed gingival units (Table 4 and Table 5).

TABLE 1

DENTAL EPIDEMIOLOGICAL SURVEY, SCHOOL CHILDREN, WEST MALAYSIA, 1970-1971

CHILDREN WITH MATERIA ALBA BY AGE AND BY ETHNIC GROUP

Age (In Years)	MALAYS			CHINESE			INDIANS/PAKISTANIS			OTHERS			ALL ETHNIC GROUPS		
	No. Examined	Affected		No. Examined	Affected		No. Examined	Affected		No. Examined	Affected		No. Examined	Affected	
		No.	%		No.	%		No.	%		No.	%		No.	%
6	497	150	30.2	292	123	41.2	109	35	32.1	11	1	9.1	909	309	34.0
7	837	424	50.7	732	438	59.8	166	88	53.0	8	4	50.0	1,743	954	54.7
8	813	456	56.1	727	484	66.6	184	112	60.9	15	10	66.7	1,739	1,062	61.1
9	793	494	62.3	671	416	62.0	139	87	62.6	8	6	75.0	1,611	1,003	62.3
10	815	458	56.2	683	409	59.9	134	85	63.4	3	3	100.0	1,635	955	58.4
11	720	399	55.4	543	300	55.2	103	67	65.0	9	3	33.3	1,375	769	55.9
12	966	540	55.9	517	307	59.4	143	105	73.4	6	4	66.7	1,632	956	58.6
13	814	460	56.5	387	195	50.4	161	113	70.2	3	1	33.3	1,365	769	56.3
14	828	357	43.1	320	138	43.1	173	110	63.6	7	1	14.3	1,328	606	45.6
15	554	190	34.4	236	89	37.7	129	75	58.1	2	0	0	921	354	38.4
16	271	76	28.0	175	41	23.4	85	37	43.5	3	0	0	534	154	28.8
17	133	27	20.3	121	27	22.3	40	17	42.5	3	2	66.7	297	73	24.6
18	24	7	29.2	60	11	18.3	18	9	50.0	0	0	0	102	27	26.5
6-18	8,065	4,038	50.1	5,464	2,978	54.5	1,584	940	59.3	78	35	44.9	15,191	7,991	52.6

NOTE: Unknown Subjects: Malaya 4: Chinese 1: Indians/Pakistanis 1.

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 2

**DENTAL EPIDEMIOLOGICAL SURVEY, SCHOOL
CHILDREN, WEST MALAYSIA, 1970-1971**

**CHILDREN WITH CALCULUS BY AGE AND BY TYPE—ALL
ETHNIC GROUPS**

Age (In Years)	No. Examined	NUMBER WITH CALCULUS				Percentage with Calculus to Number Examined
		Supra- Gingival	Sub- Gingival	Supra- and Sub- Gingival	Total	
6.. ..	909	201	3	88	292	32.1
7.. ..	1,743	403	8	179	590	33.8
8.. ..	1,739	416	4	176	596	34.2
9.. ..	1,611	389	16	289	694	43.0
10.. ..	1,635	426	11	415	852	52.1
11.. ..	1,375	333	20	401	754	54.8
12.. ..	1,632	356	49	525	930	56.9
13.. ..	1,365	182	73	575	830	80.8
14.. ..	1,328	219	96	594	909	68.4
15.. ..	921	127	66	448	641	69.5
16.. ..	534	57	49	253	359	67.2
17.. ..	297	33	18	149	200	67.3
18.. ..	102	11	10	45	66	64.7
6-18.. ..	15,191	3,153	423	4,037	7,713	50.8

Note: Unknown Subjects: 6.

Source: Dental Division, Ministry of Health, Malaysia

DENTAL EPIDEMIOLOGICAL SURVEY, SCHOOL CHILDREN, WEST MALAYSIA, 1970-1971

TABLE 3

CHILDREN WITH INFLAMMATION OF GINGIVA BY AGE AND BY ETHNIC GROUP

Age (In Years)	MALAYS			CHINESE			INDIANS/PAKISTANIS			OTHERS			ALL ETHNIC GROUPS		
	No. Examined	Affected		No. Examined	Affected		No. Examined	Affected		No. Examined	Affected		No. Examined	Affected	
		No.	%		No.	%		No.	%		No.	%		No.	%
6	..	497	276	55.5	292	146	50.0	109	46	42.2	11	2	909	470	51.7
7	..	837	485	57.9	732	447	61.1	166	67	40.4	8	4	1,743	1,003	57.5
8	..	813	493	60.6	727	484	66.6	184	98	53.3	15	6	1,739	1,081	62.2
9	..	793	486	61.3	671	439	65.4	139	69	49.6	8	4	1,611	998	61.9
10	..	815	531	65.2	683	449	65.7	134	82	61.2	3	3	1,635	1,065	65.1
11	..	720	462	64.2	543	384	70.7	103	70	68.0	9	5	1,375	921	67.0
12	..	966	540	55.9	517	360	69.6	143	83	58.0	6	3	1,632	986	60.4
13	..	814	484	59.5	387	212	54.8	161	86	53.4	3	2	1,365	784	57.4
14	..	828	175	61.4	320	187	58.4	173	90	52.0	7	3	1,328	800	60.2
15	..	554	313	56.5	236	136	57.6	129	75	58.1	2	1	921	525	57.0
16	..	271	132	48.7	175	97	55.4	85	40	47.1	3	0	534	269	50.4
17	..	133	62	46.6	121	65	53.7	40	20	50.0	3	2	297	147	50.2
18	..	24	10	41.7	60	30	50.0	18	12	66.7	0	0	102	52	51.0
6-18	..	8,065	4,449	55.2	5,464	3,436	62.9	1,584	838	52.9	78	35	15,191	9,103	59.9

NOTE—Unknown Subjects: Malays—4; Chinese—1; Indians/Pakistanis—1.

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 4

DENTAL EPIDEMIOLOGICAL SURVEY, SCHOOL CHILDREN, WEST MALAYSIA, 1970-1971

NUMBER OF INFLAMED GINGIVAL UNITS PER CHILD BY AGE AND BY ETHNIC GROUP

Age (In Years)	MALAYS			CHINESE			INDIANS/PAKISTANIS			OTHERS			ALL ETHNIC GROUPS		
	Inflamed Gin. Units			Inflamed Gin. Units			Inflamed Gin. Units			Inflamed Gin. Units			Inflamed Gin. Units		
	No. Examined	Mean	S.D.	No. Examined	Mean	S.D.	No. Examined	Mean	S.D.	No. Examined	Mean	S.D.	No. Examined	Mean	S.D.
6	497	2.0	2.7	292	1.8	2.3	109	1.3	1.9	11	0.6	1.4	909	1.8	2.5
7	837	2.1	2.5	732	2.2	2.5	166	1.4	2.3	8	2.0	3.2	1,743	2.1	2.5
8	813	2.4	3.3	727	2.4	2.7	184	1.6	2.1	15	1.5	2.2	1,739	2.3	2.9
9	793	2.7	3.5	671	2.5	2.9	139	2.1	3.2	8	2.4	4.5	1,611	2.5	3.2
10	815	2.9	3.6	683	2.7	3.1	134	2.3	3.0	3	2.0	1.4	1,635	2.8	3.3
11	720	3.1	3.7	543	3.4	3.5	103	3.6	4.2	9	2.0	2.1	1,375	3.2	3.6
12	966	2.9	3.9	517	3.9	4.1	143	2.8	3.5	6	4.5	5.3	1,632	3.2	4.0
13	814	3.5	4.2	387	3.3	4.3	161	2.6	3.4	3	6.0	4.3	1,365	3.3	4.2
14	828	3.8	4.5	320	3.7	4.4	173	2.9	4.2	7	2.6	4.4	1,328	3.6	4.5
15	554	3.3	4.5	236	3.4	4.3	129	3.1	3.9	2	1.0	1.0	921	3.3	2.4
16	271	2.9	4.5	175	3.0	3.9	85	3.0	4.0	3	0	0	534	3.0	4.2
17	1,133	2.6	4.0	1,121	3.0	3.8	40	2.5	3.7	3	3.3	3.4	297	2.8	3.9
18	24	3.4	5.0	60	2.4	2.8	18	4.7	4.5	0	0	0	102	3.0	3.9
6-18	8,065	2.9	3.8	5,464	2.8	3.4	1,584	2.4	3.4	78	2.1	3.4	15,191	2.8	3.6

NOTE: Unknown Subjects: Malays 4; Chinese 1; Indians/Pakistanis 1.

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 5

DENTAL EPIDEMIOLOGICAL SURVEY, SCHOOL CHILDREN, WEST MALAYSIA, 1970-1971

DISTRIBUTION OF CHILDREN BY NUMBER OF INFLAMED GINGIVAL UNITS BY ETHNIC GROUP

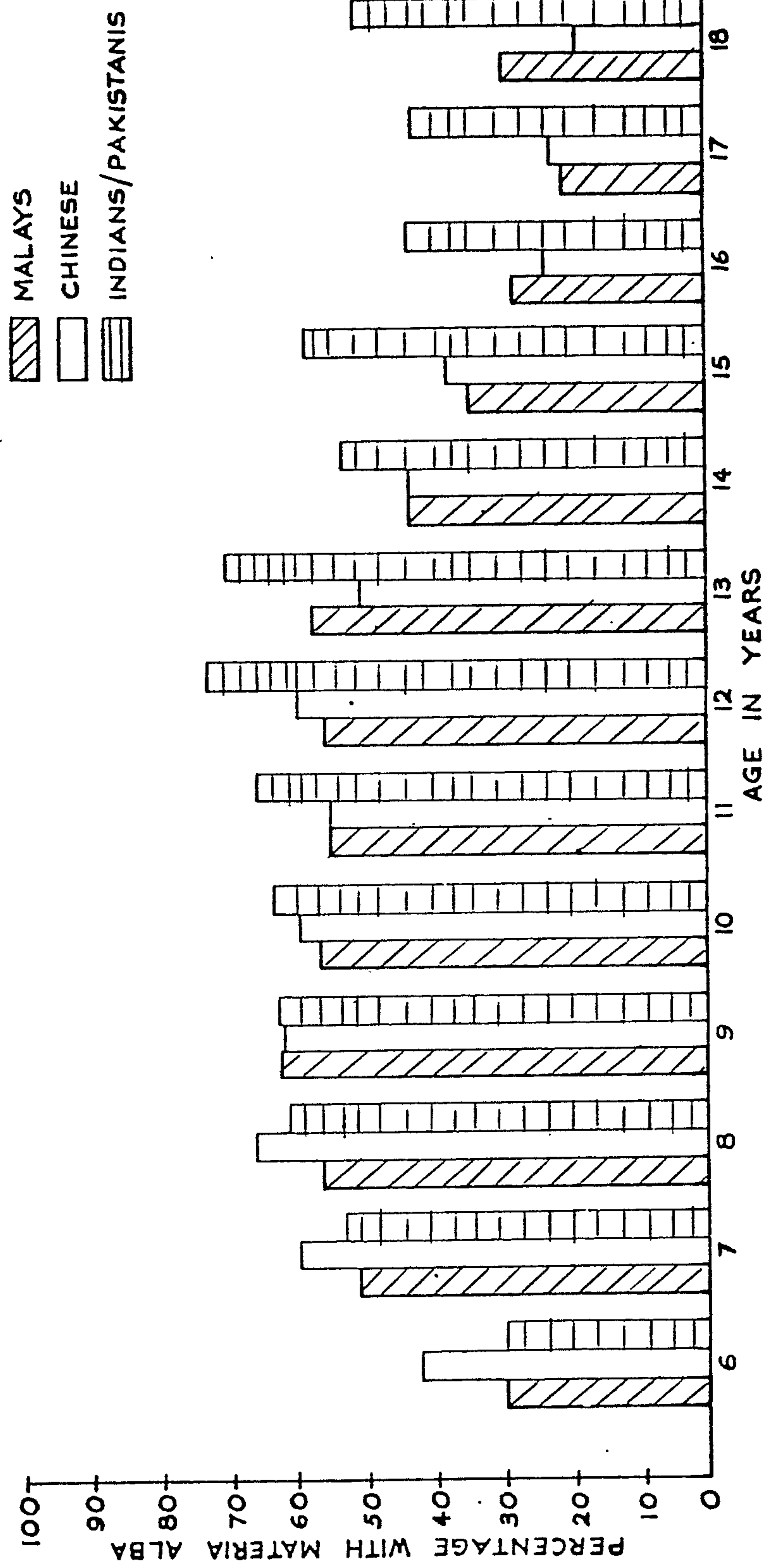
No. of Units	MALAYS		CHINESE		INDIANS/PAKISTANIS		OTHERS		ALL ETHNIC GROUPS		
	No.	Affected %	No.	Affected %	No.	Affected %	No.	Affected %	No.	Affected %	
0	..	3,283	40.7	2,035	37.2	745	47.0	43	55.0	6,106	40.2
1-2	..	1,576	19.5	1,099	20.1	316	20.0	12	15.4	3,003	19.8
3-5	..	1,618	20.1	1,325	24.2	264	16.7	12	15.4	3,219	21.2
6-9	..	1,019	12.6	712	13.0	169	10.7	6	7.7	1,906	12.5
10+	..	572	7.1	294	5.4	91	5.7	5	6.4	962	6.3
ALL	..	8,068	100.0	5,465	100.0	1,585	100.0	78	100.0	15,196	100.0

NOTE: Unknown Subjects: Malays 1.

Source: Dental Division, Ministry of Health, Malaysia.

FIGURE IX

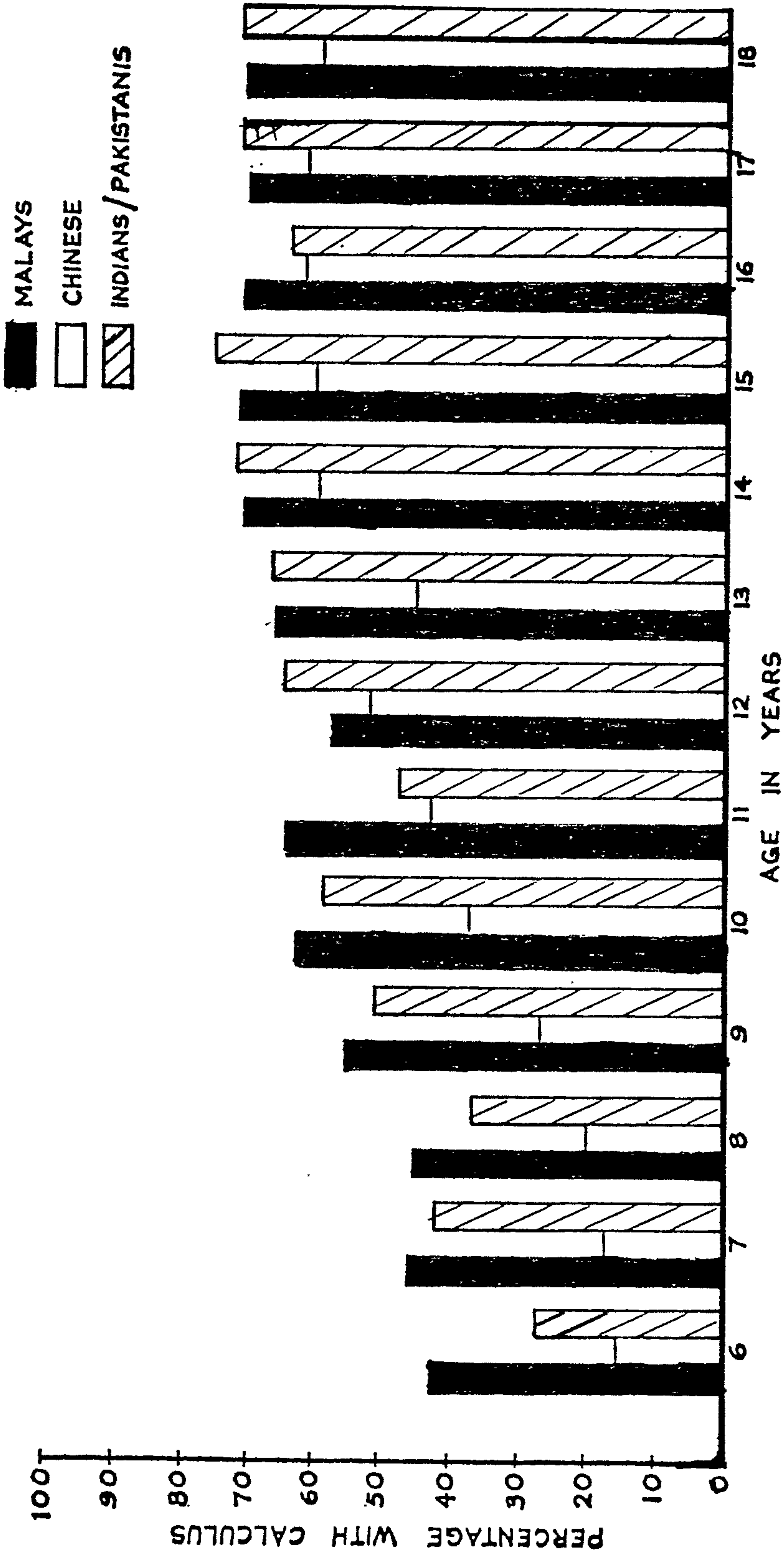
PERCENTAGE OF CHILDREN WITH MATERIA ALBA
BY AGE AND BY ETHNIC GROUP



Source: Dental Division, Ministry of Health, Malaysia.

FIGURE X

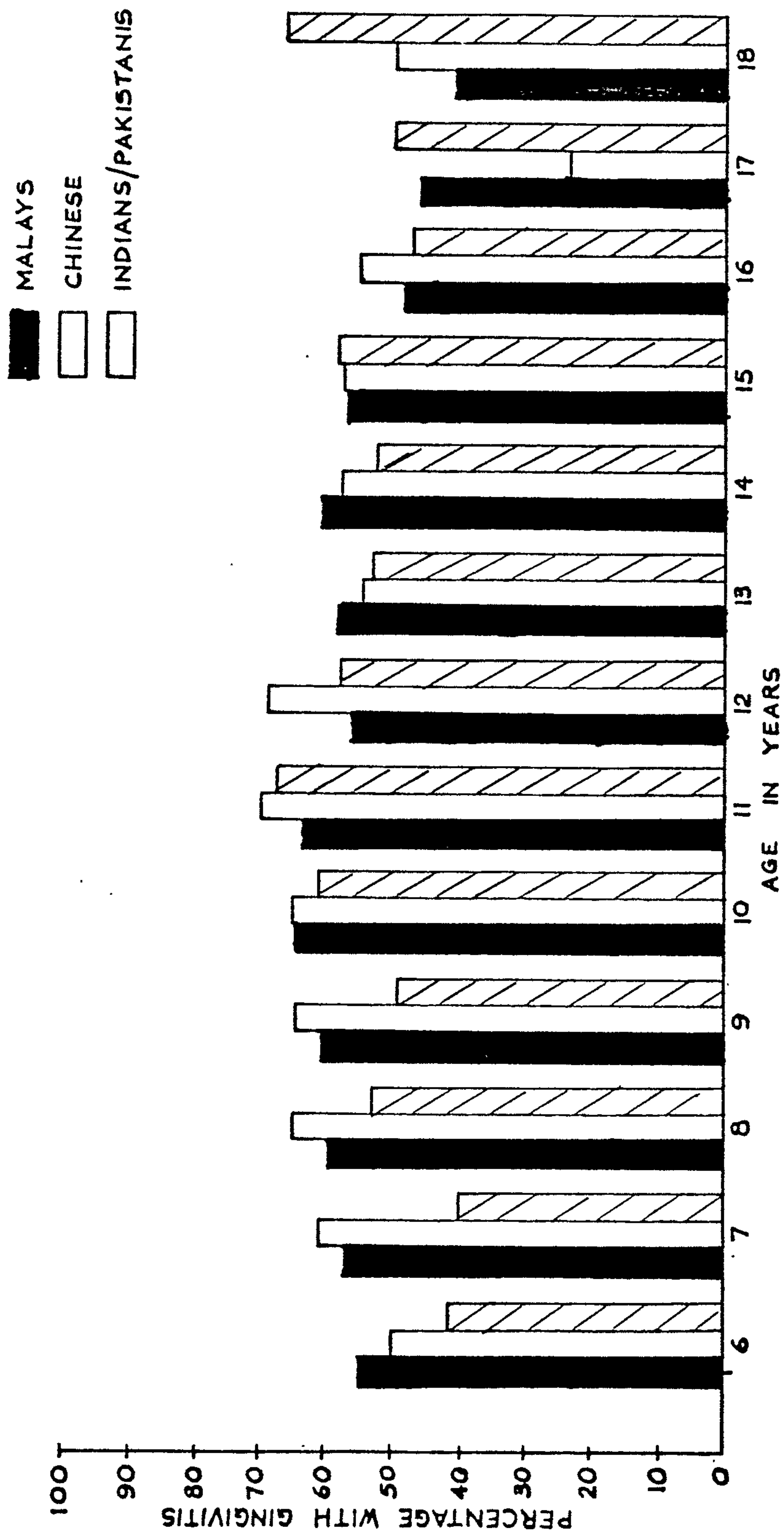
PERCENTAGE OF CHILDREN WITH CALCULUS
BY AGE AND BY ETHNIC GROUP



Source: Dental Division, Ministry of Health, Malaysia.

FIGURE XI

CHILDREN WITH INFLAMMATION OF GINGIVA
BY AGE AND BY ETHNIC GROUP



Source: Dental Division, Ministry of Health, Malaysia.

3.4 DENTAL SURVEY OF ADULTS

Having successfully carried out the dental epidemiological survey of school children in West Malaysia, the Dental Division of the Ministry of Health felt the need to complete the dental picture with the survey of the adult population. Hence, at the World Health Organisation Regional Workshop in Dental Health Services in the Western Pacific Region held in Singapore in 1972 following discussions between the Malaysian delegates and the consultants in the workshop, it was indicated that the W.H.O. would be prepared to provide assistance in the form of funds by means of contractual technical service agreement, if the Dental Division of the Ministry of Health, Malaysia, would carry out an adult dental survey in Peninsular Malaysia.

On their return, the Malaysian delegates briefed the Ministry of Health, which then decided to accept the offer of W.H.O. In 1972 an agreement to carry out the survey was signed by the Director General of Health, Malaysia, on behalf of the Ministry of Health and an official representative of the W.H.O., Geneva, on behalf of the World Health Organisation (Ministry of Health, 1977c).

In late 1973 a working committee was formed to plan and carry out the survey, and in September 1974 the survey began.

The survey was a random sample of the adult population, aged 15 years and above in Peninsular Malaysia. Sampling was based on the enumeration blocks used in the national census 1970. A total of 9,061 persons from 300 randomly selected clusters comprised the sample.

The survey revealed that periodontal disease was widely prevalent in the Malaysian community. It revealed that 72.4 per cent of the subjects have some form of periodontal disease, with 29.0 per cent having periodontal pockets greater than 3 mm (Ministry of Health, 1977d).

3.5 RESULTS OF THE DENTAL SURVEY OF ADULTS

The results of the dental survey of adults carried out in West Malaysia in 1975 are summarized below.

3.5.1 Tooth Cleansing Habits

According to the survey 81.4 per cent of the adults questioned stated that they use toothbrushes to clean their teeth. However, there was no appreciable difference between the two sexes.

The survey also revealed that 13.4 per cent do not have any cleaning habit whatsoever, and that 51.1 per cent utilize other forms of cleansing which include chewing twigs or using fingers with powdered charcoal or salt (Table 6 and Figure XII).

3.5.2 Tooth Cleansing Habits vs. Education by Age Group

The total number of subjects examined were 9,015 out of which 2,506 (27.8%) were without any education and 6,509 (72.2%) were with education. Out of those with education 4,303 (47.7%) went through primary education, 2,138 (23.7%) secondary education and 68 (0.8%) tertiary education.

The survey revealed that 58.6% per cent of those subjects with no education use toothbrushes to clean their teeth. 86.8% with primary education clean their teeth with toothbrushes as compared to 97.0 per cent for those with tertiary education indicated that they use toothbrushes to clean their teeth (Table 7a and Table 7b).

3.5.3 Periodontal Disease Status

The survey revealed that periodontal disease is widely prevalent in the adults. 72.4 per cent of the sample have periodontal disease of one form or another. 31.2 per cent exhibit the destructive stage of the disease while 21.0 per cent the mild inflammation stage (Table 8a and Table 8b, Figure XIII).

3.5.4 Periodontal Disease - Subjects with One or More Teeth with Pockets > 3 mm

2.628 (19.0%) of the subjects examined have one or more teeth with pockets greater than 3 mm and of the 9,047 examined the number of teeth with pockets greater than 3 mm is 10,513 giving a mean of 1.2 and a standard deviation of 2.8 (Tables 9a and 9b, Figure XIV).

3.5.5 Periodontal Disease - Teeth with or without Pockets > 3 mm Indicated for Extraction

The Indian/Pakistani in the age groups 35 years and above have a relatively higher value for the mean number of teeth indicated for extraction due to periodontal disease with or without pockets.

There is, however, not much difference between the Indian/Pakistani and Malay group in the younger age groups (Tables 10a and 10b).

TABLE 6

TOOTH CLEANSING HABITS—BY AGE GROUP, SEX AND ETHNIC GROUP

Age Group	Ethnic Group	Sex	Number of Subjects Examined	No. Cleansing Habit		Toothbrushing Habit		Other Forms	
				No.	Total	No.	Total	No.	Total
All Age Groups (15-65+)	Malay	Male	2,183	383	860	1,718	4,138	82	209
		Female	3,024	477	860	2,420	4,138	127	209
Chinese		Male	1,075	103	287	968	2,527	4	13
		Female	1,752	184	287	1,559	2,527	9	13
Ind./Pak.		Male	420	24	40	299	661	97	227
		Female	508	16	40	362	661	130	227
Others		Male	39	21	28	14	34	4	13
		Female	36	7	28	20	34	9	13
All Ethnic Groups		Male	3,717	531	1,215	2,999	7,360	187	462
		Female	5,320	684	1,215	4,361	7,360	275	462

Missing Observations: 24

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 7a

TOOTH CLEANSING HABITS VS. EDUCATION—BY AGE GROUP

Age Group	Tooth Cleansing Habits	No Education		Primary		Secondary		Tertiary		Total Number of Subjects Examined	
		No.	%	No.	%	No.	%	No.	%	No.	%
15-19 ..	No Cleansing Habit ..	16	20.3	10	1.6	17	1.7	0	0.0	43	2.5
	Tooth Brushing ..	58	73.4	605	95.4	954	97.3	3	100.0	1,620	95.5
	Other Forms ..	5	6.3	19	3.0	10	1.0	0	0.0	34	2.0
	No. of Subjects Examined ..	79	100.0	634	100.0	981	100.0	3	100.0	1,697	100.0
20-24 ..	No Cleansing Habit ..	13	13.4	15	2.1	7	1.4	0	0.0	35	2.7
	Tooth Brushing ..	77	79.4	657	93.9	484	98.4	24	100.0	1,242	94.5
	Other Forms ..	7	7.2	28	4.0	1	0.2	0	0.0	36	2.7
	No. of Subjects Examined ..	97	100.0	700	100.0	492	100.0	24	100.0	1,313	100.0
25-29 ..	No Cleansing Habit ..	18	14.0	27	4.1	2	0.8	0	0.0	47	4.5
	Tooth Brushing ..	102	79.0	614	92.6	243	97.2	10	100.0	969	92.1
	Other Forms ..	9	7.0	22	3.3	5	2.0	0	0.0	36	3.4
	No. of Subjects Examined ..	129	100.0	663	100.0	250	100.0	10	100.0	1,052	100.0
30-34 ..	No Cleansing Habit ..	26	14.5	27	5.2	2	1.2	0	0.0	55	6.3
	Tooth Brushing ..	138	77.1	472	91.5	157	97.5	12	100.0	779	89.8
	Other Forms ..	15	8.4	17	3.3	2	1.2	0	0.0	34	3.9
	No. of Subjects Examined ..	179	100.0	516	100.0	161	100.0	12	100.0	868	100.0
35-44 ..	No Cleansing Habit ..	128	23.6	55	6.6	3	2.0	0	0.0	186	12.0
	Tooth Brushing ..	364	67.0	723	86.5	146	96.0	14	100.0	1,247	80.7
	Other Forms ..	51	9.4	58	6.9	3	2.0	0	0.0	112	7.3
	No. of Subjects Examined ..	543	100.0	836	100.0	152	100.0	14	100.0	1,545	100.0

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 7b

TOOTH CLEANSING HABITS VS. EDUCATION—BY AGE GROUP

Age Group	Tooth Cleansing Habits	No Education		Primary		Secondary		Tertiary		Total Number of Subjects Examined	
		No.	%	No.	%	No.	%	No.	%	No.	%
45-54 ..	No Cleansing Habit ..	171	30.0	89	16.4	4	6.8	0	0.0	264	22.5
	Tooth Brushing ..	348	61.1	428	79.0	53	89.8	3	100.0	832	70.9
	Other Forms ..	51	8.9	25	4.6	2	3.4	0	0.0	78	6.6
	No. of Subjects Examined ..	570	100.0	542	100.0	59	100.0	3	100.0	1,174	100.0
55-64 ..	No Cleansing Habit ..	184	40.7	68	25.0	2	7.1	0	0.0	254	33.7
	Tooth Brushing ..	219	48.5	179	65.8	26	92.9	2	100.0	426	56.5
	Other Forms ..	49	10.8	25	9.2	0	0.0	0	0.0	74	9.8
	No. of Subjects Examined ..	452	100.0	272	100.0	28	100.0	2	100.0	754	100.0
65+ ..	No Cleansing Habit ..	262	57.3	70	50.0	3	20.0	0	0.0	335	54.7
	Tooth Brushing ..	163	35.7	57	40.7	12	80.0	0	0.0	232	37.9
	Other Forms ..	32	7.0	13	9.3	0	0.0	0	0.0	45	7.4
	No. of Subjects Examined ..	457	100.0	140	100.0	15	100.0	0	0.0	612	100.0
All Age Groups (15-65+)	No Cleansing Habit ..	818	32.6	361	8.4	40	1.9	0	0.0	1,219	13.5
	Tooth Brushing ..	1,469	58.6	3,735	86.8	2,075	97.0	68	100.0	7,347	81.5
	Other Forms ..	219	8.8	207	4.8	23	1.1	0	0.0	449	5.0
	No. of Subjects Examined ..	2,506	100.0	4,303	100.0	2,138	100.0	68	100.0	9,015	100.0

Missing Observations: 46

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 8a

PERIODONTAL DISEASE—BY AGE GROUP AND ETHNIC GROUP

Age Group	Ethnic Group	Number of Subjects Examined	Mild Inflammation		Intense Gingivitis		Destructive Perio. Disease		Total Number of Subjects Affected	
			No.	%	No.	%	No.	%	No.	%
15-19	Malay	941	311	33.1	135	14.3	94	10.0	540	57.4
	Chinese	533	191	35.8	133	25.0	49	9.2	373	70.0
	Ind./Pak.	210	67	31.9	35	16.7	30	14.3	132	62.9
	Others	13	5	38.5	1	7.7	1	7.7	7	53.9
	All Ethnic Groups	1,697	574	33.8	304	17.9	174	10.3	1,052	62.0
20-24	Malay	763	239	31.3	187	24.5	113	14.8	539	70.6
	Chinese	371	80	21.6	124	33.4	59	15.9	263	70.9
	Ind./Pak.	164	51	31.1	32	19.5	35	21.3	118	72.0
	Others	15	7	46.7	2	13.3	2	13.3	11	73.3
	All Ethnic Groups	1,313	377	28.8	345	26.3	209	15.9	931	70.9
25-29	Malay	612	160	26.1	160	26.1	152	24.8	472	77.1
	Chinese	316	74	23.4	119	37.7	53	16.8	246	77.9
	Ind./Pak.	117	28	23.9	25	21.4	25	21.4	78	66.7
	Others	7	3	42.9	1	14.3	2	28.6	6	85.7
	All Ethnic Groups	1,052	265	25.2	305	29.0	232	22.1	802	76.2
30-34	Malay	508	106	20.9	121	23.8	163	32.1	390	76.8
	Chinese	294	69	23.5	100	34.0	64	21.8	233	79.3
	Ind./Pak.	61	13	21.3	13	21.3	16	26.2	42	68.9
	Others	5	1	20.0	1	20.0	1	20.0	3	60.0
	All Ethnic Groups	868	189	21.8	235	27.1	244	28.1	668	77.0
35-44	Malay	927	131	14.1	197	21.3	411	44.3	739	79.7
	Chinese	444	101	22.8	117	26.4	147	33.1	365	82.2
	Ind./Pak.	158	33	20.9	23	14.6	69	43.7	125	79.1
	Others	16	3	18.8	2	12.5	10	62.5	15	93.8
	All Ethnic Groups	1,545	268	17.4	339	21.9	637	41.2	1,244	80.5

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 8b

PERIODONTAL DISEASE—BY AGE GROUP AND ETHNIC GROUP

Age Group	Ethnic Group	Number of Subjects Examined	Mild Inflammation		Intense Gingivitis		Destructive Perio. Disease		Total Number of Subjects Affected	
			No.	%	No.	%	No.	%	No.	%
45-54	Malay	732	62	8.5	91	12.4	425	58.1	578	79.0
	Chinese	344	53	15.4	77	22.4	127	36.9	257	74.7
	Ind./Pak.	119	12	10.1	8	6.7	85	71.4	105	88.2
	Others	11	4	36.4	0	0.0	4	36.4	8	72.7
	All Ethnic Groups	1,206	131	10.9	176	14.6	641	53.2	948	78.6
55-64	Malay	432	27	6.3	26	6.0	254	58.8	307	71.1
	Chinese	256	31	12.1	50	19.5	105	41.0	186	72.7
	Ind./Pak.	61	8	13.1	1	1.6	42	68.9	51	83.6
	Others	5	0	0.0	2	40.0	2	40.0	4	80.0
	All Ethnic Groups	754	66	8.8	79	10.5	403	53.6	548	72.7
65+	Malay	297	11	3.7	15	5.1	138	46.5	164	55.2
	Chinese	272	19	7.0	29	10.7	118	43.4	166	61.0
	Ind./Pak.	40	2	5.0	1	2.5	24	60.0	27	67.5
	Others	3	0	0.0	0	0.0	2	66.7	2	66.7
	All Ethnic Groups	612	32	5.2	45	7.4	282	46.1	359	58.7
All Age Groups (15-65+)	Malay	5,212	1,047	20.1	932	17.9	1,750	33.6	3,729	71.6
	Chinese	2,830	618	21.8	749	26.5	722	25.5	2,089	73.8
	Ind./Pak.	930	214	23.0	138	14.8	326	35.1	678	72.9
	Others	75	23	30.7	9	12.0	24	32.0	56	74.7
	All Ethnic Groups	9,047	1,902	21.0	1,828	20.2	2,822	31.2	6,552	72.4

Missing Observations: 14

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 9a

PERIODONTAL DISEASE—SUBJECTS WITH ONE OR MORE TEETH WITH POCKETS > 3mm
BY AGE GROUP AND ETHNIC GROUP

Age Group	Ethnic Group	Number of Subjects Examined	Teeth with Pockets > 3mm			Subjects with One or More Teeth with Pockets > 3mm	
			No.	Mean	S.D.	No.	%
15-19	Malay ..	941	310	0.3	1.4	96	10.2
	Chinese ..	533	164	0.3	1.2	52	9.8
	Ind./Pak. ..	210	125	0.6	2.0	29	13.8
	Others ..	13	9	0.7	2.5	1	7.7
	All Ethnic Groups	1,697	608	0.4	1.4	178	10.5
20-24	Malay ..	763	460	0.6	1.9	124	16.3
	Chinese ..	371	168	0.5	1.5	61	16.4
	Ind./Pak. ..	164	121	0.7	2.1	42	25.6
	Others ..	15	13	0.9	2.6	2	13.3
	All Ethnic Groups	1,313	762	0.6	1.8	229	17.4
25-29	Malay ..	612	639	1.0	2.6	147	24.0
	Chinese ..	316	156	0.5	1.4	60	19.0
	Ind./Pak. ..	117	108	0.9	2.4	28	23.9
	Others ..	7	11	1.6	3.7	2	28.6
	All Ethnic Groups	1,052	914	0.9	2.3	237	22.5
30-34	Malay ..	508	692	1.4	3.0	177	34.8
	Chinese ..	294	176	0.6	1.5	115	39.1
	Ind./Pak. ..	61	103	1.7	4.0	21	34.4
	Others ..	5	3	0.6	1.3	2	40.0
	All Ethnic Groups	868	974	1.1	2.7	315	36.3
35-44	Malay ..	927	2,169	2.3	4.1	381	41.1
	Chinese ..	444	351	0.8	1.8	150	33.8
	Ind./Pak. ..	158	322	2.0	3.6	66	41.8
	Others ..	16	67	4.2	5.0	8	50.0
	All Ethnic Groups	1,545	2,909	1.9	3.6	605	39.2

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 9b
PERIODONTAL DISEASE—SUBJECTS WITH ONE OR MORE TEETH WITH POCKETS>3mm
BY AGE GROUP AND ETHNIC GROUP

Age Group	Ethnic Group		Number of Subjects Examined	Teeth with Pockets > 3mm			Subjects with One or More Teeth with Pockets > 3mm	
				No.	Mean	S.D.	No.	%
45-54	Malay	..	732	1,876	2.6	4.1	360	49.2
	Chinese	..	344	271	0.8	1.9	107	31.1
	Ind./Pak.	..	119	417	3.5	4.6	74	62.2
	Others	..	11	31	2.8	6.5	4	36.4
	All Ethnic Groups	..	1,206	2,595	2.2	3.8	545	45.2
55-64	Malay	..	432	747	1.7	2.9	197	45.6
	Chinese	..	256	192	0.8	1.6	90	35.2
	Ind./Pak.	..	61	181	3.0	4.8	30	49.2
	Others	..	5	18	3.6	5.9	3	60.0
	All Ethnic Groups	..	754	1,138	1.5	2.8	320	42.4
65+	Malay	..	297	352	1.2	2.6	95	32.0
	Chinese	..	272	172	0.6	1.6	86	31.6
	Ind./Pak.	..	40	88	2.2	4.0	17	42.5
	Others	..	3	1	0.3	0.6	1	33.3
	All Ethnic Groups	..	612	613	1.0	2.4	199	32.6
All Age Groups (15-65+)	Malay	..	5,212	7,245	1.4	3.1	1,577	30.3
	Chinese	..	2,830	1,650	0.6	1.6	721	25.5
	Ind./Pak.	..	930	1,465	1.6	3.4	307	33.7
	Others	..	75	153	2.0	4.3	23	30.7
	All Ethnic Groups	..	9,047	10,513	1.2	2.8	2,628	29.0

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 10a

PERIODONTAL DISEASE—TEETH WITH OR WITHOUT POCKETS>3mm INDICATED FOR EXTRACTION
BY AGE GROUP AND ETHNIC GROUP

Age Group	Ethnic Group	Number of Subjects Examined	Teeth Indicated for Extraction Due to Perio. Disease with Pockets		Teeth Indicated for Extraction Due to Perio. Disease without Pockets	
			Mean	S.D.	Mean	S.D.
15-19	Malay	941	0.0	0.0	0.0	0.0
	Chinese	533	0.0	0.0	0.0	0.0
	Ind./Pak.	210	0.0	0.0	0.0	0.0
	Others	13	0.0	0.0	0.0	0.0
	All Ethnic Groups	1,697	0.0	0.0	0.0	0.0
20-24	Malay	763	0.0	0.4	0.0	0.3
	Chinese	371	0.0	0.1	0.0	0.2
	Ind./Pak.	164	0.0	0.0	0.0	0.3
	Others	15	0.0	0.0	0.0	0.0
	All Ethnic Groups	1,313	0.0	0.3	0.0	0.3
25-29	Malay	612	0.0	0.1	0.0	0.2
	Chinese	316	0.0	0.1	0.0	0.4
	Ind./Pak.	117	0.2	1.5	0.0	0.2
	Others	7	0.0	0.0	0.0	0.0
	All Ethnic Groups	1,052	0.1	0.5	0.0	0.3
30-34	Malay	508	0.0	0.4	0.1	0.8
	Chinese	294	0.0	0.1	0.1	0.6
	Ind./Pak.	61	0.0	0.3	0.0	0.3
	Others	5	0.0	0.0	0.0	0.0
	All Ethnic Groups	868	0.0	0.3	0.1	0.7
35-44	Malay	927	0.3	1.2	0.3	1.1
	Chinese	444	0.1	0.4	0.2	0.8
	Ind./Pak.	158	0.6	2.6	0.4	1.4
	Others	16	0.7	1.7	0.4	0.9
	All Ethnic Groups	1,545	0.2	1.2	0.3	1.0

Source: Dental Division, Ministry of Health, Malaysia.

TABLE 10b

PERIODONTAL DISEASE—TEETH WITH OR WITHOUT POCKETS>3mm INDICATED FOR EXTRACTION
BY AGE GROUP AND ETHNIC GROUP

Age Group	Ethnic Group	Number of Subjects Examined	Teeth Indicated for Extraction Due to Perio. Disease with Pockets		Teeth Indicated for Extraction Due to Perio. Disease without Pockets	
			Mean	S.D.	Mean	S.D.
45-54	Malay	732	0.5	1.2	0.6	1.3
	Chinese	344	0.1	0.4	0.4	1.5
	Ind./Pak.	119	0.7	2.2	0.7	1.6
	Others	11	0.5	0.9	0.6	1.5
	All Ethnic Groups	1,206	0.4	1.2	0.5	1.3
55-64	Malay	432	0.5	1.2	0.7	1.5
	Chinese	256	0.3	0.9	0.5	1.2
	Ind./Pak.	61	0.9	2.5	1.3	2.8
	Others	5	0.0	0.0	0.0	0.0
	All Ethnic Groups	754	0.5	1.3	0.7	1.5
65+	Malay	297	0.5	1.4	0.6	1.3
	Chinese	272	0.4	1.1	0.7	1.7
	Ind./Pak.	40	1.3	2.1	1.5	2.8
	Others	3	0.0	0.0	0.0	0.0
	All Ethnic Groups	612	0.5	1.4	0.7	1.6
All Age Groups (15-65+)	Malay	5,212	0.2	0.9	0.2	0.9
	Chinese	2,830	0.1	0.5	0.2	0.9
	Ind./Pak.	930	0.3	1.6	0.3	1.3
	Others	75	0.2	0.9	0.2	0.7
	All Ethnic Groups	9,047	0.2	0.9	0.2	1.0

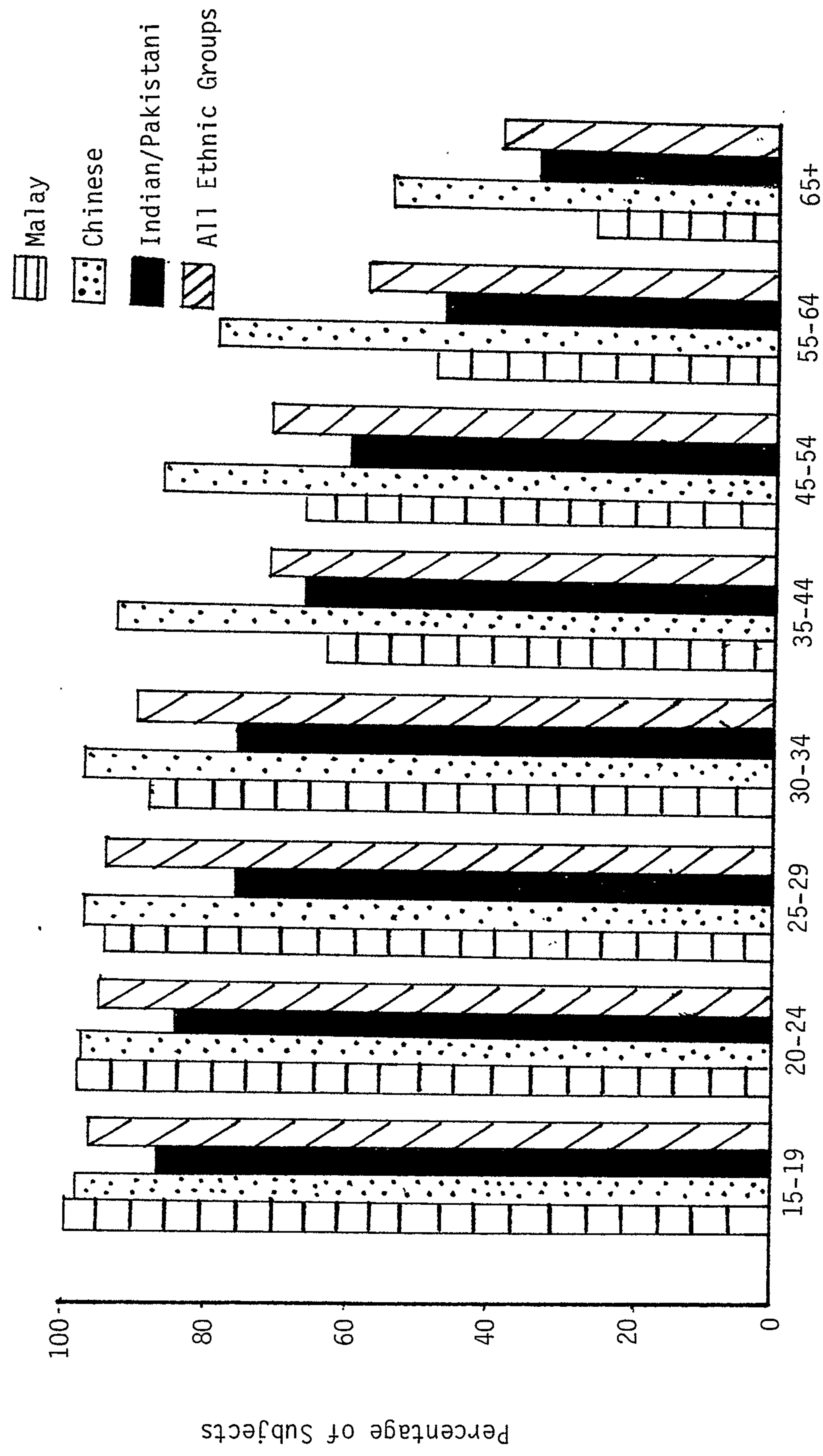
Missing Observations: 14

Source: Dental Division, Ministry of Health, Malaysia.

FIGURE XII

TOOTH CLEANSING HABITS

By Age Group and Ethnic Group

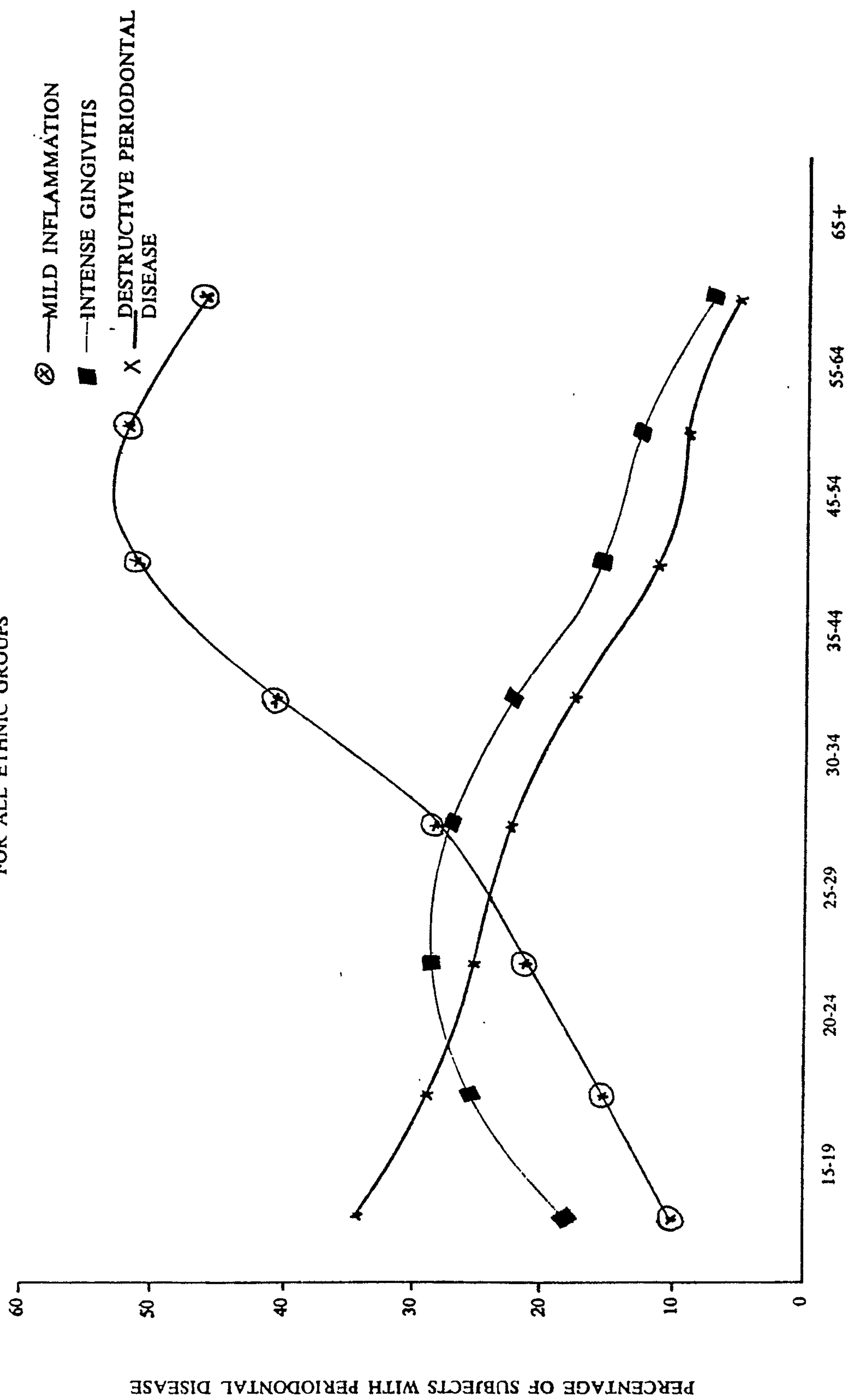


AGE GROUPS IN YEARS

Source: Dental Division, Ministry of Health, Malaysia.

FIGURE XIII

PERIODONTAL DISEASE
PERCENTAGE AFFECTED BY AGE GROUP
FOR ALL ETHNIC GROUPS



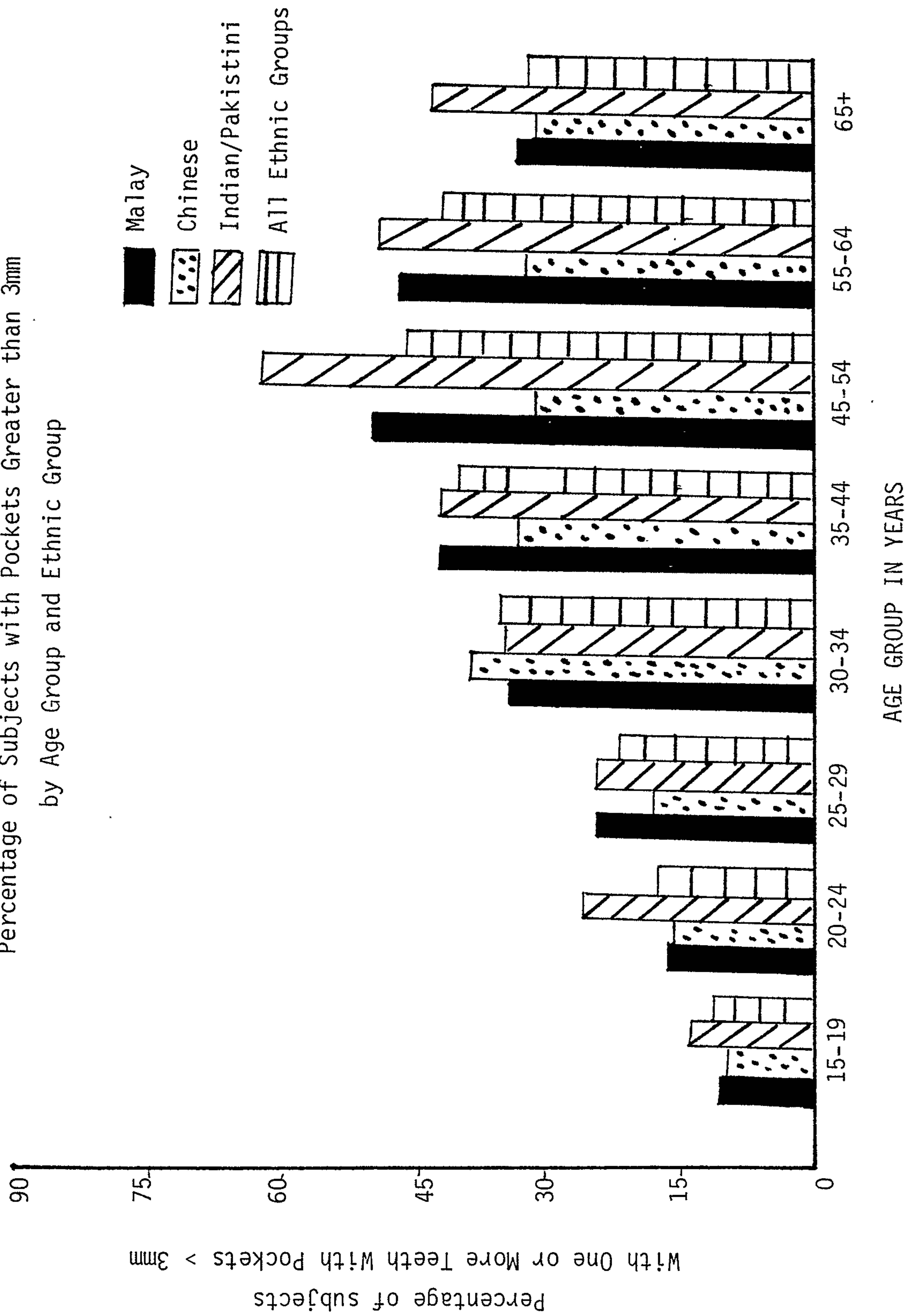
AGE GROUPS IN YEARS

Source: Dental Division, Ministry of Health, Malaysia.

FIGURE XIV

PERIODONTAL DISEASE

Percentage of Subjects with Pockets Greater than 3mm
by Age Group and Ethnic Group



Source: Dental Division, Ministry of Health, Malaysia.

4. DENTAL HEALTH EDUCATION - A PREVENTIVE MEASURE

The two most prevalent dental diseases - dental caries and periodontal disease - are affecting more than 95 per cent of the people in the civilized countries. Surveys in various parts of the world have shown that, taking the community as a whole, a high proportion of dental disease goes untreated (Bulman et al., 1968 and Hollinshead, 1961) and at the same time there is also a rapidly increasing demand for dental service (Jacobson, 1972). The traditional approach of concentrating on the treatment of dental disease alone will not provide the solution to the backlog in dental treatment needs. There is, therefore, an obvious need for more efficient and economical methods in controlling dental disease.

Due to the increasing scientific evidence in support of the preventability of dental disease (Zaki et al, 1969) many countries have adopted the modern approach of redistributing efforts towards prevention of dental disease (W.H.O., 1970b). Without effective preventive measures, it may not be possible to keep pace with the increasing need for curative treatment. Lack of manpower to cope with the demand for treatment, the high cost of treatment when utilizing top professional skill and the prohibitively expensive cost of expanding treatment facilities, are the main reasons for dental health authorities changing to a preventive approach in dentistry.

Fortunately, preventive methods which are effective and economical have been developed and these provide an attractive alternative or supplement to traditional methods.

The generally accepted goal of W.H.O. "Health for all in the year 2000" - concerns oral health as well. Worldwide experience has shown that there are very good preventive methods in dentistry, and provided they are used, a significant decrease in oral disease can be achieved (Barmes, 1981).

Preventive dentistry is a positive approach to the practice of dentistry. It promotes goodwill with patients and encourages their maximum acceptance of dental health principles. Members of the dental profession and other ancilliary dental health educators should maximise the effectiveness of dental care by increasing the motivation of the patient to care for the teeth by educating him on how to maintain optimum oral health.

Unlike fluoridation of water, which is the single most effective means of caries prevention on a large scale with minimal community participation, there is no such simple answer in the prevention of periodontal disease. However, there is enough evidence to substantiate that though dental caries is difficult to prevent totally, complete prevention of periodontal disease is possible if the disease is treated in its early stages. Hence, the responsibility falls on the dental profession to preach preventive periodontics through dental health education to the community at large. Dental health of the community is indeed a fascinating field of study. It is a subject of interest to everyone since statistics reveal that almost no one is free from dental troubles at sometime or the other in his lifetime (Gray et al. 1970).

The increasing realization that individuals should themselves take steps to prevent dental disease led to increased interest in an educational approach to prevention (British Dental Association, 1972). Health education is the process of transmitting knowledge to the learner with the hope of influencing his attitude and behaviour (Dunning, 1970a). According to Frances A. Stoll, health education is the result of the efforts made on the part of an organised society to help people to learn to live healthfully (Stoll, 1977a). Young in 1971 stated that for health education to be effective it should be able to activate the behaviour of the person and merely disseminating knowledge to the person may not bring about the desired behavioural change. More research is required to plan out programmes for health education which change behaviour successfully.

Prevention depends to a large extent on the way a person conducts his lifestyle and health education should be aimed at influencing this lifestyle (Blinkhorn et al. 1981).

There are many academic definitions of health education, but Young and Striffler (Young and Striffler, 1969a) simply define health education as the provision of health information to people in such a way that they apply it in everyday living. The W.H.O. definition of health education is aimed at persuading people:

1. to adopt and sustain health life practices;
2. to use judiciously and wisely health services available to them;
3. to take their own decisions both individually and collectively to improve their health status and environment.

However, mere acquisition of knowledge is not enough; knowledge acquired must be translated into desirable practice.

There is sufficient evidence to support that dental health education is indeed an effective measure in the prevention of dental disease, particularly periodontal disease. This has prompted many countries around the world to introduce dental health education as an important preventive measure.

India, a country with high incidence of periodontal disease, poor oral hygiene, and high population to dentist ratio, oral hygiene practices became an important part of any programme to prevent periodontal disease and therefore dental health education was recognised as a valuable aid (Horowitz and Heifitz, 1969).

Singapore is another country which has been successful in implementing D.H.E. in the practice of dentistry.

In Australia, the Dental Health Education and Research Foundation, established in 1962, has promoted D.H.E. in school children and the community through its various programmes and has met with much success.

A study undertaken by Willford and coworkers (Willford, 1967), to determine the effect of dental health education on oral hygiene of a group under study, showed that there was some improvement in the oral hygiene index, debris score and periodontal condition.

In another study by Gravelle, it was shown that health education had improved the childrens' knowledge on oral hygiene, but their practices in oral care had not change very much. However, with

intensive educational effort and constant exposure to dental health education, a better effect on oral care was demonstrated (Gravelle et al. 1967).

Dental health education should, therefore, be incorporated in the dental health services of all developing countries such as India, Indonesia, Malaysia and others where there is a large population but a lack of manpower resources. With the backing of scientifically proven techniques, well trained and knowledgeable health educators, and properly planned health education programmes, periodontal disease can be minimised through dental health education of the people.

4.1 DENTAL HEALTH EDUCATION IN MALAYSIA

When the Federation of Malaya achieved its independence in 1957, medical, health and dental services became the responsibility of the Central Government. Prior to independence, 70 per cent of such services were concentrated in the towns and urban areas where only 40 per cent of the population was found.

Today, however, through the Government's socio-economic programme, a more balanced distribution of health, medical and dental services between the urban and rural areas has been achieved.

The government dental service in Malaysia started essentially as a school dental service five decades ago. It was essentially a curative service with minimal D.H.E. Realising the needs of the people, the dental service has broadened and extended its policy

to include the dental care of the whole population. However, priority is still accorded to school children, pre-school children and expectant mothers.

Dental services are now available to the community through an elaborate network of dental clinics set up in the country. They are as listed below.

A. Dental clinics in urban areas

- (i) Main dental clinics.
- (ii) Decentralised dental clinics.
- (iii) Hospital dental clinics.
- (iv) School dental clinics.

B. Dental clinics in rural areas

- (i) Dental clinics in health centres.
- (ii) Mobile dental clinics.
- (iii) Mobile dental squads.

In the past, traditional curative programmes formed the bulk of the dental treatment requirements of the Malaysian community. Today, it is still so, though preventive programmes have slowly made inroads into the once purely curative dental service.

4.1.1 Dental Health Education Unit (D.H.E.U.)

Realising the importance of D.H.E. coupled with the shortage of manpower and the magnitude of dental disease prevalent in the Malaysian community, as shown by the two dental epidemiological surveys conducted in 1971 and 1975, the Malaysian dental service is attaching greater importance to the prevention of dental disease through dental health education. The objective of dental health education is to instill dental consciousness and to attain behavioural changes for the improvement and maintenance of the dental health of the child, the family, and the community. To achieve this objective, the National Dental Health Education Unit (D.H.E.U.) was formed in 1979. According to Wong (Wong, 1972) one of the vital steps towards developing more effective dental health programmes is the setting up of an administrative unit with responsibility for dental health education for the community within the dental health service provided by the government. This had the added advantage of continuous government support, inter-ministry cooperation and coordination of other health administrators for the successful implementation of any ambitious programme involving the whole community.

The main function of the D.H.E.U. is to formulate policies for dental health education programmes and coordinating activities in the states. All dental health activities are now being standardized and intensified.

D.H.E.U. have been set up in each of the thirteen states of Malaysia. Their role is to ensure that various programmes and activities of

the unit are carried out at the ground level. These units are still experiencing teething problems relating to the availability of properly trained manpower. Once these initial problems are overcome, these units can provide an effective dental health education service not only to the urban population, but also the rural community who is in most need of it.

The activities of the dental health education unit include oral hygiene instructions, talks, lectures, tooth-brushing drills, flouride mouth rinsing drills, campaigns, exhibitions, film shows and others. Actual implementation of these activities varies and depends on the target group concerned.

The bulk of the dental health activities are carried out by the school dental nurses (dental therapists) in their clinics as well as in the rural areas when they work with the mobile dental clinic or the mobile dental squad. Before commencing their daily work, the dental nurses are required to conduct dental health talks, and tooth-brush drills for the school children. They also occasionally give dental health talks to the ante-natal mothers in health centres, mid-wife clinics and community centres using various teaching aids. Presently, more emphasis is placed on the dental health education of the school going population, the pre-school children and the expectant mothers.

The dental officers generally provide dental health instructions to their patients on a one to one basis in the surgery while treating the patients. They are also involved in giving dental health talks to the ante-natal mothers in health clinics, teachers and related

health personnel. Non-dental personnel such as health educators, health staff and social workers also contribute to educating the public on dental health aspects.

For the general public, occasional health campaigns and exhibitions are held in conjunction with important days such as World Health Day, Independence Day and Annual Malaysian Dental Association Conference. These exhibitions generally generate great interest amongst the Malaysian public and are well attended.

All dental health activities in each state are monitored by the dental health officer. As of now, all dental officers and dental nurses, are required to submit a monthly report of the dental health activities carried out by them on a format prepared by the National Dental Health Education Unit. These are then submitted to the dental health officer in the state who then compiles this information and submits it to the National Dental Health Education Unit. This enables the national D.H.E.U. to evaluate the dental health activities in each state and also to plan future strategy.

Besides the Government, the second major group providing dental service to the community in Malaysia are the private practitioners. However, they heavily rely on curative dental practice. Very little if any dental health education activity is carried out in private practice.

In the near future, Malaysia will be setting up a periodontal unit in each of the thirteen states of Malaysia. Interviews with the Director of Dental Services in Malaysia revealed that the periodontal units will be mainly dealing with preventive periodontics and will be manned by dental officers now undergoing training abroad and the existing dental personnel.

4.2 Dental Health Education Team

Health education is concerned with behaviour change and dental health education cannot and should not be divorced from health education in general (Health Education Council, 1971a). There is no valid reason why any of the existing dental personnel should play his or her traditional role. The fundamental principle to follow is the maximum utilization of all available personnel so long as they are suitably trained to play the role expected of them.

The team concept is a measure of utilizing selected personnel both dental and non-dental who work in close cooperation as a team to carry out health education activities. The dental health team affords a perfect opportunity for the dental profession to render dental health care (Silverman, 1976).

The team approach has been shown to increase the availability of dental services (Hobdel, 1975). Utilization of personnel other than dental for dental health education activities will relieve some pressure off the dental profession particularly in countries where there is a shortage of trained dental manpower. According to Barmes the bulk of dental health education work can be undertaken by non-dental personnel, such as school teachers, school nurses, health personnel if they are properly briefed for it. Involvement of these personnel is of utmost importance to minimise loss of operating time by dental personnel (Barmes, 1972).

The dental health education team must bear in mind that they are very much going to be involved in public health relations. If they want

to succeed in improving the dental health status of the community, they would have to do something to help change attitudes, habits, cultural barriers and traditional beliefs. They would have to learn to communicate with people - how to awaken their interest in dental health, particularly in those in the rural areas where the community is mostly ignorant and illiterate. Therefore, they must be sufficiently trained and should acquire adequate knowledge of dental health education before proceeding to work in the community.

Periodontal disease is widely prevalent in the Malaysian community. With the large backlog of curative work, the dentist and the other only operative dental auxilliary the dental nurse, cannot cope effectively with carrying out dental health activities all by themselves. In Malaysia, as of 1980, the dentist-patient ratio was 1:18,000 (Figure V). Hence, Malaysian dental service has to rely on the use of other non-dental ancilliary dental health educators, such as the health personnel, teachers, health educators and others, to promote dental health. Together they can form an effective dental health education team. It is fortunate in Malaysia, that the Government plays a major role in the provision of dental service. Hence, cooperation from other government agencies such as the health, medical and education departments can be sought. From my personal experience, these are always readily obtained.

Malaysia is a multi-racial country. The dental health education team therefore, must have a good knowledge of their cultural beliefs, values and traditions, so that they will not cause any conflict of ideas, which may cause the community to resent learning.

Before the team takes to the field, it is important that they acquire sufficient skill and knowledge of what they are going to teach the community.

While planning the strategy, the head of the dental health education team, who should be a dentist, should:

- (i) consider the groups of the population that should be reached;
- (ii) study the existing personnel through whom education could be given, their qualification and training, and
- (iii) decide how best to deploy them.

The dental health education team should work closely together and meet occasionally to thrash out any problems encountered and to plan fresh strategy. Positive relationship between members of the team increases the likelihood that optimum dental health care can be provided to the community and that all the parties involved will feel good about their mutual effort.

However, success will not be absolute unless the community is prompted not only to accept but to demand the services to which it is entitled (Loison, 1970).

Unlike surgery or other operative procedures where one gets immediate gratification, in dental health education one has to wait over a long period to achieve any results of their prolonged efforts. However, when they do come, there is satisfaction for a job well done.

The D.H.E. team essentially comprises the following personnel:

- 4.2.1 The dentist
- 4.2.2 The school dental nurse (New Zealand type)
- 4.2.3 The dental hygienist
- 4.2.4 Health personnel
- 4.2.5 Classroom teacher
- 4.2.6 Others.

4.2.1• The Dentist

Prevention does not just happen, it is made to happen; it is people who make it happen for people (Dingerson and Dingerson, 1973).

For the dentist helping people help themselves becomes more rewarding than just working for the public or doing procedures to people. The dentist, by virtue of his position automatically assumes the role of a leader of the dental health team, and has full authority over what should be taught, how it should be taught and who shall do the teaching. In general, he must "set the curriculum" for all who are to teach (Stoll, 1977b).

Leadership and management skills are not acquired automatically upon graduation and cultivation of these attributes should begin at the undergraduate years (Nuffield Foundation, 1980). Besides gaining knowledge in clinical skills, the student should have reached a level of professional maturity whereby he understands his role as a dentist in the community, expresses a concern for oral health of the people and acquires a level of professional judgement (Hazen, 1976).

As leader of a team of health care personnel, the dentist will be called upon to use managerial skills and interpersonal skills to maintain a smoothly operating team which can provide a broad spectrum of care. As manager of patients, he must be equipped with basic skills of communication and facilitation and must be able to translate a variety of cues and words into an understanding of patient needs and fears. The ability to manage patients and be responsible for their care should assume primacy in any hierarchy of educational values (Rovin, 1977).

Several studies have illustrated that the central problem in preventive dentistry is how to motivate the public to take the necessary procedures to care for their oral hygiene continuously; however, an important point always forgotten is the motivation of the dentist himself. It is logical that if the dentist lacks the convictions, ideals and enthusiasm necessary to support him in developing a preventive programme, it will be still born. Therefore, the dental student must be constantly stimulated and motivated to adopt a strict preventive background to grow with him in his practice. The dental student of today can be the catalyst initiating an increased periodontal public health awareness and cooperation.

The present curricula of many dental schools which are poorly orientated towards preventive and public health dentistry make it difficult to train dentists to carry out their educational functions. The root cause of the ineffectiveness of many a dental health education programme may be due to the inadequate and inappropriate training the dental health educator has received, resulting in the lack of understanding and appreciation of the complexity of the problems associated with dental health education.

Now, imaginative undergraduate training programmes for dentists are sorely needed so that the preventive aspects of dentistry can receive proper emphasis (W.H.O., 1970c). The curriculum of dental schools should provide opportunities for participation in a variety of dental health education activities, in the school, hospital and clinic.

The dentist has a variety of roles to play in the community service. Hence, an expanded role of the dentist of the future does not mean the lengthening of the dental course by the inclusion of the ever expanding body of knowledge that is required by the dental practitioner, because this may dampen his enthusiasm and motivation for this vocation. The dental curriculum has to be therefore, selectively planned to enable a student to encompass sufficient knowledge and skills during his four years of training to be a competent general practitioner.

In Malaysia, the dentists, both in the private practice and in the public service, have ample opportunities available to them for dental health education counselling. Face to face communication will be the most effective method of dental health education and every practitioner has an obligation towards his patient to educate him to look after his dental health, to appreciate the dental service rendered to him and to correct unfavourable attitudes that exist through previous dental experiences, misinformation and superstitions.

As a leader of the dental health education team in the area, the dentist has the responsibility of formulating programmes,

identifying target groups and planning strategy for carrying out dental health activities in the area. He is also a member of the Joint School Health Committee and is often called to give talks to teachers undergoing in-service training.

Malaysia is still experiencing shortage of dentists. The annual output of 30 dentists from the University of Malaya and about 40 dentists from recognised universities abroad is still not sufficient to cope with the manpower requirements. However, the dental school hopes to increase the intake of dental students by 1983 to 46 and to 64 by 1986.

4.2.2 The School Dental Nurse (New Zealand type)

This type of ancillary was established in New Zealand in 1923 to deal with a large amount of dental disease present among the school children. She is permitted to diagnose dental disease and to plan and carry out certain specified preventive and treatment measures including some operative procedures in the treatment of dental caries and periodontal disease in school children. Today, ancillaries with similar function as that of the New Zealand type of school dental nurse are found in about 29 other countries, many of which have started their own training schemes (Elderton, 1981a).

The duties of the school dental nurse include, dental examination of school children and diagnosis and treatment of the most prevalent dental diseases, dental caries and periodontal disease, dental health education, prophylaxis, cavity preparation, and placement of cement bases and amalgam, silicate, synthetic porcelain,

cement fillings and the extraction of deciduous teeth using infiltration anesthesia. She also applies topical fluoride solutions. The role of the school dental nurse includes not only teaching the principles of oral hygiene and the prevention of dental disease in the individual children, but also the school classes, teachers, women's organisations, parent-teacher associations and similar bodies.

Patients requiring treatment beyond the scope of the dental nurses are referred to the dental officers.

The school dental nurse is the only operative auxilliary in Malaysia and is an important component of the dental health education team. She is trained at the Dental Training School in Penang over a period of two years and basically follows the New Zealand type of dental nursing. On completion she is required to do another year of field work after which she can only work in the Government Dental Service under the supervision of dental officers. She is basically trained to cater for the school dental service. The present annual output is 60. When assigned to a school, she is accepted as a member of the staff in the same way as are the teachers; she is responsible to the principal for matters which affect the running of the school such as the scheduling of group dental health instruction sessions.

The activities of the school dental nurse include practical tooth brush drills for individuals and whole classes, talks to expectant mothers at health centres, conducting dental health exhibitions, campaigns, competitions and preparing dental health education materials such as posters, models and flip-charts as teaching aids. Stress is placed on the maintenance of oral hygiene and gingival health.

Nurses with special aptitudes are also employed full time in the D.H.E.U.

Malaysia is still experiencing shortage of school dental nurses. With the setting up of periodontal units under the Fourth Malaysia Plan, and no hygienist in the Malaysian dental service, the school dental nurse will be heavily relied on to carry out preventive periodontic activities. However, it is hoped that with the increased intake of students in recent years in the Dental Training School, more dental nurses will soon be made available to assist in further development of the School Dental Service.

4.2.3 The Dental Hygienist

This type of ancillary was first employed in 1906 in the United States of America and the importance of this type of ancillary in public health programmes was recognised by Dr Fones. The dental hygienist are mainly employed in private practice in the U.S.A. where the largest number is found and many other countries including Australia. They have considerable impact on the quality of dental care rendered (Dunning, 1970b).

The dental hygienist is permitted to carry out, to the prescription of a supervising dentist, certain specified preventive and treatment measures including some operative procedures for the treatment of periodontal disease (Elderton, 1981b). However, she is not permitted to carry out any operative procedures for the treatment of dental caries.

The duties of the dental hygienist are essentially scaling and polishing of teeth with particular attention to calculus and stains, topical application of flourides and the provision of dental health education. She also does screening and preliminary examination of patients so that they may be referred to the dentist for treatment. In some countries the dental hygienist is permitted to take radiographs, make impressions for study models and polish restorations. In Denmark, Norway and the Netherlands they even make preliminary examination and charting of teeth, while in Manitoba, they are permitted to take impressions, record jaw relationship and repair some broken dentures (Fédération Dentaire Internationale, 1977).

The dental hygienist usually works with adults though there are no legal restrictions in many countries.

The training of dental hygienist is usually of 1-2 years duration, though the expert committee of the World Health Organisation thinks that one year is appropriate for countries wishing to train hygienists to enter their governmental health services. In the United Kingdom training is from nine months to one year, while many schools in the U.S.A. offer a four-year degree programme in dental hygiene as well as the two-year certificate programme.

There are no dental hygienists in the Malaysian Dental Service and it is understood Malaysia does not intend to employ them.

The dental hygienist has been found to be very effective in carrying out preventive measures in dentistry and in the field of dental health education, Malaysia, which is about to set up periodontal

units in all the states and is experiencing shortage of skilled manpower both in the dentist and the school dental nurse, could effectively utilize the services of the dental hygienist to help tackle the periodontal problem in the country. While working in the school clinics, or in the various other clinics in the country, she could combine dental prophylaxis with dental-health education. She could be an asset to the dental health education team.

4.2.4 Health Personnel

Dental health cannot be segregated from general health. Similarly, dental health education cannot and should not be divorced from health education in general (Health Education Council, 1971b). Sundram and many others are of the opinion that in the field of dental health education, much more could be done at present, in most countries, by general health personnel (Sundram, 1975). In the context of preventive health care extended to the adults, ante-natal mothers and children, health personnel such as doctors, nurses, and other health ancillaries could pay more attention to dental health.

Dunning says that a health educator from even a small health department acts as a "resource" in the transmittal of health education material to community agencies and to the public, and acts as an interpreter of the health department to the public.

In Malaysia, the dental and health personnel work closely together. Often they are housed in the same buildings particularly in the main health centres and sub-health centres, and referral of patients between them is a common feature. The health staff is larger in

number and they are able to penetrate into the more rural areas with their mobile teams. Hence, they are much more in contact with the rural folk. In the past, the rural folk have been apprehensive of modern medicine and relied on their traditional "Kampong" or village treatments. However, this has changed today and the barrier that existed before is slowly but surely being lifted.. More and more rural people are now seeking treatment in hospitals, and various clinics set up in the rural areas and there is certainly a change in behaviour and attitude.

The health personnel could easily incorporate oral health measures in their preventive general health programmes for the ante-natal mothers, school children and the public. A little time could be spent by the doctor or the nurse, to examine the mouth of the patient and give advice on dental health care. Any pathology detected or treatment required could be noted and the patient easily referred to the dentist for necessary treatment. The health personnel are well aware that poor oral health in an individual affects the general health as well. Hence, they cannot afford to ignore the dental health problem of their patients.

The health personnel make home visits during which various aspects of health are discussed, such as care for the new born, self-cleanliness, cleanliness of the house and other aspects of health. It is during these informal meetings that the importance of oral health could be stressed and simple instructions on tooth-brushing, diet and other aspects of dental health can be given.

During basic training, dental health education aspects should be incorporated into the curricula for health personnel. According to Barmes, the element of oral hygiene and dental health should be included on both basic and in-service courses for all general health personnel (Barmes, 1975).

Besides the basic training, the health officers and medical and health officers also attend short in-service courses conducted by the Ministry of Health at the Institute of Public Health in Kuala Lumpur, and at the National Institute of Public Administration, where they receive training on the skills of administration. Those wishing to become health officers have to do a Master of Public Health (M.P.H.) course at the University of Malaya or abroad.

The training of the general nurses, is conducted at the major general hospitals in Malaysia, and those wishing to serve in the health department are required to do another one-year course in public health. Besides this there are numerous in-service courses at state and federal level for these nurses.

Medical officers and general nurses in hospitals could do much more by talking to the patient on dental health aspect during examination and hospitalization. Most of the general hospitals and district hospitals in Malaysia have dental clinics incorporated in them, and referral of patients among them is common. With little training the medical doctors and the general nursing staff can contribute towards the patient's dental welfare.

Hence, the health personnel can contribute immensely as members of the dental health education team. While working in the health clinics or in the field in the rural areas, the health personnel can carry the message of dental health with the aim of educating the public, allaying their fears, apprehensions, superstitions and traditional beliefs, and ultimately changing their attitudes and behaviour.

4.2.5 The Classroom Teacher

Authorities both in the field of education and in the field of health agree that the classroom teacher must carry a major share of the task of dental health education. According to the National Education Association of America, regardless of the extent of school dental services, the teaching of oral hygiene is and must be a primary responsibility of the classroom teacher. It goes on to say that the teacher's interest in securing dental corrections is a major factor in developing pupil interest and action. Teachers with enthusiasm and persistence who are properly instructed in the principles of oral hygiene can stimulate children to seek dental service. It concludes by saying that the teacher is the keystone of the arch of dental health education. Wong (Wong, 1976) says that for young children, the classroom and the presence of the peer group form an ideal setting for acquiring dental health knowledge and developing good habits. In strongly supporting the above views, Dunning gives two other reasons. Firstly, the preponderance of teachers over dental health personnel in the school system and also because of the number of hours per year a classroom teacher is in

contact with the pupils. Secondly, the educational training of the classroom teacher and her constant practice in the understanding of the minds and motives of her pupils (Dunning, 1970c). Nyswander even goes further in saying that "the child cannot be helped to assume responsibility for his health through campaigns. Sound attitudes can only be developed through unified teaching and through one source of instruction - the teacher" (Nyswander, 1942). However, there are others who differ on this view. Stoll views the teacher as a pessimistic non-expert who, when left to her own devices and without strong motivation from the dental experts, accepts a defeatist attitude towards the health problems of her pupils. She goes on to say that the teacher does not have the facts or the initiative to teach prevention of dental disease (Stoll and Catherman, 1967). However, this may not necessarily be true. Most authorities view the role of the teacher optimistically and I would agree with them. The teacher can be motivated and stimulated to become an effective tool in teaching dental health education in the classroom by proper training and acquisition of the relevant knowledge. In this she can certainly be aided by dental health specialists.

In Malaysia, primary and secondary schools today have specially trained teachers who are assigned to look into the general health as well as dental health aspect of the pupils. This is because the relation of health to progress in education is recognised by educators. Today, school health has become a vital part of the curriculum in Malaysian schools. Hence, since 1968, the Ministries of Health and Education have combined their efforts to form the Joint School Health Committee at national, state and district

levels to coordinate the various health education activities, including dental health education, in the country (Johari, 1976a). These committees are represented by health, dental and education personnel at all levels.

The training for classroom teachers dealing with health matters is an important aspect of their specialized job. To train these teachers the Teachers Training College for Health Education and Nutrition was established in 1976 in Trengganu, one of the east coast states of Peninsular Malaysia. The college conducts a regular three-month in-service course on health education and nutrition for teachers from all over Malaysia. It is being organised as a joint effort of the Ministry of Education and the Ministry of Health. Teachers from primary schools as well as lower secondary schools attend these courses. Dental officers are involved in giving lectures and demonstrations to the teachers undergoing the course.

On completion of the course the teachers become resource personnel involved in the training of other teachers in their respective states on health education and nutrition. Part-time courses at local level involving ten weekends for teachers in charge of health who have not attended the specialized health course at the Teachers Training College for Health Education and Nutrition are being organised at various state centres. Other teachers interested in teaching health can attend these courses. Lectures on various topics relating to health are given, including dental health education, and dental officers are involved in these programmes.

4.2.6 Others

Besides the dental health education team personnel already discussed, there are many others who could easily fit into the team with little training. The most important of this is the dental surgery assistant. She normally works in a close and coordinated manner with the dentist.

Traditionally, her duties include responsibility for the management of instruments, equipment and materials, including cleansing, sterilizing and recycling of these for use by the dentist. She also looks after the well being of the patient and is in charge of reception and making appointments for patients.

In the past the dental surgery assistant was trained on the job. However, commencing from 1981, she is now trained at the Nurses Training School in Penang. The training is for a period of two years, and her curriculum includes dental health education as well. In Malaysia, these nurses are trained to give dental health education talks to ante-natal mothers and often assist in tooth-brush drills for school children. In Sweden, after two additional weeks of training they are allowed to conduct flouride mouth rinsing programmes to groups of school children (Fédération Dentaire Internationale, 1972).

Health educators are widely used in many countries. According to Dunning, health educators have a specialist's responsibility in all fields of health education and are usually found serving in school districts. In the United Kingdom, local authorities employ Dental Health Education Officers to teach prevention (British Dental Association, 1968), and preventive workers are found in Europe.

4.3 Categories of Community and Levels of Prevention

An interesting concept in thinking about preventive measures for any disease is that of levels of prevention (Leavell and Clark, 1965). The health education requirement for each group of the community can be determined by the level of prevention that needs to be applied.

In any group of people, there will be those who are healthy, some who are at higher than average risk to disease, those who are ill and others who are recuperating. Therefore, the type of prevention required will depend on the state of healthiness of that subgroup.

The community, hence, can be divided into three categories based on the level of healthiness.

1. Healthy or average risk,
2. High risk,
3. Ill-cured.

TABLE 11. Health education requirement for periodontal disease in
different categories of the community

Category of community	Health education requirement	Level of prevention
Healthy or average risk	Information on health promotion which includes health education in oral hygiene, nutrition, diet planning and periodic screening or inspection. Specific protection: Good oral hygiene, avoidance of sticky food particularly between meals, tooth-brushing after eating, dental prophylaxis and fluorides.	Primary prevention
High risk	Need for behaviour change, early diagnosis and treatment.	Secondary prevention
Ill-cured	Instructions on rehabilitation and disability limitations	Tertiary prevention

By the W.H.O. definition prevention in dentistry can be divided into three major groups and is defined by the stage in which it comes into effect. They could also be called the lines of defence. These three stages of prevention are related to periodontal disease and are discussed in the following sections mentioned below:

- 4.3.1 Primary prevention;
- 4.3.2 Secondary prevention,
- 4.3.3 Tertiary prevention.

4.3.1 Primary Prevention

This is truly a preventive stage where early steps are taken to prevent the disease from occurring by using various preventive measures. According to Dunning (Dunning, 1970d) true or primary prevention occurs in the prepathogenic period and involves first health promotion and then specific protection. In the prevention and control of periodontal disease, this is an important stage. Primary prevention, therefore is chiefly applicable to the first category of the community mentioned earlier, i.e. the healthy or the average risk. Health promotion is concerned with offering information on potential health threats to this community and advice to avoid unnecessary risk factors. This includes instructions on the maintenance of good oral hygiene, diet counselling, regular and periodical visits to the dentist for check-ups and dental health education.

Specific protection involves increasing host resistance and taking steps to minimise the danger of periodontal disease appearing. This can be achieved through dietary controls, regular maintenance of good oral hygiene and protection against professional hazards and sport injuries.

4.3.2 Secondary Prevention

This is a second line of defence presupposing that primary prevention has failed to provide the expected protection. This, therefore, involves early detection of periodontal disease and prompt treatment. The second category of the community, i.e. those at high risk, will require secondary prevention. They will have to undergo a behaviour change because the information disseminated to them earlier failed to prevent the disease. There is a need to make the high risk status socially recognisable so that people will feel that society disapproves of their actions (Blinkhorn, 1981).

Secondary prevention requires active steps to be taken in the prevention of the disease, through dental recall system, screening surveys for early detection of periodontal disease and for provision of treatment or removal of a state leading to the possibility of the disease. This means professional removal of plaque and calculus, recontouring of deficient fillings, redesigning poorly constructed dentures, and other measures to safeguard the oral tissues.

Periodontal disease at the secondary prevention level can be prevented and treated successfully by the active participation of the individual and proper diagnosis and treatment by professional dental personnel. Failure to tackle the disease at this level will ultimately lead to destruction of the periodontal tissues, hence, compelling the individual to seek tertiary preventive measures.

4.3.3 Tertiary Prevention

Tertiary prevention is concerned with the third category of the community that is ill-cured.

In this situation the disease has fully developed and the main consideration now is stopping of the process and mitigation of its effects, and an attempt to restore appearance and function. This, in short, is disability limitation. The patient is advised on the nature of the disease and the available cure. This is followed by advice on rehabilitation which is considered as part of tertiary prevention. However, many feel that this specialised approach has for the most part, been ignored by the health profession.

We are well aware that D.H.E. plays a major role in primary prevention of periodontal disease. Though this may be so, yet it is obvious that actual education is applicable to all the three stages of prevention just described, and it should be rightfully so. For successive conclusion of any preventive periodontal programme undertaken, the consent, cooperation, and active participation of the community is vitally important.

4.4 TARGET GROUPS

Community dentistry is concerned with the prevention of dental disease and the provision of dental health care services to all the people of the community; the rich, the poor, the educated, the disadvantaged, urban and rural of every racial, religious and ethnic group. However, it is beyond the means of even the most developed countries to provide the service to everyone due to economic reasons and to this can be added the lack of professional manpower in case of developing and underdeveloped countries. Hence, most countries have identified the target groups who are given priority over the rest of the population.

In Malaysia, dental target groups have been identified and are listed according to priority.

- 4.4.1 School children - primary and secondary (upper and lower),
- 4.4.2 Pre-school children,
- 4.4.3 Pre-natal and nursing mothers,
- 4.4.4 General public.

4.4.1 School children - primary and secondary (upper and lower)

Many school systems throughout the world have incorporated dental health education as part of the school curriculum because of the rationale that 'prevention is the key to controlling dental disease' and that knowledge and dental health practices can be instilled from a younger age (Roder, 1978). It is felt that the school environment is a logical place to teach D.H.E. and practices, as they are directed to different age groups of children and corresponding variations in learning abilities. Haefner states that for long range gains the school setting offers a great potential for effective D.H.E., as it provides excellent opportunity for communication with virtually all persons within the entire school age group (Haefner, 1967). World Health Organisation International collaborative studies have indicated that gingival health is better among children with long-standing school dental treatment programmes (Barnes, 1976). However, studies by Jordan and Pugner (Jordan and Pugner, 1967) and Bratthal (Bratthal, 1967) have indicated that exposing children to and increasing their knowledge of dental health may not be sufficient to motivate them to practise the habit and that constant reinforcement in as many different ways as possible is essential to develop good oral hygiene.

The entire school population as a captive audience is a rare setting and should be fully capitalized. The added advantage is that the continuing educational influence can be exerted on this target audience over a considerable time period. According to Young and Striffler (Young and Striffler, 1969b), the process can begin at an early age when habit patterns are still in the process of being

formed rather than being firmly established and resistant to change as in adults.

In a school setting both mass communication and face to face approaches can be used on the same audience. Individualizing instructions to meet the needs and problems of individuals can serve as a powerful motivating force. Rosenstock contends that health education should not merely be didactic and cooperation of parents of children and school system is actively required.

Most school based programmes relate to primary prevention and are widely being practised in schools throughout the world. Hence, periodontal disease in school children can easily be tackled as it chiefly involves primary preventive measures.

When the Public Dental Service was established in Malaysia in 1949, it was essentially a school dental service. However, today the dental service is open to the public but the school children are still accorded primary priority status (Johari, 1976b). The school dental service is a joint effort of the Ministry of Education and the Ministry of Health. Both the ministries collaborate through the Joint School Health Committee which is set up at national, state and district levels with representatives from the dental, health and education departments.

The school dental service in Malaysia can be divided essentially into two types.

4.4.1.1 Urban school dental service,

4.4.1.2 Rural school dental service.

4.4.1.1 Urban school dental service

The urban school dental service covers both the primary and secondary schools. The primary school children receive dental service either in the school dental clinics located in the schools itself or at the main dental clinics. The school dental clinics are manned by dental nurses (New Zealand type) and they generally cater for about 1,000 children. The clinics are built by the education department and are equipped by the Ministry of Health.

Schools which do not have dental clinics in the urban areas are catered for in the main dental clinics by the dental nurses. The children are transported to and from the clinic by dental vans.

Presently, besides the curative work, stress is placed on preventive measures and they are being intensified. Before the dental nurse starts her daily work she is routinely required to give dental health talks to a group of children or a class on various aspects of dental health education. Various teaching aids such as posters, models, flannel-graphs and various other techniques including audio-visual and film strips are used. Toothbrush drills are also conducted along with fluoride mouth rinsing drills on a regular basis. Prophylaxis is a routine practice and plaque disclosing tablets and solutions are used to demonstrate the presence of plaque. This is found to be very effective with school children as they can see that their teeth are not clean and are motivated to brush their teeth at home so that they will not be shamed by their school friends during mass toothbrush drills at school. This indirectly helps prevent the initiation of periodontal disease.

On completion of treatment and prophylactic measures, topical fluorides are routinely applied. Instructions on dental flossing are also given.

Besides group instructions, the dental nurse gives dental health education on a one to one basis as she treats the patient. Booklets, pamphlets and other reading materials prepared by the D.H.E.U. are also dispensed to the children. Kasey suggests that some age specific dental subject material be used for educating the child (Kasey, 1966).

On important days such as the parent-teacher day, school speech day and World Health Day, dental exhibitions are organised in the schools. Art exhibitions on dental health aspects are also held. These exhibitions generally draw a lot of attention from parents, teachers and the school children.

The secondary school children in the urban areas seek dental treatment from the dentist in the clinics, they are given one to one dental health instructions pertaining to the importance of good oral hygiene, correct tooth brushing techniques and various other aspects already discussed above.

Besides these activities, the dental officers visit secondary schools regularly to give dental health talks in the classrooms.

A few major secondary schools in the urban areas have dental clinics incorporated in them. Dental officers visit these clinics periodically to render dental service to the students.

4.4.1.2 The Rural School Dental Service

The school children in the rural areas receive dental service through any one of the means listed below.

- (i) Health centres and sub-health centres,
- (ii) Mobile dental clinics,
- (iii) Mobile dental squads.

Besides the health personnel, each health centre has a dental clinic incorporated in it. It is usually manned by a dental officer and dental nurse along with supportive staff. The dental nurse is responsible for the primary school children who are transported to and from the health centre by vans. The dental officers treat the secondary school children and cases referred by the dental nurse. Besides this, he also caters for the general public.

The dental officers from the main health centres also visit the sub-health centres periodically. The sub-health centres have a dental room which is not well equipped and only emergency treatment is offered. Both primary and secondary children may receive emergency treatment.

D.H.E. activities at the health centres are similar to those already discussed in section 4.4.1.1 and are carried out by the dental officers and dental nurses.

The mobile dental clinic and the mobile dental squad provide dental service to the primary schools only in the rural areas and their activities are similar.

With the establishment of the mobile dental squads, the rural schools in the more remote areas who cannot use dental services in the static clinics, can be reached now. The dental team of dental nurses and supportive staff work with portable dental equipment which is left in the school. After comprehensive and systematic treatment is completed for the whole school, the mobile dental squad moves on.

Dental health education activities are given the same importance as treatment in the rural schools. These activities include daily D.H.E. talks prior to commencement of treatment on various topics relating to good oral hygiene, using teaching aids such as models, posters, flip charts and others. Practical demonstrations of correct toothbrush usage with participation of the children are conducted often. Fluoride mouth rinsing drills are also carried out. Reading material pertaining to dental health is also distributed. During these talks, the children are advised to form good habits which can be developed as they grow up.

It is noticed that periodontal disease is more prevalent among rural children. Hence, the nurse stresses the importance of oral hygiene measures to combat this during treatment of an individual child.

The school teachers are encouraged to observe the group D.H.E. activities, because once the dental team leaves, they are required to enforce these measures to promote good dental health.

At the district level various campaigns and exhibitions are held to promote dental awareness among the school children. Tooth-brushing competitions, art competitions pertaining to dental health,

and puppet shows are staged. Dramas with a dental health theme are put up with the participation of the children. These activities prove to be very popular with the children.

Quite often toothbrushing campaigns are organised on a wide scale. During these campaigns toothbrushes and tooth pastes are provided free either by the Ministry of Health, the Education Department or by independent public organisations such as the Child Welfare Council of Malaysia or commercial houses such as the Colgate-Palmolive. Studies by Camrass have shown that a primary school toothbrush programme in an unsophisticated environment can significantly improve the oral hygiene and periodontal health of the participant (Camrass, 1974).

The epidemiological survey of school children in Peninsular Malaysia conducted in 1971 revealed the periodontal status of the school children. It was found that 60 per cent of the school children examined suffer from inflammation of the gingiva, the peak being at 11 years of age, where it is 67 per cent. The mean number of inflamed units of all ethnic groups between 6-18 years was 2.8. No advanced state of periodontal disease was mentioned in the survey.

It is therefore evident that the Malaysian school children will require primary prevention chiefly with some secondary prevention for periodontal disease. I am sure that with positive action from the individual, the dental personnel and the school authorities the periodontal status could further be improved.

4.4.2 Pre-school Children

Various surveys emphasize that the dental disease has become an important public health problem by the age of three. The ability of the child to learn depends on the age of development. Health education, therefore, should be planned according to the needs of different stages of age development.

Education of the child begins soon after birth. According to Frank, the human infant is highly susceptible to life long patterning by his early experiences which operate as a "forgotten childhood" to groom his subsequent learning and especially interpersonal relations (Frank, 1966).

Dunning quotes Frend who says that as the child develops, the foundation laid during the primary process can be broadened, particularly when the dentition starts appearing. Thus the child can be conditioned for further acquisition and utilization of important health preventive information. What is later necessary is to maintain a supply of this information throughout the life and the individual should continue to absorb and utilize this information.

In Malaysia, the pre-school children can be reached through the various government health clinics, nursery schools, day care centres, and kindergarten classes. Realising the need to educate and motivate the child at an early age to form good oral hygiene practices, the Dental Division of the Ministry of Health has set up a Pre-School Service Unit initially in the Federal Territory.

The units make regular visits to the kindergarten schools and offer systematic and comprehensive dental treatment, and also carry out various dental health activities suited for this age group.

The dental nurses are mainly involved in the pre-school dental health programme. They visit kindergarten schools, health clinics and baby care centres periodically.

Their activities include dental health talks, toothbrush drills (the toothbrushes being provided by the dental department along with toothpaste), diet counselling and the importance of proper nutrition. They also stress the harmful effects of sweets, sugars, biscuits, chocolates and encourage the importance of adopting good habits. Generally, the parents are included in such talks so that they can oversee that the child enforces these practices at home.

Occasionally, puppet shows are staged with a D.H.E. theme. These shows stimulate much interest among the pre-school children.

4.4.3 Pre-natal and Nursing Mothers

Dunning says that expectant mothers and nursing mothers are almost always in need of dental health information and are motivated to use it. He goes on to say that they have a great influence on growing children and should, therefore, be an important object for dental health education. Studies by Kriesberg and Trieman have indicated that attitudes of parents in preventive dentistry can influence the child (Kriesberg and Trieman, 1962).

After the school children and the pre-school children the pre-natal mothers and nursing mothers are the next priority group for special attention in Malaysia. Like the school children, they too receive free dental care (except for prostheses).

The pre-natal and nursing mothers attend clinics regularly at various health centres and sub-health centres and hospitals. Hence, they receive not only treatment but advice pertaining to their general health, including dental health. Most of these clinics have fixed pre-natal days and this makes it convenient for the dental personnel to visit these clinics on these days to render treatment as well as offer dental health advice. Here dental health activities are carried out by the dentists and the dental nurses and also the dental surgery assistants. These activities include dental health talks on how to maintain good oral hygiene, diet counselling, correct techniques of toothbrushing and dental flossing. Occasionally, practical toothbrushing drills are also carried out.

Generally, the periodontal condition of the pre-natal and nursing mothers is poor, particularly so in the rural areas and would require primary and secondary preventive measures. Some may even require tertiary prevention. This is provided by the dentist when referred by the health personnel. Cooperation of doctors, nurses, midwives, and other health personnel is essential and this is readily available in all clinics. Pre-natal mothers are routinely referred to the dental clinics by health personnel for a check-up and necessary treatment. Dental nurses during the school vacations visit the health centres and sub-health centres including midwife clinics for dental health talks.

It is found that the majority of the pre-natal and nursing mothers are receptive and anxious to know how to do the best for their infant. However, the difficulty is that a great deal of health education other than dental has to be concentrated in this period. Hence, dental health takes second place among so much else of importance to the mother and the child.

However, the objective of the talks is to bring awareness that teeth matter to her child and that its future dental health is largely in her hands. She is told of the chances of ruining a dentition at an early age, by sugar products, of the dangers of sweet snack habit and the pride she can take, justifiably, if she brings up her child free of dental disease.

It appears that more and more Malaysian women go to their general practitioners and private gynaecologist as pre-natal patients.

Hence, coopération of these personnel is of great importance in providing information on the importance of dental health. Various investigations into the relationship between pregnancy and gingival inflammation in general have shown that there is increased gingival inflammation in pregnancy with partial resolution during parturition (Loe and Silness, 1963; Cohen et al., 1969).

Pre-natal mothers must also be informed of the dangers of using drugs such as tetracycline and others which damage teeth and gums.

Oral contraceptives have been shown to affect the periodontal health of patients (Perry, 1981 and Pankhurst et al., 1981). Studies conducted in India by Das, Bhowmick and Dutta indicate that women taking oral contraceptives exhibited more gingival and periodontal disease than the comparable group (Das, 1971). The ingestion of hormones contained in the drug is said to have affected the gingival inflammation which ranges from measurable increases in gingival exudate to pregnancy-like gingivitis and tumor. There is also a possibility that hormones increase the inflammatory response of the gingiva to local irritants. Hence, patients who may wish to take oral contraceptives later on should be informed of the effect of the drug on periodontal tissues.

4.4.4 The General Public

The general public is the last priority group in Malaysia. Ironically, this is also the group that needs periodontal care most. The government servants and their dependants are accorded priority over the rest of the public and are eligible for free treatment.

According to the dental epidemiological survey of adults conducted in 1975, taking all the ethnic groups as a whole, 72.4 per cent of the subjects examined had periodontal disease. Of these 21.0 per cent suffer from mild inflammation, 20.2 per cent from intense gingivitis, and 31.2 per cent have destructive periodontal disease. This means that all the three preventive measures, primary, secondary and tertiary, discussed earlier in section 4.4.1, will be required to tackle the periodontal disease situation among the Malaysian community. The survey also revealed that periodontal disease starts as early as 15-19 years age group with 62 per cent being affected and the condition progresses into the severe stage from the age of 30 years. Although 95.2 per cent of this age group stated they brush their teeth regularly, 33.9 per cent of them were found to be already having mild inflammation. It can be presumed here that the technique and frequency of brushing would be faulty and leaves much to be desired. Here, therefore, is an area where proper D.H.E. teaching could certainly help.

The above facts bring to light the magnitude and the seriousness of the periodontal disease in the Malaysian community. This prompted the survey committee to recommend that "periodontology

as a specialized service should be established immediately to tackle this existing problem before it is too late" (Ministry of Health, 1977e). Hopefully, this will become a reality by 1983.

In spite of the high prevalence of periodontal disease in the Malaysian community, not many people seek treatment. This can be attributed to the fact that most Malaysians, particularly those in the rural areas, are unaware of the fact that treatment is available for this disease. Due to their ignorance they are unable to recognise the symptoms and, hence, do not take appropriate measures to prevent the disease. Bleeding of the gums to them is a normal phenomenon and most believe that gum disease is the disease of old age and there is nothing much one can do. As periodontal disease does not cause much pain, discomfort or suffering initially, they live with the condition until such time when the tooth becomes loose or pain persists, and only then will they seek dental treatment. Treatment is generally sought when the disease is advanced and the only alternative is the extraction of the tooth. However, there are times when tertiary prevention could save the teeth, but the patient is not interested, even with coaxing, because he feels that the disease could recur and the end result is he will still have to lose his teeth. With the existence of such a situation and attitude of the patient the dental profession cannot escape some blame. In the past the dental profession has been concentrating on dental caries and periodontal disease was a forgotten aspect of oral health. Secondly, all this while the dental service was concerned with rendering dental care to the school children and other priority groups, so much so that the general public was neglected and only

received emergency treatment. Thirdly, the almost de-facto non-existence of D.H.E. activities and facilities for the general public in the past has resulted in very little information reaching this community. Hence, unawareness, ignorance, lack of knowledge of proper oral hygiene measures, low degree of literacy superimposed by religious, cultural superstitions beliefs and socio-economic conditions have led to the failure of the general public to seek treatment for periodontal health. This in turn has resulted in the deplorable state of periodontal health among the population, particularly those in the rural areas.

Today, however, the general public is beginning to receive more dental care and information on dental health is slowly being disseminated to them through various means. The majority of the general public who does not seek dental services regularly, should be approached through community programmes and DHE should be aimed at transmitting adequate knowledge to the people with the hope of influencing their attitude and behaviour. The other important factor is motivation. Studies by Lightner et al, (1968) and Soumi et al., (1969) have shown that a well motivated patient who has been instructed in effective oral hygiene technique can keep his mouth almost free of plaque and bacteria.

The multi-racial nature of the Malaysian society, the diversity of culture, traditions and beliefs of the different communities, the different socio-economic and literacy levels and the fact that 60 per cent of the population live in rural areas are indeed barriers facing the health educator and the dental profession. However,

with careful planning and consideration an effective D.H.E. programme could be planned for the Malaysian community.

D.H.E. activities for the general public include one to one dental health talks at the chairside by the dentist. Group dental health talks are also given to those attending clinics both in the urban and rural areas prior to starting treatment by the dentist or the dental nurse using various teaching aids. Occasionally dental health exhibitions are held at district level and village levels with the aim of providing dental health knowledge and creating awareness of the facilities that are available in government-run clinics.

During these exhibitions free check-ups are given and the patients are encouraged to visit the dental clinics regularly. Film shows and slides are shown to the public and reading material in simple pictorial form is also distributed. Generally, there is good response to such exhibitions. Occasional dental campaigns are also conducted.

Dental health talks over radio and television are also given by dental personnel in the Ministry of Health, aimed at the general public. Articles on dental health often appear in the press in different languages. This mass media dissemination of information to the population should prove to be an effective measure and, therefore, should be fully utilized.

Stress is also placed on self-care as it is up to the individual who has acquired sufficient knowledge to implement this in his daily life in maintaining good oral hygiene and preventing the initiation of periodontal disease.

To minimise periodontal disease the following should be recommended to the patient:

1. To brush teeth regularly using correct techniques particularly after meals, for the maintenance of good oral hygiene.
2. Rinse mouth vigorously with water to prevent lodging of food on teeth if toothbrushing is impractical.
3. Avoid in-between-meal snacks of sticky food. Eat them only at regular meal times.
4. Regular prophylaxis.
5. Seek early treatment in case of early signs of gingival inflammation.

4.5 METHODS AND TECHNIQUES OF DENTAL HEALTH EDUCATION

4.5.1 Dental Health Talks and Content Material

The focus of dental health education of the community should be to motivate them to take necessary action in the prevention of periodontal disease. With the need for more effective prevention of the disease so apparent, we must recognise that the practice of prevention is based on lay education. The community, therefore, must have more understandable information about prevalence, cause, prevention and treatment and the prognosis of periodontal conditions. This information, therefore, can be provided through dental health talks by the various dental health educators. The dental health educators must bear in mind that they will be dealing with a variety of groups with different levels of education, socio-economic standings, intelligence and age groups. Hence, the dental health information provided should suit the target group in content material and technique of dissemination so that the message that is wished to be conveyed can be easily understood. According to Blinkhorn and Verity, the suitability of educative material for a target group should be carefully considered during the planning phase (Blinkhorn and Verity, 1979). Therefore, before dispensing any health education material during talks to the community it should be assessed in terms of ease of understanding, which is one way of matching target groups to the educative material.

It is important to limit the range of topics at each talk as new information is prone to the problem of interference. While giving dental health talks, the health educators must bear in mind that

their programmes have to compete with many other media presentations, hence, their talk must be presented in such a way that it stimulates the interest of target groups to accept the dental health message as personally relevant.

For the effective prevention of periodontal disease the following factors need to be considered.

- 4.5.1.1 Plaque control,
- 4.5.1.2 Oral Hygiene,
- 4.5.1.3 Diet counselling,
- 4.5.1.4 Fluorides,
- 4.5.1.5 Seeking early treatment.

4.5.1.1 Plaque control

Plaque is the single most significant local factor in the initiation, development and progression of inflammatory periodontal disease (Pawlak, 1980). According to Pawlak, there is a direct correlation between the presence and amount of local irritants on the tooth surface and the presence and severity of periodontal disease.

Ramfjord and coworkers established that there is ample evidence that lack of plaque removal over long periods leads to periodontitis both in animals and man (Ramfjord et al., 1982). They also state that periodic removal of plaque may cure gingivitis and arrest the progress of periodontitis.

Dental plaque may be described as an invisible, continuously forming sticky film which is composed of bacteria in an adhesive organic matrix, which forms on tooth surfaces and restorations

exposed to the oral cavity (Altman and Wendon, 1974b). Plaque is not a haphazard accumulation of bacteria and is formed in a sequence of steps. The types and numbers of organisms vary considerably with the age of plaque (Theilade, 1966a).

Bacterial plaque if not removed will calcify and lead to the formation of calculus, which is equally detrimental to periodontal health. According to Ramfjord, "the cause and effect relationship between calculus and periodontal disease has been reported practically by every worker since King's study in 1945" (Ramfjord, 1961a).

Glickman says that "calculus perpetuates the inflammatory, degenerative and proliferative changes responsible for deepening pockets and destruction of the supporting periodontal tissues" (Glickman, 1964b).

Makherjee cites the W.H.O. epidemiological reports as indicating "a close and consistent relationship between the amount of plaque and calculus on teeth and the growing severity of periodontal disease" (Mukherjee, 1968).

Plaque control is the most effective method and the basis for the prevention of periodontal diseases. Plaque control refers to all the measures taken by the patient and the dental profession to prevent the accumulation of bacterial dental plaque and other deposits on the tooth. Information on plaque, calculus and their preventibility, therefore, should be passed on to the community by the dental health educators during D.H.E. talks.

Regular plaque control has a two-fold effect on the tissues:

1. The primary role is the removal of soft deposits on tooth and gingival tissues (dental plaque, materia alba, and food debris),

2. General stimulation (gingival massage) may increase gingival tone, surface keratinization, gingival vascularity and gingival circulation.

Methods of preventing periodontal disease are directed at preventing or controlling plaque formation and/or at increasing the tissue resistance to disease. Plaque formation can be prevented by the following two ways:

1. Mechanical plaque control,
2. Chemical plaque control.

1. Mechanical plaque control

- (a) Detersive Foods

In the past it has been assumed that hard and detersive foods had valuable cleansing action and remove plaque and debris from teeth and surrounding tissues. Though some people are still inclined to believe so, studies by Lindhe and Wicén has shown that the chewing of detersive foods does not appear to have any plaque preventing effect (Lindhe and Wicén, 1969).

To date the mechanical method is the most reliable method of controlling and preventing bacterial plaque and other deposits. The toothbrush is the fundamental tool for this purpose. It has been shown that careful toothbrushing can keep the teeth free from plaque and maintain gingival health (Loe et al., 1965). Conversely, if normal toothbrushing is discontinued, plaque develops on the tooth within a few hours, and the previously healthy gingiva shows clinical signs of inflammation within 7-12 days (Theilade et al., 1966b). Hence, during

dental health talks this important point should be stressed to the community.

Though Greene and Vermillion and many other research workers contend that more frequent brushing tends to give better plaque control and gingival health (Green and Vermillion, 1960), recent evidence indicates that, as far as maintaining gingival health is concerned, the efficiency of tooth brushing may be even more important than its frequency since cleaning teeth once every second day also helps maintain gingival health (Kelner et al., 1973). Hence, combining frequency and efficiency of brushing will certainly result in better gingival health.

In a study on the effect of toothbrushing on subgingival plaque formation, Jans Waerhaug found that subgingival plaque could be prevented in areas which are accessible to the brush. However, he admits that toothbrushing alone is inadequate because the supragingival plaque left behind in the central part of the individual spaces will lead to further subgingival plaque formation (Waerhaug, 1981).

Various techniques of toothbrushing have been advocated. These include Bass technique of circular brushing, modified Bass technique, which consists of sweeping the bristles downward over tooth surfaces occlusally after completing the vibratory motion in the gingival sulcus, the roll method, which is probably the most universally used technique and others.

However, no one method of toothbrushing is adequate to meet the needs of the patients according to Pawlak. She says the thoroughness of the removal of deposits is more important than the technique.

Toothbrushes come in various shapes, sizes, bristle hardness and length and bristle arrangement to meet the patient's individual needs. Skinner and Takata say that there is no clear evidence of the superiority of any particular design of toothbrush nor any difference in cleaning efficiency between nylon and natural bristle brushes (Skinner and Takata, 1951).

Today, a variety of power driven toothbrushes are available in the market. Though initially it was thought to clean the teeth better, subsequent research revealed that these are not superior to the handbrushes in any way in removing plaque. However, electrical toothbrushes do have some advantage in assisting the handicapped individuals and the hygienically lazy children and adults.

(b) Prophylaxis

Prophylaxis is a method currently used for the removal of plaque and calculus in an effort to prevent periodontal disease. The effect is, however, related to the frequency of treatment as shown in the study carried out in Sweden which concludes that frequent prophylaxis leads to better oral health status (Horowitz, 1980). More recent studies carried out by Hamp and Johansson on youths in their late teens in Sweden,

revealed that systematic prophylactic measures at regular intervals effectively diminish occurrence of plaque and gingivitis (Hamp and Johansson, 1982). Lovdal and others have shown that sub-gingival scaling followed by controlled oral hygiene reduced gingivitis by 50 per cent to 90 per cent depending upon the individual's oral hygiene habits prior to treatment (Lovdal et al, 1958).

(c) Flossing

Toothbrushing alone cannot clean all the surfaces of the teeth. It should, therefore, be supplemented with aids which assist in either cleaning or gingival stimulation. These aids include dental floss and dental tape which are extremely effective in interproximal cleaning, and come in waxed and unwaxed forms. Other aids include balsa wood wedge, toothpicks and brushes in special holders and rubber tip stimulators.

Studies by Gjermo and Flotra (Gjermo and Flotra, 1970) and more recently by Ableson (Ableson et al., 1981) and Lobene (Lobene, 1982) reveal that dental floss was effective in removing plaque from interproximal surfaces and substantially improved gingival health.

The community, therefore, must be told of the prophylactic measures available during D.H.E. talks and that these can only be carried out at the various dental clinics. Information on the importance of dental floss and how to use it should be given to the public.

(d) Plaque disclosing tablets and solutions

Disclosing plaque using tablets and solutions enables the patient to visualize the stained deposits on the tooth surface. It is hoped that through staining of the teeth, the effectiveness of plaque removal can be increased. Such stains aid in patient education, motivation, and home care because the patient can utilize these dyes to judge his oral hygiene effectiveness.

Other mechanical methods of plaque and debris removal include dentifrices, which contain abrasives, detergents and flavouring agents. The detergents and abrasives aid in polishing and help in the removal of debris. However, the removal of debris is done by the toothbrush using the dentifrices.

2. Chemical plaque control

In recent years, major advances have been made and much knowledge gained of the bacterial nature of plaque and its biochemical components and this has prompted the testing of other methods of plaque control.

(a) Antibacterial Agents

Although a well instructed and motivated individual can control bacterial colonization by mechanical means as discussed above, there are inherent limitations in the existing tooth cleaning technique and also in the ability of the patients to apply them. One logical approach to plaque control is by means of antimicrobial agents. Loe and Schiott reported that two

daily rinses with 0.2 per cent chlorhexidine gluconate inhibited the formation of supragingival plaque and the development of gingivitis (Loe and Schiott, 1970). Recently, Yamaguchi carried out a study to describe the effect of chlorhexidine on plaque formation in humans using triacetycellulose (TAC) films and electron microscopy. He concluded that solutions containing chlorhexidine digluconate and lactic aluminium have an inhibitory effect on the development of dental plaque (Yamaguchi et al, 1981). Studies by Davis and coworkers using 2 per cent chlorhexidine once every 24 hours have shown inhibition of plaque formation, though on discontinuing treatment plaque formed within 24 hours (Davis et al, 1971). Soh investigated the effect of direct application of chlorhexidine to periodontal pockets using a technique of subgingival irrigation. His investigation revealed that during the 28 day irrigation period with chlorhexidine, there was a highly significant reduction of periodontal inflammation (Soh, 1982). Recently, Wennstrom studied the effect of a new anti-plaque agent CK-0569A on fourteen dental students using mouth rinses. His results demonstrated that CK-0569A prevented the colonization of motile t curved and spirocheates in developing plaque. Furthermore, rinsing twice daily with 0.1 per cent solution CK-0569A significantly reduced dental plaque and retarded development of gingivitis (Wennstrom, 1982).

Chicko Ino studied the inhibitory effects on the formation of dental plaque in children using a low concentration of chlorhexidine for a prolonged period. From this study he

concluded that using 40 ml of a 0.1 per cent aquatic solution of chlorhexidine di gluconate applied for 20 minutes to elementary school children for 202 days significantly inhibited plaque formation without any unpleasant complaints. Besides it also had a use as an auxiliary oral health measure for orthodontic patients wearing some kind of orthodontic appliance (Chicko, Ino, 1981).

However, though long term use of chlorhexidine rinse has clinical advantages without substantial side effects, it is found to cause superficial staining of teeth.

Other chemical plaque controlling measures such as antibiotics and enzymes have failed to show any beneficial effect on plaque control conclusively, though antibiotics such as penicillin and tetracycline have shown to inhibit plaque formation in animals. Use of surface-acting agents, which affect the surface tension of teeth too have failed to inhibit plaque formation.

However, there has been considerable evidence recently of the topical effect of fluoride rinses on plaque formation. Studies by Svatun and coworkers have shown that daily rinsing by sodium flouride and stannus fluoride solutions will inhibit plaque formation (Svatun, 1977).

4.5.1.2 Oral Hygiene

Oral hygiene has been a human concern for centuries (Goldberg, 1977). The preventive advantages of regular care of the teeth and gums were stressed by scientists and philosophers in some of the earliest written documents of human history when some societies incorporated oral hygiene practices into their religious rituals. Primitive man used twig toothpicks to relieve the inconvenience and pressure of impacted food. First toothbrushes were twigs or roots with the fibres chewed or hammered into brushes at the end. Special powders and mouthwashes to aid in oral prophylaxis in the practice of oral hygiene were used in ancient times.

Today, oral hygiene is appreciated as the essential groundwork for any efforts to maintain oral health and adequate dentition, particularly when related to periodontal disease. The current preventive movement in dentistry is based on the belief that widespread periodontal disease can be significantly reduced, provided members of the dental profession and highly motivated patients participate in a rigorous programme of oral hygiene. According to Nisengard and Genco, oral hygiene currently affords the only practical method for prevention of periodontal disease in large populations.

The cause and initiating factors of periodontal disease are well documented. Plaque is the biggest culprit in the initiation of periodontal disease and all efforts to prevent this disease must be directed towards preventing the formation of plaque. Many researches have related the severity of periodontal disease to the degree of oral hygiene efficiency. Nisengard and Genco concluded that poor

oral hygiene is definitely a precursor of periodontal disease as it allows plaque development near the gingival tissue (Nisengard and Genco, 1977). Health educators, therefore, should point out the harmful effects of plaque and stress the need for good oral hygiene in the D.H.E. talks.

Greene examined a combined population of 3,851 from Ecuador and Montana for the severity of periodontal disease using Russell's Periodontal Index and for efficiency of oral hygiene using Greene's Simplified Oral Hygiene Index. He reported that the severity of periodontal disease was related to the degree of oral hygiene.

Instructions in oral hygiene techniques should be given to all patients and not only to those who have developed periodontal disease. A variety of artificial aids to oral hygiene are used throughout the world, but the toothbrush is the most important instrument for obtaining oral cleanliness. It is available in a variety of shapes and sizes, and great many people throughout the world perform some sort of morning and evening ritual (Manson, 1970b).

Requirements of a satisfactory toothbrush according to Manson are:

1. It should be small enough to be manipulated properly everywhere in the mouth, yet not so small to be used for a long time to obtain complete coverage of the dentition.
2. The bristles should be of even length (about 1 cm) so that they function simultaneously.
3. The texture should permit effective use without causing tissue damage. A very soft bristle will not clean effectively and a brush of medium stiffness should be used. A hard bristle

brush may be used by heavy smokers, but it is essential that the individual using a hard brush has tough gingivae and knows how to use the brush so that the tissues are not damaged.

4. The brush must be easy to keep clean.

Requirements of a satisfactory toothbrushing technique are:

1. The toothbrushing technique should clean efficiently all tooth surfaces, most particularly the area of the gingival crevice and especially the interdental region.
2. The movement of the bristles should not injure the tissues.
3. The technique should be relatively simple and fairly rapid.

The Charters and Stillman techniques appear to fulfil these criteria. However, the health educators during their talks and lectures should encourage each patient to develop a technique best suited to himself.

Motivation and Learning

The patient needs not only information and skills, but also motivation for successful plaque removal. Dental health educators during their talks and lectures not only teach what to do, but motivate the community to do it. Motivation in general refers to goal seeking or need satisfying behaviour and the level of motivation is related to the individual's behaviour, and this level can be influenced. Therefore, motivation is an essential aspect of instruction and should be incorporated into the plaque control programme.

Obtaining patient-cooperation is an important factor in the maintenance of good oral hygiene. What has been learned should be put in practice in home care as a daily regime as much depends on

the individual's actions. In home care, use of plaque disclosing tablets or solutions can aid the individual to identify the plaque areas which can be easily removed by proper brushing. Regular prophylaxis can help remove calculus and maintain good oral hygiene.

Maintenance of oral hygiene after periodontal therapy such as supra-gingival and subgingival removal of calculus or surgical treatment of gingiva is equally important. Failure to do so will inevitably lead to failure of the periodontal therapy, causing further damage to the gingival tissues.

Oral hygiene education is the 'cornerstone' of most dental health talks and lectures, and it is currently the only effective means of preventing and controlling periodontal disease. Every individual, therefore, should endeavour to maintain good oral hygiene and prevent loss of teeth from periodontal disease.

Generally speaking, the oral hygiene of Malaysians can be described as fair to poor. The epidemiological survey of school children in 1971 revealed that 50 per cent of the children between the age of 7 and 13 years showed materia alba accumulations. Since the distribution of materia alba and calculus reflects the oral hygiene status, it is not unreasonable to deduce that it is indicative of poor oral hygiene.

In the adult survey 72.4 per cent of the subjects examined had periodontal disease. The mean OHI-S score was 2.2 which Greene and Vermillion consider to be fair (Greene and Vermillion, 1964).

It is highest amongst the Indians/Pakistanis of the 55-64 age group

at 2.8 and the Malay of the 35-54 age group at 2.7. This could be attributed to the socio-economic condition of this group and also their habits such as betel chewing, the ingredients of which consists of betel leaf, arecanut, dried tobacco leaf and lime. The betel quid is said to cause gingivitis, and irregularities of the teeth and gums, and betel chewing over a long period is also suspected to cause cancer.

Hence, dental health talks and lectures can be directed to these groups with poor oral hygiene with the hope of bringing awareness and changing their attitudes and behaviour which can improve their oral hygiene.

4.5.1.3 Diet Counselling

In Malaysia a variety of food is available and is generally within the means of all people. Today, malnutrition is the thing of the past and government subsidised hot meals are available to primary school children from poor homes. However, due to the multi-racial nature of the society, the food is cooked in a variety of ways. The Indians, for example, generally eat overcooked vegetables which cause loss of much of the food value. Religious barriers prohibit the consumption of some kind of foods. Hence, health educators can offer advice during their dialogues on alternative foods which can be consumed and also on the method of cooking to preserve the food value.

Epidemiological studies relating to prevalence and severity of periodontal disease in adequately nourished and undernourished

populations have not found significant differences according to Ramfjord (Ramfjord, 1961b). However, the only clear evidence of a positive relationship between periodontal disease and nutrition comes from the study of Pendborg and coworker in Bangalore, India. They examined children aged 1-5 years with kwashiorkor, a severe protein deficiency disease, and found that they had significantly more periodontal disease than the control group. Attempts to relate the severity of periodontal disease to deficiency of specific vitamins or other nutritional factors have shown little difference. However, according to Pawlak there is evidence to indicate that certain nutritional deficiencies lower tissue resistance so that the inflammatory process of periodontal disease may be accelerated.

A soft diet tends to produce more bacterial plaque, thus contributing more to initiation of gingivitis than does a coarse diet (Goldberg and Ripa, 1977). Firm foods such as raw fruits and vegetables are said to benefit the gingiva by providing limited cleansing action and minimising accumulation of food debris, also improving circulation.

Dietary control requires the cooperation of the people and through D.H.E. talks and lectures, the indiscriminate eating of refined carbohydrates should be discouraged. Malaysian supermarkets are well stocked with such foodstuffs as sweetened soft drinks, refined wheat flour, sugar, chocolates and many other sweetened products, which are the primary cause of dental caries. These modern foods now form a regular part of the diet of the Malaysian community. Introduction of these modern foods is bound to affect the caries

status of the Malaysians particularly the children. The community, therefore, must be forewarned of the detrimental effects of consuming refined carbohydrates found in modern food.

Sucrose intake also increases the rate and amount of plaque formation which affects the periodontal health. The best place to begin the propaganda against the sale of refined carbohydrates are the school tuckshops and here the cooperation of the school authorities and the government is essential.

Nutrients are chemical substances in food that are needed by the body. Health educators, therefore, should advocate a balanced diet necessary for all the body including periodontal health.

4.5.1.4 Fluorides

The discovery of fluorides has been a boon to dentistry, and its effect on dental caries has been well documented. According to the W.H.O. monograph, fluorides in very low doses do reduce the number of caries lesions by well over 50 per cent and reduces the severity of collective caries attack even more markedly (W.H.O., 1970d).

However, survey of human populations in fluoride and non-fluoride areas have uniformly failed to reveal any association, for better or for worse, between use of fluorides and the health of gingival or periodontal tissues.

Box in his study claimed that fluoride caused "appalling periodontal disease", with marked morphological changes". However, he himself

later admitted that no such study was carried out. Dillon asserted that in fluoride water containing a "toxic part", "periodontal disease will occur prematurely and a widespread loss of teeth at an early age will be the penalty for a percentage reduction in juvenile caries" (Russel and White, 1959). However, this study too was a misinterpretation based on a misconception of electro-chemical theory. According to W.H.O. although suspicions of this nature have been expressed by the opponents of fluorides, there is evidence that increased fluoride consumption in no way harms the periodontium and even may be advantageous.

The fact that continuous consumptions of fluoride-rich water in childhood does not bring about inflammatory condition of the gums was studied by Russel on children aged 14-15 years, by Adler in 16-18 years, and by Jiraskova in Czechoslovakia as well as Englander and White in the U.S.A. They found that the periodontium was in a better condition among teenagers living in fluoride-rich districts than those in fluoride-poor districts.

Studies conducted by Russel and White and by Englander, Kesel and Gupta, on adults, revealed that the effect of fluoride on gingival tissues and on the development of periodontal disease is negligible. They also concluded that continuous consumption of optimally fluoridated water neither promotes nor inhibits calculus deposition.

Recent studies by Tinanoff and coworkers and Svaton on the topical effect of fluoride rinses on plaque formation have shown that daily rinses with sodium fluoride and stannus fluoride solutions inhibited plaque formation. They found greater effectiveness of

the SnF_2 rinse and they attributed it to reduced adhesion between the bacteria and the tooth enamel.

Summing up all these researches, it is justified to conclude that the possibility of increased fluoride consumption having an adverse effect on the periodontium can be definitely excluded.

4.5.1.5 Seeking early treatment

The action that an individual takes to maintain oral health is conditioned by his knowledge of proper hygienic procedures. In order to be motivated to take action to improve his health, an individual must believe that there is something he can do which will be effective in improving health or preventing disease.

The important message health educators should convey to the community is that periodontal disease is preventable and that it can be successfully treated if one seeks treatment at the early stages. For this however, the community must be made aware of the simple signs and symptoms of early periodontal disease so that immediate dental care can be sought. Redness of gingival margins, bleeding during brushing can easily denote abnormality in the gingiva. Sadly, most people do not seek early dental care either due to ignorance and unawareness, or that they do not attach much importance to dental health. A previous bad experience with a dentist could keep the patient away.

Most Malaysians do not seek early treatment for a variety of reasons. Ignorance, lack of dental health knowledge, clinics being located too far from rural areas with poor transport, and the feeling that

prosthesis can replace dentition and look nicer and are less problematic.

Dental health talks and lectures, therefore, should correct wrong conceptions, motivate the patient using persuasive measures. That teeth can last for a lifetime with regular oral hygiene practices should be inculcated in the patient's mind.

Even with regular maintenance of oral hygiene one cannot prevent the formation of calculus. Hence, regular prophylaxis should be carried out in an attempt to prevent the disease by seeking early treatment. Early detection and initiation of treatment for periodontal disease can be easily carried out on school children by dental nurses based in the schools, by systematic regular examination of the school children under her care. Similarly, pre-natal mothers during their regular pre-natal check-up could be easily diagnosed for early periodontal disease and treated accordingly.

Basically, most people value their teeth for aesthetic and masticatory reasons and associate their loss to loss of youthfulness. Teeth, therefore, should be viewed with the same importance as any other part of the body, the loss of which can cripple a person. Hence, to prevent the loss of teeth due to periodontal disease, early detection and treatment is necessary, and this can be followed up by regular check-ups by the dentist at intervals according to the need of the individual.

4.6 DENTAL HEALTH EDUCATION MEDIA

The term media theoretically include all vehicles of communication. It is, however, more usually understood to be the specific tool used for formal teaching, other than the human voice, which was dealt with in the earlier section. These tools are best grouped in two categories:

4.6.1 Audio-visual aids

4.6.2 Mass media

4.6.1 Audio-visual aids

Audio-visual aids can be used for teaching individuals or small groups. According to Stoll, audio-visual devices are used as methods of building concepts, and are not meant to take the place of the teacher or to assume the actual task of teaching itself.

The viewer should form a critical attitude and cultivate good judgement while viewing to benefit from the use of the visual aids.

Audio-visual aids include motion pictures, film strips, slides, models, charts, exhibits and the like. In the words of a famous Chinese philosopher "a picture is worth a thousand words". These pictures bring information of a specialized nature to a selected audience, without assimilation and participation on the part of the teacher. In part audio-visual aids involve techniques that are attractive for audience participation and children can make posters and models, and in an attempt to teach others teach themselves.

In Malaysia, audio-visual aids for the purpose of teaching D.H.E. are seldom used. Though it is recognised as an important media for transferring information to the school children and the general public, this teaching aid has not been used widely in the country. This is probably due to the fact that these aids are expensive and within the limited annual dental budget, it is not possible for each clinic or dental team to possess one. Hence, for most of the time dental health educators have to rely on posters, models, charts, exhibits and occasional use of slides and overhead transparencies. According to Chan, people learn through their various senses and audio-visual aids introduce variety in the learning process and increases the effectiveness of teaching (Chan, 1963). Because of the differences in the cultural and educational backgrounds and differences in habits, beliefs, traditions and language, Malaysia could produce its own requirement of audio-visual aids and educational materials.

4.6.1.1 Motion pictures and film strips

Motion pictures, slides, film strips and television can be grouped together as they are all passive D.H.E. aids, and are adaptable for teaching of almost any age. For elementary teaching motion pictures are probably more valuable and should be used as teaching devices rather than as a means of amusement in dental health education. The main value is that they provide realism and motion. They can display complicated situations step by step. The viewer can see in a few moments what might have taken a long time to produce. Films on periodontal health showing the ugly bleeding gingiva, and the shunning of individual with halitosis, and the misery associated

with it can put the viewer in the shoes of the person in the motion picture. Hopefully this can motivate children and adults to seek treatment. Motion pictures showing people treated for periodontal disease and other oral diseases, having a happy smile again, can influence the community to care for their dental health and seek early treatment for any oral health abnormality.

Motion pictures relating to various aspects of dental health, such as brushing, a visit to a dentist, habits and many other relevant topics can be shown to bring about a change in attitude and behaviour in the community and to promote dental health.

Motion pictures for school children and the adults relating to dental health should be carefully selected and previewed and the reception accorded to these pictures will vary from audience to audience.

Slides are the media of choice for the teacher who has his own story to tell. The dentist, speaking to older children or parent-teacher groups, will do well to build his talk around a few well chosen slides or film strips.

Motion pictures could well be popular with the Malaysian adults as an educational aid as due to the lack of manpower it is not possible to render individual attention by the dentist.

Video Systems

In recent years, dental educators have developed an interest in using the video system as a teaching aid in dental schools. It can also be a valuable aid in teaching D.H.E. for small groups or for individualized instructions, making good visual impact.

The equipment basically consists of a video tape player/recorder, video cassette and T.V.

The advantage of using the video system over television for education is that it fulfils one of the conditions of learning and that there is learner involvement by response to an instructor-provided stimulus. Secondly, the video system can be operated by a non-professional and a person with little know-how could easily manipulate it. The unique feature of this system is its easy-load, push-button operation and quick forward and reverse motion. This allows the learner to obtain access to information stored on the tape quickly and easily.

Mangiaracina and Sawyer say that a tape segment can be arranged to include verbal and visual descriptions, pertinent examples, stress on important points, and questions with an optional opportunity to permit the learner to think and provide answers. They further state that the sequence would be completed with correct answers, repeated restatement of important facts, or correction of incorrect responses (Mangiaracina and Sawyer, 1981).

D.H.E. programmes suited to the community or the group can be made quickly and relatively inexpensively. Health educators in this way will have better control on the material and can base their educational programmes on the strengths and weaknesses in the community.

Video cassette television possesses all the characteristics needed to become an exciting new educational medium. Its compactness and easy packing permits ease of handling and storage.

Presently in Malaysia, the videosystem is not in use yet as a D.H.E. aid. However, in view of its compactness and ease of transport, it can be a valuable aid in educating the rural community as well as the school children in the various aspects of D.H.E.

4.6.1.2 Posters

Posters, bulletin boards and exhibits are important as visual materials in teaching dental health. They have a strong influence on the public. They should convey a simple message and emphasize one idea at a time. Posters should be attractively coloured, to attract the eye and have proper relation of space. They, in essence, are attractive temporary reminders rather than original informers. They should carry simple messages such as go to the dentist, eat nourishing food, avoid bad habits, and the like.

Bulletin boards can convey several ideas at one time and can be displayed for a longer period of time. The main purpose of a bulletin board or an exhibit is to draw immediate attention and make the learner want to stop, look and learn. Bulletin boards must be updated regularly with new interesting ideas and materials.

Posters, exhibits and other such aids are widely used as D.H.E. aids by nurses and dentists in Malaysia. They are used in dental health talks to school children and also to adults. During dental health exhibitions and dental campaigns they are widely used. These posters are mostly prepared by the dental nurse herself during the school holidays and she takes them along with her when visiting rural schools as teaching aids. During exhibitions and dental health campaigns, school children take part in poster competitions and the theme is on dental health.

4.6.2.3 Charts

Charts are primarily conveyors of information designed for long-term exhibits. Initially, they require to be explained by the health educators. They may show tooth anatomy, methods of tooth brushing, foods that are nutritionally arranged in categories, and many other topics relating to dental health. Malaysian dental nurses and health educators generally use flip-charts while educating the school children and pre-natal mothers.

4.6.1.4 Flannel Boards

Flannel boards are hard boards covered with flannel or velvet and are commonly used during dental health talks and lectures since materials can be placed, removed and rearranged at will by the health educators. It is convenient to use, easily transported, takes up little space and all the materials can be prepared ahead of time.

4.7 MASS MEDIA

The mass media in common use today involve pamphlets, newspapers, radio and television. It covers a widespread audience which is unseen and hence to attract the audience, the educational material must be both attractive and informative. The mass media can convey simple facts fairly well, but because of the impersonal nature such media do not have much effect in changing basic attitudes and motives.

According to Rosenstock mass communication methods are more effective in providing information and a favourable background climate than in stimulating behaviour. He says groups of differing educational and social status show different patterns of use of the mass media. Further, he says that individuals and groups differ in their acceptance of and reliance on various communications and that the power of mass communication to influence behaviour is limited (Rosenstock, 1962).

However, I tend to disagree with this view. We have seen how politicians have managed to influence people and change their attitude resulting in winning an election. Advertisers of various products spend millions of dollars annually advertising their products over the mass media, and have been successful in influencing a certain percentage of the population. Even the largest corporation rarely needs to capture more than 5 per cent of its potential market to show huge profits. Similarly, in dental health education the power of mass communication can influence a certain percentage

of the population to change its attitude and behaviour though the aim is for 100 per cent to derive benefit.

4.7.1 Pamphlets

Pamphlets are widely used in the attempt to disseminate knowledge to dental patients. They are found lying in almost every dental clinic, government or private practice and patients can take them away on leaving the clinic. They are also widely distributed during dental exhibitions and dental campaigns to promote dental health. However, a study was made by The Dental Health Education and Research Foundation of Australia in 1965 into community feelings on dental health education. The project called the Canowindra Project involved the saturation of the town with pamphlets, leaflets and posters on dental health. The local radio boosted the effort by flashing items on dental health. The results at the end of the campaign were disappointing. The dental status of the Canowindra population was found to be not significantly better than that of the people living in another town where no such campaign was mounted (Dental Health Education and Research Foundation, 1982).

In recent years the quality and variety of pamphlets have been greatly improved, and are widely used by dentists, teachers and health educators. The material, therefore, should be attractively presented to gain attention, regularly updated and should contain the latest information available. According to Slack before dispensing any health education literature it should be assessed in terms of ease of reading which is one way, he says, of matching the target group to the educative material. The range of topics

covered in a pamphlet is important and it is best to deal with one topic at a time. The pamphlets must convey the message that teeth can last a lifetime and that periodontal disease is preventable by individuals.

4.7.2 Newspapers

Newspapers have a wide distribution in almost every country.

News articles, feature articles and advertisements relating to dental health can be carried by the newspapers. Newspapers can give wide coverage of dental campaigns and exhibitions that are held or to be held so that the public is aware of it. Commercial houses which are related to dental products, can help in the promotion of dental health through their advertisements in newspapers as financially as they are able to do so.

The Malaysian newspapers are available in different languages to cater for the multi-racial Malaysian society. The dental department can provide the necessary material to these newspapers which then can carry it to the community at large.

4.7.3 Radio and Television

Radio and television are effective media in the propagation of dental health education message. Malaysian radio and television have coverage of almost the whole country. Presently, there are occasional talks on dental health by dental personnel in the Ministry of Health over the radio and television. These talks could be made a regular feature over this media in view of the appalling dental

health of the Malaysians. Periodontal disease which is widely prevalent and easier to prevent than other dental diseases could be stressed on. During special radio and television programmes beamed to schools daily, dental health could be incorporated in them. Regular womens' sections could also cover dental health education.

4.7.4 Government Information Service

Mobile information department vehicles regularly visit the rural areas disseminating information on government policies and aiding them with know-how on agriculture, and various other aspects affecting their daily lives. These vehicles move from village to village and generally attract great attention of the rural folk drawing large crowds. During such visits, trained information service personnel could provide information on dental health. The information department could cooperate with the dental department at national, state and district level where programmes could be planned to enable the dental personnel themselves to render dental health talks to the rural folk.

4.8 DENTAL EXHIBITIONS AND CAMPAIGNS

Dental health education exhibitions and campaigns may be defined as concerted propaganda publicity effort, conducted on a more elaborate scale and with a greater intensity than the everyday activities of dental health education. The aims of these activities are generally to increase public awareness of the need for oral health and to motivate the people to seek dental health care. Procedurally, dental health exhibitions and campaigns involve the coordination of a number of activities, tools, methods and media to rapidly condition the opinion of people to accept an idea or group of ideas.

Sundram warns that a campaign could just easily leave the public with confused opinions as make it happy and proud of its achievements (Sundram, 1976). He says there is an increasing disposition to use campaigns cautiously for the purpose of influencing the public or changing their behaviour.

Campaigns and exhibitions are generally enthusiastically initiated and once over, they are sadly shelved over a long period. They should be held more often to enforce what people had learnt earlier.

Campaigns and exhibitions can be a powerful means of communicating with the public and moving it to action.

In Malaysia, there are people of many cultural and ethnic backgrounds, with varying education and socio-economic levels. Various exhibitions and dental campaigns generally held are designed to focus public attention on a single theme - oral health. They have been organised with varying degrees of success and have served to increase public awareness of the need for oral health.

Dental exhibitions and campaigns are usually organized by the dental departments of the various districts in the country, both in urban and rural areas. They are either directed at the school children or the adults or both. Exhibitions in most schools are annually held to mark school speech day, or parent-teacher day. The children sing dental health songs, take part in toothbrushing competitions and art competitions with a dental health theme. They are given awards to motivate them further. It also gives the dental personnel an excellent opportunity to educate the parents of children during these exhibitions.

Exhibitions directed at the adult population are usually held in the community halls at both district and village levels. They are generally held along with other government departments such as the health agriculture, veterinary, fisheries and other departments. These are generally information giving exhibitions and are usually publicized by the information department and are well attended by the general public.

Special dental campaigns marking important days such as World Health Day, "Dental Health Week", are held both at district and rural levels. V.I.P. speakers such as the Minister of Health, the District Officer or the State Director of Dental Services, are invited to these exhibitions. Puppet shows, toothbrushing competitions, dramas with dental themes are put up to create enthusiasm among the school children and the general public. Attractive prizes are given to the winners and the trophies are generally proudly displayed by the winning school. This indeed motivates the schools and the dental nurses attached to them to display their best effort. During

these dental campaigns, pamphlets, badges, stickers and a variety of other material with dental health slogans are distributed. Film shows and slides are also presented.

Regrettably, the Malaysian Dental Association and dental firms dealing in dental products have not been active in promoting dental health. They could certainly hold a dental exhibition or conduct a dental campaign on an occasional basis and this would certainly boost the efforts of the dental department.

Campaigns and exhibitions can accomplish the following:

1. provide the community with general knowledge concerning dental/oral health services offered by the government, so that the public will know how to obtain them;
2. to bring awareness of the importance of dental health and to educate them on the various aspects of dental health;
3. arouse the interest of the masses in seeking dental health;
4. influence public opinion, attitude and behaviour in favour of better oral health practices.

4.9 PROBLEMS IN THE DELIVERY OF D.H.E.

In spite of the wide network of dental clinics, both static and mobile, available in Malaysia, and in spite of numerous dental health educators ranging from teachers in schools to health personnel and those in the dental profession, there are major problems encountered in the delivery of dental health education to the Malaysian community.

By this I mean the problem of behavioural sciences, which are beyond the control of the health educators. Malaysia is a multi-racial, multi-cultural and multi-lingual country. Its problem involving behavioural sciences are therefore unique. These can be summarized as the following:

4.9.1 Behaviour

4.9.2 Attitude

4.9.3 Traditions and superstitions

4.9.4 Motivation.

4.9.1 Behaviour

Bringing about a change in behaviour is vital in the field of dental health education and in dentistry in general. The problems associated with health education and the different types of preventive activities that are required indicate that simple approaches to modifying or changing behaviour are unlikely to be successful. Health professionals, therefore, need to take into account and understand the social forces such as socialization, knowledge/behaviour change, value systems, social class and learning theory which shape an individual's actions.

According to Berger and Lackman, humans have a low level of instinctive behaviour; most of our actions are learned, which accounts for the inherent adaptability of our species. We are not constrained geographically and socially by in-built patterns of behaviour (Berger and Lackman, 1967).

Many health education programmes have relied heavily upon information and health threats as a means of bringing about behaviour change. Although knowledge is a precursor to changing behaviour, says Blinkhorn, the relationship cannot be equated with a simple stimulus response model. The chain of events leading from knowledge to behaviour change involves a number of steps and health educators who have ignored the complexity of this process have often been disappointed when such programmes fail to demonstrate a change in behaviour. The simple flow diagram below represents the sequence of knowledge to behaviour change (Blinkhorn, 1977):

The sequence of knowledge and behaviour change

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graph TD; A[Unawareness] --> B[Awareness]; B --> C[Self-interest]; C --> D[Attitude]; D --> E[Belief]; E --> F[Commitment]; F --> G[Action];
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Unawareness

Awareness

Self-interest

Attitude

Belief

Commitment

Action

Generally, most people are unaware that certain patterns of behaviour are detrimental to their health and may only become aware of being

at risk, once information is disseminated to them. The very fact that information on a health problem exists is irrelevant unless one shows self-interest and sees it to be personally relevant. Once this information is acquired it is possible for an individual to adopt a positive or a negative attitude. Though a positive attitude may convince one to believe that change in behaviour would be beneficial, action does not necessarily follow. The essential component, therefore, is for knowledge and behaviour to become an integral part of the individual's life style. A commitment to change is essential if the knowledge to behaviour change sequence is to be fulfilled through action.

Bringing about a change in behaviour is not an easy process. This is amply demonstrated by the large number of people including health personnel who consume large amounts of refined carbohydrate products and are also confirmed cigarette smokers. Hence, knowledge of health problems has not resulted in a commitment to permanent behaviour change.

All individuals possess a set of values, which differ in each case, about factors affecting their daily lives, including health. This confrontation of different value systems has implications for health education and pose a problem for health educators.

Health professionals, therefore, should try and understand the views and problems of the patients. Making people feel guilty would be unreasonable as their assessment of health risks differ from that of trained clinicians. Haynes and Mathews contend that it is knowledge of human behaviour and its utilization that can make our teaching successful. They maintain that the human behaviour has

been increasingly implicated in the etiology of modern health problems. Therefore, health promotion has become more and more dependent on pupils' knowledge, understanding and decision to modify their living habits (Haynes and Mathews, 1974).

Several theories have been suggested in an attempt to explain peoples' behaviour in relation to their health. However, no one proposal has been satisfactory in encompassing all situations.

One of the most widely used and tested theories of health behaviour has been the Health Belief Model Theory described by Rosenstock and refined by Kasel and Cobb (Kasel and Cobb, 1966) and Hochbaum. According to this theory the likelihood of a person adopting a recommended health action was based on the following four factors; knowledge, perceived susceptibility, potential severity of the condition, and preventive behaviour. Becker stresses that some trigger or critical incident may be necessary as a final spur to action.

Another theory relating to health behaviour is that of Cohen which postulates that three distinct thresholds have to be crossed. They are the information threshold, the psychological probability threshold and the action threshold. The third threshold is probably the most important says Hodge as the first two forces are too weak to overcome the problem of individual inertia (Hodge, 1979).

Most dental schools have introduced the teaching of basic behavioural sciences and communication in the dental curriculum. However, if these subjects could be combined with D.H.E., the dentists and

other operative dental auxiliaries of tomorrow would be well prepared when dealing with the problems of behavioural sciences in the community.

In the Malaysian society, the behavioural problem is indeed complex, due to the complexity of the multi-racial nature of the Malaysian community. Each community has to be tackled separately keeping in view the variety of beliefs and norms that have been developed over the years and passed down to the successive generations. For example, it is the belief among the Malays, particularly those in rural areas, that the extraction of the upper canines can affect the eyes. The Indians have all along taken overcooked vegetables losing much of the food value. They may not find half-cooked vegetables palatable. The Malays and Indians have been traditionally chewing betel leaves, which causes gingivitis, irregularity of teeth and gums, and sepsis which gives rise to chronic irritation resulting in cancer (Balendra, 1969). The Chinese have been known to consume large amounts of refined carbohydrates and starchy food.

Hence, the dental health educators have to tread carefully when dealing with this complex society in trying to change the pattern of behaviour valued by many and deemed culturally acceptable. The health educator here is attempting to change values which enjoy a great measure of community support and consequently the education programme will require a broader, more long-term commitment.

4.9.2 Attitude

Most people do not see dental problems as interfering greatly with anything important to them. Attitudes form an important part of our everyday lives and determine much of our behaviour. According to Blinkhorn, attitudes are formed as a result of individual and social experience and can be defined very simply as a posture towards knowledge that is personally relevant. Stoll says it is the state of mental and emotional readiness to accept what is known to be good and to reject that which is injurious. She defines attitudes as preferences, likes and dislikes, values, feelings and on a higher level, conscience or philosophy.

Individual attitudes are acquired and developed as a result of living in a certain environment. Attitudes may develop slowly through the process of education or may come suddenly due to an intense experience. A child's first visit to a dentist or a dental hygienist should be a pleasant experience as it would lead to the development of a positive attitude. A bad experience would mean that the child would not accept dental treatment and would avoid it at all costs.

Poor attitudes learnt through unreliable sources can be changed through forceful, enthusiastic dental health education in schools.

Various factors influence peoples' attitudes towards dental health. Rayner found socio-economic status, social norms, and education to be of substantial importance (Rayner, 1974). Chambers, however, contends that although socio-economic status is a useful sign,

it should not be understood as synonymous with or as a cause of susceptibility to preventive dental health education (Chambers, 1977). According to Quereshi, "contrary to some popular beliefs, economic factors are not a chief reason for avoidance of dental care and treatment" (Quereshi, 1974).

Many individuals associate dental treatment with pain and anxiety. There are various causes of fear. Claustrophobia, a bad experience in the past, and even some were frightened by their parents who used the dentist as a method of persuasion. Various studies reported fear of pain in up to 54 per cent of cases. Dunning says fear and anxiety can block attentiveness and comprehension, and can even cause rejection of the communicator's statement resulting in avoidance of the recommended health habits.

Many research workers associate family and parental involvement particularly that of the mother, and Signorile maintains that the mother's own childhood attitudes toward brushing were the same as the children's current patterns. However, W.H.O., while strongly supporting the importance of parental education, contends that there is no general agreement in the appropriate content of such programmes or on the best method to use.

The attitude of Malaysians to dental health can be said to be that of resignation. They would contend that no one in their family had all their teeth throughout life and that at sometime or another in life the teeth will be lost. They do not generally attach much importance to teeth resulting in their failure to seek early treatment. They are quite happy in replacing their lost teeth

with dentures which they feel look nicer and are less problematic. The only time they seek treatment is when the need arises, as in pain. However, it is quite evident that the females seek more treatment than the males. The treatment generally sought is either for extractions or for dentures.

The health educators and the dental profession, therefore, have a huge task ahead of them in changing the negative attitude of the community. A long term, well planned calculative dental health programme can bring about a change in attitude. This will involve a lot of persuasion, motivation and repeated enforcement of dental health education information.

Changing attitudes to dental health emphasizes the need for cooperation between professionals and community-based organisations as a strong measure of social support in order to maintain commitment.

4.9.3 Traditions and superstitions

In Malaysia, a large cross-section of the population still lives in the traditional way, retaining old customs, culture, and superstitions which are in some instances officially supported by the government. A low degree of literacy in rural areas, particularly in the older generations, and their reliance on the "bomoh" or the village medicine-man for treatment of minor ailments are some of the barriers that face health educators. This coupled with the socio-economic factor has led to the small demand for dental treatment among the rural community.

Before initiating any D.H.E. programmes, it is essential to try and overcome the existing barriers. These barriers are slowly being lifted, as modern medicine is slowly making inroads into the rural population. The fact that more women go to hospital for delivery now than in the past shows the change in trend from tradition.

Health educators, therefore, have to deliberate greatly not only as to how much information on D.H.E. should be disseminated, but also when, and what rate of exposure to this knowledge is optimal. Introduction of ideas, words and symbols that are alien to the way of thinking of the rural folk has to be considered. Sometimes these ideas may be directly contrary to the tradition and customs. The best way, therefore, would be to tackle the leadership or the headman of the village. The opinion of these leaders often becomes a rule.

4.9.4 Motivation

Motivation, like learning, is a process which involves multiple complex factors. Just as a teacher cannot make a student learn, members of the dental health team cannot directly motivate the patient or the community. One social scientist pointed out " ... we do not and cannot motivate people. No hope, procedure, training programme, gimmick or sermon can motivate a human being. Human behaviour springs from the energy created by the individual's organism. Our job is to provide or to create an environment that will release this energy " (Aronoff, 1968).

There are different theories of motivation. According to Abraham Maslow's positive theory of human motivation, the individual differences in personality and behaviour arise from the arrangement of needs in a hierarchy of priorities. This theory postulates that less important needs emerge after gratification of more potent ones. Maslow goes on to say that basic needs are the starting point for motivating behaviour and he says physical needs (hunger) and safety needs (freedom from pain or threat of bodily harm) are the basic needs. As these are satisfied the need for belonging and love emerge as higher order needs. This need hierarchy continues with ego or self esteem needs (self respect and respect for others) and finally ends with self-actualizing needs at the top (Maslow, 1943).

There are various factors and sources of motivation that drive an individual to seek dental treatment or adopt a dental health habit. These can be related to health reasons or non-health reasons, and some of the most powerful motives for following proper health practices are not related to health at all. Visiting a dentist, for instance, would be to conform to standards set by the family rather than health reasons.

Young and Striffler say that if the dentist and dental health educators can find more than one reason for their patients to carry out a certain health action, the chances obviously are increased that the patients will do it. They go on to say that dentists and dental health educators who merely appeal to the health motive are failing to tap the richness and variety of human motivation and longing.

Attachment to value to health by an individual is an important factor in motivation. Hochbaum noted that health motives present only a very small aspect of the vast and complex motives of man and that as often as not, health motives are the weaker ones among other competing motives.

Other motivational factors that help determine an individual's action about health are the three crucial and highly subjective beliefs:

1. that one is susceptible to a particular disease;
2. that the disease would be severe if it should occur and
lastly;
3. that there is an action which can be taken to reduce
susceptibility or severity of the disease should it
occur.

Motives can be modified by social pressures or by personal preference. Social acceptance motivates an individual to keep his teeth clean or he may practise oral hygiene for a secondary goal such as avoiding a more basic problem of pain. Social restrictions compel one to maintain good oral hygiene to prevent halitosis and ugly gums to conform to customs which society demands for social acceptance. The amount of literature produced to motivate people to take care of their teeth is a strong force in shaping the mores of our culture.

Some individuals practice good oral hygiene to fulfil a desire for recognition as in adolescents. Top executives and those in the top rank of the socio-economic ladder are motivated to seek regular

treatment to conform to their status and prestige that go with their position in society.

In the Malaysian community those in better socio-economic position and those who are educated can be said to be sufficiently motivated as they are quick to seek treatment for any dental ailment. However, their motivation too gets a knock when they visit a dental clinic for scaling and polishing or even a filling and are given a long appointment. Those in the rural areas and in the lower rank of the socio-economic ladder could not be much bothered about bleeding gums, or bad oral odour as it is socially acceptable to them. The only time they are motivated to seek dental treatment is in response to pain or when they require dentures.

In relation to periodontal disease the following factors should be able to motivate an individual to seek early dental treatment and to maintain good oral hygiene on his own:

1. Impaired function - loss of teeth due to periodontal disease impairs functions and no appliance can function as efficiently as natural dentition.
2. Effects on general health. Toxins from a periodontal lesion are absorbed either from the tissues or directly from the digestive system. This may impair general health and aggravate gastric ulcers.
3. Social handicap - periodontal disease produces halitosis, and dirty teeth, red and swollen gingivae make the mouth visually unpleasant and mar the freshness of youth. Elongated and spaced teeth rob a mature face of dignity and beauty.

4. Personal hygiene - concern for personal hygiene can motivate an individual to link it with good oral hygiene.
5. Personal disfigurement - most of us unconsciously associate loss of teeth with loss of youth.

4.10 DENTAL HEALTH EDUCATION RESOURCES

Because preventive hygiene for the prevention of disease and personal hygiene for the promotion of positive health are based upon the application of health knowledge by the individual, organized dental health education has become an important factor in public health programmes. Therefore, any goal to improve health should have a common purpose that gives unity and direction to all efforts. In the case of dental health, it is to provide the opportunity for everyone to maintain a sound complement of teeth in a healthy mouth for a lifetime. To achieve this a combined effort by the various resources mentioned below can assist in the dental health education of the community.

4.10.1 Government resources.

4.10.2 Commercial resources.

4.10.3 Voluntary organisations.

4.10.1 Government resources

In Malaysia, though the government resources in dentistry are devoted to the clinical repair service, it is also the major if not the only resource involved in the promotion of dental health education in the community. Fortunately, in Malaysia the cooperation of

other government agencies such as medical, health, education and information departments are readily available. Utilization of personnel trained in dental health education from these departments, greatly subsidized the efforts of the dental profession which lacks adequate manpower, leaving them to devote more time to clinical dentistry. Organisation of dental health campaigns and exhibitions, therefore, do not pose much of a problem as the various government agencies can easily be mobilized and financial assistance is fairly easily available. In fact such activities in urban and rural areas are well supported by the government as it also enhances its image with the public.

Production of dental health education material and the equipment used in the teaching of dental health education involves a large sum of money. Hence without government resources this important field of dentistry would certainly suffer. The national D.H.E.U. produces D.H.E. booklets, pamphlets, badges, stickers and a variety of other educational materials for distribution to various clinics in the country and to teachers and other health educators. State level D.H.E.U. too produce their own educational material for distribution.

The added advantage of the government resources is that it is able to liaise with international organisations such as the W.H.O., F.D.I., and many other dental organisations in various parts of the world giving dental health education an international forum.

Resources from the government enable Malaysian dental health educators to attend seminars, conferences and workshops on dental health in various parts of the world.

4.10.2 Commercial Resources

In some of the developed countries, commercial organisations contribute fairly to the promotion of dental health education in the community. With the financial backing they have, and with collaboration with dental associations, they are able to contribute immensely, particularly in the preparation of dental health education material. Quite a number of commercial organisations have entered the field of dental health education especially in schools. The majority of the material produced is of a high standard and usually carries a minimum of brand labelling. Some of the material bears the approval of the national dental associations. Dentifrice manufacturers and producers of various other dental products also produce dental health education material. However, Dunning warns that care must be used in avoiding those firms which advertise their own wares in an unethical manner.

In Malaysia commercial organisations, particularly those dealing in dental products, do play some role indirectly in the promotion of dental health. They generally finance to some extent dental health campaigns and exhibitions and occasionally sponsor seminars such as on eating less sugar. Firms such as Colgate-Palmolive provide free toothbrushes and toothpastes to primary school children, which are dispensed by dental personnel with practical toothbrushing drills.

4.10.3 Voluntary organisations

Voluntary health organisations are those groups of people who are interested in furthering the health status of the community through independent action. They usually work with official government agencies. In some countries they may establish and support dental health clinics for indigent children or provide funds for the treatment of children under a free-for-service plan. Sometimes they assist the dental personnel in distributing dental health literature prepared by professional dental health educators.

The voluntary organisations often join together in community health councils in order to coordinate their services and to prevent overlapping of effort. Any such group formed in the community for the purpose of furthering better dental health should be a cross section of the community population. It should include representative citizens from the medical and dental professions, but should not be dominated by people who have vested interests in either medicine or dentistry.

Unfortunately, in Malaysia, there are no such organisations presently that help in the promotion of dental health though they are involved in other fields. However, their efforts to promote would be welcome and I am sure all the government agencies would provide every assistance.

In some of the developed countries such as America, Australia and United Kingdom, the National Dental Associations play an active role in the promotion of dental health education. They are good

sources of dental health education material for the public, and they generally design their own education material with a local slant particularly adapted for use within their own countries. Besides, they also produce scientific articles and monographs for professional consumption.

In America units of the American Dental Association such as the Bureau of Dental Health Education and the Bureau of Public Information, have dental specialists in the field of D.H.E. who assist state and local dental societies with their problem of D.H.E. and make material available, primarily for mass media. In Australia, the Dental Health Education and Research Foundation produces valuable up-to-date attractive D.H.E. material for dentists, teachers and health educators. In the United Kingdom, besides the British Dental Association, various councils such as the General Dental Council, the Health Education Council and various other units contribute to the promotion of dental health.

However, the Malaysian Dental Association has not been active in the promotion of dental health in the Malaysian community. A more active role can certainly be expected of it.

4.11 EVALUATION

Evaluation of the dental health programmes is as important as implementation of the programme itself. Evaluation is a process of making decisions, drawing together data, judging pertinent facts, weighing the pros and cons of various suggestions and selecting courses of action. The primary purpose of evaluation are to provide objective estimates of achievements and to provide guidance for the conduct of activities of a programme. Unless periodic review of what is being done in community projects is made, deterioration of effort due to lack of stimulus is likely. Constant evaluation stimulates interest and at the same time clarifies objectives. Dental health is a continuous challenge says Stoll, with many unsolved facets. Hence, evaluation becomes a necessary part of any community effort.

Evaluation helps to answer many questions such as: is the programme travelling the right direction, or are there better ways of doing what we have continued to do for several years.

While evaluating the effects of D.H.E. in developing countries, it is important to bear in mind that the initial 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.

The first evaluation will be concerned with assessing of official approval, support and cooperation of the community. Next we shall concentrate on the evaluation of immediate effects of the D.H.E. programme. This will include evaluation of presence of

development of health preventive habits, particularly oral hygiene. This can be considered as a short-term effect evaluation.

Various methods can be applied in the evaluation of an on-going dental health educational programme. Discussions, interviews, questionnaires, data or any other technique may be applied. The critical factor is, however, the kinds of questions to explore.

The following criteria could be applied in evaluating the D.H.E. programme:

1. Population at risk. This can be obtained from the baseline data.
2. Coverage of the community.
3. Percentage of patients given periodontal treatment.
4. Average number of visits per patient. This also will determine the extent of recall and the severity of the problem.
5. Items of care. This would indicate type of surgery carried out, scaling and polishing.

In evaluating the achievement of the programme, sound studies are essential. Concrete evidence that the objectives of the programmes set earlier have been achieved is the only relative criterion for measuring achievement. Such evidence should be distinguished clearly from evidence that intermediate goals have been achieved.

Three steps must be taken to evaluate the achievement of a D.H.E. programme. Firstly, it is essential to have a precise statement of the objective of the programme and the specific, agreed-upon criteria that will be used to determine whether or not these

objectives have been achieved. Secondly, it is essential to have a baseline of the status of the situation at the time the objectives were established. Thirdly, with regards to objectives, it is essential to know the status of the programme at some point sufficiently advanced in time so that changes resulting from the effort of the programme reasonably can be anticipated. This will give an opportunity to the implementors to identify and correct any error that occurs. Therefore, to determine the achievement of D.H.E. programmes, the general state of dental and oral health can be evaluated in a survey on a nationwide scale. The data collected on the incidence and prevalence of the disease will point at success or failure of the educational programmes. Increased number of patients seeking periodontal care, unprecedented sales of tooth-brushes and dentrifrices too could give some indication of the impact D.H.E. programme had on the community.

Service records of patients, registers maintained in the clinics could also indicate the number of patients seeking periodontal care as a result of D.H.E. programmes.

It is therefore essential that after the D.H.E. programme has run its course, its success or failure be measured in terms of defined objectives.

5. DISCUSSION

The high prevalence of periodontal disease in the Malaysian community is a constant reminder of the need for the implementation of an effective D.H.E. programme to prevent and control this disease. Epidemiological surveys indicate that 59.9 per cent of the school children and 72.4 percent of adults suffer from periodontal disease and it is the second major cause of tooth loss.

Since the establishment of the Malaysian Dental Service five decades ago, all efforts have been concentrated on the prevention, control and treatment of dental caries so much so that periodontal disease suffered from neglect. This is due to the fact that the dental service in Malaysia started essentially as a school dental service. Dental caries was widely prevalent amongst the school children and was the major cause of tooth loss amongst them. Today, it is still highly prevalent, and preventing tooth loss due to dental caries is still the major concern of the dental service in Malaysia. Even though the dental service has been broadened and extended to the whole population, priority is accorded to the target groups namely the school children pre-school children and pre-natal mothers. The adults, in whom periodontal disease is most prevalent and is the major cause of tooth loss, is the last priority group.

Hence, the concentration on treating dental caries in school children in the past, neglect of the adult population, coupled with the poor oral hygiene of the Malaysian community, have probably contributed to the high incidence of periodontal disease in Malaysia. Thus,

in view of the high prevalence of the disease in Malaysia, more stress should be placed on the prevention and control of this disease and the adult population, who is most affected, should be accorded priority.

The major factors contributing to the high prevalence of periodontal disease in Malaysia, I believe, are unawareness, ignorance and misconception amongst the populace of the nature of the disease. The actions of patients make it clear that the public is not well informed about dental health. This can be attributed to the fact that in the past no major effort had been made to educate the community on periodontal care. Lack of knowledge of the disease, and the ignorance that there is treatment available for it, has resulted in most Malaysians failing to seek early treatment and hence living with the condition until pain, discomfort and suffering drive them to seek treatment. The dentist at this stage is left with no choice but to carry out extractions.

The first step, therefore, in the prevention and control of periodontal disease is to bring awareness of the disease to the Malaysian community by educating them through carefully planned D.H.E. programmes, both in the school and community setting. Various methods and techniques of educating the community have been discussed in section 4.5 of this thesis.

In the past some D.H.E. was taught by the dental personnel and mainly involved the school children. However, these D.H.E programmes have been essentially "information giving" types and their informational content have almost always been the same over the years.

Hence, these programmes have not been effective in reducing dental disease or obtaining a behavioural change. Realizing that the effective utilization of the educational approach is central to any widespread improvement in the oral and dental health, Malaysia set up a Dental Health Education Unit at the national and state levels. Since then the D.H.E. activities have been standardized and intensified. The dentist and the dental nurses are now required to maintain daily records of the D.H.E. activities carried out and submit a monthly report of these activities to the Dental Health Officer in the State. The D.H.E. activities are still directed at the prevention and control of dental caries. Periodontal disease which affects more than half the school children and almost three quarters of the adult population, therefore, should be given due importance. D.H.E. programmes should incorporate care of the periodontal health and information on the prevalence nature and preventability of the disease should be disseminated to the community.

Various surveys emphasize that dental disease has become an important public health problem by the age of three years. Health education, therefore, should be planned according to the needs of different stages of development. Pre-school children in Malaysia can be reached through kindergartens, nursery schools and health clinics. Dental nurses occasionally visit the kindergarten and nursery schools for D.H.E. talks and for conducting toothbrush drills. The child can be conditioned for further acquisition and utilization of important health preventive information by more frequent visits by the dental nurse. This will reinforce the knowledge gained in

earlier talks. Personalized dental health instructions in a friendly manner, puppet shows and practical demonstration of correct method of brushing teeth will have a favourable impact on the child.

Wherever possible, the parents could take part in these activities.

A visit to the dental clinic will familiarize the child with the clinic environment. This can help allay his fears of the dentist.

The school children are the top priority group of the dental treatment programmes. The dental health activities in the past have not had the desired effect on the oral health of the school children though these activities have been mainly directed at them. This could be attributed to two factors. Firstly, all along stress has been placed on curative dental treatment and secondly, the D.H.E. activities have not been intensively carried out and mere dissemination of knowledge has not led to the motivation of the school children to practice sound oral hygiene or change their dietary habits. Diet counselling is an important part of any preventive programme. A well balanced nutritional diet is also a good dental health diet. Need for restriction of between-meal eating, dangers of indiscriminate consumption of snacks and the hazards of consuming excessive quantities of refined carbohydrates should be explained to the school children. Advice on the need for an adequately nutritious meal should be offered. Failure on the part of the teachers to reinforce knowledge imparted by the dental personnel has led to the loss of interest and neglect of oral hygiene among the school children, particularly among those in the rural areas. Hence, a rethinking and modification of the mode of educating the school children is very necessary. A new strategy and a better approach have to be initiated to bring

about a behavioural change in the school children so as to motivate them to care for their dental health. This can be attained with individualized instructions to meet the needs and problems of an individual. In this way, mistakes made can be corrected instantly. In the school setting mass communication and face-to-face approach can be effectively applied. Practical demonstrations of the presence of plaque followed by teaching the correct technique of toothbrushing will prove to be effective. The children should be encouraged to brush teeth at home using plaque disclosing solutions and tablets. Correct information on diet habits, importance of teeth and good oral hygiene should be given during D.H.E. talks using up-to-date teaching aids, such as posters, models, charts, film strips and video cassettes wherever possible. Mere dissemination of information once is not enough. It should, therefore, be constantly reinforced in as many different ways as possible. The teachers should sit in during the D.H.E. sessions as observers so that they can supplement the efforts of the dental personnel once they leave. The school setting is an ideal environment for the teaching of D.H.E. and dental health educators must exploit this fully.

The dental health of pre-natal and nursing mothers in Malaysia is generally poor, particularly among those in the rural areas. Though they are regularly referred to the dental clinics by health personnel, who also provide some knowledge on dental health, no significant improvement has resulted in their dental health. This is probably because the information provided by the health personnel has been inadequate, as most of the time they are more concerned with educating the expectant and nursing mothers on general health. Besides,

the failure on the part of the health personnel to check whether the patient has visited the dentist or has kept the appointments and the neglect in redirecting the faulty patients to the dentist have also probably contributed to the poor oral health status of the pre-natal and nursing mothers. Health personnel, therefore, should show more initiative and greater interest in the oral health of this group by making sure they visit the dentist as directed.

Patients referred to the dental clinic from mid-wife clinics in the rural areas generally fail to keep their appointments. Problems of transport, household responsibilities and lack of value for teeth are some of the reasons for their failure to seek dental care.

A concerted effort by the dental profession and the health educators is, therefore, absolutely essential to educate and motivate this important group. This can be done by coinciding the pre-natal day at the various health clinics with dental treatment day for the pre-natal and nursing mothers. Prophylaxis should be carried out routinely on these days and the patient in a few days can notice the improvement of the gingival tissues, and this will motivate the patient to keep the subsequent appointments. Personalized oral hygiene instructions on a one-to-one basis or in a group will be more effective as the dentist or the health educators can answer most of their questions. The D.H.E. sessions could be aided by slides, film strips, posters and charts. Toothbrush drills using plaque disclosing solutions and tablets, flossing, diet counselling could be made a regular feature on pre-natal days in the clinics. The dentist, with his portable equipment, could also visit the

mid-wife clinics in the rural areas to treat the pre-natal and nursing mothers and also carry out other D.H.E. activities. Private practitioners, gynaecologists, to whom more and more women go for pre-natal check-ups can also contribute by offering advice on dental health.

There is a high incidence of periodontal disease in the adult populace in Malaysia and this high incidence of the disease could be attributed to various factors. Unawareness, ignorance, lack of value for teeth, socio-economic conditions, misconceptions, and traditions are some of the contributing factors. Secondly, since the establishment of the dental service, priority has been accorded to the school children and the adult populace suffered from neglect. Lastly, the de-facto non-existence of D.H.E. activities and facilities has resulted in very little information reaching this community.

An intensive D.H.E. programme is, therefore, needed to educate this community, followed by adequate facilities to treat the patients. Though the dental service has been extended to the whole population, much needs to be desired in terms of motivating this group to seek dental care. Most people, particularly those in the rural areas, who do not seek dental treatment should be approached through community programmes and the dental health education activities should be aimed at transmitting adequate knowledge to influence the attitude and behaviour of the community. Chairside instructions by the dentist or group education using various aids, practical demonstrations on toothbrushing using plaque disclosing wafers

can be effective in educating the people. Dental health exhibitions and campaigns should be held more often, particularly in the rural areas to educate and reinforce their knowledge on dental health.

The need for D.H.E., especially among the school children and the community in the rural areas, is enormous. One of the effective ways of promoting D.H.E. among the rural folk is by setting up a mobile dental health education unit chiefly designed as an educational unit. Its purpose would be to educate the community on the various aspects of oral and dental health with the view of bringing about a change in attitude and behaviour and to awaken their interest in dental health, particularly periodontal health, which is the major problem in the rural people. Presently, the rural folk seek dental treatment mainly for relief of pain and are ignorant of the various other facilities available in the dental clinics. Another important function of this unit, therefore, would be to provide information as to where and what facilities are available in the dental clinics and how to obtain them, particularly in government-run clinics. This unit would be very popular with the rural schools as it does not carry out curative dental treatment, and besides, the rural people can be easily reached by it. The mobile educational unit has the added advantage in that it can visit a number of rural schools and villages in a single day and is relatively economical to maintain. Its visits to the rural areas could be publicized by sending letters to the heads of schools or community leaders or even by radio, T.V. or the mobile government information service so that the community is aware of it and can derive maximum benefit from its educational programme.

The activities of the mobile D.H.E. unit should include D.H.E. talks and lectures by trained personnel, plaque disclosing, practical toothbrushing demonstrations and distribution D.H.E. materials, such as pamphlets, stickers, badges and other existing motivational aids. Motion pictures, slides and film strips should also be used as real life-like pictures which are more likely to influence the people than mere talks and lectures. It is essential that the unit make regular visits to the areas already visited previously. This is because people tend to forget quickly, particularly those in the rural areas where people are mostly illiterate. It is important to reinforce their knowledge acquired earlier through repeated visits so as to initiate interest and motivate them to take action. Besides, any problems encountered could be easily settled by the dental health educators attached to the unit.

The most important outcome desired of health education is the development and institution of behavioural change that will motivate an individual to take action. In dental health this outcome is particularly important as dental conditions continue to deteriorate and desirable habits of daily care are most important. Simple approaches to modifying a change in behaviour are unlikely to be successful. Health professionals, therefore, need to take into account and understand the social forces, such as knowledge, value systems, social class and learning theory which shape an individual's actions. Knowledge is the precursor to changing behaviour.

Dental professionals and health educators, therefore, must disseminate adequate, correct and factual information to the individual and it

should be personally relevant. Once this information is acquired it is possible for an individual to adopt a positive attitude. Knowledge and behaviour should become an integral part of an individual's life style.

In the Malaysian society instituting a behavioural change is indeed a complex problem due to the complexity of the multi-racial nature of the country. A variety of norms, beliefs, traditions and habits such as betel chewing and the belief that the extraction of upper canines will affect the eye sight, have developed over the years and passed down to the successive generations, particularly among the rural dwellers. These misconceptions and other detrimental habits must be corrected through proper D.H.E. programme and by persuasion. An intensive D.H.E. can forge a behavioural change and motivate an individual to take action so as to practise good oral hygiene.

Motivation like learning is a process which involves multiple complex factors. It is the most important part of D.H.E. as merely knowing that something should be done is not sufficient in itself to cause a person to do it. The motivation of the Malaysian community can be brought about by intensive D.H.E. activities, persuasion and by providing correct scientifically-based information. These must be constantly reinforced at frequent intervals if skills are to improve. There should be a proper guidance in the practice of oral hygiene measure, school children should be closely supervised by the teachers at schools and parents at home. Any problems encountered must be dealt with instantly, faulty techniques corrected and rechecked.

Such actions are motivating forces which keep the dental health practices alive and which supplement and reinforce knowledge of dental health facts. People associate loss of teeth with loss of youth. This can be a strong motivating factor. The Malaysian population is a relatively young population with 50 per cent under 20 years of age. Certainly, they would not wish to lose their youth at an early age. Aesthetics is another factor for maintaining a good set of healthy teeth. As most people are conscious of their aesthetic looks, it can be a strong motive to possess a healthy set of teeth which will certainly add to one's good looks and personality.

The role of dental health educators, both dental and non-dental, is equally important in educating the community. They should be knowledgeable, adequately trained, motivated and committed to the task of imparting knowledge to the community. However, mere possession of knowledge will not make one a good teacher. Hence, the educators must acquire the skill and technique of teaching D.H.E. The dental personnel could acquire this in dental schools and the non-dental educators such as teachers and health personnel could be trained during their basic training period. It is important that the dental health educators take note of the multi-racial nature of the Malaysian community and be aware of the socio-economic, cultural, educational and traditional variations of the community. They would have to communicate with people to awaken their interest in dental health, particularly those in the rural areas where the community is more ignorant and illiterate. As they are going to deal with human behaviour and behavioural change, some knowledge would be necessary

on the subject of behavioural science. This can be acquired by the dental personnel in dental schools where the subject could be included in the curricula as is done in many countries. The dental personnel could then educate the other health educators on this subject. Regular seminars and in-service courses must be held to supplement their knowledge and improve the teaching ability of the dental health educators. This will also help to motivate them.

In view of the different races in Malaysia, health educators from these communities could be used to educate its own ethnic group. This will have the added advantage that the educator will be aware of the customs, beliefs and traditions and will be readily accepted by the ethnic group concerned. Such methods have been successfully used in other countries where similar problems exist.

The final proof of a successful preventive oral hygiene programme is the attitude and behaviour pattern of the patient in his home. Therefore, all instructions must lead an individual to follow the explicit information he has received during D.H.E. which must be put into practice during home care. Effective brushing of the teeth efficiently daily at home helps remove plaque, improves gingival health and retards the formation of calculus. The onset of periodontal disease is arrested by good toothbrushing and by a full regime of mouth care at home. Brushing after eating, including snacks, is advised for the reduction of food debris. The home care should also include the use of disclosing solutions and tablets and flossing. Parents can supervise the children during home care and make sure that these oral hygiene practices are carried out daily.

Regular recall is equally important in maintaining good oral and dental health, particularly in patients who are suspect of carrying out oral hygiene practices at home. This can be done by giving the patient an appointment before he leaves the clinic or by sending reminders through letters. Recall will not only help an individual to receive treatment if required, but will enable the dentist or the dental nurse to assess whether the patient has been carrying out oral hygiene practices at home and provide further dental instructions if necessary.

Mere dissemination of information will not have the desired effect in educating the community. Hence, for effective propagation of dental health a variety of dental health educational aids must be used. D.H.E. aids used by health educators in the past have always been the same. Posters, charts, models and pamphlets were the main educational aids used. Much more, therefore, needs to be done in improving the quality of these aids to draw the interest of the learners. The educational material to be used by the dentist, teachers, and other health educators must be colourful and attractively presented to gain the attention of the learners. These materials must be regularly updated and contain the latest information available. Badges, lapel buttons and stickers with colourful oral hygiene slogans would interest the school children in particular. These colourful exciting animated motivational aids can be distributed during dental health activities.

Audio-visual aids are useful as methods of building concepts, and should form a regular component of dental health talks and lectures. Presently in Malaysia, motion pictures, film strips and slides

are rarely used during dental health educational programmes. This is because the equipment required is expensive and with the limited budget it is not possible to purchase this equipment. However, these are effective educational aids as they provide realism and motion and can display complicated situations step by step. Seeing is believing, and the learners will be more convinced to carry out oral hygiene measures to maintain their dental health. Such audio-visual aids including video-cassettes and T.V. could be progressively introduced as teaching media once more funds are available. The video-system has the added advantage that it is easy to manipulate and can be easily transported. Besides, dental health programmes can be locally prepared, fairly cheaply, to suit the local environment.

The mass media such as T.V., radio and newspapers can be effectively used in promoting dental health. These media reach almost all the ethnic groups in the urban and rural areas. Presently, some dental health talks are broadcast over the radio and T.V. but their effectiveness is doubtful as they are not on a regular basis. In view of the high incidence of periodontal disease and poor dental health of the community, the T.V. and the radio could schedule a lot more time for the propagation of the dental health message. Programmes directed at school children, women groups and youths should have a dental health component on a regular basis as only then a significant impact can be made on the public. The T.V. has a greater potential in influencing the masses than the more impersonal radio. It can be effectively used in the promotion of D.H.E. by introducing a regular D.H.E. programme on a daily

basis designed to educate and provide information to the community on dental health matters. The people could send queries to the 'T.V. Dentist' who could then answer their questions pertaining to the dental problems and related matters over the T.V. for the benefit of all viewers.

Exhibitions and campaigns are occasionally held to mark important days such as the World Health Day, Dental Day and Parent-Teacher Day. However, they have not been effective as once they are held, they are shelved over a long period leaving the public with opinions that may not be reinforced. Besides, such campaigns are usually held in the urban areas and do not benefit the rural people.

Exhibitions and campaigns, therefore, should be held more often and chiefly concentrated in the rural areas where the incidence of periodontal disease is exceptionally high and the community is in most need of dental health information. Such campaigns and exhibitions are a powerful means of communicating with the public and moving it to action.

The community that is sufficiently motivated and is aware of the nature of the periodontal disease through the various dental health programmes is bound to seek dental treatment. The dental service, therefore, must be ready to meet the increased demand for service. This can be done by the dentist by setting aside certain days to treat periodontal cases. The dental nurses, with their larger numbers can meet the demand of the school children. Private practitioners can aid by attending to the periodontal needs of the patients. The increased demand can also be met by the dentists and dental nurses by carrying out preventive measures such as

diet counselling, plaque control, oral hygiene maintenance and dental flossing to reduce the conservative workload.

It is understood that under the Fourth Malaysia Plan (1981-1985), Malaysia plans to set up periodontal units in each of the 13 states in Malaysia. It is understood that they will be chiefly concerned with preventive periodontics and dissemination of information on periodontal health through D.H.E. programmes. While this move is commendable, a word of caution is that these units must be adequately staffed with trained personnel. The existing dental health education units set up in 1979 are still facing staffing problems and are yet to be fully operational. A similar situation for the periodonal units could render them ineffective functionally. Mere window dressing of the dental service with such units is not enough and it should provide an effective service to the community.

It is understood that these units like the D.H.E.U.'s, will rely on the existing manpower to manage these units, and there are no plans as such to recruit dental hygienists in the Malaysian Dental Service to supplement the dental manpower. This will certainly put a strain on the present dental personnel. While I would advocate the recruitment of dental hygienists, as they are best suited to deal with periodontal care, the shortage of dental manpower can be overcome by increasing the intake of more dental undergraduates and dental nurses in the dental schools. Some dental undergraduates could also be sent abroad to cope with the lack of manpower trained in Malaysia. More stress on preventive periodontic could be placed during their training periods. To make up for the shortage of

professional dental manpower, non-dental personnel such as teachers, health personnel and even the dental surgery assistants could be effectively used to promote periodontal care. However, they need to be provided with additional training through seminars and in-service courses.

The conventional method of carrying out scaling using hand scalers is both cumbersome and time consuming. As a result most dentists tend to avoid carrying out scaling though they perceive that the patient needs it. Wherever possible, clinics therefore should be equipped with modern ultrasonic scalers to facilitate the scaling process.

Presently, there are some 290 private practitioners in Malaysia. They are a substantial force and treat a fair segment of the community. They have traditionally concentrated on curative dental care with very little preventive dentistry being practised if at all. It is therefore, time the private practitioners placed greater stress on preventive dentistry in their daily practice. They should educate their patients on the importance of maintaining good oral hygiene thus motivating them to accept and perform the oral hygiene procedures required to keep the dentition and oral tissues in a healthy state always. In return for the service rendered in educating the patient an adequate fee commensurate with that of restorative services could be charged by the practitioner. The service rendered will certainly be appreciated by the patient as it will broaden his knowledge of dental health.

Oral hygiene procedures are directly related to prevention, initiation and treatment of inflammatory periodontal disease. As a matter of fact, oral hygiene currently affords the only practical method for the prevention and control of periodontal disease in a large population. This is, therefore, the message that needs to be conveyed to the community at large, through the various D.H.E. programmes.

Once the Malaysian community has been made aware of the nature of periodontal disease, which affects almost all of them sometime or another, it will be motivated to seek periodontal care. With the regular practice of good oral hygiene, and seeking early periodontal treatment as a preventive measure, the incidence of this disease is bound to drop.

There is ample evidence from clinical trials that the health of the periodontal tissues can be maintained for most individuals if the teeth are kept free of debris, plaque, and calculus. The relative freedom from periodontal disease enjoyed by persons in developed countries such as the United States, compared with groups in Asia and Africa, may be due principally to better habits of personal oral hygiene and not only better utilization of professional dental care.

The mission of dentistry, in relation to periodontal disease, is to keep a healthy mouth healthy rather than repair damage done by a disease that we know is preventable, correctable and controllable.

6. SUMMARY

Periodontal disease is one of the most widely prevalent diseases in mankind affecting approximately half the child population and almost the entire adult population. It has been estimated that 67 million adults in the U.S. suffer from this disease and more than 20 million people have lost their natural teeth due to it.

Epidemiological studies in countries of Asian and South Pacific region indicate that periodontal disease is pandemic in these countries. It is the major cause of tooth loss beyond the age of 35 years, and presents a threat to general health, oral function and aesthetics of an individual. Historically, the problem is very old and past Chinese, Egyptian and Roman records reveal that periodontal disease undoubtedly existed in one form or another in ancient man. Various medical remedies were used to treat the disease.

In the past, researchers have directed major efforts in the search for ways of preventing and controlling dental caries so much so that periodontal disease suffered from neglect. However, today, periodontal disease is recognized as a major cause of tooth mortality in adults particularly in developing countries. This has prompted most countries to adopt preventive measures through D.H.E. in the prevention and control of this disease.

Periodontal disease is a disease of neglect of the healthy tissues that permits the disease to occur thus enabling it to advance and destroy the tooth supporting structures. Its etiology can be

attributed to local as well as systemic factors, the principal local factors being bacteria, dental plaque, calculus, materia alba, food impaction and mechanical, chemical and thermal extremes. It can be prevented easily by the elimination of local irritation, patient education and by avoiding the creation of disease producing conditions. Systematic factors such as diabetes, pregnancy, nutritional deficiencies and blood dyscrasia, reduce the resistance of the periodontal tissues so as to intensify or exaggerate the disease initiated by local irritants.

Immune reactions of the gingiva have long been suspected and the probability of stimulating and thus 'immunize' an individual against periodontal disease has interested many research workers. Immunological responses have both protective as well as destructive potential. However, research is still continuing although many details are still missing relating to immunology of host response in periodontal disease, several broad principles have been established. They are:

1. Periodontitis, without exception, is caused by bacteria, but the mere presence of bacteria is insufficient; interaction of bacteria with the host's response system is essential if the disease is to become established and progress.
2. The host defence system not only provides protection against the microbial challenge but also destroys tissues as observed in chronic periodontitis.
3. Both protective and destructive processes are activated simultaneously.

As indicated by epidemiological surveys, periodontal disease is widely prevalent in the Malaysian community. More than half the

school children and three quarters of the adult population are affected by it. This could be attributed to apathy on the part of the Malaysian community towards dental health and this apathy could be the result of unawareness, ignorance, superstitions, misconceptions and traditions which can be corrected through D.H.E. programmes.

Malaysia is a cosmopolitan country with a diversity of different ethnic groups each with its own culture, traditions, customs and beliefs. Almost 60 per cent of the population live in the rural areas. Malaysia has a relatively young population. Approximately 50 per cent are less than 20 years of age. The diet is basically the same varying only in the method of cooking. There is a high consumption of refined carbohydrates (sucrose) and associated products found in the Malaysian markets.

In Malaysia, the government plays a major role in the provision of medical, health and dental services, through a network of hospitals, health centres and dental clinics. The medical service provides general patient care in all the general and district hospitals in the country. Specialist services such as gynaecology, ophthalmology, dermatology, etc. are available in the general hospitals located in the capitals of each of the 13 states of Malaysia.

The health services are extended to various parts of the country through the expansion of the Rural Health Service. Public health programmes are implemented through a network of infrastructure at each health district headed by a health officer. He is responsible for the rural health unit which comprises main health centres, sub-health centres, maternity and child health care units and mid-wife clinics that provide health service to the rural population.

The School Health Unit is under the Ministry of Education and is responsible for planning, organisation and administration of all activities of health education at school and teacher training colleges. The Ministry of Education and the Ministry of Health liaise together when implementing their school health programmes.

The Malaysian dental service started essentially as a school dental service. However, today, dental care has been extended to the whole population.

Dental care of the Malaysian community is rendered through a wide network of dental clinics located in the urban as well as rural areas, as discussed in section 2.6.4.5 of this thesis. The dental programmes include both preventive and curative dental care. The general objective of the preventive programme is to provide preventive and promotional dental service through fluoridation and D.H.E. However, curative dental care still predominates the Malaysian dental service.

The private practitioners, mainly located in urban areas, are the second major providers of dental care and chiefly concentrate on curative dental work.

Though there has been a steady increase, Malaysia still lacks professional dental manpower resources. The dentist : population ratio is 1:18,000. The bulk of the dentists are from the University of Malaya. The rest come from recognized universities in Commonwealth countries and approved universities in India and Taiwan. The lack of dental manpower can be overcome by increasing

the intake of dental undergraduates and dental nurses in the dental schools or by sending students abroad to supplement the dental manpower shortage and to specialize in the various fields of dentistry. Introduction of dental hygienists in the Malaysian dental service would be ideal to tackle the periodontal problem and to supplement the shortage of dental manpower.

The dental nurses (New Zealand type) are the only operative auxiliaries in the Malaysian dental service. They are trained at the Dental Training School in Penang over a period of two years. As of 1980 there were 647 nurses. They treat only primary school children and are chiefly attached to school dental clinics and main health centres.

Surveys in various parts of the world indicate that a high proportion of dental disease goes untreated. Lack of professional manpower, high cost of treatment and the prohibitively expensive cost of expanding treatment facilities and above all the increasing scientific evidence that dental disease is preventable has prompted many dental health authorities to adopt preventive measures. D.H.E. is an effective and economical method of preventing dental disease particularly in the prevention and control of periodontal disease. It is an attractive alternative or supplement to traditional methods.

In Malaysia some D.H.E. was carried out by the government dental clinics in the past, mainly involving school children. D.H.E. talks, lectures and toothbrush drills were some of the activities carried out chiefly by the dental nurses. However, since 1979 with the setting up of the National and State Dental Health Education Units, D.H.E. activities have been intensified. The objective of the

D.H.E.U is to instill dental consciousness and to attain behavioural changes for the improvement and maintenance of dental health of the Malaysian community. D.H.E. activities include oral health instructions, talks, lectures, toothbrushing drills, fluoride mouth rinsing, campaigns and exhibitions. Audio-visual aids such as film shows, slides, posters, pamphlets and other aids are used in the promotion of dental health. These activities vary depending on the target group concerned. The bulk of the D.H.E. activities are carried out by the dental nurses. Daily and monthly returns on D.H.E. activities are submitted to the State Dental Health Officer, who then compiles the state returns which are then submitted to the National D.H.E.U. The D.H.E.U.'s also produce D.H.E. material periodically.

However, the D.H.E. activities have not yet been shown to bring about a significant improvement of dental health of the Malaysian community. This is because in the past the Malaysian dental service has concentrated on treating dental caries and treating the priority groups, namely the school children and the pre-natal and nursing mothers, thus neglecting the adult populace in whom the periodontal disease is most prevalent. This, coupled with the lack of awareness of the disease, lack of value for teeth and motivation have probably contributed to the high prevalence of periodontal disease in the Malaysian community, particularly among those in the rural areas. Hence, a concerted effort has to be made to educate the public by intensifying the D.H.E. activities and by placing greater stress on preventive dentistry and periodontal disease.

The setting up of a mobile D.H.E. unit will be very effective in the promotion of D.H.E. among the school children and the community, particularly those in the rural areas, in whom periodontal disease is widely prevalent. The purpose of the unit would be to educate the community on dental health through talks, lectures, practical demonstration of toothbrushing, flossing and mouth rinsing programmes. These activities should be aided by motion pictures, slides, film strips and other motivating and attractive educational material such as pamphlets, stickers and badges. Information on where and how to obtain the dental services and what facilities are available in the dental clinics could be disseminated to the public. Most important of all, the mobile D.H.E. unit must make repeated visits to the schools and rural areas to reinforce the knowledge of the people on dental health acquired during earlier visits.

Malaysia proposes to set up a periodontal unit in each of the 13 states in the country. Besides some surgical and prophylactic treatment, these units will be primarily concerned with preventive periodontics and in the education of the Malaysian community on periodontal health. It is understood that, like the D.H.E.U.'s, the periodontal units will be staffed by the existing dental personnel. To enhance the effectiveness of these units, the dental personnel should receive extra training on preventive periodontics. This could be provided by the periodontist who heads the unit through seminars or via inservice courses conducted by the dental schools. The periodontal units and the D.H.E.U.'s will liaise their programmes for effective implementation.

The dental personnel alone cannot cope with the effective propagation of D.H.E. due to the large backlog of curative dental work in Malaysia. Hence, non-dental personnel supplement the efforts of the dental personnel in the propagation of dental health in the Malaysian community. Together they form the D.H.E. teams which comprise the dentist as head of the team, dental nurses, chairside assistants, health personnel and teachers. The D.H.E. team affords a perfect opportunity for the dental profession to render dental health care and the team approach has been shown to increase the availability of dental services. However, the D.H.E. team must bear in mind that they are going to be involved in public health relations and are going to deal with a complex multi-racial Malaysian community, with socio-economic, educational, cultural and traditional variations. They would have to learn to communicate with people - how to awaken their interest in dental health, particularly those in the rural areas, most of whom are ignorant, illiterate and prone to superstitious beliefs. Above all they must be knowledgeable, have motivation, dedication and commitment to the task of educating the community.

Professional dental personnel though sufficiently trained in the mechanics of dental treatment lack orientation in the art of behavioural sciences, so important when dealing with human behaviour. During undergraduate training, therefore, greater stress should be placed on the teaching of D.H.E. and the subject of behavioural sciences could be incorporated in the dental curricula. Health personnel and teachers receive some D.H.E. during their training period. Selected teachers undergo specialized health education

training after which they are attached to the primary schools and are responsible for educating the school children on health matters including dental health. The health personnel work closely with the dental personnel in Malaysia. They also propagate the importance of dental health during general health tasks and during home visits.

Seminars and inservice courses should be regularly held for members of the D.H.E. team to update and reinforce their knowledge on new methods and techniques of teaching D.H.E. and on dental health. This could be achieved by the dental health specialists.

D.H.E. requirements for each group of the community will be determined by the level of prevention that needs to be applied. Hence, those who are healthy or at average risk would require primary prevention and those at high risk, secondary prevention and those ill-cured tertiary prevention.

In Malaysia the target groups have been identified and the school children top the list. As a captive audience they afford an excellent opportunity for D.H.E., as communication with virtually all persons within the entire school age group is possible. Besides, habit patterns are in the process of being formed and it is easy to institute behavioural change. Mass communication and face-to-face approach can be applied on the same audience effectively.

Dental nurses based in school clinics, main health centres, mobile dental clinics and mobile dental squads cater for the school children in the urban and rural areas. The D.H.E. activities include dental health talks, lectures, toothbrush drills and

fluoride mouth rinsing. Teaching aids are widely used. The dental department and the education authorities liaise with the Joint School Health Committee.

School tuckshops could be made to restrict if not ban the sale of refined carbohydrate products and sweetened soft drinks which are so popular with the school children and are harmful to the teeth. These could be replaced by nutritious foods.

Pre-school children can be reached through kindergartens, nursery schools and day care centres. The dental nurses visit them periodically.

Pre-natal mothers can be reached in pre-natal clinics in hospitals, main health centres, sub-health centres and mid-wife clinics in the rural areas. They are routinely referred to the dental clinics and receive D.H.E. from the dental personnel as well as the health personnel in the various clinics during general health care talks.

The general public in whom periodontal disease is widely prevalent, is ironically the last group. Some D.H.E. is provided by the dentist while treating the patient or during exhibitions and campaigns.

It is hoped that when the periodontal units come into being, priority will be accorded to this group and through an intensive educational programme, this community can be sufficiently educated and motivated to maintain proper oral hygiene.

There is enough evidence to indicate that periodontal disease is preventable, controllable and treatable by the maintenance of good oral hygiene and seeking early treatment. Prevention of the

disease is within the reach of every individual. The focus of D.H.E., therefore, is to motivate the community to take action. To achieve this, more understandable information on prevalence, cause, prevention and treatment must be given to the community. Information on plaque control, oral hygiene, diet, fluorides and the importance of early treatment and regular check-ups must be disseminated to the community through D.H.E. talks with content material that is factual, up to date and personally relevant.

Bacterial plaque, which is an invisible, continuously forming sticky film, is the single most significant contributing factor in the initiation and progression of periodontal disease. It can be prevented by mechanical plaque controlling measures such as regular toothbrushing, flossing and regular prophylaxis, and chemical plaque controlling measures utilizing antibacterial agents such as chlorhexidine.

Oral hygiene currently affords the only practical method for the prevention of periodontal disease in a large population and is the 'cornerstone' of most D.H.E. talks. Health educators, therefore, should place stress on the correct technique of toothbrushing which is the most effective means of plaque control and maintenance of oral hygiene. Motivation is an essential aspect of patient instruction and should be incorporated in plaque control programmes. Toothbrushing could be aided by plaque disclosing wafers. Diet counselling in D.H.E. talks is equally important.

In the propagation of D.H.E., the use of media is equally essential. Audio-visual aids, such as motion pictures, film strips, T.V. videos, slides, models and posters can help to build concepts and can be a valuable aid in teaching D.H.E. for small groups or for individual instructions making a good visual impact. Motion pictures, T.V., film strips which are passive D.H.E. aids are adaptable for all ages. They provide realism and motion. The video system is an exciting new educational medium and has the added advantage in that it allows the learner access to stored information on tape quickly and easily. Besides, health educators have a better control of the material and educational programmes can be made to suit the environment fairly easily and cheaply. However, the media is not presently being used in Malaysia and its introduction will certainly boost the efforts of dental health educators in the teaching of D.H.E., particularly in a school setting.

T.V., radio, and newspapers have a wide coverage and reach almost all the ethnic groups in the country. It could be effectively used in the propagation of dental health information to the Malaysian community,

Dental health exhibitions and campaigns are also held for the school children as well as for the general public in Malaysia. They are a powerful means of communicating with the public and moving it to action. They should be held more often to enforce what people have learnt earlier. In Malaysia dental health exhibitions and campaigns have been organized in the past with varying degrees of success. They are held to mark important days

such as World Health Day, parent-teacher day, and dental day and are directed at the school children as well as the adults in the urban as well as rural areas. Toothbrushing competitions, puppet shows, and slides are shown during those exhibitions. Attractive prizes are awarded to the winners.

The delivery of D.H.E. is not without problems and barriers. Mere acquisition of knowledge and awareness of the disease need not necessarily motivate an individual to carry out dental care procedures or seek dental treatment. The problem of behavioural sciences which deals with behaviour, attitudes, motivation and traditions and superstitions is a unique problem. More so in the Malaysian community which is multi-racial, multi-cultural and multi-lingual with people of different beliefs. D.H.E. is concerned with behaviour change and the development of a positive attitude. Health educators, therefore, must take into account and understand the social forces which shape an individual's actions. Hence, they should strive not only for the induction of health preventive behaviour, but once it has been developed to retain it permanently, which thus means an institution of behavioural change.

Attitudes form an important part of our everyday lives and determine much of our behaviour. Most people do not view dental problems as interfering with anything important. Attitudes can be developed through the process of education and are influenced by various factors such as socio-economic status, social norms and education.

The attitude of most Malaysians to dental health can be said to be generally a negative one. As periodontal disease progresses insidiously and does not cause much pain or suffering, it seems to have been accepted as a fact of life by most Malaysians. Bleeding of gums to them is a normal phenomenon and they believe that periodontal disease is a disease of old age. It is, therefore, the responsibility of the dental profession and the dental health educators to correct these misconceptions and to inculcate a positive attitude through D.H.E. and persuasion of the community.

Superstitions, beliefs and traditions are still prevalent in the Malaysian community. Health educators, therefore, must tread carefully when trying to correct them in the process of imparting D.H.E.

Motivation is the process which involves multiple complex factors. A variety of factors and sources can motivate an individual to seek dental treatment or to adopt a dental health habit. They could be related to health reasons or non-health reasons. Attachment of values to health, fear of pain, social acceptance and the desire for recognition are some of the strong motives for an individual to seek dental care.

In the Malaysian community the educated and those in better socio-economic positions can be said to be sufficiently motivated.

However, for the rural folk, a carefully planned programme is needed to educate as well as motivate them. Hence, to deal with the complex problem of behavioural sciences, the dental educators must have some knowledge of the subject of human behaviour. Professional

dental personnel could acquire this from dental schools where the subject of behavioural science could be incorporated in the dental curricula. These personnel could then train the other members of the D.H.E. team in the subject of behavioural sciences, through seminars and inservice courses held periodically.

Organized D.H.E. has become an important factor in public health programmes. Pooling the various D.H.E. resources, such as government, commercial and voluntary organisations and their common purpose of improving dental health gives unity and direction to all efforts of achieving the goal of enabling everyone to possess a sound complement of teeth in a healthy mouth for life.

In Malaysia, the government is the major agency involved in the promotion of D.H.E with minimal involvement of commercial resources. The voluntary organisations play no role in the promotion of D.H.E. Their participation will certainly be welcome.

Periodic evaluation of dental health programmes are equally important to determine whether the programmes are progressing satisfactorily towards the set objectives and goals. Constant evaluation generates interest and helps to answer many questions. Various methods and techniques can be applied in the evaluation of on-going D.H.E. programmes, such as discussions, interviews, questionnaires and data from surveys.

In evaluating D.H.E. programmes, the following criteria could be applied:

- (a) Population at risk.
- (b) Coverage of community.
- (c) Percentage of patients who recieved periodontal treatment.
- (d) Percentage of patients completed periodontal treatment.
- (e) Average number of visits per patient. This helps to measure extent of recall and severity of disease.
- (f) Items of care carried out such as surgery, scaling and polishing.

Short term evaluation can help determine support and cooperation of the community, official approval and development of health preventive habits, in particular, oral hygiene.

Overall evaluation to measure the success of the D.H.E. programme after it has run its course can be carried out with a nationwide survey utilizing baseline information of past surveys. Other records such as registers maintained in clinics and service records of patients can help determine the extent in the increase in demand for periodontal care after implementing the D.H.E. programme. Through evaluation one can also determine the awareness of the disease in the community and whether or not they are sufficiently motivated to seek dental care.

Prevention of periodontal disease is within the means of all individuals. It is a disease none of us need to have. Various dental health education activities, methods and techniques have been broadly discussed in this thesis. It is, therefore, hoped that it would generate awareness of the disease in the Malaysian community. The knowledge gained and the need for a healthy set of teeth for

a lifetime, hopefully, will motivate the community to practise good oral hygiene daily and seek early dental care. This in the long run will minimise the prevalence of the disease in the Malaysian community thus fulfilling the aims of this thesis.

7. CONCLUSION

Dental surveys of school children and adults revealed that periodontal disease is widely prevalent in Malaysia. It is the second major cause of tooth loss in the Malaysian community.

It is a disease that is preventable and controllable by the regular practice of proper oral hygiene. It can be treated easily by seeking early dental care.

The major factors contributing to the high prevalence are unawareness, ignorance and misconceptions amongst the Malaysian populace of the nature of the disease. Curative dental care dominated the Malaysian dental service in the past.

D.H.E. activities have been more of an information giving type in the past and have failed to bring about the desired effect of improving the dental health of the community or instituting behavioural change.

There is, therefore, a need to intensify the efforts to educate the community on the importance of dental health through carefully planned dental health education programmes.

In view of the high prevalence of periodontal disease in the Malaysian community and recognizing the need for periodontal care Malaysia proposes to set up periodontal units in each of the 13 states of Malaysia.

Dental health education units have been set up with the objective of standardizing and intensifying the D.H.E. activities.

As the disease is widely prevalent in the adults, they should be accorded priority in the treatment of this disease.

The community must be educated through an intensive D.H.E. programme on preventive periodontics so that the knowledge gained can institute a behavioural change, motivate the community and remove misconceptions.

Dental and non-dental personnel who form the D.H.E. team and who are knowledgeable, well trained and motivated can play a vital role in educating the community on dental health.

Various methods and techniques using a variety of educational material and media, have been discussed in this thesis.

With a view to improving the periodontal health of the Malaysian community the following suggestions are made:

1. Set up a mobile D.H.E. unit primarily concerned with dissemination of information on dental health with particular stress on periodontal care.
2. Introduce dental hygienists into the Malaysian dental service to provide periodontal care and to supplement the already lacking professional dental manpower.
3. Incorporate D.H.E. in primary school syllabus.
4. Restrict the sales of sugar products and 'junk' food in school tuckshops.
5. Introduce ultra-sonic scalers in all dental clinics.

6. Audio-visual aids and video-cassettes should be widely used during D.H.E. activities preferably using locally prepared programmes to suit the local environment.
7. Introduce the subject of behavioural sciences in dental schools.
8. Regularly update D.H.E. aids and materials. They should be attractive and contain latest information.
9. Private practitioners and the Malaysian Dental Association should play an active role in the promotion of dental health.

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