3. DENTAL EDUCATION IN FIJI

3.1 HISTORY

The inception of dental education in Fiji was in 1931 when medical students were introduced to dentistry lectures. Dentistry was a part of medicine until 1945 when a 2-year clinical dental course was implemented. Students were required to successfully complete the 2-year premedical course in the basic sciences, anatomy and physiology with the medical students prior to the clinical dental course.

In 1946, the first dental student graduated as an Assistant Dental Practitioner. Later in 1954, the dental course was reduced to three years by the exclusion of Prosthodontics which became an optional postgraduate course. During this period only a certificate was awarded upon completion of the course as Assistant Dental Officers.

From 1968 the University of the South Pacific trained medical and dental students in their foundation year (one year) prior to their training at Fiji School of Medicine (FSM). A Diploma in Dental Surgery was awarded after four years of training and thence the title Assistant Dental Officer was changed to Dental Officer. A list of the number of graduates at FSM is in Table 25.
Table 25 - Dental Graduates of the Fiji School of Medicine (1946-1985)

(Source: Lander & Miles, 1992)

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946-1955</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>1</td>
<td></td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>1956-1965</td>
<td>19</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>4</td>
<td>3</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>1966-1975</td>
<td>13</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td></td>
<td>38</td>
</tr>
<tr>
<td>1976-1985</td>
<td>29</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td></td>
<td>41</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>22</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>146</td>
</tr>
</tbody>
</table>

Key: 1 - Fiji  2 - Kiribati  3 - Tonga  4 - Cook Is.  5 - TTPI  6 - Vanuatu  7 - Solomon Is.  8 - Western Samoa  9 - American Samoa  10 - Papua New Guinea  11 - Others

As was recommended by the Hardy/Frank report in 1983, the Diploma in Dental Surgery course ceased in 1984, largely on financial grounds (Lander, Miles 1992). Meanwhile the University of Adelaide in South Australia in 1984, offered to train two students each year. At the Eleventh Regional Conference of Permanent Heads of Health Services held on the 10-14th of March 1986 in Noumea the Government of Fiji proposed to incorporate FSM as a Faculty of the University of the South Pacific and urged the rationalization of dental training in the region by supporting such training to the University of Papua New Guinea where adequate staff and facilities were already in existence (Lander, Miles 1992).
The first students in dental mechanics and dental nursing graduated in 1955. In 1969 the first dental hygienist graduated. The latter course was upgraded to a 2-year course to become dental hygiene therapy in 1973. The first junior dental assistants graduated in 1976. (Landen, Miles 1992)

3.2 UNDERGRADUATE DENTAL EDUCATION

In defining dental undergraduate education the general assembly of the Federation Dentaire Internationale in 1987 stated that it is "the form of dental education that leads to the achievement of the primary qualification for the practice of dentistry."

In the final year of high school (Form 6) students are given an opportunity to select their choice of career through information disclosed by the career division of the Ministry of Education. This information is available through booklets and exhibitions similar to a trade display known as 'Expos'. Selection of students to the first year is competitive.

The undergraduate education described in this section is that of the Diploma in Dental Surgery which ceased in 1984 (Kewai, 1974).

3.2.1 Year 1

Dental students selected for their first year were trained at the University of the South Pacific whereby a continuation of the science subjects were taught. Commonly, all would be sponsored by Fiji or other regional governments with an average intake of six per year, therefore entry of private students was limited. The subjects covered are outlined:
Physics

In areas on vectors, kinematics, dynamics, conservation of momentum, oscillations, wave motion, light and quantum theory, nuclear physics, electrostatics, direct current, capacitance, magnetic field of current and time varying currents. Emphasis was placed on interpretation of relevant information in all experimental work and drawing of conclusions.

Biology

Cell and molecular biology, comparative study of living organisms, genetics and evolution, the genetics of population and the biological inter-relationships.

Chemistry

Basic concepts, introduction to carbon compounds, driving force of chemical reactions, path of chemical change, types of reactions, first transition series, further organic chemistry, gases and liquids and the nature of matter.

Also, Psychology, Statistics, Pacific Studies and Communication and Study Skills were taught in addition to the above subjects.

3.2.2 Year 2

The second year consisted of introductory lectures into dentistry and laboratory practicals. Subjects covered included;

General anatomy (histology and embryology)

Study of the macroscopic structure of the human body including the trunk, extremities, head and neck, organ systems, tissue histology and elementary embryology. Students were involved in practical dissections.

Text - A regional study of human structures by Gardner and Gray

- Manual of practical anatomy by Cunningham
General physiology

Historical introduction, body fluids, physical and chemical properties, distribution and measurement, membrane structure, properties of excitable tissue, nerve and muscle, cardiovascular system, heart as a pump, regulation, regional circulation, blood and blood cells, haemostasis, plasma proteins, respiration, mechanics and control, gas exchange and carriage, regulation of neutrality, kidney, alimentary system, motility, secretion, digestion and absorption, principles of nutrition, reticulo-endothelial system, endocrine system, pregnancy, parturition, lactation, fetal circulation cerebrospinal fluid, temperature regulation, nervous system, motor and sensory nerves, reflex activity, maintenance of posture, the cerebellums, cortex, special senses, autonomic nervous system and hypothalamus.

Text - A review of medical physiology by Ganong

- An introduction to human physiology by Green

Biochemistry

The meaning of biochemistry and it's place in medicine, chemistry of carbohydrates, chemistry of lipids, chemistry of proteins and amino acids, cytology, caloric value of food stuffs, biological oxidations and bioenergetics, lipid and protein breakdown, biosynthetic pathways, nitrogen metabolism, vitamins and co-enzymes, metabolic inter-relations, organ-specific metabolic activities, hormones, genetic code and protein synthesis, metabolism of iron, bile pigments, inborn errors of metabolism, blood proteins, viruses and control of metabolism.

Tooth morphology

Kinds of teeth, number, classification, eruption times, nomenclature, enamel lobes, articulation, anatomical design of tooth roots and right and left-sided teeth. Replicas of each tooth were carved (approximate three times life size) for practicals.

Text - Atlas of tooth form by Wheeler
Dental histology and embryology

The early development of teeth and jaws, the latter development of teeth, growth of face, enamel dentine, pulp, cementum, periodontal membrane, alveolar bone, jaws, mucous membrane of the mouth and related structures. Relation of structure and function in the oral cavity, shedding of the primary teeth, temporo-mandibular joint and maxillary sinus.

Text - Orban's oral histology and embryology by Harry Sicher
         - Dental anatomy by Scott and Symons

Prosthetics

Covered general properties of non-metallic materials, standards, plaster of paris and dental stones, waxes and natural resins, impression compounds, zinc-oxide eugenol pastes, denture base resins, methyl methacrylate and other synthetic base material, polishing agents, dental casting investment, alginate.

Technology - use and care of instruments, base plates and bite blocks, articulators, arrangement of teeth, waxing up, flanking, wax elimination, use of tin foil and substitutes, packing acrylic resins, curing, deflasking, polishing, repair of dentures, free-hand soldering.

Text - Science of dental materials by Skinner and Phillips
         - Applied dental materials by Anderson

3.2.3 Year 3

During this year lectures on pre-clinical subjects were covered. Students were examined on the qualifying subjects at the end of the semester except for prosthodontics. The subjects were:

General pathology and microbiology

Microbiology - staining reactions, physiology, morphology, methods of culture and identification of bacteria, methods of sterilisation, chemotherapy, immunology and systemic bacteriology. A study of bacteria, viruses, fungi, richettsiae, protozoa and helminths, host
parasites their isolation and identification were included.

Pathology - infection, inflammation, repair, circulatory disturbances, fever shock, degenerative processes, tumours, injuries caused by physical irritants, injuries caused by chemical poisons, lesion of valves, respiratory system, lymph nodes, fracture, bacterial infections, tetanus.

Text - Muir's textbook of pathology by Campbell and Anderson

- General pathology and bacteriology by Rishton.

Pharmacology and therapeutics

The subject dealt with prescription writing, dosage and administration of drugs, their stability, drug absorption, metabolism and excretion and drug interaction. The pharmacodynamics of narcotics, analgesics, and sedatives were discussed. Drugs such as tranquillisers and stimulants, general anaesthetics and muscle relaxants, sympathomimetic and vasoconstrictors, steroids, hormones were covered.

Text - Drugs in dentistry by Kay

Oral pathology and microbiology

This subject included clinical symptoms, gross and microscopic tissue changes of the teeth and other oral structures and pathology of oral neoplasms. It discussed the biology of pathogenic microorganisms, their identification and isolation as found in the oral cavity.

Text - A textbook of oral pathology by Shafer


Pre-clinical operative dentistry

Lectures on cavities, cavities nomenclature, features of dental caries, histological structure of enamel in relation to cavity preparation, stages in cavity preparation, names uses and care of operative instruments, preparation of class 1, 11,111, 1V, and V cavities, cusp restoration, pulp capping, moisture control, temporary fillings, examination of the mouth, charting, finishing and polishing of silver amalgam.

A technical procedure in restoring tooth structures to their proper form, function and
aesthetics on manikins and later, on actual patients.

Text - The conservation of teeth by Eccles and Green
- Manual of operative dentistry by Pickard

Periodontics

Normal periodontium, diseases of the periodontium, deposits on the teeth, stains, calculus, classification of periodontal disease, gingivitis, Vincent's infection, gingival hyperplasia, periodontitis simplex, periodontal simplex, periodontal abscess, gingivosis, periodontosis, periodontitis complex, periodontal atrophy, gingival recession, periodontal traumatism, pericoronitis.

Clinical - causes, diagnosis, treatment and prevention of periodontal disease, therapeutic procedures of treatment of periodontal disease; oral hygiene and prophylaxis, gingivectomy, electro-coagulation, periodontal packs, splinting, traumatic occlusion, natural cleansing, artificial aids, interdental cleaners and stimulators, recalls.

Text - Clinical periodontology by Glickman
- Essentials of periodontology and periodontics by McPhee and Cowley.

Prosthodontics

Anatomical and physiological considerations, examination of the mouth, preparation of the mouth, impression techniques, centric relationship, selection and setting up of teeth, insertion of full dentures, instruction to patients, adjustment and grinding in, principles of retention of artificial dentures, partial denture retainers, rebasing and relining of full dentures, splints, surgical preparation of the mouth (alveolecctomy, alveolotomy, excision of hyperplastic soft and hard tissue.

Practical techniques and construction of complete and partial removable dentures in manikins and later on patients.
Dental public health

Principles and methods of dental public health practice and its application. Included also were the research methodology and statistics relevant to dentistry.

Text - Principles of public health by Dunning
- The dentist, his practice and his community by Young and Striffler.

Oral medicine, diagnosis and treatment planning

Included radiology, the types of apparatus, technique of intra and extra-oral roentgenograms. Safety precautions in the use of X-ray, interpretation of radiographs and their use as an aid diagnosis. Principles and procedures in making a diagnosis and planning a treatment. A systematic analyses of oral health care problems for a variety of clinical cases presented.

Oral surgery (part 1)

Areas dealt with were asepsis, clinical procedures with emphasis on exodontia, use of instruments like forceps, elevators, etc. Local anaesthesia, principles and techniques for various injections with emphasis on second and third division of the trigeminal nerves.

Text - Extraction of teeth by Howe
- Local anaesthesia in dentistry by Robert and Sowray
- Local anaesthesia and pain control in dental practice by Bennett

Endodontics

The fundamental principles, diagnosis, treatment planning of pulpal disorders, including anatomy, physiology and pathology of the pulp. Practicals were done on extracted natural teeth and on patients later.

Text - Handbook of clinical endodontics by Bence
- Pathways of the pulp by Cohen
Pedodontic dentistry

Review of the anatomy and morphology of primary dentition, child management, restorative procedures modified in child patients, vital pulp therapy for deciduous and young permanent teeth, relative and local anaesthesia for pain control and sedation, diagnosis and treatment planning, preventive measures such as oral hygiene, fluoride therapy, dietary analysis and counselling, plaque control and dental caries in the growing child. Management of behaviour problems in children.

Text - Clinical pedodontics by Finn

- Handbook of clinical pedodontics by Snawder
- Dentistry for the child and the adolescent by McDonald.

Orthodontics

The fundamentals of growth and development of the cranio-facial structures and their relation to the stomatognathic system. Classification of malocclusion and their early recognition. Demonstration on the uses and fabrication of appliances.

Text - Minor tooth movement in children by Sim

- Orthodontics, principles and practice by Graber.

Principles in medicine

The evaluation procedures and specific examination techniques relevant to dentistry of general medicine including cardio-vascular and respiratory systems, lymph nodes, neurologic examination, haematologic diseases, gastro-enterology and nephrologic examination.

Text - Harrison's principle of internal medicine by Thorn.

Clinical conference

An introduction to the dental clinic and limited practice in restorative dentistry, exodontia and oral prophylaxis under close supervision by supervisors.
3.2.4 Year 4

The final year was inclined heavily to clinical work whereby each student had to achieve a minimum number of practical clinical requirements. Although these requirements were necessary, there was no strict adherence to this guidelines.

*Oral surgery 2*

Dealt with surgical management of pathological conditions of the oral cavity, principles and management of maxillary and mandibular fractures, pain control and sedation connected with surgical procedures like general anaesthesia, hypodontics and acupuncture.

Text - Minor oral surgery by Howe

- Oral and maxillo-facial surgery by Archer

*Restorative dentistry (crown and bridge)*

The subject was composed of lectures and practical exercises covering root and crown preparation, restorations of coronal defects using various restorative materials, restoration of unilateral short span spaces with fixed prosthesis and methods of producing a restored occlusion in complete and partially edentulous dentition. Also touched on were ceramics and dental porcelain, their properties and manipulations.

Text - Inlays, crowns and bridges - A handbook by Cowel, Curson, Kantorowicz and Shovelton

- Theory and practice of crown and fixed partial prosthodontics by Tyiman

*Dental public health*

Dealt with the principles and methods of epidemiology, prevention of major dental problems, organisation and motivational processes in dental public health programmes. Also the principles and application of dental health education was discussed in depth.

Text - Principles of public health by Dunning
- Behavioural science in dental practice by Dworkin
- Preventive dentistry in action by Katz, MacDonald and Stockey.

**Prosthodontia**

A continuation of the clinical work on both complete and partial removal dentures. Lectures on the properties, use, and manipulation of the different dental materials used in denture making.

**Clinical conference and practice**

Dealt with the management and provision of dental care in the clinic or field in all areas of dentistry covered by the subjects taught.
3.3 TRAINING OF AUXILIARY PERSONNEL

3.3.1 Junior Dental Assistant

The minimum qualification for students was a pass in Fiji Junior Certificate in English and three other subjects. Course work is mainly apprenticeship training for a duration of one year with some theoretical lectures. The average intake is five students per year. As graduates they are also known as chairside assistants. The subjects taught in 1978 were:

**Semester 1**
- Orientation, cleanliness, sterilisation, instruments and arrangements, charting on history cards, reception and registration of patients, manipulation, properties, usefulness, proportioning, storage and safety of restorative materials, general medicaments used in dentistry, pharmacology and therapeutic value of these drugs. Students are expected to do chairside assisting in all fields of operation under close supervision.

**Semester 2**
Lectures in indenting of supplies, inventory keeping, stores identification, personal appearance, recall system for patients, processing and filing of X-ray film, simple dental anatomy, pathology, pharmacology and therapeutics, dental health education such as tooth brushing and plaque control, fluoride and nutrition. Students are assessed on their clinical performance and examination at the end of the year. Successful students are awarded a certificate as a Junior Dental Assistant.

3.3.2 Dental Hygienist Therapist

3.3.2.1 Certificate Holders in Dental Therapy

In 1973 the two years training course for dental hygienists was discontinued and a conversion course of an additional one year was introduced leading to a certificate in dental hygiene therapy. The new three years course on dental hygiene therapy was designed to give the student a functional and
fundamental knowledge of oral health and the problems associated with maintaining it. It also aimed to provide a high level of technical skill in various clinical procedures associated with oral health care. Applicants must pass in the New Zealand School Certificate or it's equivalent with a minimum of 50% in English, 50% in one science subject and 50% in any other. Students intake each year had an average of four.

The subjects taught from 1978 were;

**Year 1** - Orientation, hygiene and nursing, chairside assisting, records, sterilisation and instruments, general anatomy and physiology, dental regional anatomy(face and mouth), tooth structure and dental anatomy, clinical dentistry 1 [clinical preventive techniques - scaling, polishing and fluoridation pre-clinical operative - restorative].

**Year 2** - General pathology and microbiology, local anaesthesia and exodontia, dental public health and health education(including nutrition), law and ethics, pharmacology and therapeutics, clinical dentistry 11 [oral diagnosis, treatment planning and referrals, radiology], clinical dentistry 111 [pedodontics, clinical operative dentistry and restorative materials].

A follow-up session at the clinic with the facilitator and a qualifying exam was mandatory at the end of the year.

**Year 3** - The third year of the dental hygiene course was mainly based on field and clinical training. Students were involved in clinical dentistry, oral health education, tours to rural areas and attending seminars. Final examinations were on theoretical, clinical and in viva.

**3.3.2.2 Diploma in Dental Therapy**

In 1985 the dental officer course was terminated (Lander, Miles 1992), followed by another unfortunate incident in 1987 where a large number of dentists left the service. There was a huge reduction in manpower available to maintain the demand for dental services. For this reason the dental therapy course was upgraded, so that as graduates they could also be recognised as
team leaders. For a long period of time dental therapists were managing clinics, on their own and they were, at times "forced" to perform duties assigned only for dentists. Therefore this course was designed to teach them more in depth of what the certificate in dental therapy are currently being taught. The curriculum attempted to amalgamate some subjects from the certificate in dental therapy and the diploma in dental surgery courses.

The entry requirement was a pass in Fiji school leaving certificate examination in English, Biology and one other science subject with an intake of three students each year. Duration was also three years upon which a Diploma in dental therapy was awarded.

The subjects studied from 1989 were as follows;

**Year 1 (pre-clinical)**

Semester 1 - Perspective in dentistry and dental anatomy, general anatomy, general physiology, dental materials, dental equipment.

Semester 2 - General anatomy, general physiology, oral histology and embryology, oral anatomy, restorative dentistry, dental materials.

**Year 2 (clinical)**

Semester 1 - General pathology and microbiology, restorative dentistry(clinical) oral surgery, dental public health, dental radiology, first aid and emergencies.

Semester 2 - oral surgery, paediatric dentistry, pharmacology and therapeutics, oral pathology and microbiology, periodontics, dental public health, restorative dentistry.

**Year 3 (clinical)**

Semester 1 - oral medicine/ oral diagnosis/ treatment planning/ radiology, dental public health, dental jurisprudence/ ethics and practical administration, restorative dentistry(clinical) preventive dentistry oral surgery(clinical), principles of medicine.

Semester 2 - Dental public health, restorative dentistry, oral surgery, preventive dentistry, basic prosthodontia.
3.4 CERTIFICATE IN DENTAL TECHNOLOGY

This is a three year course with a minimum qualification of a pass in the New Zealand university entrance or Fiji school leaving certificate examination in English and three other subjects, two of which must be science subjects. The graduates are awarded a Certificate in Dental Technology when completing the programme. The subjects taught from 1989 were:

Year 1 (pre-clinical)
Semester 1 - Introduction to dentistry and dental anatomy, general anatomy, physiology, dental materials, dental equipment, dental technology practical.
Semester 2 - General anatomy, general physiology, dental materials, dental technology (theory and practical), oral anatomy, dental histology and embryology, dental anatomy (practical).

Year 2
Semester 1 - Theory of dental technology, dental materials, dental technology practical.
Semester 2 - Theory of dental technology, dental materials, dental technology practical.

Year 3
Semester 1 - Theory of dental technology, dental technology.
Semester 2 - Theory of dental technology, dental technology practical.

3.5 POST-GRADUATE TRAINING OF DENTISTS

Post-graduate training is essential in dentistry as it enables a practitioner to have in-depth study in a particular field of dentistry. The FDI General Assembly in 1987 defined post-graduate training as "all forms of dental education offered to the graduate dentist". The practice of dentistry in Fiji (government service) is mainly a general one where a graduate is expected
to be an `all-rounder`. The system in the hospital setting rosters dentists into all areas of dentistry i.e. restorative, oral surgery and dental public health. Therefore for a dentist to concentrate on a particular field, for example orthodontics, it is in their own interest and time from the normal roster. There is no post-graduate training available in Fiji, so dentists apply to other countries such as Australia, New Zealand, United Kingdom and Thailand for further training in their area of interest.

3.5.1 Demand

Post-graduate training often streamed dentists into specialisation. At this period of time whereby Fiji is facing manpower shortage, it may not be a priority in the service. Perhaps an equally appropriate method for further training is reinforcement through continuing education. The dental association would play a significant role in this respect. This is similar to one of the objective of the Australian Dental Association which is `To encourage the improvement of the health of the public and to promote the art and science of dentistry' through continuing education (Southwick, 1992). From the Report of the Select Committee of Inquiry meeting into the Health Services in Fiji (1979) it was noted that there was a lack of qualified personnel for the training of dental students at FSM. The committee further noted (paragraph 3.07.27 page 86) that dental officers trained in the field of dental public health were in charge of dental training which was unsatisfactory. Therefore the committee recommended specialist tutors of clinical dentistry including oral surgery to take charge and if they were not available, qualified local personnel should be selected for overseas training. It is in this arena that the writer believes the ministry should consider upgrading. That is to say, the demand of post-
graduate training lies at the dental school and it is mandatory for tutors to receive some formal post-graduate training. Previously, areas in clinical dentistry and public health were available for post-graduate training but at present public health dentistry continues to be the only training option existing.

3.5.2 Sponsorship

There are numerous funding agents (sponsors) whose aims are to aid in enhancing the standard of education for approved applicants. Such sponsors as the World Health Organization (WHO), Australian International Development Assistance Bureau (AIDAB), Fijian Affairs Board (FAB), New Zealand and Japanese education organisations are some that are widely known. All these sponsors liaise with the Ministry of Health for their recommendation on a particular post-graduate training. There is a great influx of sponsoring agents but applications are subjected to hard decisions on the release from duties for the staff due to the manpower shortage which the country is currently facing.
4. THE 1993 TRAINING PROGRAMME - BACHELOR IN DENTAL SURGERY

4.1 INTRODUCTION

Commencing from this year (1993), an innovative curriculum was implemented for the FSM enabling dental personnel to proceed through a sequence of educational modules on a career path leading from a Dental Assistant through other auxiliary grades to a Dentist. A degree leading to a Bachelor in Dental Surgery (BDS) will be awarded at the end of the study. The courses for each grade are formulated to:

- be relevant to the pattern of oral diseases in Fiji and the Pacific Islands
- be competency-based in accordance with specified job descriptions
- have a strong community orientation with emphasis on prevention and the promotion of oral health
- permit exit and re-entry of students at each level for Dental assistants, Dental Hygienists, Dental Technologists, Senior Dental Therapists and Dentists.
- incorporate where appropriate, the principle of problem-based learning
- incorporate procedures to ensure early establishment of clinical skills

The intake of students has increased to thirty, whereby twenty places are reserved for Fiji applicants and ten for other regional applicants. The length of the study is five years.
4.2 CURRICULUM

During a series of meetings from 26th August to 28th October 1992, the curriculum committee reached a consensus for the following subjects to be taught to the dental students. These subjects correspond to the job descriptions of each dental personnel.

Module 1 - Oral Diseases
Areas to be covered
Include an elementary explanation of diseased oral tissues; the clinical appearance of dental caries, periodontal disease, malocclusion, diseases of the oral mucosa, edentulousness and methods of conducting a simple screening examination to detect obvious dental and oral abnormalities.


Module 2 - Preventive Dentistry 1
Areas to be covered
Include fluoride, plaque, calculus, toothbrushing, flossing, healthy mouth and oral hygiene, diet and nutrition, regular dental visits and the availability and use of oral health education materials.

Module 3 - Community Dentistry 1
Areas to be covered
Include practical experience in the conduct of an oral screening examination; interviews and the administration of a simple questionnaire to determine the attitudes of a small community to oral health and an overview of oral health problems in Fiji and the Pacific Islands. Social customs and habits and their relation to oral disease. Oral disease and general health.
Module 4 - First Aid

Areas to be covered

Include the materials covered in the standard St. John Ambulance Brigade First Aid course and dental emergencies - knocked out teeth; broken teeth; bitten lip; tongue or cheek; bleeding; objects wedged between teeth; teeth displaced out of alignment; dislocation of the jaw, toothache and teething problems and procedures for taking blood pressure.

These introductory modules cover a period of four weeks for all students entering a career in Dentistry. The general objective is to introduce participants to the concept of primary health care with emphasis on the establishment of self-reliance and self-help to overcoming individual and community oral health problems. Modules 1 to 4 may also be taken by Primary health care workers who are village health workers, kindergarten teachers, primary school teachers, senior, public health nurses and midwives.

Since the planning and the implementation of this training is new, information regarding this dental training was not disseminated adequately to warrant any intake this year (1993). There is provision in this programme for in-service training and students exit at the end of Module 4 with a Certificate of Participation.

Module 5 - Applied psychology in dentistry

Areas to be covered

Include factors determining behaviour and behavioural change. Principles of normal psychological development. Causes of dental anxiety and ways it can be prevented. Factors affecting attitudes to oral health and preventive behaviour. Learning
communication. Different methods of communication

Text - Dental Assistants' Manual by Grant & Harcourt

Reference - Behavioural science and dental practice by Dworkin et al
   - Chair-side psychology in patient education by Weiss and Swearingen
   - Teaching and learning about food, drinks and nutrition by Goodwillie
   - The way we teach psychology to dental students by Kent

Module 6 - Health Education 1

Areas to be covered

Include the principles and purposes of health education. Communication process and skills in presentation to an audience. Approaches to communities about health and health services and how to develop teaching aids. Language studies.

Reference - African medical and research and foundation; A self teaching manual for rural health workers
   - Methods and materials of health education by Schneider
   - Making and using training materials by Cox and Goodwillie
   - Helping health workers learn by Werner and Bond

Module 7 - Preventive Dentistry 11

Areas to be covered

Include the characteristics of oral health. The composition and role of dental plaque in the initiation and progress of periodontal disease. The role of oral hygiene in the control and prevention of dental caries and periodontal disease. The use of fluoride at the individual and community levels in the prevention of dental caries. The role of diet and nutrition in tooth formation, dental caries and the maintenance of the health of the oral mucosa. The use of fissure sealants in the control of dental caries. The preventable causes of oral cancer and traumatic injuries to the teeth and jaws. The composition of calculus and it's relationship to periodontal disease.

Reference - Textbook in clinical periodontology - Copenhagen
- Diet and dental caries by Storey
- Principles of preventive dentistry by Goose and Harties
- International workshop on fluorides and caries reduction by Forrester and Schulz
- The physiology and biochemistry of the mouth by Jenkins
- Periodontics for the dental practitioner by Mason
- Current aspects of dental health by Hoogendoorn

Module 8 - Microbiology and Sterilisation

Areas to be covered


Text - Dental assistants’ manual by Grant and Harcourt

- Oral microbiology for dental students by Coogan

Module 9 - Dental Materials 1

Areas to be covered

Include the properties and methods of manipulating for clinical use of cavity liners, cements, resins, sealants, temporary dressings, amalgam, waxes and impression materials. Precautions to be observed in the preparation and storage of dental materials for clinical use.

Text - Dental assistants’ manual by Grant and Harcourt
Reference - The science of dental materials by Phillips
Module 10 - Dental Instruments and Equipment

Areas to be covered

Include the identification, use and care of all instruments used in clinical dentistry. The identification use and basic maintenance of dental equipment. Rust prevention.

Text - Dental assistants' manual by Grant and Harcourt

Module 11 - Ethics and Jurisprudence

Areas to be covered

Include the legal responsibilities of all the members of the oral health team and the ethical responsibilities of dental assistants.

Text - Dental assistants' manual by Grant and Harcourt

Reference - Law and ethics by Sear
- The Medical Act and By-Laws

Module 12 - Primary Health Care 1

Areas to be covered


Reference - Research and action for the promotion of oral health within health care by

WHO
- Primary oral health care for developing countries by Davies
- Secrets of Fijian medicine by Weiner
- Dental health by Ajomi
- A historical review; Nutrition related diseases and their prevention - FSM and USP
Module 13 - Dental Assisting

Areas to be covered

Include assignment to dental clinics for practical experience in the performance of administrative, clerical and clinical duties.

Text - Dental assistants' manual by Grant and Harcourt

- Handbook of Dental auxiliary practice by Castano and Alden
- Dental instruments by Yaman

At the end of these modules which is scheduled to cover a period of one year, the students exit as Dental Assistants.

Module 14 - Dental Examination and Recording

Areas to be covered

Include instruments and equipment required for examination and recording. Notations used for charting and recording personal data, dental history, medical history, clinical findings, treatment plan and special tests.

Reference - Oral health surveys. Basic methods by WHO

Module 15 - Health Education and Promotion

Areas to be covered

Include the basic principles of health education, communication skills, approach to communities, development of education aids, control and prevention of non-communicable diseases, nutrition and health promotive behaviour.

Module 16 - Environmental Health Practical

Areas to be covered

Include visits to the water supply, waste and refuse disposal, environmental sanitation and housing in a rural setting. Food hygiene and pollution control. Survey methodology in a multi-disciplinary team. Basic components of primary health care as well as community
assessment and community participation.

Module 17 - Preventive Dentistry 111
Areas to be covered
References - Improving dental practice through preventive measures by Bernire & Muhler
- Helping health workers learn by Werner and Bowen

Module 18 - Periodontics 1
Areas to be covered
Include the structure and function of the normal periodontium. The etiology and pathogenesis of periodontal disease. The rationale and response of tissue to periodontal therapy. The application of measures for the prevention of periodontal disease.
Reference - Textbook of clinical periodontology by Lindhe
- Practical periodontal therapy by Wilkins

Module 19 - Clinical Dental Hygiene
Areas to be covered
Include liaison with maternity and public health nurses. child welfare and community clinic, nutritionists and mother's group to discuss the promotion of oral health. Preparation of mouths of patients for extractions and oral surgery. The organisation of school preventive programs and clinical dental hygiene.
Reference - Clinical practice of the dental hygienist by Wilkins
- Helping health workers learn by Werner and Brown

The Dental Hygiene course terminates after this module
Module 20 - Physical Science

Areas to be covered

Include units of measurement of length, volume, pressure, temperature and the use of measuring apparatus. Types of force, stress, strain and mechanical principles. Principles of physical testing. Transmission of heat; exothermic reaction, thermal movement. Atomic structure of elements, formation of compounds, chemical reaction, oxidation, reduction, corrosion, polymers, valency, ionisation, flame chemistry and catalysis.

References - Skinner's science of dental materials by Phillips

- Notes on dental materials by Combe
- Material science in dentistry by Greener, Harcourt and Lautenschlager

Module 21 - Dental Materials 11

Areas to be covered

Include the chemistry of synthetic resins, denture base resins, restorative resins, gypsum products, impression compounds, zinc oxide and eugenol pastes, dental waxes, base plate materials, abrasive, lubricants, reversible and irreversible hydrocolloids

References are the same as module 20

Module 22 - Dental Technology 1

Areas to be covered

Include the theory of full and partial denture construction; cast preparation; cast duplication; denture bases; maxillary and mandibular records; articulators mounting of cast and tooth arrangement. Denture processing, finishing and polishing. Immediate dentures, relineing and rebasing. Repairs and dental casts surveyor, partial denture case preparation, manipulation of dental waxes. Simple orthodontic appliances. Occlusion, dental anatomy, tooth morphology and anaesthetics.

References are the same as modules 20 and 21
Module 23 - Equipment Maintenance

Areas to be covered

Include the repair and servicing of Tri-pac portable dental unit. Servicing of dental units - filters, control box, air rotors; handpieces; syringes, aspirators, polishing units, cavitrion tank and pump and foot controls.

The dental technology course terminates at this stage

Module 24 - Dental Radiography

Areas to be covered


Module 25 - Local Anaesthesia

Areas to be covered


Text - Clinical dental anaesthesia by Bell

- Local analgesia in dentistry by Robert and Sewray

Module 26 - Operative Dentistry 1

Areas to be covered


Text - The evolution of dental care by Elderton

- Modern concepts in operative dentistry by Horsted-Bindsley and Mjor
Module 27 - Exodontia

Areas to be covered

Include the identification of teeth for extraction. Selection of type of anaesthesia. Techniques for extraction. Control of bleeding. Post-operative instructions. Medical and dental complications associated with exodontia.

Text - Minor oral surgery by Howe

- The extraction of teeth by Howe

Module 28 - Clinical Dentistry

Areas to be covered

Include practical experience in clinical dentistry.

Text is the same as in module 26

The dental therapy course terminates at this stage and these next modules are for senior dental technologists.

Module 29 - Dental Materials 111

Areas to be covered

Include the characteristics and properties of dental porcelain, dental gold alloys fusible alloys, chrome cobalt alloys, solders, fluxes, welding, stainless steel wire, castings used in dentistry.

Text - Science of dental materials by Skinner and Phillips

Module 30 - Dental Technology 11

Areas to be covered

Include metal based dentures, techniques, casting procedures and surveying, clasp system, advanced soldering and welding techniques, porcelain, crown and bridge technique, advanced orthodontic appliances and maxillo-facial appliances.
Module 31 - Maxillo-facial Prosthesis

Areas to be covered

Include obturators, maxillo-facial prosthesis of the ears, eyes and nose.

Module 32 - Laboratory Management

Areas to be covered

Include ethics, common law, dental and industrial legislation and control of work flow.

Personnel management, stress and safety in the work place.

The modules for the Senior Dental Therapist, fourth and fifth years of the Bachelor in Dental Surgery programs have not been spelled out in the last curriculum committee meeting on the 15th October 1992, but the tentative modules are set out below.

The modules for the Senior Dental Therapists will include;

33 - Community Dentistry 11
34 - Services Procedures and Clinical Management
35 - Clinical Dentistry
36 - Primary Health Epidemiology

The modules for the fourth and the fifth years of the Bachelor in Dental Surgery course will include;

37 - Oral Medicine and Oral Surgery
38 - Relative Anaesthesia and Sedation
39 - Crown and Bridgework
40 - Prosthetic
41 - Orthodontics
42 - Operative Dentistry 11
43 - Paediatric Dentistry
44 - Periodontics 11
45 - Primary Health Care 111
46 - Personnel Management and Administration
47 - Clinical Dentistry
48 - Elective Study and Research

4.3 ASSESSMENT

Aims:

- To determine whether or not the students have succeeded in achieving the educational objectives.
- To provide feedback to students by comparing their achievements to an established norm.
- To provide feedback to teachers by comparing students to an established norm.

Skills that are tested:

- intellectual ability
- communication skill
- practical skill
Categories of evaluation:

- formative evaluation which is continuous assessment
- summative evaluation is the assessment at the end of a module or semester

These assessments consist of clinical and non-clinical performance.

Weighting:

- 40% is allocated to continuous or formative assessment
- 60% to summative evaluation

Methods of evaluation:

- written essay-type answer to questions
- written short answers to a series of consecutive and related questions (linked structure of questions)
- written selected answers to multiple-choice questions of different complexity
- oral examinations
- identification of a series of items
- observation and examination of practical clinical tasks
- assignments
- reports
Grades are given as recognition of certain degree of accomplishment as follows;

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 - 100%</td>
<td>A+</td>
</tr>
<tr>
<td>75 - 79%</td>
<td>A</td>
</tr>
<tr>
<td>70 - 74%</td>
<td>B+</td>
</tr>
<tr>
<td>65 - 69%</td>
<td>B</td>
</tr>
<tr>
<td>60 - 64%</td>
<td>C+</td>
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<tr>
<td>55 - 59%</td>
<td>C</td>
</tr>
<tr>
<td>50 - 54%</td>
<td>C</td>
</tr>
<tr>
<td>45 - 49%</td>
<td>D (Work is below the standard required for a pass)</td>
</tr>
<tr>
<td>40 - 44%</td>
<td>D</td>
</tr>
</tbody>
</table>

Below 39% E (Very weak performance failure to satisfy the examiner in areas such as practical field or other work as may be prescribed in the handbook).
4.4 PROBLEM-BASED LEARNING

Problem-based learning (PBL) can be reasonably defined as the ability to use past experience in solving new problems. The traditional approach to learning gives information first and uses problems to emphasise the importance of the information. The advantages of the problem-based approach is that it is easier to remember salient facts and the students only learn what is relevant to their future work. In addition the students should find PBL stimulating and enjoyable and one that engenders a desire to continue learning after graduation.

Problem-based learning requires a lot of work by the student, and so the system is student oriented. Students are expected to learn from their own efforts through the help of group discussions and guidance from the tutor in drawing attention to the accessibility of resources such as experts in the field and the library. Therefore the student learns to formulate their own questions, seek the answers and relates the learning gained to specific experiences. What is learnt from solving the problem remains inherently in the memory, and is native to the problem. so that when encountering a similar or comparable problem in the future, the information and skills acquired is easily retrievable. The students are expected to adapt to the skill in defining problems, assessing cues. setting questions, assessing information and formulating solutions. This is followed by a group discussion and presentations. thus facilitating participation. Of course they will be guided by a tutor in that particular field of dentistry.
This method of teaching is convenient in the FSM due to the fact that the dental faculty is not well equipped with teaching staff. One of the objectives of PBL at the University of Adelaide is "to reduce formal contact hours for students and provide greater opportunity for self-directed, experiential learning throughout the course." (Wetherell, Mullins 1993). Initially this teaching method is time consuming but as problem-solving skills develop less time will be involved.

At a seminar at Hoodless House (FSM) on the 9th September 1992, the Head of the FSM in his address mentioned that according to the experience with the medical students, they all passed without any lowering of standards of competency.

It is also important to define the level of ability of the student that is intended to perform different tasks. So to assess competency, the tasks must be stated and relatively straightforward. In computing the areas of competency for the proposed dental officers (1993), equal weighting are given for curative and preventive dentistry. The grading for competency are summarised as:

- Clinical/ Curative Dentistry 49%
- Epidemiology and Health Information 14%
- Management and Health Economics 13%
Public Health/Personal Hygiene 10%

Health Education 9%

Behavioural and Social Science 5%

4.5 THE CAREER-PATH

All students entering a career in Dentistry in Fiji for 1993, enrolled for Dental Studies rather than for a specific occupational category. The category of personnel termed as primary health care workers include the village health workers, kindergarten teachers, primary school teachers, public health nurses and midwives. Their training covers Module 1 to Module 4 over a period of four weeks and a Certificate of Participation is awarded at the end of the course. These introductory modules are compulsory for students and primary health care workers, but the primary health care workers and others exit at the end of Module 4.

The Dental Assistant course continues from Module 5 to Module 13 for a period of one year. Students who are successful have the option to exit and work as Dental Assistant or pursue the Dental Hygiene course for another six months covering Module 14 to Module 19 leading to a Certificate in Dental Hygiene.

Alternatively they may proceed to a one year course leading to a Certificate in Dental Technology.
A further course of six months is required, which covers Module 24 to Module 28 to enable the student to graduate with a Certificate in Dental Therapy. This is followed by another year of training covering Module 33 to Module 36 for the student to graduate as a Senior Dental Therapist.

An additional two years after completing the Senior Dental Therapy course is required, covering Module 37 to Module 48 for the student to graduate with a Bachelor in Dental Surgery.

Students who opt to pursue the Dental Technology course, will cover Module 20 to Module 23. A further study of one year covering Module 29 to Module 32, will enable the student to graduate as a Senior Dental Technologist. For a Dental Technologist intending to pursue the degree programme, they will have to enter the career-path as a Dental Assistant.

The career-path structure permits exit and re-entry of personnel at each level corresponding to the competencies required for each category of personnel in the system. Therefore the graduate dentist would have qualified seriatim as a Primary Health Care Worker, a Dental Assistant, a Dental Hygienist, a Dental Technologist/ Dental Therapist, a Senior Dental Technologist/ Senior Dental Therapist.

The design of the career-path structure has also incorporated a system in which the dental personnel already in the service could enter into the dental school for further training. Although there is an opportunity for dental staff to progress further in the career-path, the intake is limited, taking into
consideration the demand of care and manpower supply in the dental service. The decision on this issue lies at the Ministry level. Early this year in 1994 three qualified Dental Assistants were selected for further training to become Dental Therapists.
5. CHANGES IMPLEMENTED FROM THE DIPLOMA IN DENTAL SURGERY TO BACHELOR IN DENTAL SURGERY PROGRAMME

5.1 PHILOSOPHY AND RATIONALE OF CURRICULUM CHANGE

By its nature, curriculum development and revision is an ongoing process. All of education, including dental, is a dynamic process (FDI, 1987). Since emerging from its origins in the traditional barber-surgeon apprenticeship systems, dental education has undergone an evolutionary process in its efforts to keep pace with increasing knowledge and changing circumstances (WHO, 1990). However, not all innovations are improvements or even innovations (Cowan, 1972).

A philosophy of teaching the basic concepts should be promoted. The style and objectives of the curriculum should educate dental practitioners and not merely train dental students.

When contemplating change, decisions must be made concerning the general format and nature of the curriculum (Allen, 1988). That is whether all the students are to complete the programme at the time of graduation or to develop a career-path type of curriculum for students to follow according to their ambitions. Furthermore, this change will be influenced by the dental needs of the country, the resources of the institution and the governmental mandates.
Inputs relating to the format and nature of the curriculum should be accessible to all the members of the faculty and decisions are made at the appropriate level e.g. the content of the curriculum should be decided at the department level; prerequisites, admissions criteria, format, sequence of courses, time allocation to teaching unit and the general nature of the curriculum are decided at the School level; the resources, that is finance and space, are decided at the Ministry level.

The rationale for curriculum change differ from school to school and from time to time (Allen 1988). Faculty members and students still spend a great deal of time on technical and clinical tasks which have little benefit for future learning or little transferability to clinical practice. Teachers become too comfortable with the content and procedures which they have used for many years and rationalise their continuous use with little, if any, justification of the benefits. Obsolete or less important content must be decreased in emphasis or removed (FDI, 1987).

The dental curriculum will have to be modified if new auxiliaries or expanded function auxiliaries are incorperated to the dental training.

One of the most important things in curriculum development and revision is that the needs and requirements of a particular geographic region be met and that no compulsion be felt to utilise a curriculum or type of curriculum which was designed for some other part of the world. (Allen, 1988)
Major curriculum change should not be implemented until it has been well researched, well thought out and designed with input from all parties to be affected. There must be a careful documentation as to exactly what is going to be done, identification of the resources needed to implement the changes and an adequate evaluation system designed to determine the degree to which the predetermined goals and objectives designed for the programme will be met.
5.2 CHANGES IN THE DESIGN OF THE EDUCATIONAL PROGRAMME

Two fundamental factors which influence the design of a curriculum in a country are;

- Environmental factors which owe something to the profile of demand, to the patterns of dental disease prevailing, to the feedback from graduates and principally to the limitation imposed by manpower and economics on the planning of educators. Chaves (1968) has pointed out that much time may be wasted in teaching sophisticated skills to practitioners who may rarely use them. The environment factor may demand plain repair type dentistry and in such circumstances these sophisticated skills will be lost owing to lack of use.

- Academic factors is governed by what the consensus of leading dental thought in a continent or subcontinent believes to be the ideal curriculum (Cowan 1972).

One of the obvious changes that had taken place was the change in the design of the curriculum from the old vertical type (1945-1984) to the new modular type (1993). Previously, the old curriculum was designed specifically for each category of dental personnel and with the change to the modular type of curriculum, a single curriculum with a number of modules was designed. In this new approach the integration of knowledge, skills and attitudes is more logically established. Instead of trying to locate a concrete health problem to which a pre-formed solution can be applied, this new way seeks to generate solutions appropriate to the problems uncovered (UAM,1988). That is, instead of favouring a synthesis in which
all possible knowledge is compiled and organised according to a given taxonomy, there is the intention to follow a dialectic method (Camara, 1988). Traditionally, vertical curricula have been used to educate health personnel, but a study of the various types of job description given in the Council of Europe Publication reveals that major overlaps occur, and that a modular approach to the design of curricula is both possible and desirable (Allred, Hobdell 1986).

As well as the change in the design, the format of the curriculum was modified. For the Diploma in Dental Surgery (DSD) course it was mandatory that students spend the first year at the University of the South Pacific (USP) before being accepted to the dental school (FSM). The overall concept of teaching and learning dentistry that was advocated in the older dental training followed the biomedical approach. Certainly, the new preventively-oriented approach is convenient for Fiji, because the cultural background of Fiji and the Pacific Islands is centred around the family and extended family functions. Good community interaction at the village level prevails and this concept of introducing health care at the village level is recent. Generally speaking Fijians are not preventively oriented. Targeting the population to promote self-care at the community level, is a change from the old concept of dental education. The behavioural aspect in the curriculum will enable the students to be better in public relations and patient management.

With the career-path included in the BDS course, students have the option to exit at the level of the career they have vested their interest in and re-
enter at a latter time when they have the ambition for further study. This opportunity was not possible with the previous dental training as students were trained specifically to their future career and they will remain as such throughout their career life.

5.3 **CHANGES IN THE PROGRAMME IMPLEMENTATION**

The Selection Committee, which is the Paramedical board, remains the body that selects applicants for the study of Dentistry. Students applying from other Pacific Islands are selected on the discretion of their own Health representatives, having attained the equivalent specified entry level and being sponsored by their government. Circulation of the information package relating to the dental training available in Fiji remains unchanged, however, there is a change in the entry levels of the two dental training programs (Section 3.2). Previously, the old dental training had specific entry level for each category of dental personnel which was set at a lower scale for the Dental Assistant course, a slightly higher scale for the Dental Therapy/Dental Technologist course and at university entry level for the Diploma in Dental Surgery (DSD) course. For the new dental training programme (BDS) only one entry requirement level was selected despite the student's future career ambition to be a Dental Assistant, Dental Hygienist, Dental Therapy/Dental Technologist or a Dentist. Primary Health Care Workers are not included in this entry requirement. This change in the entry requirements also applies to Pacific Islands students.
Since 1987, there was a 40% reduction in the number of dental officers, and a further 9% in the dental therapists totalling to an overall reduction of 24% in dental manpower; so there is a corresponding increased demand in the dental service for dental manpower (Davies, 1990). Therefore, the students intake in 1993 was increased from an average of fifteen* each year prior to 1984, to thirty students in 1993 (* for all dental students including auxiliary).

Among the changes which have taken place, the preliminary year at the University of the South Pacific is omitted, including the advantages of utilising the university facilities and obtaining a certificate of attainment awarded by USP.

During the clinical practice stage in the Year 4 of the DSD course, all the students were accommodated at the dental clinic at CWMH. The equipment and facilities were shared by the outpatient and teaching staff. Therefore students had no priority as to the patients and instruments of their choice. In addition, because of the limited number of dental chairs, students either spent a lot of time waiting for a chair to seat the patient or worst still, they may postpone the appointment. This problem is rectified by a change implemented in the BDS course by the use of extramural clinics. This is a logical decision when considering the sudden increase in intake of students. Accompanying this solution, is the additional task of providing tutors for each group of students at the extramural clinics and the transportation of students to these clinics. It is also anticipated that as the students progress through the years, some may opt to exit at different levels, thus limiting the
number of students needing the use of clinic facilities.

Furthermore, the length of dental training has been extended from four years in the Diploma in Dental Surgery course to five years in the Bachelor in Dental Surgery course.

In addition to the teaching methods adopted in the DSD course, a different approach to learning is implemented in the BDS course which is the problem-based approach described in section 4.4.

5.3.1 Changes in the Dentist Curriculum

Before attempting to identify the changes to be implemented in the curriculum, the writer is reminded of the fact that the basic sciences (i.e. anatomy, physiology, histology and biochemistry) is not outlined in the new curriculum because it is covered in PBL. Meanwhile, for the purpose of convenience, the curriculum outlined in sections 3.2.1, 3.2.2, 3.2.3, and 3.2.4 is referred to as the 'old' curriculum and the subjects in modules 1 to 48 is referred to as the 'new' curriculum in this text.

Firstly, the subjects covered in Year 1 of the old curriculum were mainly an extension of the science subjects covered from high school. Incidentally, these subjects were also covered by students pursuing a Bachelor in Science degree. Secondly, the subjects outlined in the first year of the new curriculum (Module 1 to Module 13) are entirely different from the subjects outlined in Year 1 at USP, because these subjects are directly related to dentistry. In addition, the BDS course encompass all the dental personnel
in one training, so the subjects are arranged in a manner that commences with the understanding of the basic concepts of dentistry and proceeds to the more complex subjects.

In both the dental education programs psychology and communication skills are spelled out in the curriculum. The only difference is that in the DSD course, these subjects were taught in Year 1 and the students commenced treating patients in Year 4 (section 3.2). There is dormant period between the acquisition of practical knowledge to it's application (understanding and management of patients). Generally speaking one can say that the gathering of knowledge and it's application was treated as separate entity. It is essential that psychology and communication skills (an integral part of behavioural science) be taught in the clinical years of the course, regardless whether it is in the beginning or final year of study.

Epidemiological post-care studies, have shown that dental care actually performed often differs quite considerably from the theoretical optimum dental care which has been taught at the universities. It is often not a question of inadequate knowledge but of inadequate implementation of knowledge (Zillen, 1976). For the BDS course the students are introduced early to the community and that involves interaction with the community so the modules in Applied Psychology and Health Education 1 may complement their skill in the understanding of patients. A new subject in Module 46 (Personnel Management and Administration) is included in the dentist curriculum.
It is noted that apart from the above changes there is no further distinct change, except that the preventively oriented subjects are covered in the introductory years of the new curriculum and the more complex subjects in the fourth and fifth years which is exclusively for the dentist student. The core of the curriculum is similar, it is only re-arranged differently.
5.3.2 Changes in the Dental Assistant Curriculum

The dental assistant who remains most of the time near the dental chair, constituted a second pair of hands for the dentist. In Fiji, the subjects in the old curriculum focussed on the procedures performed at the dental clinic and these subjects are outlined in section 3.3.1. A different approach was designed and implemented for the new dental assistant curriculum which is outlined in Module 1 to Module 13. Initially, the students are introduced to the subjects which would develop their knowledge on the basic oral diseases in Fiji (by conducting a simple screening examination), first aid, health education and applied psychology prior to the same subjects covered in section 3.3.1. In Module 4, the procedures for taking blood pressure and Module 11 (Ethics and Jurisprudence) are now included in the new dental assistant curriculum. The writer noted that no lectures are set aside for processing and filing of x-ray films in the new dental assistant curriculum. It is assumed this subject is covered in Module 13 during the students' practical sessions.
5.3.3 Changes in the Dental Therapy Curriculum

The two curriculum are essentially the same except in Year 2 of the old curriculum, subjects like general pathology and microbiology, pharmacology and therapeutics and pedodontics are included. When revising the change from the Diploma in Dental Therapy (DDT) to the Senior Dental Therapy courses it is noted that the old curriculum included subjects like basic prosthodontia and oral surgery. Because the DDT course was designed through the amalgamation of the Certificate in Dental Hygiene and the DSD curriculum (section 3.3.2.2), the students were expected to do minor oral surgery e.g recovery of fractured root of a tooth, intra-oral suturing, etc; with the exception of the removal of impacted teeth. With the new curriculum, the students are taught subjects mainly involved in the supervising area (Module 33 and 34).

5.3.4 Changes in the Dental Technology Curriculum

Apparently there is no major change in the Dental Technology curriculum. For the new curriculum in Senior Dental Technology, Module 31 (maxillo-facial prosthesis) and Module 32 (laboratory management) are included.
5.4 CHANGES IN THE TYPES AND MIX OF ORAL HEALTH PERSONNEL

The personnel that comprise an oral health team can be categorised as follows:

- Ancillaries, i.e. non-dental personnel such as primary health care workers, health educators and school teachers.
- Auxiliaries, i.e. dental therapists, dental hygienists, dental assistants and dental laboratory technicians.
- Professionals, i.e. academically educated staff with varying degrees of specialisation.

The optimum mix and utilisation of these categories within an oral health team are essential for any country if it is to achieve the most economic, yet adequate, oral health care for the population (WHO, 1990).

Two new types of dental personnel are included in the BDS course namely the primary health care workers (ancillaries) and the dental hygienists. In Fiji these primary health care workers are village health care workers, preschool and primary school teachers, public health nurses and midwives.

5.4.1 Primary Health Care Workers

Village health care workers

In most villages and settlements, the village health workers are working voluntarily to assist the medical team in maintaining general hygiene, identifying medically complicated cases and undertaking basic emergencies treatment such as giving panadol to the villagers to relieve pain, dressing of superficial wounds, etc. Originally they are from the village
that they are serving and their role in the community is recognised and respected. Although the survey carried out in Fiji in 1985 showed a decline in the frequency of fluoride solution application by 42% in 1986 to 3% in 1989, there was a difference in opinion amongst the curriculum committee as to whether the village health workers should administer fluoride tablets to the community. However before such a programme is implemented it was agreed that a pilot study should be conducted to determine the acceptance of fluoride distribution. Village health care workers are expected to undertake basic dental emergency care to the point where referral is needed.

**Pre-school and Primary School Teachers**

Teachers spend about seven hours each day with the school children at school, so it is necessary that they are furnished with the basic knowledge on principles and promotion of preventive dentistry. Their role includes dietary counselling, supervision of toothbrushing drills, screening to detect potential advanced carious lesions and orthodontic problems and the relief of pain.

**Public Health Nurses and Midwives**

These category of personnel will receive instructions on the elements of preventive and oral screening to detect obvious dental defects that require referral for appropriate dental care.
5.4.2 Dental Hygienist

Fiji, trained Dental Hygienists in 1969, until in 1972 the course was upgraded to a certificate in hygiene/therapy. The dental hygiene training in 1993 cover a period of one year and six months. Dental Hygienists are recognised as an important adjunct to dental practice (US Dept. of Health, 1954). The need for dental health education and early periodontal care is increasing. This is a field in which the dental hygienist is indeed a central figure (Dunning, 1990).

Well over half the population that was surveyed in Fiji in 1985 needed calculus removal (57% at age 13-14 years, 58% at age 15-19 years and 74% at age 55+ years) and other care well within the hygienist designated duties. In addition, 41.2% of the population perceived that they need 'cleaning of teeth' and 51.9% indicated that they would like to learn about their teeth from dental personnel. In this respect, Dental Hygienists are needed as an essential part of the dental team (Dunning, 1990).
6. MANPOWER REQUIREMENTS

6.1 INTRODUCTION

Results from epidemiological and utilisation of dental services data indicated that the excessive demand for extractions and the needs for fillings and periodontal care are not being met on the same proportional basis. It is now apparent that there is a dire need to increase the number of dental personnel. Routine dental care is compromised because there is a great number of people waiting to be treated, that is for emergency care and those on appointments. The objectives of the health services are complex and often implicit. It is particularly important to distinguish between the objective of maintaining services to meet an existing level of demand and that of seeking to provide services to satisfy the needs of the population (however those needs may be defined). Waiting time is prolonged, and sometimes is aggravated by the breakdown of equipment. Even with the existing manpower available barely 5% of the treatment need is met. Therefore, one can imagine the accumulation of the backlog of unmet needs in the population.

After a dental health promotion week (which is free), people are encouraged and advised to seek treatment. Frustrations do arise when they discover the fees they have to pay, because the perception is that free treatment will be given. From the writer's experience on dental health promotion activities, immediately after the promotion there is a surge in the number of patients seeking care at the clinics but the staff cannot cater for
the increase, so the alternative is to put them for appointments. One cannot guarantee that once they are given appointments that they will be kept. It is in situations like this that not only it is appropriate to promote dental health but to have the supportive staff whether curative or preventive to complete the scenario of promotion. For preventive treatment to thrive staff are also needed, in addition to those already in the static clinic setting rendering routine dental care.
6.2 CURRENT STAFF ESTABLISHMENT

The dental services in Fiji are going through a hard period with the shortage of manpower and transport which could aggravate the caries disease problem. The result of the epidemiological survey of 1985 would be the best indicator of the oral health problem of Fiji and how strongly the services must address the problem to meet the World Health Organisation target for the year 2000. Ever since 1987, Fiji has continued to face a shortage of dental officers. It is not unusual for the government (Ministry of Health), to approach retired dentists to be re-employed soon after retirement. Further hardships arose when the education of dental officers at the Fiji School of Medicine ceased in 1984. This exposed the extended role that the dental therapists can play in the case of the absence of the team leader. Currently dental therapists are running many dental clinic settings without any direct supervisions from the dentist. As shown on Figure 38 and Table 26, there was a reduction of about 50% in the number of dental officers from 1987 to 1994.

Figure 38 - Dental Staff in Fiji (1987-1994)
(Source: Ministry of Health, 1994)
Table 26 - Dental Staff Establishment (1987-1994)

<table>
<thead>
<tr>
<th>Years</th>
<th>Dental Officers</th>
<th>Dental Therapists</th>
<th>Dental Assistants</th>
<th>Dental Technologists</th>
<th>Total</th>
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<td>44</td>
<td>53</td>
<td>8</td>
<td>129</td>
</tr>
<tr>
<td>1994</td>
<td>25</td>
<td>49</td>
<td>61</td>
<td>12</td>
<td>147</td>
</tr>
</tbody>
</table>

In its desire to restore the manpower required to satisfy the needs of the population, Fiji has recruited five dentists in 1993 and another five in 1994 for a contract period of three years from the Philippines.
6.3 DISTRIBUTION OF MANPOWER IN FIJI

One of the mandatory aspects of health care is the extension of services to different geographic locations of the population. When it fails to accomplish this then it is obligatory to use mobile services so that health care, including dental care, is restored or repaired. The tendency in many countries has been to view manpower distribution problems largely from a geographic perspective, so that they emphasise policies either of redistributing existing manpower or of inducing a larger proportion of health professionals to go to undeserved geographical areas (Mejia, et al., 1978). Fiji has fulfilled it's attempt to expand it's dental services to the various parts of the country with a coverage of 90%, however the core of the problem lies with the availability of personnel to man the clinics. A classic example is the extramural clinic in the rural hospital of Wainibokasi, which is about five kilometres from the health centre in Nausori. Previously, there was a dental therapist and a dental assistant operating from that self-contained one room clinic. Unfortunately, when Fiji commenced experiencing manpower shortage, the dental therapist and the dental assistant were re-located and staff from Nausori health centre had to cater for the population in that area by opening the Wainibokasi clinic one day a week. There were a lot of questions and frustrations from the so called 'neglected population', especially from those who travel by boat to reach the mainland. Because the dental clinic in Nausori health centre is already understaffed, inevitably there will be inconsistency in the manning of this extramural clinic in Wainibokasi. In this particular case the dental service in Nausori was affected where only 16 of the 52 primary schools in the sub-division were
16 of the 52 primary schools in the sub-division were visited in 1992 (Nausori Dental Clinic Annual Report, 1992); at the same time the dental staff were not able to fulfill its responsibility of the weekly visit to Wainibokasi dental clinic. Overall, productivity was lower than if it had concentrated on improving the dental services in Nausori per se. Thus, decisions were made to close this self-contained clinic until there is sufficient manpower to go around.

From the writer's recent survey, the same disappointment is observed from the population in Navua about twelve kilometres away from Suva dental clinic. Similarly, Navua is a town in itself, but is served by staff from the Suva dental clinic, who according to the people in Navua have irregular opening hours.

In Fiji, there are twenty one dental clinics which are centred at the three divisional hospitals, fifteen subdivisional hospitals and three health centres (Figure 39) providing both curative and preventive dental services. The following is the manpower distribution of dental personnel and the estimate of the population that they served in the Republic of Fiji (Table 27). As it is observed from the Table 27, Wainibokasi dental clinic is omitted due to its closure.
Table 27 - Distribution of dental personnel in Fiji (1994)

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
<th>Dentist</th>
<th>Dental Therapist</th>
<th>Dental Technician</th>
<th>Dental Assistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suva</td>
<td>245,140</td>
<td>10</td>
<td>15</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Lautoka</td>
<td>169,057</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Ba</td>
<td>80,237</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Tavua</td>
<td>41,336</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Nadi</td>
<td>82,223</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Sigatoka</td>
<td>52,786</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Labasa</td>
<td>140,800</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Nausori</td>
<td>85,000</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Navua</td>
<td>45,000</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Korovou</td>
<td>36,000</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Vunidawa</td>
<td>30,000</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Levuka</td>
<td>20,000</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Kadavu</td>
<td>12,000</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Lakeba</td>
<td>17,000</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Lomaloma</td>
<td>14,000</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Rotuma</td>
<td>12,887</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sevusavu</td>
<td>46,280</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Sesanga</td>
<td>33,000</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Nabouwalu</td>
<td>28,000</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Rakiraki</td>
<td>46,261</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>49</td>
<td>12</td>
<td>59</td>
<td></td>
</tr>
</tbody>
</table>
Figure 39 - Distribution of dental clinics in Fiji
6.4 MANPOWER REQUIREMENTS FOR THE YEAR 2004

It is evident at this stage that the cadre of dental personnel urgently needed in Fiji are an increase in the number of dental officers and the re-instatement of the dental hygienists. While the number of dental therapists and dental assistants are increasing proportionately during the years (1989-1994), the consistent output from the FSM is adequate to maintain a balance in the number of staff ratio i.e dental therapist : dental assistant. Thus, only the calculations of dental officers and dental hygienists requirements is given below.

The steps for calculating manpower requirements in this dissertation are adopted from that used by WHO (WHO, 1980).

6.4.1 Dental Officer

6.4.1.1 Prevention

Administratively, there are three divisions namely the central/eastern, western and northern divisions. At present there is a Principal Dental Officer (PDO) and a Divisional Dental Officer (DDO) in the central division. This organisation is lacking in the other two divisions. The PDO attends to hospital-based matters while the DDO serves the extramural clinics in that division. Because the DDO's duties and responsibilities are mainly administrative, a convenient way to ensure that preventive programmes are implemented, monitored and evaluated is the inclusion of supervising dental officers in each divisions. WHO has proposed a requirement of 1-2 persons per district of about 100,000 population. Having a population of 756,000 it is safe to allocate 2 dental officers to each of the three divisions for preventive programmes. In addition to the unfilled DDO posts a requirement of eight
dental officers is needed for prevention.

6.4.1.2 Services on demand

So far, this area of providing services on demand needs a lot of improvements as far as restoring the number of personnel who are needed in the provision of services. Treatment services should not be compromised as the patients also need to be treated for their dental disease to prevent further loss of the remaining dentition. Adequately supplying each static clinics with the required manpower will prevent the swapping of personnel from those involved in preventive programmes to services on demand and vice versa.

Working from a unit of 5,000 persons the population in Fiji is 39% urban and 61% rural. In the ten-year period, if the demand per year at the start of the plan is 10% rural and 30% urban, then at the end of the plan with an increase of utilisation by 15%, the demand will be 25% rural and 45% urban. Because of the different disease patterns observed in these two areas it is assumed that each rural patient requires 15 minutes and each urban patient requires 30 minutes care per year. The working year with patients is 1750 hours.

From the unit of 5,000 persons, 1,950(39%) are urban of whom 585 will need 292.5 hours of care at the start of the plan and 877.5 need 438.75 hours at the end. The 3,050 (61%) rural population of whom 305 need 76.25 hours of care at the start of the plan and 762.5 need 190.63 hours at the end. The total requirement for this population unit of 5,000 is 368.75
hours at the start of the plan and 629.38 hours at the end.

Before converting into manpower requirements, the population in 1993 is adjusted at a growth rate of 1.9%. The estimated population in 1994 is 770,364.

The manpower requirement for services on demand is calculated as follows:

\[
\frac{770,364}{5000} \times \frac{368.75}{1750} = 32.5 \text{ personnel at the start}
\]

\[
\frac{770,364}{5000} \times \frac{629.38}{1750} = 55.4 \text{ personnel at the end}
\]

According to these calculations, 32.5 dental officers are required for the delivery of services on demand in 1994 and by the year 2004, there should be an increase to 55.4 dental officers for this population.

6.4.1.3 Manpower production

Estimates of manpower are not complete if the staff in training institutions are omitted. Assuming there will be no part-time teachers and an intake of 30 students each year, the dental educators is calculated at a ratio of 1 teacher to 5 students. Ease in calculation is facilitated when there is a single entry for all the cadre of personnel but they exit according to the level of career intended and academic competency.
For year 1, thirty students are entering the system, therefore 6 teachers are required. Being the foundation year, the use of four dental auxiliaries teachers is sufficient plus an additional two dentists. At the end of year 1, five students are expected to exit as dental assistants, leaving twenty five students for year 2 who require two dental auxiliaries teachers and three dentists. Five more dental hygenists students exit after year 2, so 20 students are left for year 3. Two dental auxiliaries and two dentist teachers are required in year 3. It is expected that after year 3, five dental therapy and five dental technology students will exit, leaving behind ten students to pursue year 4 and 5. For these final years two dentists are required in each year. Summing up the requirements for dentists and dental auxillaries as dental educators, there is a need for eleven dentists and eight dental auxiliary teachers at the Fiji Medical School.

6.4.2 Dental Hygienists

Team work in dentistry is generally considered to be a very important and effective method of meeting the ever increasing requirements of dental care. The term 'teamwork' means co-operation between the dentist, dental therapists, dental assistant, dental technician and dental hygenists (WHO, 1968). Fewer dentists will be required if auxiliaries are used to carry out preventive procedures. This combination offers the most promising approach to the control of dental diseases. There are no dental hygenists in Fiji and with the high prevalence of periodontal disease, consequently the demand for this category of personnel is high. The duties and responsibilities of dental hygenists were outlined by the Curriculum Committee in 1992 and these includes;
- Identification of treatment needs
- Initiation of health education programs
- Render initial periodontal care
- Application of preventive measures
- Organise school preventive programs
- Do oral screening to monitor preventive programs and detect conditions for referral
- Preparation of the mouth for extractions and other oral surgery
- Liaison with other health workers
- Do prophylaxis and scaling
- Application of topical fluoride and other prophylactic solutions
- Application of fissure sealants
- Apply occupational health and safety procedures

The need for dental hygenists in Fiji cannot be overemphasised as it can be a topic in itself, however it is sufficient at this stage to calculate the number of dental hygenists that Fiji will need for the year 2004. While the duration of training is 18 months and the first intake of 30 students in 1993, five students are expected to graduate in June 1994 as dental hygenists. Assuming that this pattern continues until year 2004 then the country's output for dental hygenists is 55 by the year 2004.
7. MONITORING AND EVALUATION

There is no doubt that monitoring and evaluation are essential to any oral care programmes and should form an integral part of any health programme from the planning phase. WHO has suggested that for a ten-year plan, it should be monitored at the end of the fifth year where appropriate modification are to be implemented, then re-plan for the coming ten years is done at the end of the ninth year. The fundamental purpose of program evaluation is to provide information for decision making to program administrators and public policy makers (Born & Burek, 1993). In a large organisation such as the government dental services in Fiji, epidemiological data collection is scarce, therefore it relies on the clinical data for planning. But as it is evident from this utilisation survey, those reporting for treatment are the manifestation of that tip 'of the iceberg'. While it is mandatory to have an efficient clinical reporting system, the same is suggested for epidemiological, utilisation, and other fact finding surveys to enhance quality planning. It was nearly ten years ago since the last epidemiological survey and another one is due so that the administrators can monitor and evaluate the progress of the dental service. The utilisation survey carried out for this project will provide a baseline data and another similar one should be carried out after five years.

It is suggested in this dissertation that the education of dental personnel in Fiji should be appropriate for Fiji, rather than adopting one that is from another country. This will enable students to be fully equipped to face the population they will serve, effectively and efficiently. There is no doubt
that it is difficult to monitor this, but the tutors when supervising students out on community practicals can evaluate the students' ability to socialise (behavioural science) and educate (dental health education) the community. Once these students do graduate these skills will help them to dispense dental health education to the community. The ultimate goal, is to change the dental behaviour of the community to be preventively-orientated, visit the dentist more regularly and be more dentally educated. A workshop sponsored by WHO was held at the FSM from the fifth to the tenth of December 1993, to evaluate the progress of the first year of dental studies and also to elicit the views of the local and overseas participants and observers concerning the new dental education curriculum in Fiji. Participants were asked about their opinion on subjects such as the;

- Curriculum development and problem-based learning - the Primary Care Practitioner experience
- The course of dental studies at FSM
- The reaction of tutors to the first year course
- Students' response to the first year course
- Report of the external examiner
- Proposed modules for the second year course in dental hygiene
- Proposed modules for the second year course in dental technology
- Proposed modules for the second year course in dental therapy
- Educational objectives of the fourth and fifth years of the course
- Overall impression of the workshop

The responses from eight overseas (South Pacific region), fifteen local
and ten observers are listed in Figure 40.

The primary care practitioner's experience in curriculum development and problem-based learning were thought to be good by the majority of the overseas participants; very good by the majority of the local participants and equal percentages of observers thought it was good and very good (Figure 40a).

![Figure 40a - Response on the curriculum development and problem-based learning - the Primary Care Practitioner experience](image)
Figure 41b shows that equal percentages of overseas participants thought the dental studies at FSM is good and very good. A lesser percentage thought it is satisfactory. Equal percentage of local participants thought the dental studies is very good and satisfactory while a lesser percentage said it is good. Majority of the observers agreed the dental studies at FSM is good.

On the subject of the reaction of the tutors to the first year course, majority of the overseas and local participants, including observers showed great interest (Figure 40c).
According to Figure 40d, equal percentages of overseas participants showed great and some interest; while majority of the local participants and observers showed great interest to the students' response to the first year course.

Figure 40d - Responses of the participants to the students' response to the first year course

More local participants and observers showed great interest to the report of the external examiner while an equal percentages of overseas participants showed some and great interest (Figure 40e).

Figure 40e - Responses to the report of the External examiner
More of the overseas participants thought the proposed modules for the second year course in dental hygiene is valuable. However, the local participants and the observers thought it to be very valuable (Figure 40f).

From Figure 40g, more of the overseas participants and observers thought the proposed modules for the second year course in dental technology is valuable, while more of the local participants thought it to be very valuable.
Most of all the participants in the workshop agreed that the proposed modules for the second year course in dental therapy is very valuable (Figure 40h).

In Figure 40i, majority of the overseas participants and observers agreed that the educational objectives of the fourth and fifth years of the course was very valuable. More of the local participants thought it was valuable.
Most the overseas and local participants including the observers thought that overall the workshop was very valuable (Figure 40j).

![Figure 40j - Overall impression of the workshop](image)

Again, the point to increase the current manpower need not be overemphasised. At present, there are ten expatriate dentists from the Phillipines on contract in Fiji until this manpower problem is alleviated. Fiji School of Medicine will graduate dentists by the end of 1998, however other dental auxiliaries will graduate before this year. The majority of the community (51.7%) perceived that they needed 'cleaning of their teeth', which is the designated duties of the dental hygenists. The calculated number of dental hygenists in this dissertation will provide these services thus reducing the dental therapists of this work load. Dental administrators are obliged to monitor the output from the FSM in accordance to the needs and demands of the population at the end of the fifth year for the dental auxiliaries and at the tenth year for the dentists. In a package, evaluation can be looked at in three components as suggested by Donabedian (Donabedian, 1988) and that is structure,
process and outcome. For the above program, structure, being the facilities which are provided by the government and the current human resources (which are inadequate). Process refers to the ways and methods, which includes the use of surveys, clinical data and how the dental personnel are educated in the program. The actual impact in outcome will bring about changes as a result of the program. These changes are anticipated to be positive and meeting the goals outlined in Chapter 1.
8. DISCUSSION

Good planning is the basis for successful programs. Sometimes planning can be made difficult when there are constraints such as lack of funding, change of office, policy changes and others. In 1992, the actual total expenditure by the Ministry of Health and Social Welfare was $58,763,000, which increased to an estimated sum of $60,048,000 in 1993. An increase in estimated expenditure is anticipated for 1994 to $66,623,000 but later decreasing to $62,784,000 in 1995 and $62,784,00 in 1996. Because a fixed percentage of budget is allocated to each department, including the dental department, it is affected by variable inflation rates. Changes in office largely depends on retirements and vacancies. A major change of policy within the Ministry of Health led to the cessation of the locally trained dentists in Fiji in 1984, sending dental students to receive dental education at the University of Adelaide since that time. Because the output was not meeting the need for dentists in Fiji, the policy was again ammended to reinstate dental education in Fiji.

Inspite of these limitations, the leaders in the community which include the politicians and the dental profession are responsible and accountable when there is a deterioration in the oral health of the community it is serving. Complacency in knowing that the existing oral health situation is worsening without any constructive action is immoral. Community participation in the planning and implementation of programs has been reccomended by WHO (WHO, 1984). Occasionally, providers of services are oblivious to some relevant details which can be picked up by the
recipient of services from their perspective. This two-way interaction is of paramount importance because the providers are there for the community. Involving them in the planning process will not only boost the interaction but also help in improving compliance to any dental health programs.

8.1 SITUATION ANALYSIS

Dental surveys are essential tools whereby the oral health status and dental health behaviours of the community are derived and documented. Whilst the survey on the prevalence of dental caries, periodontal disease and tooth loss showed that these dental conditions are rife, the personal oral hygiene behaviour of the adult urban population is acceptable i.e 66% brushed their teeth at least two times a day and 90% use fluoride toothpaste. However, there is a need to emphasise the importance of regular visits and how to take care of one's teeth. Sixty seven percent of the adults will only pay a visit to the dentist when they are faced with a dental problem, suggesting that health tends to be appreciated only when it is impaired. Early symptoms of disease frequently go unnoticed or are regarded as of little significance (WHO, 1970). In this respect, more Fijians and males defer dental visits to the point when they cannot bear the pain, while more Indians and females commit themselves to a dental visit a few days later. Thus, at age 20-24 years old about 46% of the teeth were still decayed and 35% were missing due to dental caries. Missing teeth due to periodontal disease occur predominantly after the age of 30-34 years at 4% and increased to 17% at age 55+ years old. Furthermore,
complete edentulousness is present to 1% of the 30-34 year-old age
group. The rationale for periodic visits is: (a) to check the patient’s oral
hygiene status and other self care procedures; (b) to detect, and if
necessary treat, any disease at an early stage; (c) to reinforce dental
health education messages; and (d) to apply appropriate preventive
procedures (FDI, 1984). About 76% of the adult population perceived the
need for dental treatment. If perceived need is the most important
predictor, and if we can prove that high utilisation services result in better
treatment to need ratios, then the policy implication is that planners must
contemplate large-scale educational programs to persuade the public of
it’s individual unmet oral health needs and that they must present those
needs to dental care professionals (Cohen, 1978). The irony is that
81.6% of the adults saw no reason to visit the dentist because nothing is
wrong, although there is a perceived need for treatment.

Since most of the adults in the survey reported learning to care for their
teeth at home and during their school years, the accuracy of the
information is in question. If these adults are disseminating the same
dental health messages at home (to other members of their family),
acquired during their school years then it is outdated. An example is the
use of the outdated scrub method on the buccal surfaces of the teeth,
which ultimately is manifested in cervical toothbrush abrasion of the
buccal surfaces of the affected teeth. In addition, many studies indicate
that when the mass media are used alone to motivate preventive
behaviour, most individuals are not significantly influenced to act (Green,
1978). Media-based campaigns to promote dental health are more likely
to be effective if they continue over long periods of time, appeal to multiple motives, are coupled with social support and provide training in requisite skills (Silver & Kornacki, 1984). It is however comforting to know that the respondents recognised that the right source of dental health education should come from dental personnel. It appeared to suggest that dental education messages are not sufficiently being disseminated by dental personnel to the adults in the urban areas. Therefore the community at present is not an 'informed' community. The severity of this deficiency could be exaggerated in the rural community.

Patient and dental personnel relationship towards the delivery of services needs to be improved dramatically. So much so when about 67% of the adult (over 20 years old) population visit the government dental service. Predominantly these adults are in the low income group (85%), unemployed (78%) and received no or primary education (85%). Understanding the social, cultural and economic status of the community served with empathy, together with health education may improve utilisation

Fear of the dentist is a contributing factor which may deter people from using the services as is evidenced by the level of education in adults. This fear further postpones a visit to the dentist which leads to the deterioration of an incipient lesion to an advanced stage. Usually by this time extraction is the treatment of choice. Having the traumatic experience of extraction with the underlying fear, further reinforce the
nastiness of dental visits. Kent in 1984 found that dissatisfied patients have been associated with access problems, non compliance and low utilisation of dental care. On the other hand, although the younger adults indicated they were more fearful of the dentist than the other adult groups, they still demonstrated a higher percentage who visited the dentist within the last 12 months period.

Taking into account the above oral health status, behaviour and attitude to dental care it is found that whilst the dental caries and periodontal disease are prevalent, the community is not educated and motivated sufficiently to warrant a dental visit. For those people who took the initiative, evidence showed that the attitude of the dental personnel does not enhance utilisation of the dental services, to the standard where improved dental health will be accomplished. Although it will be excellent to educate the existing dental personnel to problems concerning public relations (as commented by the community), it is beyond the scope of this dissertation. The strategy suggested, is for upcoming dental students at the commencement of the dental studies to be familiar with the community it is serving, have a preventive-approach to dental treatment and adopt a team work attitude. There is also a dire need for adequate supply of manpower to complement the existing one. A great lesson from the medical zone nurses who do home visitation in Fiji is worth adopting. These zone nurses perform a mammoth task of taking care of the health of the population in their zones, through home visitation. New cases are identified, documented and referred to the main health clinics for
treatment. Continuous follow-ups in default cases are given reinforcement during subsequent home visitation. Given an adequate manpower supply, the future of dentistry in Fiji should be along this direction. For the present time, the adoption of the preventive approach to dental education and more behaviourally oriented service is highly recommended.

8.2 DENTAL EDUCATION IN FIJI

From its humble beginning 48 years ago, many changes have occurred in the education of dentists in Fiji. The advent of civilisation brought in its wake many changes in the dietary habits of the people resulting in dental disease. After commencing with an apprentice-type of training dentistry was recognised as a profession and formal training was implemented in 1945. From thence the norm of teaching the students with the basic sciences prior to clinical dental course began. Although there were slight changes in the curriculum, the core of the curriculum remained the same; for example in 1954 there was an option for post-graduate training in prosthetic, which later was incorporated back into the curriculum.

First and foremost, it must be stated at this point that it is not in the writer’s intention to demerit one type of dental education from another. Both the dental education programs are commendable as the traditional biomedical approach has a long and well established history and the preventive approach has been recommended by WHO (Allred, Hobwell 1986), which of course has been revised. The writer’s main aim is just to
expose the changes that have taken place. To plan and implement a change (in this case dental education), a lot of effort has been put together to accomplish the final result. The finer points it is assumed will fit in when adjustment is called for. Hence, the design of the curriculum should be flexible.

Previously each cadre of dental personnel were educated separately, that is in regard to entry level, curriculum and awards given. Apparently a lot of emphasis was allocated to their academic performance and if a student was not competent in attaining the grades then his/her study, was terminated. And these students were sponsored by the government, so not only was there a drop in the anticipated annual manpower supply, the government had also wasted a sum of money (limited budget) with zero outcome. Thus, one advantage of the BDS program is that, all the students are educated together inspite of their ambition for their future career. So, as they progress through the years of study, if and when one does not achieve the required standard he/she can always exit as a dental auxiliary. In this respect, manpower and government financial investment is retained.

Since the beginning of dental education in Fiji, the concept of preparing future professionals with the necessary technical skill and knowledge was in vogue. That is the students were educated mainly on the technical approach of treating or repairing oral diseases. Therefore, there was a tendency that only the ‘sick’ would seek dental care which meant going to where the professionals are (dental hospital/clinic). With the immensity of the demand of care in the country there is little chance of improvement
if the community sustain this attitude. It is anticipated with this new dental education program (BDS) that the community will be made adequately motivated so that the idea of self-help is reinforced. The early introduction of the students to the community enhances learning because not only is the 'out of classroom' learning exciting, but it also enhance familiarity amongst the students of the oral disease level in the community. Their mere presence in the community will hopefully, trigger awareness in the community which may eventually lead to behaviour change. In addition, introducing the dental hygiene course to the BDS program is a positive step in recognising that a majority of care needed is basic. When these students enter into the profession they will extend the concept of prevention to the community. The graduating dentist students will engage in more complex treatment to those who require such treatment. Despite what the students future career will be, grouping them together in one course of study will create a sense of team work for the future.

8.3 MANPOWER REQUIREMENTS

Approximately 43% of the suggestions from the urban/periurban adult population in this study referred to the improvement on the manpower situation as a means of improving the dental services in Fiji. This recognition from the community is real and may therefore influence current and future dental attitude and behaviour, if it is not rectified. Due to the current acute manpower shortage, the work load on each operator is high. Thus each operator cannot afford to dedicate enough time to
each patient leading to the unpleasant behaviour that may sometimes arise. Furthermore, the two types of dental personnel that should be increased in number are the dentists and dental hygienists. This is in view of the management and supervisory role that is now lacking in most dental clinic centres and the recognition that basic periodontal care is needed. Although dental therapists have a wider scope of duties compared to other countries (in that they do extractions for adults), they should not be a substitute to a dentist as a team leader. Occasionally, because of geographic isolation they are forced to perform duties which are beyond their job descriptions. Besides being accountable for any risks undertaken it is simply unethical and unacceptable. Ideally, a dentist is recommended to be available within the vicinity of the dental therapists to attend to duties beyond the dental therapists’ job descriptions.

Davies (1992), found that the presence of calculus and periodontal disease is prevalent. The survey carried out by the writer found that a greater percentage of the adult population perceived the need for prophylaxis. These two surveys ruled out any speculation on whether ‘cleaning of teeth’ is purely for aesthetic reasons or is influenced by peer pressure. For these reasons the need for dental hygienists in the country is confirmed from the two surveys.

The number of dentists calculated from this dissertation is comparable to that calculated by Davies in 1993. He calculated that by the year 2000, forty dentists are required for ‘effective clinical operators’ and six more dentists for administration. Davies also calculated that fifty one dental hygienists are required by the same target year. In another estimation the
WHO statistician based in Fiji, together with the local Oral Health Planning Group calculated a requirement of sixty four dentists by the year 2004 including administrative and clinical staff. There was no estimation of dental hygienists done by this group.
9. CONCLUSION

This paper suggests that the government of Fiji need to be informed that the battle against oral disease is far from over.

1. Large segments of the society are moving from rural to urban areas, neglecting their natural diet and adopting a more 'westernised' diet.

2. Utilisation of dental services in the urban adult population seemed to be constant from 1988-1992, even though dental caries and periodontal disease are prevalent.

3. Sixty seven percent of the adult population visit the public dental service, predominantly from the low income group, have received no or primary education and are unemployed.

4. Seventy percent of the adult population visit the dentist only when faced with a dental problem (symptomatic dental visit), therefore they need to be educated on the benefits of regular visits regardless of the presence or absence of dental diseases. The advantages of regular dental visits is seen when oral diseases are diagnosed early and appropriate treatments are given, thus eliminating the demand for extraction which is demonstrated in edentulousness.

5. Complementing the scenario, dental health education is vital, enabling the population to make informed options regarding their dental health and behaviour.

6. Indeed, 58% of the adult population prefer these information from dental personnel who by training are experts and should be more informative and up-to-date in the latest development in dentistry.
7. The task at hand, that is, creating dental awareness, providing preventive and restorative treatment will be fulfilled when the number of existing dental personnel is increased as suggested by 43% of the population.

8. The current manpower establishment is not sufficient to take on the immense work load. There is a reduction of about 50% in the number of dental officers from 1987-1994.

9. Sixty three dentists are required for the delivery of preventive and curative care by the year 2004. In addition, eleven dentists are required in the teaching of dental students at the Fiji School of Medicine.

10. The role of Dental Hygienists is of paramount importance when the majority of care needed is basic, that is, prophylactic care, dental health education and implementation of preventive programs. Therefore for the year 2004, fifty five Dental Hygienists are required in Fiji.

11. In addition, changes to the educational system to be community and preventively oriented, place more emphasis in behavioural science and communication skills will enhance the quality of dental personnel who in turn will disseminate these products to the community. Consequently, the dental health behaviour of the community including utilisation, will be positive towards an improved dental health status.

12. Periodic dental surveys is needed to monitor the oral disease status and the use of dental services by the population. These surveys act as guidelines which is significant in dental education at the Fiji School of Medicine.
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Appendix 1

A STUDY OF THE USE OF DENTAL SERVICES IN FIJI

DEMOGRAPHIC DATA
1. Address ____________________________
2. Age ________________________________
3. Sex [ ] Female [ ] Male
4. Occupation ________________________
5. Race [ ] Fijian [ ] Indian
6. Highest level of education
   [ ] None
   [ ] Primary school
   [ ] Secondary school
   [ ] Tertiary school
7. What is your family (you and your spouse) annual salary?
   [ ] < $3,000
   [ ] $3,000 - $6,000
   [ ] $6,000 - $12,000
   [ ] $12,000 - $20,000
   [ ] > $20,000

SERVICE UTILISATION
8. Where do you go for dental treatment?
   [ ] Private practice
   [ ] Public hospital
   [ ] Health centre
   [ ] Both public and private practice
9. How often do you visit the dentist?
   [ ] Never
   [ ] Once a year
   [ ] Twice a year
   [ ] More than twice a year
   [ ] Only when you have a dental problem
10. Did you visit the dentist?
    [ ] Within the last 6 months
     [ ] Within the last 12 months
     [ ] Within the last 2 years
     [ ] More than 2 years
11. The last dental visit was for
    [ ] Toothache
    [ ] Gum problem
    [ ] Check-up
    [ ] Extraction (pull out your tooth)
    [ ] Dentures
    [ ] Other
12. What is the main reason for not obtaining dental care within the last 12 months?
   [ ] Nothing wrong
   [ ] Afraid of dentist
   [ ] Can't afford
   [ ] Was too busy
   [ ] No service available
   [ ] Have no teeth/false teeth
   [ ] Other

13. Are you paying for your own dental fees?
   [ ] Yes
   [ ] No

14. The dental fees are
   [ ] alright (can afford it)
   [ ] cheap
   [ ] cost too much

15. How do you travel to the dentist?
   [ ] Walk
   [ ] Bus
   [ ] Car
   [ ] Other

ATTITUDE AND BEHAVIOUR
16. How often do you brush your teeth?
   [ ] Not at all
   [ ] Once a day
   [ ] Twice a day
   [ ] More than twice a day

17. Do you use fluoride toothpaste?
   [ ] Yes
   [ ] No

18. Do you think you need dental treatment?
   [ ] Yes
   [ ] No

19. If yes then what treatment do you think you need?
   [ ] Extraction (pull out your tooth)
   [ ] Clean up your teeth / polishing
   [ ] Fillings
   [ ] Advise
   [ ] Dentures
   [ ] Other

20. When faced with a dental problem, do you go for dental treatment---
   [ ] At the same time
   [ ] Few days later
   [ ] When you cannot bear the pain

21. Have you avoided going to the dentist in the past because of fear and anxiety?
   [ ] Yes
   [ ] No

22. How confident are you at present, if you could go to a dentist for dental treatment?
   [ ] Very unsure
   [ ] Unsure
   [ ] Confident
   [ ] Very confident
23. Where and from whom did you learn to care for your teeth?
   [ ] Friends and relatives
   [ ] Newspapers/ Magazines/ Pamphlets
   [ ] Medical doctor
   [ ] Advertisements
   [ ] TV/Radio
   [ ] Dentist and other dental personnel
   [ ] At home
   [ ] Other

24. Where and from whom would you like to learn how to care for your teeth?
   [ ] Friends and relatives
   [ ] Newspapers/Magazines/Pamphlets
   [ ] Medical doctor
   [ ] Advertisements
   [ ] TV/Radio
   [ ] Dentist and other dental personnel
   [ ] At home
   [ ] Other

25. How satisfied are you with the appearance of your natural teeth?
   [ ] Very satisfied
   [ ] Fairly satisfied
   [ ] Satisfied
   [ ] Not satisfied
   [ ] Very satisfied

25. What are your general comments on the dental services?

__________________________________________________________________________

__________________________________________________________________________

26. Have you any suggestion(s) on how it can be improved?

__________________________________________________________________________

__________________________________________________________________________

Thank-you for your co-operation
PUBLIC HOSPITALS & DISPENSARIES ORDINANCE
(Chapter 90)
PUBLIC HOSPITALS & DISPENSARIES
(AMENDMENT) REGULATIONS, 1961
(Regulation 20 (3) )

Second Schedule

CERTIFICATE OF EXEMPTION FROM
PAYMENT OF CHARGES

This is to certify that ........................................

(s/o. ........................................) is exempt from the payment of
charges in respect of treatment at a general out-patient clinic or in a
public ward of a public hospital for a period of 12 months from
the ....................... day of ...................... 19........

Dated this ....................... day of ...................... 19........

...........................
District Officer, or his Authorized Representative