



सत्यमेव जयते

WORLD OF WORK SERIES : 24

CAREERS IN PARA-MEDICAL OCCUPATIONS

CAREER STUDY CENTRE,
CENTRAL INSTITUTE FOR RESEARCH & TRAINING
IN EMPLOYMENT SERVICE (D. G. E. & T.),
MINISTRY OF LABOUR, GOVERNMENT OF INDIA,
PUSA, NEW DELHI-110 012.





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CONTENTS

	PAGE No.
1. The Pharmacist	1
2. The Physiotherapist	5
3. The Sanitary Inspector	8
4. The Nurse	10
5. The Vaccinator/Multipurpose Health Worker	15
6. The Laboratory Technician/Radiographer	17
7. The Dental Auxiliary	21
 Appendix A. List of Colleges/Institutions Offering Degree/Diploma Courses in Pharmacy.	 24
Appendix B. List of Colleges/Institutions Offering Degree/Diploma Courses in Physiotherapy.	26
Appendix C. List of Colleges/Institutions Offering Sanitary Ins- pector's Training Courses.	27
Appendix D. List of Nursing Colleges Offering B.Sc. (Nursing) Degree Courses	29
Appendix E. List of Institution Offering Medical Laboratory Technician and Radiographer Diploma/Certificate Courses.	30
Appendix F. List of Dental Hygiene/Dental Mechanic Colleges Offering Certificate Courses.	32

INTRODUCTION

Health is the right of all people and not the privilege of a few. Everybody wants to live free from diseases and have good health. Doctors and Medical Technicians play a vital role in keeping the people healthy. Those who aspire a career in para-medical discipline should have an aptitude to study physics, chemistry and biology. Para-medical courses are available in hospitals, institutions, polytechnics and colleges. The educational qualification for these courses except for Physiotherapy and Nursing is pass in Matriculation or equivalent. It is 10+2 or equivalent for Physiotherapy and Nursing courses. Admission notices are published in leading news papers generally one to two months before the results of the qualifying examinations are announced. Admission is generally based on the merit depending upon the percentage of the marks obtained in the last qualifying examination or in the entrance examination. The minimum age limit is generally 16 years. Job description, openings, prospects for advancement, salaries and employment out-look in respect of some of the important para-medical occupations are given in the present publication. The similar information in regard to M.B.B.S., B.D.S., Ayurvedic and Homoeopathic courses have been provided in our other publication "Careers in Medicine & Allied Field". Details regarding Admission to M.B.B.S. are available in our another publication "Admission to M.B.B.S. at a Glance".

THE PHARMACIST

For centuries diagnosing of disease and preparing and dispensing medicines for its cure were carried out by a single person—the physician. With the expansion and growth of specialised knowledge, these functions are now discharged by three categories of professionals viz., (i) one who diagnoses the disease—the doctor; (ii) one who prepares and dispenses medicine—the pharmacist and (iii) one who administers medicines to patient the nurse.

Pharmacy as a profession is as old as the medical profession. A registered pharmacist today is an important link between the patient and his doctor. He must, observe high ethical standards particularly so, because he is legally entrusted with the storage and distribution of dangerous or habit forming drugs, and dispensing medicines.

Functions of a Pharmacist :

A pharmacist's job is to prepare, mix compound and/or dispense drugs and medicines e.g. ointments, powders, pills, tablets, and injections on the basis of the prescription of a medical practitioner, dentist or veterinarian. He is also required to explain to the patient the mode of taking medicines and precautions to be observed while using medicines. In a hospital pharmacy, he may be required to develop, prepare special formulation, normally not available in the market and to render requisite information to the medical profession about drugs and their formulation, their contra-indications, incompatibility etc. He may be required to administer medicine by injection, provide first aid in emergency cases. He is acquainted with all legal requirements for maintaining proper records concerning the profession of pharmacy.

In a retail Pharmacy (drug store) he has to perform varied duties; buying and selling drugs and related items; inventory control and rejection of drugs whose shelf life has expired. Graduate pharmacists may manufacture medicines and analyse them for purity and strength.

As a drug inspector or government Analyst a pharmacist has to make sure that the drugs of standard quality are only manufactured and sold. As a medical representative he is to keep medical profession informed about the introduction of new drugs and their formulations. Other jobs of pharmacist include teaching and research.

Qualification :

A diploma in pharmacy is a statutory requirement for becoming a qualified pharmacist. The duration of the course is two years and the minimum qualifications prescribed for admission to the course is a pass in the 10th class of 10+2 examination or matriculation with chemistry, physics and mathematics or any other equivalent examination accepted by the Pharmacy Council of India. The diploma course consists of three parts namely Part-I, Part-IIA and Part-IIB. Part-I and Part-IIA of one year duration each. Part-IIB consists of practical training. The duration of diploma courses is one year for candidates who have passed Intermediate examination, First Year of three year degree course in B.Sc. or 10+2 examination in Science or any other examination, accepted by the Pharmacy Council of India. The age limit is 15—25 years.

The State Directorates of Technical Education have set up teaching institutions providing courses of study in pharmacy in accordance with the "Educational Regulations" of the Pharmacy Council of India. At present there are nearly 200 institutions in the country which offer diploma in pharmacy, besides 41 institutions which offer degree and 20 institutions which impart post-graduate courses in Pharmacy. The list of the institutions offering diploma/degree courses in pharmacy and other details regarding admission requirements, tuition fee, etc. are given in our publication 'Admission to Para-Medical Courses'.

The duration of the first degree course in pharmacy (B.Pharm.) is four years after 10+2 or equivalent examination. The courses are conducted by Universities or Colleges affiliated to Universities.

Students after getting degree in Pharmacy have to undergo 1½ years practical training in pharmaceutical industry before they are approved by the drug control authority of the State concerned as qualified persons for manufacturing drugs. The Drug & Cosmetics Act, however, provides that the students of B.Pharm. may complete six months training during B.Pharm. course and may undergo practical training for one year only after completion of B.Pharm. degree to become a qualified person for manufacturing of drugs. The students under-going practical training in industry after completion of B.Pharm. usually get stipend varying from Rs. 600 to Rs. 800 per month. However, under Apprenticeship

Act, a stipend of Rs. 450 per month is provided. Institutions conducting degree/diploma courses in Pharmacy are given at appendix-A.

Master's degree in pharmacy (M. Pharm.) is of two years duration after B.Pharm. degree. Recently it has been decided to reduce the period to 1½ years. (3 semester course) for M.Pharm. degree. Opportunities for post-graduate research in pharmaceutical sciences leading to the award of Ph.D. degree are also available at a number of Indian Universities.

Openings :

The pharmacists can find employment in hospitals, dispensaries, nursing homes, drug manufacturing houses and research laboratories both in public and private sectors. Drug Control Administration and Armed Forces also offer a wide range of opportunities to pharmacists. Pharmaceutical technologists (M.Pharm. or Ph.D.) are normally assigned research work in develop new drugs and production of drugs in the pharmaceutical industry. Such pharmacists are also posted as teachers in pharmacy educational institutions and as Lecturer/Asst. Professor in Pharmacy College.

Entry into the profession is generally through interview by manufacturing concerns, research laboratories, hospitals and dispensaries, etc. Quite often, these vacancies are notified to Employment Exchanges. Higher posts under State and Central Governments are filled through the respective Public Service Commissions. In private sector, the recruitment is generally done through press advertisement.

Prospects of Promotion :

Promotion to senior and better paid posts usually depends on technical qualifications and experience. The Pharmacist who has obtained requisite qualifications and experience can go up to the position of Chief Hospital Pharmacist. In drug control administration an Inspector is promoted to the post of Analyst or even as Drug Controller. In teaching and research the chances of promotion to senior positions also exist.

Salary :

Salaries of the pharmacists vary from State to State. A diploma holder pharmacist is generally posted in the pay scale of Rs. 1350—2200. Some public sector undertakings and private

industrial concerns offer better pay scales. Degree holders (B.Pharm.) in drug control administration are generally posted in the pay scale of Rs. 2000—3500 with other allowances and as a medical representative one can earn Rs. 1500 to 2000 per month.

Self-Employment Opportunities :

Persons possessing a diploma or degree in pharmacy, after registering with the State Pharmacy Council, can set up their own pharmacy or chemists and druggist's shop to shop and sell medicines and dispense them. It is estimated that for opening a modest retail pharmacy, drugs store, chemist's and druggist's shop an expenditure of Rs. 50,000 to 1,00,000 is needed. Financial assistance is available from Nationalised Banks for setting up their own venture.

Employment Outlook :

Pharmaceutical Industry in India has shown phenomenal growth. In any scheme of National Health Service a trained pharmacist has an important role to play. There is a need for increasing the intake capacity in the existing training pharmaceutical institutions as well as to open more training institutions so as to produce qualified and trained pharmacists in good numbers to work in Hospitals/Clinics and dispensaries.

With the expansion of medical facilities in rural areas, enforcement of the provisions of the Drugs and Pharmacy Acts and growing demand of the drug and pharmaceutical industry, drug control administration, research laboratories and pharmacy colleges, etc. the prospects of employment for trained pharmacists are becoming brighter day by day.

THE PHYSIOTHERAPIST

The skill of managing joints not bone problems by physical means has been known to the human race for centuries. After the IInd World War, Physiotherapy emerged as an important aspect of medical services, as it helps the injured and disabled to overcome the loss of function.

The Physiotherapy is a science that deals with the management of various conditions of neuro-musculoskeletal system and other systems of the human body by physical means. The physical agents utilised are Heat, Cold, Water, Sound, Radiations, Electricity and exercise, both manual and mechanical. The Physiotherapy is an adjunct to medical/surgical science and is one of the most important and popular paramedical profession.

The physiotherapy deals with the preventive, curative and restorative means to provide normal or alternative function of various systems of the body. The inborn deformities of limbs and trunk, or such permanent disabling deformities, can be fully corrected or functionally and cosmetically improved by physiotherapy alongwith various surgical procedures. The permanently disabled is trained to make best use of the able potentials in him/her to live an active, independent life. The physiotherapy plays an important role in training sportsmen and in the management of sports injuries. The physiotherapy also deals with preventive and remedial aspects of the elderly disabled.

Functions of a Physiotherapist :

A physiotherapist deals with the conditions of fractures, stiffness, joint pains, muscular weakness and paralysis, inborn and acquired deformities, amputations, heart, chest, skin, and gynaecological conditions etc. The physiotherapist attends to patients in a busy out-patient department and in the wards. Besides functional restoration of movements, the physiotherapist is always a source of inspiration to the patient as he helps the severely disabled to maintain their mental status.

Qualification :

A number of physiotherapy schools spread all over India are conducting Diploma/Degree courses in Physiotherapy. These courses are of 2 to 3½ years duration including internship.

Those who have completed 17 years of age and have passed senior secondary education school examination (10+2) of Central Board of Secondary or its equivalent with English, Physics, Chemistry and Biology as main subjects are eligible for admission to Physiotherapy courses. Candidates are selected for admissions to the Diploma/Degree courses on the basis of marks secured by them in the senior secondary examination or written entrance test as applicable. The course starts from June-July every year. A stipend of Rs. 100 per month is paid to the candidates admitted to Diploma in Physiotherapy.

Institutions conducting Degree/Diploma courses in Physiotherapy are given at Appendix B.

Post-graduation in physiotherapy of two years duration is available at Bombay University only. Admission requirement to the course is B.Sc. Physiotherapy or its equivalent. Post-Graduate certificate in Rehabilitation of three months duration and Post-graduate Diploma in Rehabilitation of one year duration are available at All India Institute of Physical Medicine and Rehabilitation, Haji Ali Park, Mahalaxmi, Bombay.

Information about these courses and the dates of their commencement is published in leading newspapers. Full details regarding admission requirements, fees etc. may be obtained from the concerned Institution.

Openings :

Qualified physiotherapists are employed in Physiotherapy Departments of various hospitals. Besides, big hospitals and medical colleges most of the State Governments have physiotherapy departments at district level hospitals. Considering the growing rate of disabling diseases and injuries, the increasing requirement of physiotherapists need not be emphasized. The physiotherapists who possess good academic qualification may opt for teaching.

Prospects of Promotion :

With experience, a physiotherapist may be promoted to the rank of Senior Physiotherapist and Superintendent.

Salaries :

The scales of pay as per recommendations of the Fourth Pay Commission for the Physiotherapists in the Central Government service are as :—

Physiotherapist	Rs. 1400—40—1800—50—2300
Sr. Physiotherapist	Rs. 2000—75—2600—75—3200
Superintendent	Rs. 2375—75—3200—100—3500

Self-Employment Opportunities :

Physiotherapists can also establish a Private Clinic and earn enough for good living. The trained and qualified physiotherapists can procure loan from the nationalised banks to set up such clinics. The leading companies manufacturing Electro and Exercise Therapy equipments also provide loan facilities for setting up such clinics.

Employment Outlook

The ideal ratio of physiotherapists to the population is one Physiotherapist to every 10,000* people. It means that our country with the population of 700 million needs 70,000 physiotherapists. At present there are about 3000 qualified physiotherapists. Thus job opportunities for this profession are very promising.

THE SANITARY INSPECTOR

A Sanitary Inspector has an important place among the health staff. He is a link between the para medical team deployed to protect public health in urban and rural areas. Since independence more attention has been given to sanitation and cleanliness for which the Sanitary Inspector is responsible.

Function :

The Sanitary Inspector makes efforts to see that no disease breaks out in his area. This is done by removing all possible sources which breed germs spreading disease. A Sanitary Inspector is responsible for the maintenance of cleanliness of roads, drains and proper disposal of waste material and excreta. For this he utilizes the services of the staff engaged by the Municipality or Corporation. He keeps a watch on the occurrence of infectious diseases in the area and reports to the superior officers and takes measures to control the spread of such diseases. He ensures that proper sanitary conditions are maintained in the food establishments and eating houses as prescribed by law.

If authorised by the Government, he takes samples of suspected adulterated or sub-standard food stuff and sends them for analysis in a Public Health Laboratory. He periodically examines the sources of drinking water to ensure purity and takes measures for their disinfection whenever necessary.

He also verifies the births and deaths occurring within his jurisdiction for accurate recording of vital statistics. While performing his duties he establishes rapport with the people of the locality for educating them to create health consciousness and persuade them to lead a hygienic way of life.

Qualification :

One has to undergo training in a recognised Institute. Matriculates with science below 25 years of age are eligible for admission to the course. The duration of the courses vary from one to two years. Institutions conducting training courses are given at Appendix 'C'. In addition, study visits to various institutions are arranged to let them gain practical experience.

Further Training :

Specialisation can be had in various fields e.g. Anti-Malarial Work, Food Inspection, Rural Sanitation, B.C.G. Vaccination,

Family Planning, Vital Statistics, etc. The Gandhigram Rural Institute, Madurai, Tamil Nadu is conducting Sanitary Science course for sponsored candidates. The duration of the course is one year.

Openings :

Sanitary Inspectors are employed by local bodies such as Municipal Committees, Corporations, Cantonment Boards, District Boards; State Health Departments; Railways; Community Projects, Factories, Industrial Concerns and Airports.

Entry :

One can enter the job in response to the newspaper advertisements. Sanitary Inspectors are also recruited through employment exchanges.

Prospects of Promotion :

A Sanitary Inspector can rise to the post of Chief Sanitary Inspector or Sanitary Superintendent. There is a provision for special pay for special assignments.

Salaries :

Under the Central Government Undertakings, Sanitary Inspectors get the pay scale of Rs. 1320—2040 with usual allowances. However, pay scales differ from State to State.

Employment Outlook :

Public Health activities are receiving great attention in the country. Emphasis is laid on prevention rather than curing the diseases. Anti-malarial steps and virtual non-existence of cholera are largely due to sanitation drive launched.

A qualified Sanitary Inspector with knowledge of all aspects of public health activities is assured of a job. At present, qualified persons in this field, are not easily available. Hence, good job opportunities exist in this field.

THE NURSE

Nursing is as old as the universe itself. "The nurse works so that others may live." Nursing is a people oriented profession for those who can accept responsibility and respond creatively to the challenge of helping people to cope with their daily acts of living on their road to recovery. Around 3000 B.C. patients were cared for at the temples but gradually nursing went through many phases. During the early Christian era, it was considered as a religious duty as it was believed that "service to the fellow-men was service to God." With the passage of time nursing has become Institutionalised.

Nursing is a career with a prospective future for young women (and for men in lesser number) who enjoy working and helping other men. As members of the modern health team, nurses fulfil the role of caring for the sick with the aim of restoring the sick to health or when this is not possible to help them to live with some disability meaningfully. In addition, nurses teach and help people to prevent illness, promote health, prevent disability and rehabilitate the disabled. Thus the nurse is a teacher, a guide, a counsellor, a friend, a philosopher.

Functions of a Nurse :

She is to give bed side care in cases of illness, assist physician in examination and operation of patient and perform other nursing tasks. She maintains record of patient's treatment, dresses wounds and renders first-aid. She observes and reports to physician or surgeon the mental, physical and emotional condition of the patient. She prepares patient for examination or operation and helps to maintain healthy and hygienic environment for patient and takes preventive measures to check spread of communicable disease in ward.

She works under the supervision and guidance of the Ward Sister/Sister on the wards outdoor deptt. (in the clinics). She is the custodian of the equipment. She supplies linen, appliances (in the speciality department) costly/sophisticated equipment in the operation room. She has to account for loss, breakage, theft of goods, under her charge. In addition, she is expected to keep the patient, her unit, the ward environment safe and hygienic with the help of the house-keeping domestic staff.

Qualification :

There are three types of Nursing Programmes to prepare basic Nurses :—

I. B.Sc. (Nursing) Degree :

The main purpose of the under-graduate degree in Nursing is to provide an educational programme through which the graduates are prepared to assume responsibility in the primary, secondary and tertiary/level of health care of people as professional nurses. It is expected that graduates capable of teaching and supervising appropriate Nursing and health care in different settings and participate in the administration of Nursing Service and education.

Admission Requirements :

The minimum age for admission is 17 years. The minimum educational qualification is Higher Secondary School Certificate Examination (12 year Course), Senior School Certificate Examination (10+2), Pre-Degree examination (10+2) or any equivalent with 12 years Schooling with Biology, Physical Sciences and English. Duration of the Course is four years. Every year there is a University examination. Institutions conducting degree courses in Nursing are given at Appendix D.

II. General Nursing & Midwifery Course :

The purpose of the General Nursing programme is to prepare General Nurse who functions as member of the Health Team to hold first level positions in both hospital and Community.

The programme is geared to the Health needs of the Country; the Community and the individuals in society. It serves as a basis for advanced study and specialization in Nursing. This programme assists nurses in their personal and professional development.

Admission Requirements :

1. Age for entrance is between 17 years to 32 years. For Auxillary Nurse Midwife/Lady Health Visitor age is relaxable upto 35 years, provided they meet the minimum educational requirements i.e. 12 years of schooling.

2. Admission requirement is 12th class or its equivalent preferably with Science subjects. Duration of the course is 3½ years. Every year there is an Examination conducted by the council.

Admission is made to probationer Nurses' Course in the Schools of Nursing in Armed Forces Hospitals located all over the country. The minimum qualification is XII class (10+2) or equivalent examination with 40% marks. The minimum age is 17 years. Selection is made on the basis of written objective type examination in General Intelligence, English and knowledge of Biology. Further details can be obtained from Director General, Armed Forces Medical Services, (DGMHS) Ministry of Defence, New Delhi-110011. Stipend of Rs. 500/- per month is paid to all General Nursing Students for the entire training period.

Opportunities for Higher Education after General Nursing :

A post Basic B.Sc./Nursing course of two years duration is available for persons who have completed General Nursing course.

Specialisation can be done in Nursing Administration and Nursing Education, Psychiatric Nursing, Paediatric Nursing, Orthopaedic Nursing, Public Health Nursing. Duration of these courses vary from 10 to 12 months.

Post-Graduation in Nursing :

Post-graduation in Nursing is of two years duration and is open to those who had done B.Sc. (Nursing) and have 2 years teaching experience. These courses are available at R.A.K. College of Nursing New Delhi; College of Nursing, Vellore and L. T. College of Nursing, Bombay. M. Phil in Nursing of one year duration is available at some Universities/Colleges. It is open to post-graduates in Nursing.

III. Auxiliary Nurse/Midwife/Health Workers (Female) :

ANM/Health Worker (Female) are prepared to work among the rural areas to look after their health needs and particularly of mothers and children.

Entrance Requirements :

The minimum age for admission is 16 years and the upper age limit is 35 years.

The minimum educational requirement for admission is 10th class of the Central Board of Secondary Education or an equivalent examination. Duration of the course is 1½ years 3 semesters.

Openings :

Job Opportunities for ANM/HW(F) exist in Municipalities, Community projects and Health Centres. Some industrial concerns and factories also employ Industrial Nurses. The Rail-

ways, Central Government Health Scheme, Employees State Insurance Corporation recruit nurses for maternity and child welfare (including school health) and family planning work. Big hospitals and maternity homes employ General Nurses. Openings also exist in Armed Forces.

Entry into the profession is by advertisement in newspapers or by Notification to Employment Exchanges.

- (a) 30 Candidates every year are selected after written test and interview for training at the Nursing College Wing of Armed Forces Medical College, Pune. The duration of the course is 4 years. The minimum qualification for admission is Senior Secondary School certificate or equivalent with 50% marks in physics, chemistry and biology in Medical group. Candidates are given stipend during training besides free training, accommodation, messing, laundry and also free servants. On completing the course, the students are granted permanent commission in the Military Nursing service in the rank of Lieutenant.
- (b) Un-married civilian Nurses possessing State Registration certificates for general Nursing and Midwifery are granted Temporary commission in the MNS for an initial period of one year. The age limit is 21—35 years.
- (c) Married nurses within the age group of 21—35 years are granted temporary commission in MNS (L) for an initial period of one year. These officers are not transferable.
- (d) MNS (Regular);—Un-married civilian nurses possessing State Registration certificates for general Nursing and Midwifery are granted permanent commission in the Military Service. The age limit is 20—35 years.

Prospects of Promotion :

Experienced candidates with additional qualifications in Nursing can rise to the post of teachers & Administrators in Nursing School service agencies and to supervisory posts in the health services.

Salaries :

salaries vary from State to State. Generally a nurse starts with a pay scale of Rs. 1400-2300. In addition to pay she is entitled to uniform and washing allowance. They are also entitled for nursing allowance @ Rs. 350 per month depending upon the post held.

Self-Employment opportunities :

Qualified Nurses and Health Visitors can attend to domiciliary deliveries. They can set up their practice in big towns, urban, semiurban and industrial areas. They may also find work on part time or daily wages in homes as private nurses to assist sick and physically handicapped persons.

Employment outlook :

As per the recommendations of Central Council of Health and the Indian Nursing Council (I.N.C.), the Central Government is staffing at present in its hospitals at Delhi at 1:3 nurse-patient ratio. Many State Governments too have been working according to almost similar yardstick in a phased manner and thereby additional posts for nurses are being created. Previously the Nurse-patient ratio in the States was 1:5. Thus, more employment opportunities for nurses are being created in the country. If the private clinics have to be compulsorily registered, it will provide further scope for employment of trained nurses.

The country needs more community nurses to serve illiterate/poverty stricken, economically backward masses in the rural areas. At present, one A.N.M. covers upto 10,000 population. With advances in Medical Science and technology highly sophisticated equipment have been invented to investigate and treat the patient. More nursing specialities have come up in the past two decades like Neuro-Nursing, Psychiatric, Paediatric, Operation room, Eye, ENT, Orthopaedic, Industrial, Obstetrics, Intensive Care and Coronary Care, etc. This all provides a bright future to those who desire to take up this profession.

THE VACCINATOR/MULTI PURPOSE HEALTH WORKER

In our country, there are many diseases which can be prevented by vaccination.

Functions of a Vaccinator :

A vaccinator's work is to give vaccine to human beings specifically to protect children against diseases. Some of these diseases are tuberculosis, diphtheria, whooping cough, tetanus, poliomyelitis, measles, typhoid, etc.

A vaccinator not only works at a fixed vaccination centre but has also to visit private houses, schools, hostels, boarding houses in urban and rural areas. He carries his equipment and the vaccine with him. He gives appropriate directions to the vaccinated persons on after care. This he does either through follow-up visits or by asking the vaccinated persons to come to him. The current policy of the Health Department is to employ Multipurpose worker (MPW) (male or female) to do all the health and family welfare activities in the community, including vaccination.

Records are prepared and statements of daily work are submitted to the officers. In addition, birth and death registers are also maintained by vaccinator/MPW. The unprotected children are checked and recorded in a register during the field visits and subsequently the children are followed up and vaccinated. Other minor duties relating to public health administration are also carried out.

A vaccinator is a field worker and his working hours are from morning till evening. The work is generally light, except during epidemics.

Qualification :

Vaccinator's training can be had at a specified Institute or at a district hospital. Training programmes are adjusted according to local needs for vaccinators. Training is imparted at vaccine Institutes or at the district level Government Hospitals according to the local needs. The duration of training ranges from six months to one year. The minimum qualification for entrance to the vaccinator's training courses is a pass in Matriculation/High school examination. However, the basic educational qualification varies from State to State. This occupation is open to both, men

and women can become vaccinators. In some States, Health Assistants or Inspectors are also deployed as vaccinators.

The training includes instructions on hygiene, techniques and methods of vaccination and re-vaccination, after care of vaccinated persons, the storage and use of various types of vaccines and the instruments used by a vaccinator and sterilisation. Practical training is also given in the field.

For B.C.G. vaccination special training courses of six months duration are conducted by the State B.C.G. Organisations. Matriculates are eligible for this course.

Openings :

Vaccinators/Multipurpose Workers are usually employed by the State Health Departments, Municipal Committees, Corporations, Cantonment Boards and District Boards, etc. Vaccinators are also needed for mass vaccinations at the time of festivals and melas.

Entry into the profession is by getting the name registered with the Employment Exchange. Sometimes applications are also invited by State Directorates of Health Services through newspaper advertisements.

Prospects of Promotion :

A Vaccinator/Multipurpose Worker may rise to the position of a Health Inspector. For higher para-medical posts like Sanitary Inspector, para medical assistant etc., he may have to undergo special training.

Salaries :

The existing scale of pay of vaccinator in the Central Health Department is Rs. 950—1500 plus usual allowances per month. However, the scale varies from State to State.

Employment Outlook :

Public Health has been receiving adequate attention under the successive Five Year Plans. Programmes for controlling diseases like tuberculosis, diphtheria, whooping cough, tetanus, poliomyelitis, measles, etc. through mass inoculation are also launched. Emphasis is being laid on large scale immunisation against these diseases. For this large number of vaccinators/MPWs will be required.

LABORATORY TECHNICIANS AND RADIOGRAPHERS

A group of para-medical occupations such as nurses, laboratory technicians, radiographers, X-ray technicians etc., is auxiliary to medical profession. They help in the diagnosis and prevention of diseases and in the restoration and maintenance of health. These occupations are suitable both for men and women.

Functions of a Laboratory Technician :

A Laboratory Technician's job is to perform medical tests in a hospital or clinical laboratory to assist a physician, surgeon or a medical specialist in the diagnosis, treatment or prevention of diseases. He has to set and operate various instruments and other equipment in a clinical laboratory for conducting a pathological, bacteriological and other routine tests on specimen of blood, urine, sputum, etc to determine their chemical composition and the extent of variation from normal healthy specimens.

They are also required to work as E.C.G. operators and in handling anaesthesia equipment in operation theatres. As a matter of fact they are required in the department of anatomy physiology, pharmacology, P&SM, cardiology, neurology, in addition to Bio-chemistry, pathology and microbiology.

A Laboratory Technician is required to do various jobs in different departments such as Biochemistry (for chemical analysis of specimens of blood, stomach contents etc.) Histology (for microscopic examination of human organic tissues), Bacteriology (for examination of blood, stool, sputum, to diagnose microbial/bacterial diseases), Haematology (examination of blood, tissues), and Clinical Pathology (for examination of faeces and urine).

Functions of a Radiographer :

A Radiographer's job is to operate X-ray equipment and take radiographs of various parts of human body as prescribed by the physician or surgeon. He also gives radio-therapeutic treatment to patients for various ailments under the direct supervision of a radio-therapist.

In the radiotherapy department, his work is of two kinds; one involving radiotherapeutic treatment of the skin and other

involving treatment of parts below the skin. At times, a Radiographer has to assist the radio-therapist in preparing radium-charged needles for use in special surgical operations and in other types of therapeutical treatments.

In big hospitals X-ray technicians are also employed as dark room assistants for loading films, and developing and washing the exposed films. However, in small hospitals all this work is done by the radiographer himself.

Qualification :

(a) Laboratory Technician :

One has to complete course in medical laboratory technology. The training can be completed by undergoing (a) on the job training (mostly stipendiary) in a district hospital, (b) a certificate course from an institution, or (c) a diploma course in medical technology from a polytechnic including women's polytechnics and medical institutions. The courses are usually of one to two year's duration in respect of on-the-job training and certificate courses. The duration is two years in case of diploma courses. The minimum qualification for admission to on-the-job training or certificate course is 10th class of 10+2 examination or matriculation with science. For diploma course, the minimum qualification is a pass in 12th class or senior secondary or pre-university certificate with science. Age limits vary between 16 and 35 years, but many institutions have no age restrictions.

A few institutions/hospitals, however, admit science graduates. Many institutions also prescribe certain percentage of secured marks in the qualifying examination as the minimum eligibility condition. A certificate of physical fitness from a registered medical practitioner is also required. In some institutions previous experience in laboratory techniques is insisted upon as an essential condition.

Radiographer :

One has to complete a one-year course in radiography. Radiographers are trained in a similar way, as the Medical Laboratory Technicians, viz., through (a) on-the-job training in a hospital, (b) a certificate course from a medical college, or (c) a diploma course from a institution/medical college. There are 20 recognised training centres imparting certificate and diploma courses in Radiography.

The minimum qualifications for admission is matriculation or 10th Class of 10+2 examination with science for on-the-job training and certificate courses, and senior secondary school certi-

ficate (with science subjects) for diploma courses. For the post of Dark Room Assistant and Radiological Assistant, the courses are of six month's duration. The minimum age of admission to the courses is 16 years. Institutions conducting the medical laboratory technician and radiographer's course are Guntur Medical College, Guntur; Institute of Medical Science, Hyderabad; Kurnool Medical College, Kurnool; Assam Medical College, Dibrugarh; Holy Family Hospital, New Delhi; Lok Nayak Jai Prakash Narayan Hospital, New Delhi; Medical College, Baroda; Medical College, Trivandrum; Ratlam Mission Hospital, Ratlam; Stanely Medical College, Madras; B. J. Medical College, Pune; Grant Medical College, Bombay; Holosworth Memorial Hospital, Mysore; K. R. Hospital, Mysore; Ramchandra Bhargo Medical College, Cuttack; Christian Medical College, Ludhiana; Vidya Bhawan Rural Institute, Udaipur; Medical College, Agra; Clara Swain Hospital, Bareilly; State Medical Faculty, Sada Lucknow; and Institute of Post-Graduates Medical Education, Research, Calcutta. Details are given at appendix E.

Openings :

Medical Laboratory Technicians find employment in laboratories attached to hospitals, nursing homes, medical research institutions, clinics, industrial medical establishments, Public Health organisations, pharmaceutical concerns, and with physicians practising independently. The largest number of such technicians find employment in civilian and defence medical institutions controlled by the Central and State Governments. Private medical organisations and local bodies also employ quite a large number of such technicians.

The Radiographers find employment mostly in X-ray departments of hospitals under the Central and State Governments and private bodies. Opportunities also exist in nursing homes, medical research institutions, clinics and in defence medical establishments.

Entry into the profession is either through direct contact with the employer in response to newspaper advertisements or through employment exchanges. Since facilities for training are not adequate to meet the general demand of trained workers, at times persons without experience are also considered for appointment by medical clinics, laboratories, etc. especially in the private sector. They are later on trained according to needs.

Prospects for Promotion :

A medical technician can rise to the post of technical assistant and technical supervisor after gaining adequate experience in the line.

Salaries :

Salaries of Medical Laboratory technician vary from State to State. Generally, a Medical Laboratory Technician or a Radiographer starts in Government Hospitals on a pay scale of Rs. 1400—2600 plus other allowances.

Employment Outlook :

Prospects for the employment of Medical Laboratory Technicians are good. There is a shortage of qualified and experienced Laboratory Technicians in the country. With the expansion of medical facilities in the rural areas, as well as in the existing hospitals/institutions equipped with laboratories, the scope for their employment has expanded considerably.

Prospects of employment for Radiographers are also quite good, because of the increasing use of X-ray techniques in the medicinal field for diagnosis and for curative treatment of numerous diseases. In fact, radiography and electro-therapy have become important tools in the treatment of diseases like cancer, tumour etc.

THE DENTAL AUXILIARY

A dental disease often leads to diseases in other parts of body and also adversely affects general health. Besides the treatment of dental diseases by private practitioners treatment facilities are also available in the dental department of modern hospitals. A Dental Surgeon, whether in private practice or in a hospital, requires trained auxiliary personnel like doctors in other fields. They are (i) The Dental Mechanic or Dental Technician, and (ii) The Dental Hygienist. Dental Mechanics/Technicians are mostly men; but the carrier of a Dental Hygienist is open to both boys and girls.

These two ancilliary categories do not come in direct contact of the patient. They work under the supervision of the Dentist.

Functions :

A dental mechanic makes or repairs dental appliances and prepares dentures including Inlay, Crown and Bridge work. His work is purely mechanical laboratory work on the instructions of a registered dental surgeon. He has not to attend any chair-side work.

Dental Hygienist :

A dental Hygienist does Oral Prophylaxis, gives instructions in Oral Hygiene & Preventive Dentistry, assists the Dental Surgeon in 'Chair-side' work and manages the office. He/She works under the supervision of the Dental Surgeon.

Qualification :

To become a Dental Mechanic, one has to undergo a regular two year's Certificate Course in a recognised dental institution. Presently there are 12 institutions in India at which, two year's certificate course is available. After passing this course one has to get himself registered with the concerned State Dental Council and obtain a registration certificate on payment of the prescribed fee. The registration certificate has to be renewed every year on payment of a fee, as envisaged under the Dentists Act 1948.

The Dental Council of India has also accorded approval to Class II & I Dental Mechanic Course, imparted at various Military Dental Centres. The eligibility criteria are :

- (i) a candidate should be at least 15 years of age at the time of admission or within 3 months of it and should be medically fit.
- (ii) a Candidate must have passed at least Matriculation of a recognised Board with science subjects or an equivalent examination.

Dental Hygienist Course :

To qualify as a Dental Hygienist, one has to undergo a regular two year's Certificate Course at a recognised dental institution. Presently, there are 9 institutions ("Appendix F") in India imparting two years certificate course. After passing two years certificate course one has to register himself with the concerned State Dental Council to obtain a registration certificate from State Dental Council, on payment of the prescribed fee. The registration certificate is to be renewed every year on payment of a fee, as envisaged under the Dentists Act, 1948.

The Dental Council of India has also accorded recognition to Dental Hygienist Course, imparted at various Military Dental Centres.

The minimum qualifications for doing this course are:

- (i) a candidate should be at least 15 years of age at the time of admission or within 3 months of it and should be medically fit.
- (ii) a candidate must have passed at least Matriculation Examination of a recognised Board with science subjects or an equivalent examination.

The Dental Council of India has also accorded recognition to the Dental Hygiene course of the Armed Forces Medical College, Pune.

Openings :

Dental mechanics and hygienists are required in dental departments of Dental/Medical Colleges, Dental Research Institutions, Government and Private dental clinics. The largest number of them are employed in dental institutions and Defence Dental establishments.

In Defence Services dental Mechanics are called Dental Technicians. For recruitment, persons need not be trained mechanics. They have to be between 17 and 25 years of age,

and meet the prescribed standards of physical fitness, viz, height 5'1" (156 cms.); weight : 105 lbs. (47.7 kgs.) to 120 lbs. (54.4 Kgs.) and expanded chest : 33" (84-cms.) to 34" (86.4 cms.). The educational standard is pre-matriculation. After recruitment they are first given two years' training as fighting soldiers and another 14 months' training as Dental Mechanics. On successful completion of training, they are posted as Dental Technicians in ranks of sepoy (in the nursing capacity) of the Army Medical Corps.

The conditions for entry in the Army as a Dental Hygienist are the same as in the case of dental technician except that (i) the minimum qualifications for eligibility is matriculation and that (ii) the duration of vocational training is 20 months.

Entry into the profession is by direct contact in the case of private dental practitioners. Recruitment in Govt. hospital is done through newspaper advertisements and Employment Exchange. Recruitment in Defence Services is made through the Recruiting Offices.

Salaries :

The pay scales and other service conditions of Dental Mechanics/Technicians and Hygienists vary from State to State. However, the Dental Council of India has recommended the pay-scale of Rs. 1400—2600 plus usual allowances.

Employment Outlook :

Dental laboratory and surgery work, though comparatively new in our country as compared to medical profession, offers attractive careers to young boys and girls who are interested in dentistry and Dental Hygiene. There are at present 973 dental clinics functioning in the country; including free school dental clinics. It is expected that there will be considerable expansion of dental care facilities all over country in the coming years. This will provide more employment opportunities in this field.

Appendix A

LIST OF COLLEGES/INSTITUTIONS OFFERING DEGREE/DIPLOMA COURSES IN PHARMACY

Sl. No.	Name of College/ Institution
1.	Department of Pharmaceutical Science (JVD College of Science & Technology). Vishakhapatnam-530 003.
2.	University College of Pharmaceutical Science, Warangal-506 009.
3.	Department of Pharmaceutical Science, Dibrugarh-786 004.
4.	Muzaffarpur Institute of Technology, Muzaffarpur-842 003.
5.	Birla Institute of Technology, Mesra, Ranchi-835 215.
6.	Department of Pharmaceutical Science, Chandigarh-160 014.
7.	College of Pharmacy, Pushp Vihar, New Delhi-110 017.
8.	Hamdard College of Pharmacy, Hamdardnagar, New Delhi-110 062.
9.	Goa College of Pharmacy, Panaji-403 001-Goa.
10.	Pharmacy Department (Faculty of Technology & Engineering), Kalabhavan, Baroda-390 001.
11.	Lallubhai Motilal College of Pharmacy, Navarangpura, Ahmedabad-380 009.
12.	A. R. College of Pharmacy & G. H. Patel Institute of Pharmacy, Vallabh Vidyanagar-388 120. Kheda.
13.	B. K. Mody Govt. Pharmacy College Polytechnic Campus, Rajkot-360 003.
14.	Department of Pharmaceutical Science, Hazratbal, Srinagar-190 006.
15.	Government College of Pharmacy, Lalbagh Road, Bangalore-560 027.
16.	HKE Society's College of Pharmacy, Gulbarga-585-105.
17.	Luqman College of Pharmacy, Tewargi Road, Gulbarga-585 102.
18.	S.C.S. College of Pharmacy, Harapanahalli, Bellary-583 131.
19.	Vuikoo Laxmaiah College of Pharmacy, Raichur-584 101.
20.	Nitte Gulabi Shetty Memorial College of Pharmacy, Karkula, Dakshina Kannad-574 110.
21.	J.J.S. Medical College, Davangere-577 004.
22.	Sree Siddaganga College of Pharmacy, Tumkur, Karnataka-572 102
23.	Medical College, Trivandrum-695 011.
24.	Viveswarapura Institute of Pharmaceutical Science, Bangalore-560 004.

Sl. No.	Name of College/Institution
25.	State College of Pharmacy, 25, Park Road, Indore-452 001.
26.	Department of Pharmaceutical Science, Sagar-470 003.
27.	Institute of Pharmacy, Pusad, Yavatmal (Maharashtra).
28.	Department of Chemical Technology, Matunga-Bombay-400 019.
29.	K. M. Kundrani College of Pharmacy, Dr. R. G. Jhadani Marg, Bombay-400 025.
30.	Bombay College of Pharmacy, Santacruz, Bombay-400 098.
31.	Maharashtra College of Pharmacy, Nilanga, Latur (Mah.).
32.	Department of Pharmaceutical Science, Nagpur-440 010.
33.	Nagpur College of Pharmacy, Atne Layout, Nagpur-440 002.
34.	Poona College of Pharmacy, Erandawana, Pune-411 003.
35.	Govt. College of Pharmacy, Karad, Satara-415 110.
36.	C. U. Shah College of Pharmacy, Sir Vithaldas Vidyavihar, Bombay-400 409.
37.	A. L. Ameen College of Pharmacy, Hosur Road, Bangalore-560 027.
38.	Dr. H. L. Themmegowda College of Pharmacy, Chaunapatha, Bangalore-571 501.
39.	Gauttam College of Pharmacy, Mahalakshimpuram, Bangalore-560 086.
40.	M.M.U. College of Pharmacy, Ramanagaram, Bangalore-571 511.
41.	P.E.S. College of Pharmacy, Hanumanthnagar, Bangalore-560 050.
42.	ST. John's College of Pharmacy, Vijaynagar, Bangalore-560 040.
43.	College of Pharmaceutical Science, Berhanpur, Mohuda, Orissa.
44.	Department of Pharmaceutical Science, Chandigarh.
45.	Birla Institute of Technology and Science, Pilani-333 013.
46.	University Institute of Pharmaceutical Technology, Annamalaiagar-608 002.
47.	J.S.S. College of Pharmacy, Elkhill Road, Ootacamund-643 001.
48.	C. L. Baid Metha College of Pharmacy, Jhorapakkam, Madras-600 096.
49.	Department of Pharmaceutics, Institute of Technology, Varanasi-221 005.
50.	Department of Pharmacy, (Faculty of Engineering & Technology), Calcutta-700 032.

Appendix B

LIST OF COLLEGES/INSTITUTIONS OFFERING DEGREE/DIPLOMA COURSES IN PHYSIOTHERAPY

Sl. No.	Name of College/Institution
1.	Christian Medical College, Vellore.
2.	Institute for the Physically Handicapped, 4, Vishnu Digamber Marg, New Delhi-110 002.
3.	All India Institute of Medical Sciences, Ansari Nagar. New Delhi-110 029.
4.	Medical College and Hospital, Ajni, Nagpur-440 003.
5.	Occupational Therapy Training School, Sir, D. B. Orthopaedic Centre, Bombay-400 012.
6.	School of Physiotherapy, KEM Hospital, Bombay.
7.	Central Leprosy Teaching & Research Institute, Chingleput.
8.	Catherine Booth Hospital, Nagercoil.
9.	National Institute of Rehab, Training & Research Bairoi, Orissa-754 010.
10.	Govt. Medical College, Baroda.
11.	National Institute of Orthopaedic Handicapped B.T. Road, Bon Hooghly, Calcutta.

Appendix C

LIST OF COLLEGES/INSTITUTIONS OFFERING SANITARY INSPECTOR'S TRAINING COURSES

Sl. No.	Name of College/Institution
1.	Andhra Medical College, Vishakhapatnam.
2.	Guntur Medical College, Guntur.
3.	Institute of Medical Science, Hyderabad.
4.	Rural Health Training Centre, Chabua.
5.	Public Health Institute, Patna.
6.	Rural Health Training Centre, Ahmedabad.
7.	Medical College, Srinagar.
8.	Gandhi Memorial Hospital, Rewa.
9.	Gandhigram Rural Institute, Ambathuria, Madurai.
10.	Christian Medical College, Vellore.
11.	Madras Medical College, Madras.
12.	Madurai Medical College, Madurai.
13.	Stanely Medical College, Madras.
14.	Public Health Institute, Nagpur.
15.	Medical College, Burla.
16.	Birla Medical College, Sambalpur.
17.	Vidya Bhavan Rural Institute, Udaipur.
18.	Provincial Hygiene Institute, Lucknow.
19.	State Medical Faculty, Sada, Lucknow.
20.	All India Institute of Local—Self Government, C. D. Barfiwala Marg, Bombay-400 038.
21.	All India Institute of Local—Self Government, Khanpur, Ahmednagar-380 001.
22.	Local—Self Government, Ahmednagar Municipal Council, Ahmednagar-(MS).
23.	All India Institute of Local—Self Government, Rajmahal Road, Vado-dara-390 001.
24.	Local—Self Govt. Training Centre, Corporation Girls' High School, Bangalore-560 009.
25.	All India Institute of Local—Self Government, Sthanitraj Bhavan, P.N. Road, Belgaum-590 006.

26. All India Institute of Local—Self Govt., Shivaji Nagar, Bhopal-462 006.
27. Municipal Training Institute, Vivekanand Marg, Bhubaneswar-751 014.
28. All India Institute of Local—Self Govt., Din Dayal Upadhaya Marg, New Delhi-110 002.
29. Rajasthan Institute of Local—Self Govt., Tonk Road, Jaipur-302 015.
30. Local—Self Govt. Training, Kolhapur Municipal Corporation, Kolhapur-416 002.
31. Local—Self Govt. Diploma Class, Nasik Municipal Corporation, Nasik Road-422 101.
32. Local—Self Govt. Diploma Class, Shankarshet Street, Pune-411 005.
33. Local—Self Govt. Diploma Centre, Nagar Nigam, Premises, Raipur.
34. Local—Self Govt. Diploma Class, Surat Municipal Corporation, Surat-395 003.

Appendix D

LIST OF NURSING COLLEGES OFFERING B.Sc.
(NURSING) DEGREE COURSES

Sl. No.	Name of College
1.	College of Nursing, King George Hospital Compound, Vishakhapatnam (A.P.).
2.	College of Nursing, Somaji Guda, Raj Bhavan Road, Hyderabad.
3.	College of Nursing, Kurnool-518 002 (A.P.).
4.	Regional College of Nursing, Kamrup, Guwahati.
5.	College of Nursing, P.G.I., Chandigarh-160 012.
6.	College of Nursing, All India Institute of Medical Sciences, Ansari Nagar, New Delhi-110 029.
7.	Rajkumari Amrit Kaur College of Nursing, Andrews Ganj, New Delhi-110 049.
8.	College of Nursing, Asarwa, Ahmedabad-380 016.
9.	College of Nursing, Calicut Medical College, P.O. Calicut-673 008.
10.	College of Nursing, Fort. Bangalore-360 002.
11.	College of Nursing, Kuttlayam.
12.	College of Nursing, Medical College, P.O. Trivandrum-693 011.
13.	College of Nursing, Indore-452 001.
14.	College of Nursing, Bhilai-490 001.
15.	Institute of Nursing Education, Byculla, Bombay-400 008.
16.	Armed Forces Medical College, Sholapur Road, Pune-411 040.
17.	College of Nursing, Wanless Hospital, Miraj Medical Centre, Miraj-416 410.
18.	Leelabai Thackersey College of Nursing, 1-Nathibai Thackersey Road, Bombay-400 020.
19.	College of Nursing, Berhampur, Orissa.
20.	College of Nursing, (Christian Medical College), Ludhiana.
21.	College of Nursing, Jaipur-302 004.
22.	University Department of Nursing, Annamalaiagar-608 002.
23.	College of Nursing, Vellore-632 004.
24.	College of Nursing, SSKM Hospital Campus, Calcutta-700 020.

Appendix E

**LIST OF INSTITUTION OFFERING MEDICAL
LABORATORY TECHNICIAN AND RADIOGRAPHER
DIPLOMA/CERTIFICATE COURSES**

Sl. No.	Name of College/Institution
1.	Andhra Medical College, Vishakhapatnam.
2.	Guntur Medical College, Guntur (Radio).
3.	Kurnool Medical College, Kurnool.
4.	Patna Medical College & Hospital, Patna.
5.	Public Health Institute, Patna.
6.	Holy Family Hospital, New Delhi (Radio).
7.	Lok Nayak Jai Prakash Narayan Hospital, New Delhi (Radio).
8.	Vallabhbhai Patel Chest Institute, Delhi.
9.	Women's Polytechnic, New Delhi.
10.	Medical College, Baroda (Radio).
11.	M. P. Shah Medical College, Jamnagar.
12.	Medical College, Srinagar.
13.	Medical College, Trivandrum (Radio).
14.	Medical College, Calicut.
15.	Women's Polytechnic, Bhopal.
16.	Ratlant Mission Hospital, Ratlam (Radio).
17.	Central Leprosy Teaching & Research Institute, Chingleput.
18.	Stanely Medical College, Madras (Radio).
19.	Medical College, Aurangabad.
20.	Haffkin Institute, Parel, Bombay.
21.	B. J. Medical College, Pune.
22.	Grant Medical College, Bombay (Radio).
23.	Medical College & Hospital, Nagpur (Radio).
24.	Miraj Medical College, Miraj (Radio).
25.	G.T.C.M. Hospital, Kolar.
26.	Holsworth Memorial Hospital, Mysore (Radio).
27.	K. R. Hospital & Krishnarajendra Hospital, Mysore (Radio).
28.	Kasturba Medical College, Manipal.
29.	Ramchandra Bhargo Medical College, Cuttack (Radio).
30.	Philadelphia Hospital, Ambala.
31.	The Dean of Hygiene & Vaccine, Amritsar.
32.	Machbert Hospital, Dhariwal, Distt. Gurudaspur.
33.	Medical College, Rohtak.
34.	Christian Medical College, Ludhiana (Radio).

Sl. No.	Name of College/Institution
35.	Govt. Medical College, Patiala.
36.	Medical College, Amritsar.
37.	Medical College, Agra (Radio).
38.	Clara Sevain Hospital, Bareilly (Radio).
39.	State Medical Faculty, Sada, Lucknow (Radio).
40.	Institute of Post-Graduate Medical Education Research, Calcutta (Radio).

(Radio)—Radiographer

Appendix F
LIST OF DENTAL HYGIENE/DENTAL MECHANIC
COLLEGES OFFERING CERTIFICATE COURSES

Sl. No.	Name of College
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Dental Hygiene

1. Dental College, Bombay.
2. Dental College, Lucknow.
3. Dental College, Trivandrum.
4. Madras Dental College, Madras.
5. Armed Forces Medical College, Pune.

Dental Mechanic

6. Dental College, Lucknow.
7. Dental College, Bangalore.
8. Dental College, Trivandrum.
9. Madras Medical College, Madras.

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