Third Edition

Textbook of Preventive and Community Dentistry

Public Health Dentistry

Joseph John

CBS Publishers & Distributors Pvt Ltd

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Preventive and Community Dentistry

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Foreword by

Dr Mahesh Verma

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Foreword

The problems related to oral health are often overlooked by the community primarily because these are usually not life-threatening conditions. One of the reasons for this attitude towards oral health neglect is the poor representation of dentists to the community and *vice versa.*

Several efforts have been persistently made in India by governing and statutory bodies like the Dental Council of India, Indian Dental Association and particularly the Indian Association of Public Health Dentistry, and several players in the field of dentistry to bridge the chasm between dental service delivery and the community. A peep into the past will remind us of the untiring works of several stalwarts. May I, infact dedicate this ode to Dr. Mohandas Bhat and Mr Orango who have been pioneers with their vision and efforts to start the first department of community dentistry (in 1971) at Government Dental College, Bangalore. I laud the efforts of one and all including Dr. Joseph John who has over the past decade worked relentlessly to set the bar higher and make community and public health dentistry more visible than what it was several decades ago by his contributions including the past edition of the book in context.

The need to emphasize on this specialty right in the formative years of dental graduates is obvious. It has been said, “A journey of thousand miles begins with first step”. This book on public health dentistry does just that is to place the right first step within the protocol of the undergraduate curriculum.

Additionally, the author identifies the fact that the addressal of issues (in dentistry) in our Indian subcontinent requires a different perspective when compared to the rest of the world. This may be attributed to shifting demographic status, evolving economic trends, changing dental services and newer policies attributed to health care. This constant state of flux makes it a herculean task to perform. Yet this task has been carried out flawlessly by the ardent specialty of public health dentistry. May we rightly say this specialty

is the “guardian of dentistry” in all aspects? In truth of the aforementioned statement, it can also be said that this book is the pole star to attain the same effect.

Apart from drafting policies and administering tasks to meet the unmet needs of people, the game changers in this field of public health dentistry are also sharing the onus to align the education in dentistry, in laying down the principles and guidelines of ethics in dentistry, coming up with solutions of insurance and payment policies, defining the legalities of duty, demystifying the enigma of infection control and sterilization policies and much more—primarily to append the existing status of dental research and practice. For the undergraduates, the current edition of this book can be considered an essential elemental documentation, converged in a lucid manner not only nuance of the subject but also cultivate in them a sense of responsibility towards serving the public in a disciplined, assertive and dogmatic manner.

An interesting aspect of this book is that even for those of us who belong to a specialty other than community dentistry (like me) find this book elucidative and enlightening about several issues.

As is said, the ‘loftier the building, the deeper must its foundation be laid’. If we wish to raise dentistry on a still higher pedestal, we need to ensure our future generation is made robust and endowed. This edition does just that it passes the legacy to the younger generation in a simplistic and comprehensive manner and empowers them to put India on a global map in the field of dentistry!

Kudos and read on ...!

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Preface to the Third Edition

It has been a pleasure to work on the third edition of *Textbook of Preventive and Community Dentistry* because it has presented me an opportunity to provide a framework for students to learn the subject and bring into focus some of the newer concepts in preventive dentistry. Much of the materials in several chapters have been completely rewritten or revised by selected contributors from their areas of expertise. In writing the third edition, I have tried hard to be precise while at the same time being reader friendly. The focus of the third edition of this book has not changed from previous editions. I am, therefore, confident that the undergraduate students will find the book useful.

As in the previous edition, the book has been divided into seven sections:

Section A: This part presents fundamental aspects of public health and a historical perspective of history of medicine, public health and its practice with health education. A brief overview of health care delivery system of India is also discussed.

Section B: Broadens understanding of the role of epidemiology, linking it with other core public health disciplines, and highlighting the core diseases in oral health which are of prime importance in the real-world practice of public health.

Section C: Deals with infection control procedures and precautions taken in health care settings to prevent the spread of disease. The transmission of infection in a dental practice is one of the most serious issues the industry can face, which is why it is so important that everyone in the dental office be aware of the most recent protocols to reduce the overall risk.

Section D: This section introduces the core principles of dental public

health, and its application to population-based oral health. Differences in the roles of a private dental practitioner and a dental public health specialist are addressed. The importance of core public health functions, indices, planning of oral health status and payment to dental care is highlighted.

Section E: The caries preventive mechanisms of fluoride, materials and methods for rational use of fluorides for self-care and professional along with minimally invasive procedures are highlighted in this section.

Section F: This section on biostatistics is casual in tone and sometimes a bit demanding where mathematical and statistical tests are introduced. We have made an attempt to simplify statistical methods in the best possible manner.

Section G: The last part of the section sits at the crossroads of health. Social sciences are intimately connected to the health and socioeconomic welfare of individuals, families, and communities. As a result, efforts to improve oral health must consider both the consequences and causes of underlying social, political, cultural and economic factors that affect oral health.

About the Book

The subject of preventive and community dentistry public health dentistry | has become an important component of dental education and training today. Keeping pace with the evolving technologies, and acknowledging the dynamicity of the subject, the third edition of textbook has been conceptualized to make learning easy for undergraduate students. The text has been completely reorganized and edited by experts from around the globe. The entire syllabus is divided into seven sections covering: • Public Health, • Epidemiology, • Infection Control, • Dental Public Health, • Preventive Dentistry, • Health Statistics and • Social Sciences.

Salient Features

- The user-friendly format of presentation
- A clearly written narrative style
- Over 200 illustrations
- High value multiple choice questions (MCQs)
- Updates on recent advances in preventive dentistry
- Basic tenets of biostatistics and research methodology to enable students to become familiar with the art of using research methods and techniques
- Ready reckoner for both undergraduate and postgraduate students

About the Author

Joseph John MDS is Professor and Head, Department of Public Health Dentistry, Saveetha Dental College, Chennai. He received his training at Manipal University and completed his postgraduation from SDM College of Dental Sciences, Dharwad. His interests include minimal invasive dentistry, epidemiology and preventive dentistry. He has received numerous awards, has authored over 50 peer-reviewed scientific articles, has given invited lectures, and holds leadership positions in many scholarly societies. He has handled both academic and administrative positions successfully. He was a member of University's institutional review board for several years and was later appointed to serve as chairperson in 2012. He has been the controller of examinations at Meenakshi University and later at Saveetha University. He was Associate Dean of Administration during which he ensured the continuous accreditation of the college. He also served as Associate Dean of faculties at Saveetha Dental College, Chennai.

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CHAPTER

1

Health, Disease and Infection

Kindness, concern and love for the art of healing earned “**Hippocrates**” the immortal title of “Father of Medicine”. Medicine has evolved after a series of false theories, misinformation, mistaken interpretations, inventions and discoveries. Medical knowledge in fact has been derived, to a very great degree, from the intuitive and observational propositions and cumulative experiences gleaned from others.

VARIOUS SYSTEMS OF MEDICINE

From time immemorial, man has been interested in trying to control the disease. The medicine man, the priest, the herbolist and the magician, all undertook in various ways to cure man's disease and bring relief to the sick.[3]

Medicine in Antiquity

Medicine was dominated by magical and religious beliefs, which were an integral part of ancient culture and civilization. In ancient times, health and illness were interpreted in a cosmological and anthropological perspectives.

Primitive Medicine

The primitive man attributed disease and in fact all human sufferings and other calamities to the wrath of the gods, the invasion of body by “evil spirits” and the influence of the stars and planets. The concept of disease in which the ancient man believes is known as the “supernatural theories of disease”. In the prehistoric times, medicine was intermingled with superstition, religion, magic and witchcraft.

Indian Medicine

The medical systems those are truly Indian in origin and developments are the Ayurveda and Siddha systems. Ayurveda is practiced throughout India, but the Siddha system is practiced in the Tamil speaking areas of South India. These systems differ very little in theory and practice. Ayurveda implies “knowledge of life” or the knowledge by which life may be prolonged. Its origin is traced back to Vedic times. During this period, the medical history was associated with mythological figures, sages and seers. The celebrated authorities in Ayurvedic medicine were Atreya, Charaka, Susruta and Vaghbhatt. The Indian sago (rauwolfia) was employed for centuries by the Indian physicians, before reserpine was extracted from the root and found effective in the treatment of hypertension. Susruta was also called as the “father of Indian surgery”. His work was mainly devoted to surgery, which also included medicine, pathology, anatomy, midwifery, ophthalmology, hygiene and bedside manners. The early Indians set fractures, performed amputations, excised tumors, repaired hernias and excelled in cataract operations and plastic surgeries. The golden age of Indian medicine was between 800 BC and 600 AD. Other indigenous systems of medicine practiced in India include Unani-Tibb and Homeopathy.[3]

Chinese Medicine

Chinese medicine claims to be the world's first organized body of medical knowledge dating back to 2700 BC. Hygiene, dietetics, hydrotherapy, massage, drugs were all used by Chinese physicians. Chinese were the early pioneers of immunization. The Chinese systems of barefoot doctors and acupuncture have attracted worldwide attention in recent years.

Egyptian Medicine

In Egyptian times, the art of medicine was mingled with religion. Egyptian physicians were co-equals of priest, trained in schools within the temples. They often helped priests to care for the sick who were brought to the temples for treatment. Egyptian medicine was far from primitive. They believed that pulse was the “speech of the heart”. Diseases were treated with enema, bloodletting and wide range of drugs. In the field of public health also, Egyptians excelled. They built planned cities, public baths, and underground drains. They had also some knowledge of inoculation against smallpox, the value of mosquito nets and the association of plague with rats.

Mesopotamian Medicine

The basic concepts of medicine were religious, and taught and practiced by herb doctors and knife doctors and spell doctors—a classification that roughly parallels our own internists, surgeons and psychiatrists. Medical students were busy in classifying ‘demons’, the causes of the diseases. Laws relating to medical practice including fees payable to the physicians for satisfactory services and penalties for harmful therapy are contained in Babylonian Code of Hammurabi, the very first codification of medical practice.[2]

Greek Medicine

The Greeks enjoyed the reputation of “the civilizers of the ancient world”. They taught men to think in terms of “why and how”. By far the greatest physician in Greek medicine was Hippocrate who is called the ‘Father of Medicine’. He studied and classified diseases based on observation and reasoning. He challenged the tradition of magic in medicine, and initiated radically new approach to the medicine, i.e. application of clinical methods in medicine. Hippocratic concept of health and disease stressed the relation between the man and the environment. In short, the Greeks gave a new direction to medical thought. They rejected the supernatural theory of disease and looked upon disease as a natural process, not a visitation from the God.[2]

Roman Medicine

The Romans were more practical-minded people than the Greeks. They had a keen sense of sanitation. Public health was born in Rome with the development of baths, sewers and aqueducts. The Romans made fine roads, throughout the empire, brought pure water to all the cities through aqueducts, drained marshes to combat malaria, built seweage systems and established hospitals for the sick. Galen was an outstanding figure among Roman medical teachers. About the disease, Galen observed that disease is due to three factors—predisposing, exciting and environmental factors.

HEALTH

All communities have their concepts of health, as part of their culture. Health continues to be a neglected entity despite lip service. At the individual level, it cannot be said that health occupies an important place, it is usually subjugated to other needs defined as more important, e.g. power, prestige, wealth, knowledge and security. Health is often taken for granted and its value is not fully understood until it is lost.

Definition

Health is one of those terms, which most people find it difficult to define although they are confident of its meaning. One of the oldest definitions of health is "absence of disease".

Webster defined health as "the condition of being sound in body, mind or spirit, especially freedom from physical disease or pain".

WHO defined as "a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity".[4a]

Changing Concepts of Health

1. Biomedical Concept

Health has been viewed as an “absence of disease” and if one was free from disease, then the person was considered healthy. This is known as the biomedical concept. This concept was, however, found inadequate to solve some of the major health problems like malnutrition, chronic diseases, accidents, etc.[4f]

2. Ecological Concept

The ecologists put forward a hypothesis, which viewed health as a dynamic equilibrium between man and his environment, and disease a maladjustment of the human organism to environment.

3. Psychosocial Concept

Health is influenced by social, psychological, cultural, economic and political factors. These factors need to be considered while defining and measuring health.

4. Holistic Concept

This concept implies that all sectors of society have an effect on health, in particular agriculture, food, industry, education and other sectors. This view corresponds to the view held by ancients that health implies a sound mind, in a sound body, in a sound family, in a sound environment.[4f]

Dimensions of Health

Health is multidimensional. WHO envisages three specific dimensions, namely the physical, mental and the social. The others include, spiritual, emotional, vocational and political dimensions.

Physical Dimension

The state of physical health implies the notion of "perfect functioning" of the body. It conceptualizes health biologically as a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body.

At the community level, such indicators, as death rate, infant mortality rate and expectation of life, may assess the state of health.

Mental Dimension

Mental health is not mere absence of mental illness. Mental health is defined as "a state of balance between the individual and the surrounding world, a state of harmony between oneself and others, a coexistence between the realities of the self and that of other people and that of the environment".

Assessment of mental health at the population level may be made by administering mental status questionnaires by trained interviewers.

Social Dimension

It has been defined as "quantity and quality of an individual's interpersonal ties and the extent of involvement with the community".

Social well-being implies harmony and integration within the individual, between each individual and other members of society and between individuals and the world in which they live.

Spiritual Dimension

It includes integrity, principles and ethics, the purpose in life, commitment to some higher being and belief in concepts that are not subject to "state of the art" explanation.

Emotional Dimension

Mental and emotional dimensions have been seen as one element, however, psychobiology relates emotional health, to “feeling” and mental health towards “knowing” and “cognition”.

Others

A few other dimensions have also been suggested such as:

- Vocational dimension
- Philosophical dimension
- Cultural dimension
- Socioeconomic dimension
- Environmental dimension
- Educational dimension
- Nutritional dimension
- Preventive dimension.

Indicators of Health

Indicators are required not only to measure the health status of a community, but also to compare the health status of one country with that of another, for assessment of health care needs, for allocation of scarce resources, and for monitoring and evaluation of health services, activities and programs. Indicators help to measure the extent to which the objectives and the targets of a program are being attained.[1]

Characteristics of Indicators

Ideal indicators should be:

1. ***Valid***—should measure what they are supposed to measure.
2. ***Reliable***—answer should be the same when measured by different people in similar circumstances.
3. ***Sensitive***—should be sensitive to the changes in the situation concerned.
4. ***Specific***—should reflect changes only in the situation concerned.
5. ***Feasible***—should have the ability to obtain data needed.
6. ***Relevant***—should contribute to the understanding of the phenomenon of interest.

Classification

The indicators of health may be classified as:

1. Mortality indicators
2. Morbidity indicators
3. Disability rates
4. Nutritional status indicators
5. Health care delivery indicators
6. Utilization rates
7. Indicators of social and mental health
8. Environmental indicators