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THE EVOLUTION OF CARE: NURSING AND DENTAL SPECIALIZATIONS AT THE FOREFRONT

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Abstract
It is impossible to overestimate the significance of dental health for general wellbeing. However, the dental delivery system in the United States faces challenges in efficiently treating periodontal disease and caries, the two most common oral disorders. These conditions are highly avoidable and rank among the most frequent chronic diseases. The development of dental care policy and practice in the US is discussed in this paper, along with the difficulties brought about by the dental system's isolation from the rest of the healthcare system and its potential effects on future reforms to the system. The conventional dental care delivery model from the nineteenth century may not be able to accommodate the demands of population health, interprofessional practice, information technology, and dentistry science in the twenty-first century. Over time, the nursing profession has undergone tremendous change, moving from a largely task-oriented vocation to one that is highly specialized and autonomous. In an era where healthcare systems are constantly changing, nurses are essential to patient care, health promotion, and community advocacy.

Aim: To detect the evolution of nursing care and dental specializations at the forefront

Key words: The evolution, Nursing care, Dental specializations, Technologies

Introduction

The growing urbanization of the nineteenth century necessitated the development of systematic sanitary measures, which led to the development of public health initiatives. During the early 1900s,

cutting-edge research facilities began to appear, frequently in close proximity to large hospitals. The advent of novel biological therapies, including antibiotics, defined the mid-1900s. These discoveries, along with others in chemistry, genetics, and laboratory technology (like the x-ray machine), made modern medicine possible. The twentieth century saw a significant professionalization of medicine, opening up new career paths for women as nurses (starting in the 1870s) and physicians (particularly after 1970). Disease specialization also emerged during this time, meaning that medical care was now provided by specialists in the field and in relation to the unique features of the disease (Koutsouris, 2016).

The majority of healthcare providers are nurses, but their influence on patient outcomes and the efficiency of the healthcare system is not commensurate with their numbers. Nursing admissions range from diploma to degree levels. Demand often determines which diploma-level nursing students are admitted. Shorter training periods and less rigorous academic entrance standards for programs offer chances to let more young people into the workforce. Some nurses have higher aspirations for their careers and will pursue specialized training and further education to help them get there. When it comes to human resource management, advanced practice nurse (APN) positions can be retained in the workforce if they are integrated into a clearly defined career path (Wong, 2018).
Additionally, nurses now play a larger part in primary care. Primarily focused on health education, chronic illness treatment, and preventative care, primary care nurses are essential to the world's healthcare systems. They provide comprehensive treatment that includes illness prevention, health promotion, and the management of ailments like diabetes, hypertension, and heart disease. They are frequently the initial point of contact for patients. In order to achieve the best possible health outcomes, nurses are in a unique position to speak up for the needs of patients, coordinate treatment across various providers, and guarantee maintaining continuity of care through their regular patient encounters (Admin, 2024).

It is true that the domains of medicine and dentistry are distinct, but oral health is crucial for overall physical, psychological, emotional, and socioeconomic well-being. Released in 2000, the historic Surgeon General's Report on Oral Health raised public awareness of the significance of oral health to overall well-being by showcasing significant advancements in dental science and practice as well as the relationships between oral health and general health. Ten years later, two oral health reports from the Institute of Medicine (IOM) further brought attention to the US dental care delivery system's numerous shortcomings in treating the two most common oral diseases (periodontitis and caries), which are among the most common chronic diseases despite being largely preventable (Mertz, 2016).

One explanation for why dental care reform has been sluggish or nonexistent in comparison to the medical industry is to look at the advantages and disadvantages of the proposed changes. The dentistry profession is not primarily responsible for the health hazards related to untreated dental disease. Rather, the burden falls on the medical system, which covers emergency room expenses to treat patients' pain and illness brought on by untreated oral disease, as well as on the patients themselves, who suffer, lose function, and eventually lose their dentition (teeth). Similarly, there are no concrete incentives within the dental care system to link the wide range of potential benefits of bettering oral health and access to dental care, including better diabetes management, better cardiovascular health management, the prevention of childhood diseases, and the employability of low-income adults (Mertz, 2016).

Literature review

Technological advancement and the improvement of medical care were closely related. The primary means of applying basic understanding of biological processes was technology. According to a 2010 article by Philip Hunter, "Biology is the new Physics" might be used to describe the twenty-first century. These very technological developments—which included improvements in semi-conductors,

an increase in computing power, and a drop in the price of computing power—led to the emergence of personalized medicine (Koutsouris, 2016).

Nurses are in a unique position to lead and contribute to these revolutionary changes in healthcare as we go from episodic, provider-based, fee-for-service care to team-based, patient-centered care across the continuum that provides seamless, economical, and high-quality care. These changes call for fresh perspectives on population health and wellness as well as improved knowledge, abilities, and attitudes. Priorities are being set for patient-centered care, care coordination, data analytics, and quality improvement (Salmond & Echevarria, 2017).

The evolution of the role of nurses

Over the past few decades, there has been a notable shift in the role of nurses in healthcare, with a shift away from bedside care and patient support toward a larger role that includes advocacy, leadership, and specialized clinical practice. This growth is a reflection of the healthcare industry's dynamic nature and the growing understanding of the vital role nurses play in maintaining the standard of patient care, streamlining the delivery of healthcare, and advancing public health. The expanding role of nurses demonstrates the profession's adaptability, resilience, and unwavering dedication to patient welfare and healthcare innovation (Admin, 2024).

In the past, nurses were mainly thought of as caregivers who supported patients and their families, gave comfort, and gave medication. Although these components are still essential to nursing, a modern nurse's job description includes much more. These days, nurses impact healthcare policy and practices as educators, leaders, researchers, and activists. Their function has grown into areas previously occupied only by top healthcare administrators and doctors, demonstrating the increasing complexity and interdisciplinarity of healthcare (Admin, 2024).

The growing importance of nurses to public health and global health issues is further highlighted by their rising position. Nurses participate in global health initiatives addressing non-communicable diseases, health inequities, and infectious diseases. They are essential to vaccination drives, health education initiatives, and emergency plans for disease outbreaks and natural catastrophes. Nurses are vital in advancing global health and well-being because of their capacity to collaborate in a variety of contexts and cultures (Admin, 2024).

The evolution of nursing practice

In addition to supervising nursing care, clinical nurses also make choices, plan patient care, communicate with families and other medical professionals. Working closely with colleagues in other health care specialties, these nurses have the ability to impact organizational procedures and policies, as well as clinical practice environments and local organizational cultures. In order to detect and solve needs at the individual, family, and community levels, public health, school, and other community-based nurses collaborate with experts from other fields and industries. Some nurses are directly responsible for developing policies and procedures, managing organizations, sitting on boards, and supervising programs (Sciences et al., 2021).

Nurses in charge of community organizations sometimes work with individuals and groups in various industries in addition to managing teams. Even though they are not in charge of everyday affairs of the organization, nurses on health care boards can still exert a strong leadership influence on its policies and procedures. While employed within the healthcare system, other nurses support and strive for institutions and policies in the public and private sectors that can enhance health and well-being (Sciences et al., 2021).

Due to a confluence of social demands, political objectives from the outside world, and internal professionalizing forces, nurses are experiencing a historic turning point in their career. It is

anticipated that nurses with advanced skills, knowledge, and competences will act as change agents within the health system and take on new and unexplored roles. The traditional extent of nursing practice and institutional healthcare at the bedside must be transformed by nurses into new nursing disciplines in each nation's health system. Universal health coverage will be aided by effective collaboration and involvement from nurses (UHC) (Kamei et al., 2017).

It used to be thought that only nurses could implement advanced nursing practices, such as transforming healthcare and establishing collaborations with community members. These new roles emerged in response to both external social health policies and individual health issues (Kamei et al., 2017).

Classification of nursing specialties

The specialty groups formed under nursing associations at the national and provincial levels include nursing administration, internal medicine, surgery, obstetrics, the field of pediatrics outpatient, emergency, critical care, cancer therapy, orthopedics, operating room, sterilization supply center, mental health, infectious diseases, IV infusion, hemodialysis treatment, catheter, injury, urinary tract infections, diabetes, hospital infection, disaster, geriatric, community, and rehabilitation. Certain professional groups and institutions offer nursing care specific training, including dysphagia (Wong, 2018).

The taxonomy of nursing specialty has been suggested. Some have proposed classifying nurses based on their medical specialization. In medical practice, it is evident how varied medical, nursing, pediatric, obstetric, and similar specialties are from one another. Nonetheless, a wide range of subspecialties in medicine have emerged recently, including cardiac, renal, respiratory, and similar fields. The control of symptoms, particular conditions, and the whole person is the foundation of nursing practice, rather than the organs. Certain nursing specialties, such wound care and palliative care, really intersect with other medical specialties (Wong, 2018).

Historical Evolution of Nursing

The origins of nursing can be found in the primitive healthcare practices of ancient civilizations' caregivers. On the other hand, Florence Nightingale's revolutionary work in the 19th century is credited with founding the contemporary nursing profession. Nightingale laid the groundwork for modern professional nursing practice by emphasizing cleanliness, hygiene, and patient care. Since then, the field of nursing has expanded to include a variety of roles and specializations, such as clinical nursing, research, teaching, and leadership (Jordan, 2023).

Embracing Technological Advancements:

The nursing profession has been significantly impacted by technological breakthroughs that have altered the delivery of healthcare. The utilization of remote monitoring devices, telemedicine, and electronic health records (EHRs) has improved patient safety, efficiency, and communication. These days, nurses work with interdisciplinary teams, access information, and record patient care using a variety of digital tools and applications. Adopting technology enhances patient outcomes and gives nurses the chance to take part in research and data analysis, as well as novel methods of care delivery (Jordan, 2023).

Moreover, the incorporation of technology in healthcare has provided nurses with novel opportunities. The delivery of care has changed, becoming more accessible and individualized because to telehealth, electronic health records (EHRs), and digital health technologies. Leading the charge in this digital transformation are nurses, who use technology to monitor and consult with patients remotely, increase health literacy, and improve patient care. This broadens the scope of healthcare services and gives nurses a crucial opportunity to contribute to the digital transformation of healthcare systems (Admin, 2024).

Nursing education

The growing importance of nurses is largely dependent on education and lifelong learning. Because of the complexity of healthcare and the speed at which technology is developing, nurses must continue their education and professional growth. Advance degrees and specialist certificates are becoming more and more important, allowing nurses to specialize in fields including pediatrics, gerontology, informatics, and cancer. Through research and evidence-based practice, this specialization not only improves the standard of care given to patients, but also adds to the body of nursing knowledge (Admin, 2024).

The evolution of dental specializations

As dentistry is such a large discipline, there are many different career routes available to aspirant practitioners. Although general dentistry is the most popular specialty, dentists can specialize in a number of other fields to advance their careers. In order to get certified in their chosen discipline, dentists must complete additional coursework and training after dental school, as well as pass a specialized board exam (Chen, 2023).

The different dental specialties include:

1. General Dentistry: General dentists offer a variety of dental services, such as cosmetic, restorative, and preventive care.
2. Orthodontics: The diagnosis, prevention, and treatment of abnormalities of the teeth and face are the areas of expertise for orthodontists. They straighten teeth and fix bite issues with braces, aligners, and other appliances.
3. Oral and Maxillofacial Surgery: Surgeons that specialize in this field operate on the jaw, face, and mouth. They can fix face injuries, remove malignancies, and extract teeth.
4-Pediatric Dentistry: From infancy to puberty, pediatric dentists focus on the oral health of children. In addition to diagnosing and treating dental issues, they also teach parents and kids about the need of maintaining proper oral hygiene.
5. Endodontics: Endodontists are experts in identifying and resolving issues with dental pulp and root canal therapy. They carry out various treatments, such as root canal therapy, to save broken or diseased teeth.
6. Periodontists: They are experts in the diagnosis, treatment, and prevention of gum disease. To treat gum issues, they carry out gum grafts, scaling and root planning, and other treatments.
7. Prosthodontics: The replacement and repair of lost teeth is the specialty of prosthodontists. To enhance a patient's oral health and aesthetics, they might design and fabricate prosthetic items such as bridges and dentures (Chen, 2023).

Advancements in dental materials, technologies

The opportunity to eliminate manual handling of specimens during the various processing steps has been made possible by the increasing use of technology in dentistry; this technique has been dubbed "digital workflow" by some. Digital workflow is predicated on three main components. Data collection, including different scanning technologies, comes first. Next comes data manipulation and processing, which is done with the use of computer-aided design (CAD) software. Once the data has been processed, computer-aided manufacturing (CAM) is used to manufacture the appropriate material structures. Three-dimensional (3D) printing is a rapidly expanding substitute for milling techniques in the production stage, which is sometimes referred to as subtractive manufacturing. This method, sometimes known as "rapid prototyping" or "additive manufacturing," has been taking the place of subtractive manufacturing in some industrial processes (Venkatesh & Nandini, 2013).

All areas of dentistry have been significantly impacted by the quick development of CAD/CAM (Computer Aided Design, Computer Aided Manufacture), particularly prosthodontics and restorative dentistry. Education and patient care have undergone significant changes as a result of the fusion of these technology systems with developments in biomaterials, such as zirconia high strength ceramics. Because of this, dental education as a whole has changed and will continue to change in terms of

efficiency of time and money as well as, most importantly, the capacity to predict clinical treatment and delivery following surgery. Three primary protocols—digital models, virtual articulators and facebow, and digital impressions—will use the benefits of CAD/CAM technology (Alghazzawi, 2016).

Three-dimensional printing for a personalized implant

The fields of fast tooling and rapid prototyping were the first to adopt custom implants created by 3DP. In the beginning, 3DP produced individual, customized items for use in restorative dentistry. Some have proposed ideas for applying 3DP and CAD/CAM, two cutting-edge technologies, not only in the creation of prosthesis-related components but also in the planning stage of implantation. It was proposed to create a surgical guidance for implant implantation using CAD/CAM in conjunction with cone beam computed tomography (CBCT). Mini-implants served as reference points in this situation. By using software to build a three-dimensional simulation, a doctor may theoretically integrate the future prosthetic for a full rehabilitation treatment and arrange the optimal implant site. After exporting a digital version of the surgical template, 3DP manufactured the surgical guide. A study that evaluated the accuracy of computer-guided implant surgery produced positive findings (Hong & Oh, 2017).

Figure 1. the surgical implant placement guidance. A surgical guide is created using CBCT and CAD/CAM for implant placement (Hong & Oh, 2017).

Electronic Dentist–Patient Communication

Conventional dentist offices provide the best environment for educating patients about oral, dental, and craniofacial health issues and providing treatment. For patients to change their oral health-related behavior, motivated communication between dentists and patients is essential between those borders. But thanks to technology, our care environment is now larger than just the physical space and time constraints of traditional in-person meetings. This enables continuous and remote health monitoring as well as treatment compliance. As a result, patients now have greater control over their medical histories and treatments, sometimes even from the comfort of their own homes. This benefit makes it easier to provide care, or at least an assessment of it, to people who are physically ill, reside in remote locations, or don't have access to local healthcare facilities. While the increased exchange of health information and outreach has been beneficial to society overall, it has also presented a number of urgent challenges. These include the need to ensure that patients receive care from multiple dental and medical specialists in a timely manner, that their health information is properly integrated, and that a payer model that can support this more comprehensive treatment is established (DaSilva et al., 2022).

3D Imaging and Digital Radiography

Contemporary imaging methods including magnetic resonance imaging (MRI) and computed tomography with cone beams (CBCT) assist in detecting issues that the human eye would have missed. This aids in the identification of organs susceptible to cystic development or head and neck cancer. Temporomandibular disorders (TMD) are relatively easy to identify and assess for degree of impairment prior to appropriate treatment. A Digital Imaging and Communication in Medicine (DICOM) file created from cone-beam computed tomography is used to critically evaluate the bone density, bone condition, pathologic enlargements, and important features including blood vessels and nerve bundles in order to obtain the imaging diagnosis. Additionally, diseases surrounding the root apex, vertical root fractures, and root canals can also be detected by digital radiography (Raut et al., 2022).

Surgical Guidance and Digital Planning

The implant prosthesis follows the reverse planning approach because its design is determined prior to surgery and implant selection. The CT scan images enable a virtual surgery by anticipating the optimal implant site, bone anchorage, and the eventual prosthesis that these implants will get based on the technology of virtual reality (VR) (Raut et al., 2022).

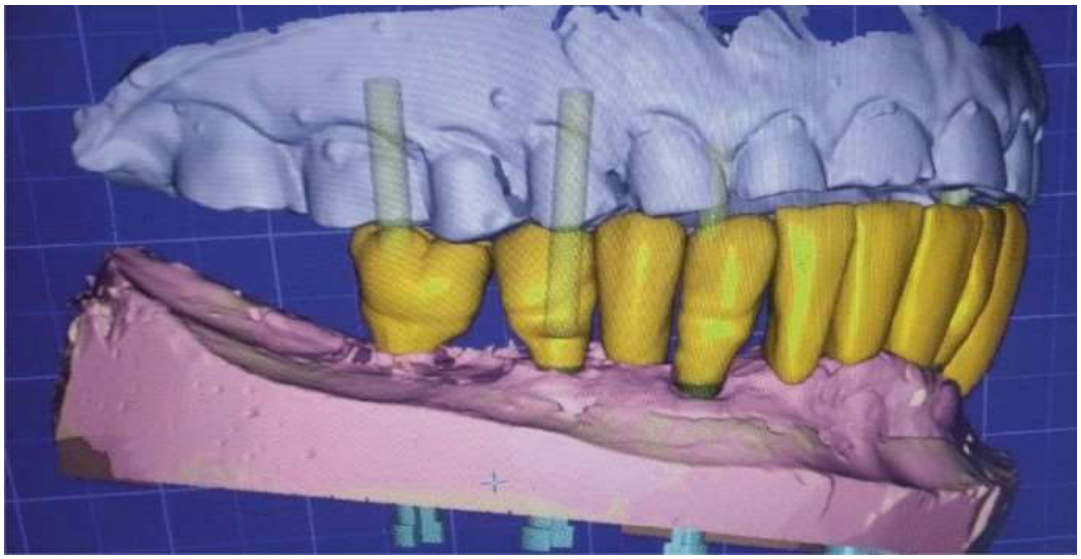

Figure 2. Virtual implant placement (Raut et al., 2022).

A surgical guide is essentially a transfer instrument. Its objective is to transmit the diagnostic and planning of the surgical and prosthetic components of the therapy from the planning stage to the patient during surgery. CAD/CAM surgical guides are an extremely detailed transfer tool that necessitates extremely accurate treatment planning. Its invention began with a carefully considered prosthetic design that considered the demands of the patients as well as the intended functional and cosmetic results. The intended implant locations and distribution must then be planned taking into account prosthetic planning, bone density, biomechanical considerations, and availability (Raut et al., 2022).

Conclusion

The nursing profession has developed through the years with possibilities, difficulties, and a dedication to provide high-quality, compassionate care. From being caregivers, nurses now perform a wide range of jobs and responsibilities as highly skilled professionals. As the healthcare industry changes, nurses need to be able to take advantage of new possibilities, overcome obstacles, and adjust to new trends. The nursing profession will continue to grow and influence healthcare in the future if it is dedicated to lifelong learning, patient advocacy, technological adoption, and teamwork. Certain advancements in dentistry are progressing rapidly, and our profession has had to expedite their adoption. One such example is telemedicine following COVID-19. The adoption of these innovative

therapies and technological advancements also hinges on a change in our often-conservative mentalities about healthcare. They can be adopted more quickly and overcome early resistance with the help of improved infrastructure, new legislation, and cheaper starting expenses. These difficulties, meanwhile, are complex and may also depend on how each member of our healthcare community behaves.

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