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Oral Health Care System in Libya: Case Study of Benghazi

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Declaration

I Aisha Hassan Aloshiby confirm that the work contained in this thesis is the researcher's own work, and has not been previously submitted to meet requirements of an award at this University or any other higher education or research institution, I furthermore, cede copyright of this thesis in favour of University of Benghazi.

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Abstract

Background & Aim: little is known about oral health care system in Libya. The present study aims to describe the Libyan oral health care system in terms of its structure, function, workforce, funding, reimbursement and target groups.

Methods and Materials: a case study design by using questionnaire, interviews and documentary analysis was used. Both quantitative and qualitative analysis were conducted. Proportions and frequencies were used to summarise the responses to the questionnaire, and the framework analysis based on the basic components of the health system was used to analyze the interviews and documents. This is to find a description of the Libyan health care system in the city of Benghazi by using multiple sources of evidence.

Results: The results showed that the Libyan health system, with regard to oral and dental health, provides two main levels of care; at the national level through general, central and specialized hospitals and specialized centers, and at the local level through the Department of Health Services in the regions. In both cases, dental services are integrated into the medical services without any special consideration. As a function, the services were largely treatment oriented and provided by general dental practitioners in most of them, with the presence of an auxiliary workforce such as nursing staff and dental technicians. The funding is mainly provided by the government but the private sector is self-funded. There are certain groups targeted for free treatment in the public sector, but without clear plans or policies.

Conclusion: The oral health care system in Libya is poorly organized, malfunctioning in the public sector and mostly privatised. There is an urgent need to develop polices and plans to improve the system and take it away from the shadow of medical services which cause low priority of dentistry.

Dedication

This work is dedicated to the soul of my loving sister. I hope my sister feels at peace just like she always made me feel.

Aisha Aloshiby

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First and foremost, thanks to Allah Almighty for giving me the strength and ability to complete my thesis. Then, I gratefully acknowledge my supervisor, Dr. Arheiam Alawami for being a tremendous mentor and for his continuous guidance and support throughout my academic study. I am grateful for his patience, persistence and motivation which kept me positive and confident throughout this journey. Dr. Arheiam, thank you for your guidance; every sentence written and every revision done is evidence of your endless commitment to your students.

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List of abbreviations

Abbreviation	Meaning
GDPs	General Dental Practitioners
GDP	Gross Domestic Product
GMPs	General Medical Practitioners
HSA	Health Services Administration
PG	Post-Graduation
PCP	Primary Care Provider
PHC	Primary Health Care
PhD	Doctor of Philosophy
FDI	World Dental Federation
MoH	Ministry of Health
MSc	Master of Science
NHS	National Health Service
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

1. Introduction

The World Health Organization (WHO) defines a health care system as all organizations, people and actions whose primary intent is to promote, restore or maintain health. This includes efforts to influence determinants of health as well as more direct health-improving activities (WHO, 2007). Dentistry is only one component of the broader healthcare system and part of the overall social welfare system. Therefore, as health professionals, dentists need to understand the essential elements of the health care system within which they are working and how the changes in the system impact them (Gift et al., 2007).

All Health care systems are complex organizations in a constant process of change and evolution to meet the health needs of their citizens. However, there are no universally acknowledged definitions of a health system since they have been defined differently for different purposes by different scholars (Hsiao, 2003). For example, Policy makers are interested in understanding what interventions are likely to improve the performance of a health system. On the other hand, researchers want to investigate what structural components cause the varied outcomes.

The need to make the health care system available to all citizens has historically increased in numerous nations as their civilizations developed. Health systems not only benefit people by preventing and treating illnesses, but they improve people's lives by generating security within society and including them in the developmental process with political support (Gilson et al., 2007). Other important factors that influence the nature, extent, and shape of a healthcare system include the demographics of society, advances in technology, expectations and a country's economic wealth (Arah et al, 2003). Therefore, some scholars suggested that an ideal oral health care system would be integrated with the rest of the health care system to respond to the ongoing changes in society.

Many of the current challenges to oral health care systems are based on incongruities that have evolved among policy, organizational structures, reallocation of resources, actual population oral health care needs, altered disease patterns and changing socio-political systems. The oral health care system, therefore, would include surveillance

of population oral health status and needs, and be evidence-based, effective, cost-effective, sustainable, equitable, comprehensive, ethical, and culturally competent, with an emphasis on health promotion and disease prevention. Moreover, it should include universal coverage, and continuous quality assessment and assurance. Finally, the ideal system would empower communities and individuals to create conditions conducive to health (Tomar & Cohen, 2010).

It is crucial for each country to regularly examine its healthcare system to ensure that it is taking account of population changes, health needs, workforce numbers, skills and expectations (Gallagher et al., 2009). There are disparities in human and financial resources, dental workforce and types of trained personnel between developed and developing countries. Unfortunately, in many countries, the human, financial and material resources are still insufficient to meet the need for oral health care services and to provide universal access, especially in disadvantaged communities in developing and developed countries (Kandelman et al.,2012).

In recent years many countries have been affected by the state of fragility is associated with a range of challenging, complex and inter-related political, security, economic, and social challenges, with people's health being at the centre of these challenges since it has significant adverse impacts on how health care is delivered and utilized (Guha-Sapir & van Panhuis, 2002 & Woodward et al., 2016). A *fragile state* is defined as one that failed or is vulnerable to failure regarding its authority, legitimacy and comprehensive service entitlements that it should provide to its population (Stewart-Brown, 2009). Recently, the number of people living in fragile and conflict-affected states has increased, particularly in the Middle East and North Africa region. Many of these states were part of the so-called Arab Spring revolution to oust dictatorships in these countries, but the aftermath of these revolutions turned sour. As a result, most of these countries have experienced a chronic state of instability ranging from economic and political turmoil, such as Egypt and Tunisia, to armed conflicts and completely failed states, such as Libya and Syria.

The Libyan healthcare system has once been described as one of the most successful. However, as with other aspects of life in Libya, the healthcare system has been affected by turmoil and political crises in the last ten years. Health systems are affected by various contextual factors, for example, personal, organizational and social

factors, which affect staff, their motivation, and the beneficiaries' response to health services (Gilson et al., 2011). Several attempts to assess the performance of the health care system in Libya were made by several organizations and groups. Yet, the oral health sector was neglected, and attention was given to the medical field. Therefore, this research aims to describe the Libyan oral healthcare system in terms of its structure, function, personnel, funding, reimbursement and target group. This will inform health care planners and policy makers as well as educational institutions about the current status of Libyan oral health care system and how it can be improved.

2. Literature review

2.1 Overview

This chapter reviews literature related to oral health care systems. It is structured to give an overview of different concepts and frameworks associated with the health care systems. For example: What is a health system? Why it is important to study them? And what are the challenges? A description of oral health systems at both regional and international levels is provided.

2.2 Definition of health

The term "health" comes from the old English word ‘hoelth’ meaning "wholeness or being sound or well" (Dolfman, 1973). The modern understanding of health became authorized when the World Health Organization (WHO), at the time of its establishment in 1948, included the definition of health in its Constitution. This generally accepted definition states that “health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (Svalastog et al., 2017). Within the last few decades, the WHO definition of health has been increasingly amended and supplemented by the fourth dimension – spiritual health which involves a sense of fulfillment and satisfaction with our own lives, system of values, self-confidence and self-esteem, (Donev, 2014). Therefore, Huber and colleagues (2011) suggest that the emphasis should be given towards the ability to adapt and self-manage oneself in the face of social, physical and emotional challenges.

This above conceptualization of health also relates to the Ottawa charter for health promotion (WHO, 1986) which states that, in order to be healthy, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. In this way, health is seen as a resource or an asset that helps one to lead a normal everyday life. This idea is central to the concept of ‘health related quality of life (HRQoL) which reflects an individual’s subjective evaluation and reaction to health or illness. Further, it is suggested in the Ottawa charter that people can not achieve their fullest health potential unless they are able to take control of those things which determine their health. To do this, it is important that people are provided with the necessary resources which enable them to achieve health. The resources specified in the

Ottawa charter can be interpreted as factors related to the social, economic, and physical environment, and persons' individual characteristics and behaviours; together referred to as the determinants of health. Moreover, these determinants of health interact with each other to shape the health and well-being of a person and society as a whole (WHO, 2008). Thus, differential availability of these resources in daily life can influence health, leading to inequalities in health among people and within societies. Hence, it is important to consider how the determinants of health affect general well-being and health. Having a well-functioning health care system is crucial to reach status conducive to health. Health systems and policies are important determinants of health because they influence the type and quality of health care available to a population.

2.3 Oral health

Oral health has been defined as the 'standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being' (Daly et al., 2013). Again this definition reflects the WHO definition of health and bio-psychosocial concepts of health. As it incorporates the ability to carry out the important everyday activities which affect overall well-being, measuring the ability to perform these activities and the impact of oral conditions on life overall is as important as identifying oral disease.

According to the biomedical model of health and disease, dentistry has traditionally focused on measuring oral disease with clinical indices such as caries experience and levels of periodontal diseases which tell little about the functional and psychosocial impacts of oral disease on an individual or society(Allen, 2003). As consequence, oral diseases are seen as separate from the rest of the body. Similarly, prevention strategies in oral health primarily focus on changing the behaviours of the high risk individuals rather than emphasising the factors which lead to adoption of high risk behaviours (Watt, 2007). For example, dentists often suggest people to reduce sugar intake which is a risk factor for dental caries, however, fail to address the issue why the individual consume much sugar in the first instance. The high intake of sugars can be related to individual and environmental factors such as perceived stress and socio-economic status (SES). Thus, the biomedical model of health has been criticised for its narrow conceptualization, and being unable to define the multidimensional concept of health within a broad social context (Daly et al., 2013).

To avoid the shortcomings of biomedical model, the bio-psychosocial model has been developed which incorporates the psychological and environmental factors. This model embraces the systems approach (Engel, 1980) where the person is seen as highest level of the organismic hierarchy and the lowest member of the social hierarchy. Thus, the bio-psychosocial model may help to move the concern from treating disease to reaching health, from highlighting the biological factors to wider determinants of health and from using only clinical disease status measures to incorporating subjective social indicators. With the adoption of such model of health, oral health is also considered to contribute to general wellbeing and not just absence of disease. Therefore, oral health is influenced by wider determinants of general health and its conceptualization extends to include social activities and wellbeing (Willis & Elmer, 2007).

On September 6, 2016, a new definition of oral health was adopted by the World Dental Federation (FDI) General Assembly. Acknowledging the multifaceted nature and attributes of oral health, it has been defined as: " Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex (head, face, and oral cavity)" (Glick et al., 2016). According to this definition and its related framework (Figure 2.1), the oral health is influenced by ‘Moderating factors’ which are elements that affect how individuals define their oral health such as age, culture, income, and ‘Driving determinants’ which are factors that affect oral health and cover 5 main domains: genetic and biological factors, social environment, physical environment, health behaviours, and access to care. In turn, driving determinants nest within systems that can support or serve as a barrier to maintaining and promoting oral health and managing oral diseases and conditions.

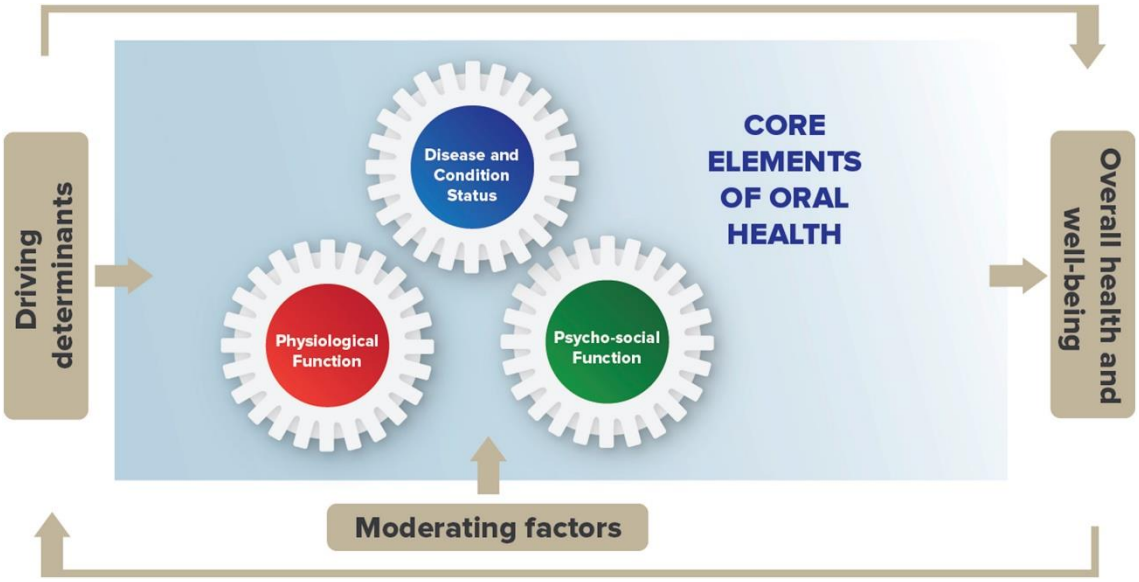

Figure 2.1: Framework for oral health definition by the World Dental Federation (FDI)

2.4 Health care system

A health care system, also sometimes referred to as a health system, is the organization of people, institutions, and resources that deliver health care services to meet the health needs of target populations (Burazeri and Kragelj, 2013). Health care systems are essential for improving and maintaining the health of the population of any country. This includes efforts to influence determinants of health as well as more direct health-improving activities. They are the result of the inter-sectoral action of institutions, and resources to improve the health of their people (WHO, 2010). It extends beyond the state-run facilities that deliver personal health services, to a combination of public health actions by both State and non-State actors and profit and non-profit providers. Frenk (1994) presents health systems as a complex dynamic set of relationships among significant players such as health service providers, the population, and the state.

According to WHO, a health system is determined by all the organizations, institutions, and resources whose primary purpose is to improve health. Therefore, a health system includes staff, funds, information, supplies, transport, communication networks, and overall guidance and direction. It also needs to provide responsive, respectful and financially fair services (WHO, 2010). The health system delivers a range of services spanning from primary preventive interventions to curative and rehabilitative care. The actions of the health system should be responsive and financially fair, while

treating people respectably. A health system needs staff, funds, information, supplies, transport, communications and overall guidance and direction to function. Strengthening health systems thus means addressing key constraints in each of these areas. A well-functioning health system responds in a balanced way to a population's needs and expectations by improving the health status of individuals, families, and communities, defending the population against threats to its health, protecting people from the financial consequences of ill-health, and providing equitable access to people-centred care (WHO, 2000).

WHO's definition of health implies that everything related to health is part of the health system. WHO stresses that health systems are "Everybody's business: Strengthening health systems to improve health outcome". However, this definition does not account for the psychosocial dimension such as ideas, interests, values, norms and power, which are critical to guide the relationship between those involved in a Health System (Sheikh et al., 2011).

Since the health system is an integral part of society, it generates much national and global interest. The health system provides a platform to launch dedicated efforts to address health issues and improve the health condition of low-income populations. This is recognized as a critical element of every society to provide and influence health and as a vital part of society, reflecting its value in society (Gilson et al., 2007). Gilson et al. (2011) point out, "Health policies and systems are complex social and political phenomena, constructed by human action rather than naturally occurring". In addition to this health system includes the social determinants of health, for example, safe housing, access to education, public safety, social support and infrastructures, including roads. Health systems, also, include a full range of personnel, stakeholders and services, such as donors, implementers and beneficiaries at central, regional, district and community levels.

2.5 Types of a health system

Based on how they are financed and operated, health systems come in a variety of models. Prior to the 1980s, political ideology had a strong influence on how health systems were classed. In accordance with their adherence to a pre-capitalist, capitalist, and socialist political ideology, they were public aid, health insurance, and the national Health Service (Terris, 1978). In the public assistance system, health care is provided by

the government but only to those who cannot afford it usually. In the health insurance model, the cost of care is borne by insurance, which can be run by private companies, state, employers or jointly, but it is free at the point of service. Moreover, in the national health model, the state offers free health care to all of its residents at the point of service.

2.6 Health systems frameworks

Though different people have defined health systems differently, health systems can broadly be treated as a complex system of system components, system functions, people and their interrelationships. At the highest level, the healthcare system can be divided into two sections: providers and Clients. Providers and suppliers include hospitals (doctors, nurses, administrators, and allied health professionals), clinics, rehabilitation centres, nursing homes, research organizations, pharmaceutical companies, educators, and equipment manufacturers. These organizations provide healthcare services. The clients are the users of healthcare; include healthcare consumers, the government, and insurance companies. The relationships between these components are nonlinear; in fact, the healthcare system has been described as a complex adaptive system (Daly et al, 2013).

A health systems framework is defined as a "bird's eye view over the health system". It describes and explains the health system and its objectives, structural and organisational elements, functions and processes. Many of the available frameworks are really health care system frameworks, describing only the narrower system which delivers health care. Health outcomes are the results of many factors that could be considered part of a larger health system within which the health care system sits. However, the complexity of those larger set of relationships makes these larger health systems much more difficult to represent (Shakarishvili et al, 2010). While there are many frameworks to describe health systems, the two most influential are WHO's Building Blocks framework and the World Bank/Harvard's Control Knobs framework.

2.6.1 The World Health Organization's "Building Blocks"

For several years, WHO and its partners have been working to reach a broad-based consensus on key indicators and effective methods and measures of health systems capacity, including "inputs", "processes" and "outputs", and to relate these to indicators of "outcome". Acknowledging the health system strengthening agenda, WHO has formulated a health systems framework that describes health systems in terms of six

building blocks which include service delivery, health workforce, information, medical products, vaccines and technologies, financing, and leadership/governance. Figure 2.2 shows the six building blocks of a health system, aims and desirable attributes. Some cross-cutting components, such as leadership/governance and health information systems, provide the basis for the overall policy and regulation of all the other health system blocks. Key input components to the health system include financing and the health workforce. A third group, namely medical products and technologies and service delivery, reflects the immediate outputs of the health system, i.e. the availability and distribution of care (WHO, 2007).

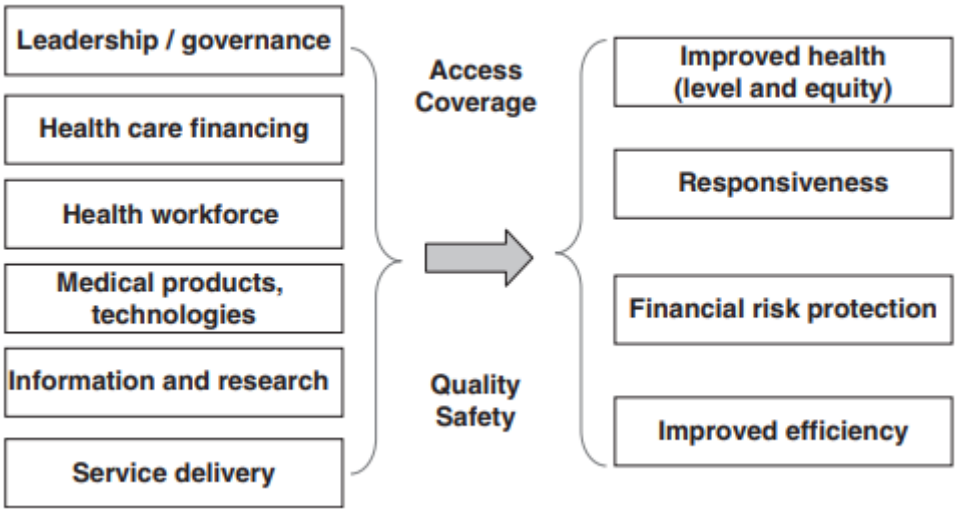

Figure 2.2: The six building blocks of WHO Health Systems Framework

According to WHO (2010), good service deliveries are those which deliver effective, safe, quality personal and non-personal health interventions to those that need them, when and where needed, with minimum waste of resources. A well-performing health workforce is one that works in responsive ways, fair and efficient to achieve the best health outcomes possible, given available resources and circumstances. A well-functioning health information system is one that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health system performance and health status. A well-functioning health system ensures equitable access to essential medical products, vaccines and technologies of assured quality, safety, efficacy and cost-effectiveness, with scientifically sound and cost-effective use. A good health financing system raises adequate funds for health, in ways that ensure people can use needed services and are protected from financial catastrophe or impoverishment

associated with having to pay for them. Leadership and governance involve ensuring the existence of policy frameworks combined with effective oversight, coalition building, regulation, attention to system design and accountability.

Strengthening health system means improving these building blocks and managing their interactions in ways that achieve more equitable and sustained improvements across health services and health outcomes which require technical and political knowledge and action. The WHO has supported its health system framework with a monitoring and evaluation framework to monitor program management of health system investments, assess health system performance and evaluate the results of health reform investments. The building blocks framework, while widely used, also received criticism for not acknowledging how the building blocks were interconnected and interacted with each other's, as well as ignoring the consumers and communities. A revised version of the six blocks was published in 2009 that placed "people" at the centre and showed the interconnectedness of the different blocks (De Savigny & Adam, 2009).

It is critical that the role of people is a macro system with little attention paid to highlighted, not just at the centre of the system the interaction among its component parts, when as mediators and beneficiaries but as actors in driving the system itself. This includes their participation as individuals, civil society organizations, and stakeholder networks, and also as key players influencing each of the building blocks, as health workers, managers and policy-makers. Placing people and their institutions in the centre of this emphasizes WHO's renewed commitment to the principles and values of primary health care fairness, social justice, participation and intersectoral collaboration (Figure 2.3) (WHO, 2008).

Figure 2.3: The dynamic architecture and interconnectedness of the health system building blocks

2.6.2 The World Bank Flagship Program "Control Knobs" framework

Roberts et al (2008) published a framework to assess health systems performance and guide health systems strengthening efforts. This approach was jointly developed by the World Bank Institute (WBI) and the Harvard University School of Public Health and is taught in the WBI-run Flagship Program on Health Sector Reform and Sustainable Financing. The focus of this framework is to identify areas of policy action to modify health systems and improve their performance. This framework identifies five "control knobs" that can be adjusted/changed to strengthen health systems (Figure 2.4) (Roberts et al., 2008).

Briefly, the five control knobs are:

Financing: this control knob deals with the mechanisms which mobilise money to fund healthcare and how it is allocated. In other words, how much money is available, who pays for health sector activities, and how are the funds distributed?

Payment: this control knob looks at how providers are paid and the incentives or disincentives this creates to influence performance.

Organization: this control knob looks at how healthcare delivery systems are organized and managed.

Regulation: these are the coercive requirements imposed by the state to direct the behaviour of health care providers and organisations.

Behaviour: this control knob is around influencing the behaviour of providers and consumers through population-based interventions, since these are grounded in social and cultural structures and therefore influenced by beliefs, perceptions, attitudes and cultural norms.

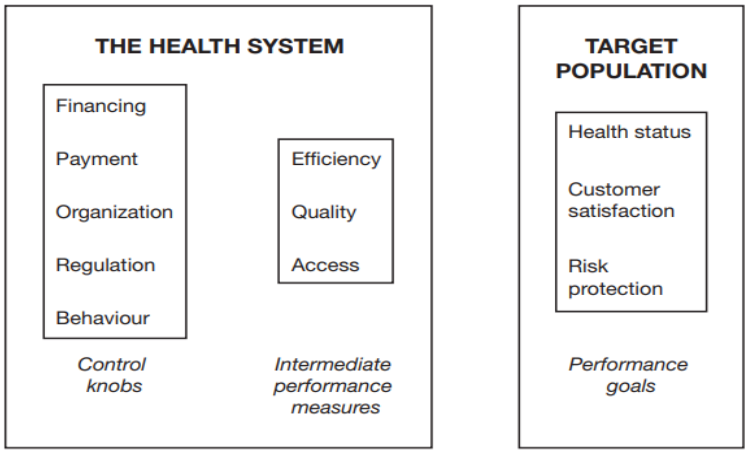

Figure 2.4: Assessing the performance of a health system by Roberts et al. (2008).

Health system goals according to this framework are improved health status, customer satisfaction and risk protection (fairly similar to the WHO framework) and intermediate goals are access, quality and efficiency. Both intermediate measures of performance and the goals of a system can be modified, depending upon the political priorities, using the five elements within a system. Changing the financing, the routing of payments, the organization of a system, its regulatory framework, and/ or the behaviour of the workforce all impact performance measures or goals. It is the job of the planners within the system to identify which of the control knobs provide better outputs and outcomes than currently exist (Roberts et al., 2008).

Sheikh et al. (2011) divided health systems into three categories and illustrated how they differ when the setting is taken into consideration (Figure 2.5). First, the WHO health system building blocks, an illustration of a health system that serves as hardware for

systems. The second category is a complicated system where the current policy choices have an impact on both the hardware and the software. The third form of health system is a social construction, which resembles a sophisticated system but is influenced by the social and political environment.

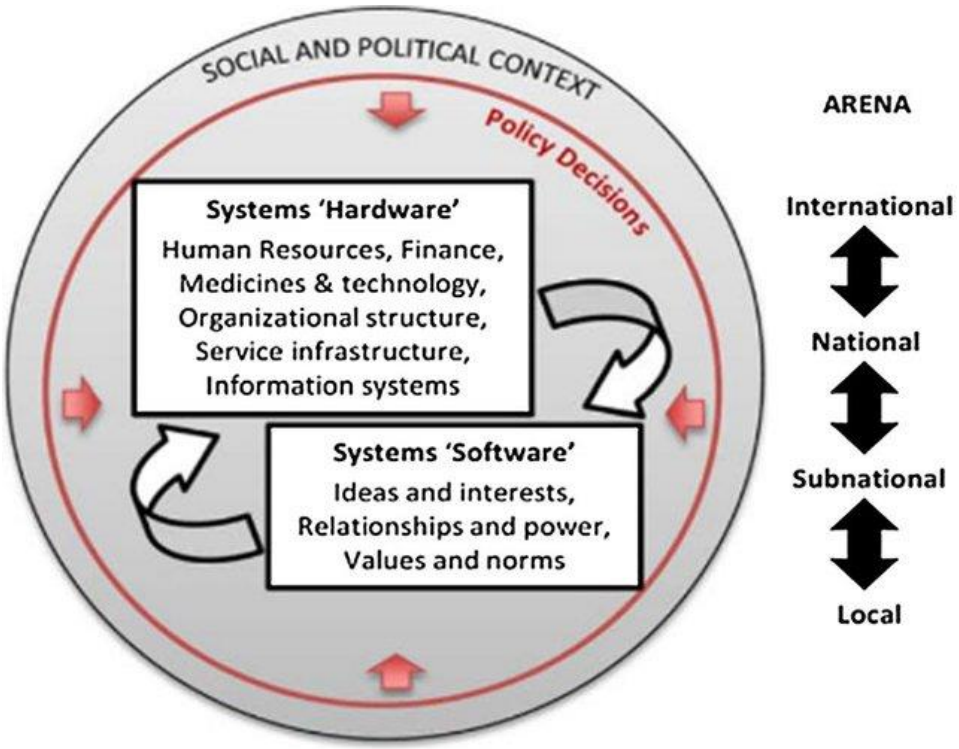

Figure 2.5: Sheikh et al's framework for understanding the health system

2.7 Oral health care system

According to Gift and Andersen (2007), any oral health care systems can be described in terms of six aspects. These are Structure, Functions, Personnel, Funding, Reimbursement and Target population.

2.7.1 Structure

The structure of the system is one of the most complex and dynamic aspects of a health care system. The majority of systems have three levels: primary, secondary, and tertiary (OECD, 2010). The primary level is normally the first point of contact between an individual and the health care system. General Medical Practitioners (GMPs), General Dental Practitioners (GDPs), pharmacists, and nurses work as part of the primary health

care workforce (Cueto, 2004). The secondary level is where more specialized personnel work and diagnostic services are more available. The Consultant grades are normally found at this level, although there have been several attempts to move much of the care provided into a primary care setting (Daly et al., 2013).

Dentistry is essentially a primary care discipline insofar as the vast majority of patient care takes place in community settings, is restricted to simple procedures and is provided by 'generalists' who in the main hold, or aspire to hold, a long-term relationship with their patients (Morris et al.,2000). In medicine, a key aspect of recent health policy has been to drive the provision of a greater proportion of care in community settings by generalists and thus reduce the referral rate to secondary care. This policy has had major implications for medicine in the last decade (Evans, 1996 & Hausman & Le Grand, 1999), and is a key element in the new NHS Plan (British, 2000).

2.7.2 Function

Health care systems tend towards the delivery of treatments to people who have presented themselves as patients with a perceived problem (the downstream approach to health care) (Daly et al., 2013). The need to tackle the causes of health made the systems move toward a more preventive approach (upstream model) (Kandelman, 2012). Besides economic arguments, a strong influence in such developments was Julian Tudor-Hart (1971), who coined the term the inverse care law in his paper, he suggested that health care was delivered in sites where needs were low. This has considerable implications for the functions of a delivery system and has seen a growing emphasis on health-promoting activities and earlier interventions based in the community. For example, mother and baby clinics held in community institutions advise on a range of health conditions as well as advice on nutrition and hygiene (Kandelman, 2012). Although most periodontal illnesses seen in the Middle East and most developing nations are caused by poor oral hygiene habits, emergency oral treatment and pain management are prioritized in most Middle Eastern countries over preventive measures (Morgano et al., 2010). In Saudi Arabia, dental visits are the most-common reason for a visiting any medical speciality (The Organizational Regulation of Dental service, 2004). Another study of 138 educated Jordanian adults demonstrated poor levels of oral health awareness among the study group. Only 26% knew the meaning of dental plaque. While 12% had never been to a dentist, only 12% visited the dentist on a regular basis. The majority (63.2%) of the

respondents reported that they visited the dentist only when in pain (Tubaishat et al., 2005). In the Middle East, there is a critical need for enhanced public awareness as well as ongoing monitoring of oral hygiene and associated implications. In addition, there is a general lack of health system specific and clear dental care guidelines, which can lead to long-term oral health problems (Morgano et al., 2010).

2.7.3 Personnel

The health workforce can be defined as “all people engaged in actions whose primary intent is to enhance health” (Dal Poz et al., 2009). Healthcare is a team effort; each healthcare provider is like a member of the team with a special role. Some team members are doctors or technicians who help diagnose diseases. Others are experts who treat disease or care for patients' physical and emotional needs. There are various types of health care personnel: Physicians, Nursing and midwifery personnel, Dentistry personnel, pharmaceutical personnel, Laboratory health professionals, public health professionals, technologists and technicians, Community and traditional health workers, Allied health professions, and Health management and support. Determining policy, need, and allocation of human resources is an important health planning issue. A relative oversupply or undersupply of one or more health professions creates a bias or imbalance in the health system and its economics (WHO, 2012). As with many jobs, there has been a move to professionalize the activities of workers.

Friedson (1970) argued a specific set of characteristics that defined the professions. These are: The tasks undertaken by the workforce are highly skilled and require specialized knowledge, a worker needs to be on a register, allowing a monopoly to exist, the worker has considerable autonomy, a code of practice exists that is designed to prevent malpractice and exploitation of the public and the rewards of a profession can be counted in both financial and status terms and tend to be associated with the higher social strata in a society.

Oral health personnel

All countries have legal or regulatory systems by which newly trained oral health personnel are permitted to practice their profession. Requirements differ from country to country and for various types of personnel within a country. In some countries, oral health personnel must pass licensing examinations in addition to completing the prescribed

training. In others, registration by the government is more or less automatic after the prescribed training, including the examinations, has been completed (Dal Poz et al, 2009). In all countries, the dentist is the responsible individual, directly or indirectly overseeing or coordinating contributions from the related workforce (Daly et al., 2013). Global movement of populations and dental health professionals presents a major challenge to planning for the future (Yamalik et al., 2014); therefore, it is important that each country regularly examines its dental workforce needs specially dentists to ensure that it is taking account of population changes, health needs, workforce numbers, skills and expectations. In an ideal world this would occur on a regular basis (Gallagher & Wilson, 2009). Figure 2.6 shows a comparison of dentists in the UK, USA, Russia, Canada, China, Israel, and Japan (WHO, 2012).

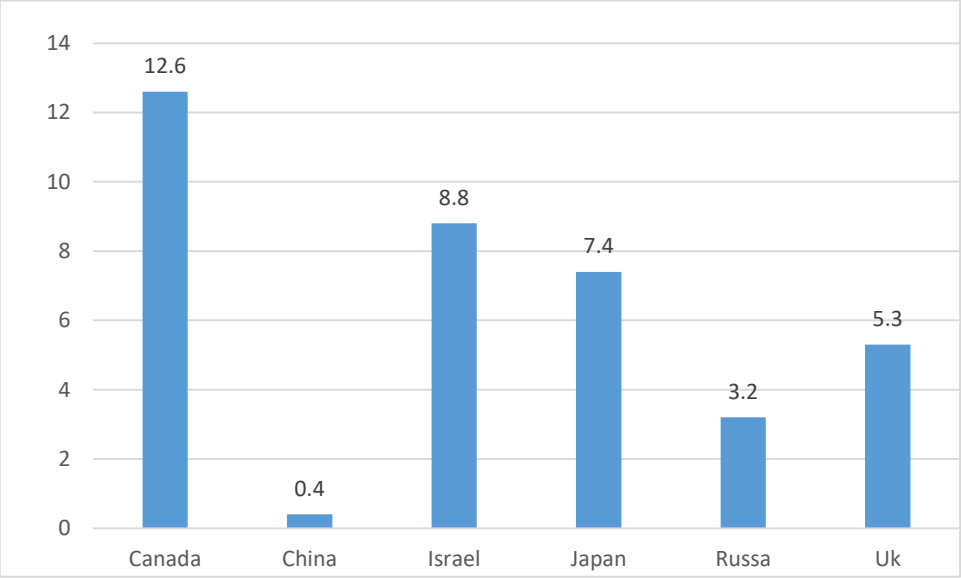

Figure 2.6: Dentist per 10,000 Population in Selected Countries and Years, 2005–2010.

Primary and Secondary dental Care Providers: primary and secondary care providers are dependent upon each other whereas primary care provider takes care of a patient's basic needs across a wide continuum of different problems and is the first point of contact for a person with health concern like GDPs and nurses in dentistry. This provider makes sure the patient receives the proper care and coordinates with specialists as needed. (Amado & Dyson, 2008). Primary Dental Care (PDC) provider requires a place to refer patients who require care outside of his or her knowledge and expertise and may also need help for patients whose care might be delivered inside primary care but for whom

this would require specialized counsel. Secondary Dental Care providers require a way to return finished cases for routine maintenance care because PDC is their primary source of referrals, which in turn provide research and training materials for undergraduate and postgraduate students (Morris, 2001).

Dental hygienist: is a health professional who, through clinical services, education, consultative planning, and evaluation endeavors, seeks to prevent oral diseases, provide treatment for existing diseases and assist individual patients or the public in maintaining an optimum level of oral health. Practice standards provide that dental hygienists serve as primary prevention personnel in the US and approximately 40 countries (Brewster, 1995). Dental hygienists have direct patient contact and provide specific preventive services, such as fluorides, dental sealants, oral prophylaxis, and oral health education (Brewster, 1995).

Dental therapists are personnel operate under guidelines that allow them to provide specified services such as restorative procedures and primary teeth extraction in schools or rural areas (Brewster, 1995).

Dental laboratory technicians are critical to the field of restorative dentistry, preparing prosthetic materials based on prescriptions from the dentist (Brewster, 1995).

The oral health workforce is estimated to consist of nearly 4 million professionals, with sub-Saharan Africa and parts of Southeast Asia reporting the lowest absolute numbers and professional-to-population ratios. Globally in 2019, there are about 2.5 million dentists, 1.2 million dental assistants and therapists and 300,000 technicians (WHO, 2022).

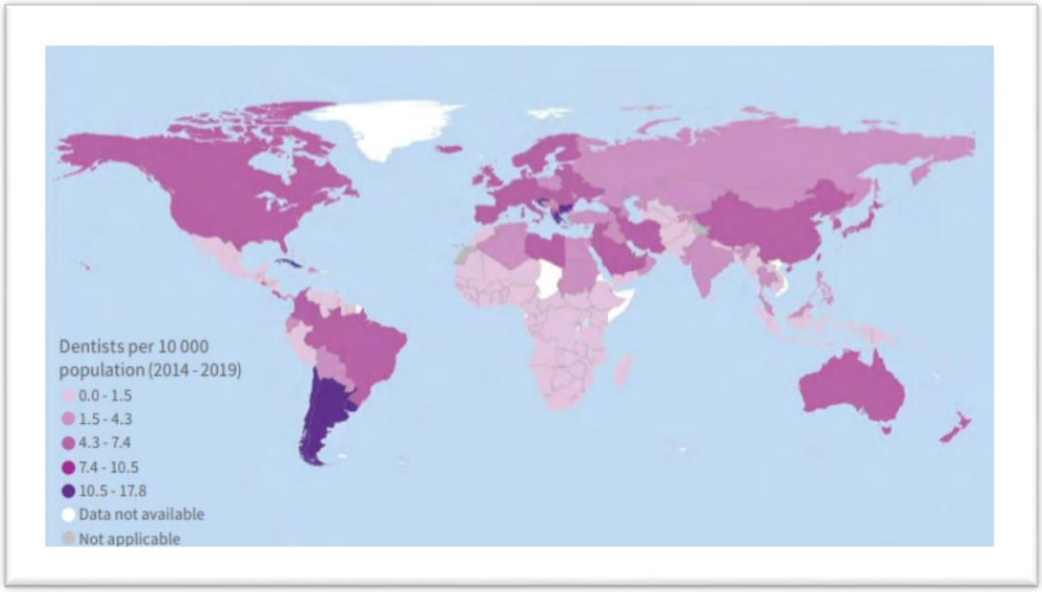

Figure 2.7: Dentist per 10000 population in 184 countries all over the world (2014-2019) (WHO, 2022)

To provide effective oral health coverage, a range of oral health care professionals with complementary roles must work together within teams, with other health and community care teams, and fully adhere to the principles of primary health care. A small workforce, a predominance of private provision models, underfunded public services, insufficient task sharing and skill mixes within teams, limited or no access for rural, remote, or disadvantaged populations, and a lack of financial protection and coverage for oral health care are common characteristics of the current state of oral health care globally (WHO, 2022).

2.7.4 Funding

Spending on health care has risen steadily for nearly all countries for many years. This increase and, perhaps more importantly, its percentage of the wealth of a country that is allocated to health care has given rise to concerns about its sustainability. When combined with the global economic downturn seen in the early 1990s, nearly all countries have been looking for mechanisms to control, if not reduce expenditure (Pine & Harris, 1997). The way a health system is financed is key to population health and wellbeing. The mechanisms of financing a health system vary for each country depending, among many other factors, on the economic context. Whereas the way a health system is financed is key to population health and wellbeing (Kiribati, 2016). In 2005, the World Health

Assembly passed a resolution that urged countries to develop health financing systems that allow all people access to needed services whereas Inequalities in oral health expenditures are striking. The average per capita expenditure in low-income countries is 0.52 US$, whereas high income countries spend an average of 260 US$ per capita—500 times more. Figure 2.8 presents per capita dental expenditures in US$ per country in 2019 (WHO, 2022).

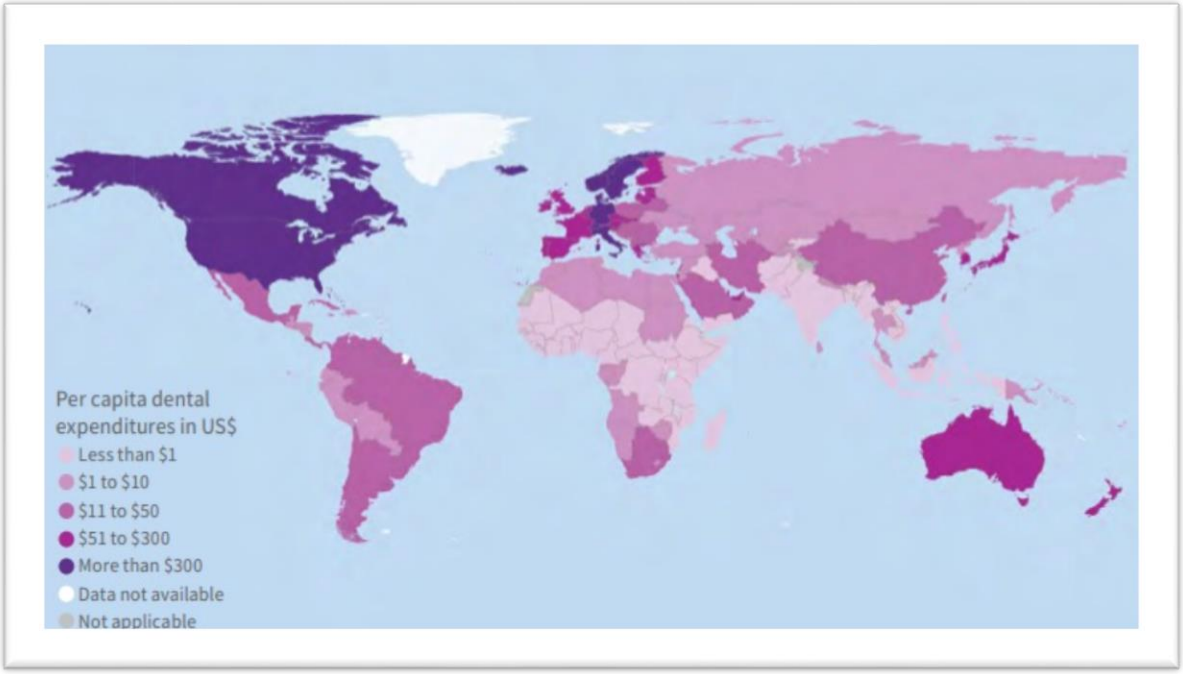

Figure 2.8: Per capita dental expenditures in US$ per country (2019)

Worryingly, growth in health expenditure in developing countries is low and highly vulnerable to political and economic contexts. Developing countries accumulate a set of problems that, despite their diversity, share many characteristics. Whole population groups are excluded from access to health and oral health quality care because no services are available, because they are too expensive, or underfunded, under-staffed and under-equipped, or because they are fragmented and limited to a few priority programs (WHO, 2022).

The funds for health care provision are in general derived from three main sources:

Taxation (Beverage model) either general or hypothecated (Daly et al, 2013). The main problem in this model is 'Moral Hazards': Meaning when an individual can take advantage of a deal or situation, knowing that all the risks and fallout will land on another party.

Insurance either compulsory as in many European Union countries, or voluntary (Grytten and J., 2005 and Daly et al., 2013). Compulsory health insurance is earmarked premiums paid by employers and employees and related to income. As for voluntary, it is private insurance and funding with predominantly private providers (Burazeri & Kragelj, 2013).

Out-of-pocket payments are of growing importance and are formed of three types: deductibles, Co-payment, and Costs that exceed those covered by a plan. Deductible is the amount a patient pays each year before the insurance company starts covering costs. Co-payment is fixed amount a patient pays for a doctor's visit or prescription medication. The amount they pay is negotiated under a contract. Insurance plans may have a limit on how much they will pay for a certain service (known as the allowed amount). The person is required to pay any fees that a practitioner demands in excess of this limit, this is what known as Costs that exceed a plan (Daly et al., 2013).

2.7.5 Reimbursement

It is related to the basis on which the health care fund is distributed. There are four mechanisms, all of which use a single or in combination: fee-for-service, capitation, diagnostic-related-payment and salaried.

In Fee-for-service, the care provider is paid for each item of care delivered to an individual or group, for example, a type of filling, oral health promotion advice, or a scaling and polishing. This mechanism is the most widely adopted type in the world in the oral health system (Bramson et al., 1998). The main disadvantages of this model are over-utilisation of resources by health care workers, hospitals, and clinics. (El Oakley et al., 2013).

While in capitation, the larger the number of patients that a care provider has, the larger their income (Tulchinsky & Varavikova, 2014). And in diagnostic-related-payment; the

payment to the care provider has linked to the disease that the patient has (Daly et al., 2013). The last mechanism is salaried; in which the care provider is paid at a set rate for working for an employer (Bramson et al., 1998).

2.7.6 Target population

As societies strive to meet all the health needs of their citizens, stakeholders and health care planners can prioritize care provision (Tulchinsky & Varavikova, 2014). This can be based on need or the identification of groups who are already disadvantaged. The targeting can take several different forms that vary from country to country, depending on their social and cultural histories. For example, in many countries older people may be exempt from charges, so reducing the cost barrier or pregnant women who may be offered the opportunity for health promotional activities at antenatal classes to begin prevention of diseases as early as possible. Further examples of groups that are targeted are homeless people, infants, and nursing mothers using mother and baby groups (Daly et al., 2013).

2.8 Examples of oral health care systems in different countries

Historically the oral health care system has been an integral part of health care system. Dentistry as separate occupation was established in the nineteenth century when Europe and United states recognized dentistry as independent occupation that requires a separate education and training in specialized institutions. The organization and development of oral health care vary widely across countries. While in some countries, dentistry is a subspecialty of medicine, in other countries dentistry is a separate specialty. Countries also vary by their health system objectives and how it is represented in the national polices. National policies influence who is entitled to care, which age group are emphasized, who provides the care, and where the care is provided. The distribution, location, and ownership of care provision facilities vary by country as a result of national oral health care policies and subsequent targeting of specific populations (Hussain & Khan, 2014).

2.8.1 United States of America

The term non-system is often applied to health care in the United States of America (USA). There are many stakeholders and providers, high costs, and poorer

results than health systems in other industrialized countries. In the USA, the oral health care system does not meet many of the criteria for an ideal system. Oral health education, service delivery and financing are largely independent of the rest of the US health care system. People subscribe to a care plan that is set up by a healthcare organization, which then contracts with dentists to deliver a certain level of care (Daly et al., 2013). There has been scant financing for research on models of maintaining oral health and delivering oral health care services. Periodontal disease and intervention have relatively low priority. Although there have been some advances in oral disease prevention, dental education in the USA remains focused primarily on treatment and promoting extensive restorations and rehabilitation rather than on primary prevention and population health status. Oral health surveillance is nearly non-existent at the local level, the level at which most programs and services are organized and delivered.

Access to the oral health care system in the USA is neither universal nor equitable, and the services available to many communities and individuals, particularly those that bear the greatest burden of disease, are far from comprehensive (Tomar & Cohen, 2010). More than 10 million Americans 65 years of age or older have lost all of their teeth, while millions of Americans suffer from periodontal diseases and other oral disorders. There is a high prevalence of gingivitis, and roughly 30% of people have periodontitis in some form or another, with less than 5% having a severe case (WHO, 2010). Instead of emphasizing primary prevention and population health status, dental care in USA continues to be predominantly focused on treating patients and encouraging major restorations and rehabilitation (Tomar & Cohen, 2010).

There are many programs in the USA that have important positive dental public health content to target groups, such as school programs; nutrition support for poor women, infants, and children, free care in emergency departments, urgent hospital care for the poor, Medicare for the elderly, and Medicaid for the poor**.** Governmental programs, such as Medicaid, covered 4% of the US$38.7 billion spent on dental treatments in 1992. More than 90% of services were paid for either directly by dental patients or by private dental insurance (Tomar & Cohen, 2010).

As for Oral health personnel, dental hygienists have provided direct access to care in the United States for decades. Older adults, persons with special needs, children in schools, pregnant women, minority populations, rural populations, and others have

benefited from the availability of many services provided by direct access dental hygienists (Tomar & Cohen, 2010).

To advancing primary care integration with oral health and expanding oral health care in health centers, The Health Resources and Services Administration (HRSA) created a funding opportunity known as the Oral Health Service Expansion in 2016. HRSA awarded nearly $156 million to support 420 health centers for up to $350,000 each to expand oral health services through funding new onsite dental providers, the purchase and installation of equipment, minor alterations and renovations, and/or the addition of new sites (Teng et al., 2016). Studies investigating the effect of HRSA funding for oral health expansion on the capacity of health centers to provide oral health care found that funding for the expansion of oral health services in health centers may have a variety of effects, including an increase in workforce and a decrease in access and financial barriers. exhibited enhanced capability for providing oral healthcare due to HRSA support to HCs (Nguyen, et al., 2020).

2.8.2 The United Kingdom

There have been major improvements in dental health over the last 30 years as measured by the proportion of the population with natural teeth and the improved condition of those teeth. These improvements have affected all age groups, including children. Despite these general improvements, groups with lower socioeconomic status continue to suffer from a poorer state than higher groups. Dental health inequalities among children are a particular concern (Daly et al., 2013 & Robinson et al., 2004). In the UK there are different ways in which oral health care is funded. Figure 2.9 shows these ways. The model that exists in the UK centred on routes 1 and 3, based on taxation, either directly or through national insurance contributions, and its subsequent allocation to various public-funded services, including dentistry (Daly et al., 2013).

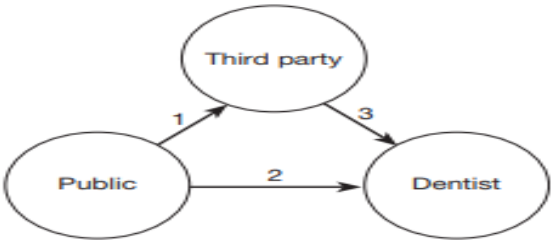

Figure 2.9: Routing of funds for oral health care

The subsequent distribution process for paying oral care workers is illustrated in Figure 2.10. There are again three mechanisms:

1. A purely private arrangement.

2. The state pays the total cost.

3. The co-payment model, where a contribution is made by the patient for the cost of his or her treatment (Tickle, 2012).

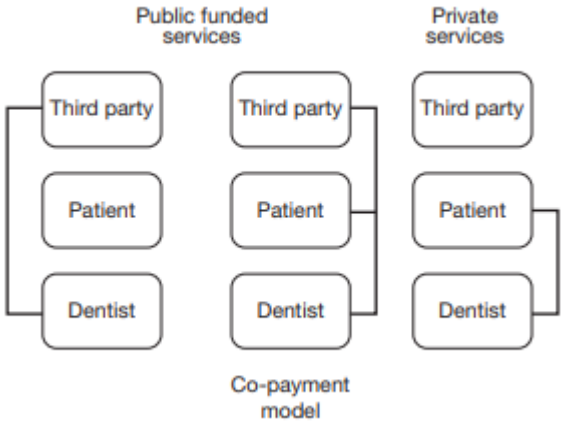

Figure 2.10: Arrangement of distribution options for paying oral care workers in UK.

In the UK, dentists have always been reimbursed in different ways. The predominant form of payment is the fee per item of service (Daly et al., 2013). General dental practitioners are free to see as many or as few patients as they want and can determine the mix between private and NHS care. The NHS dental contract in England pays dentists for the number of units of dental activity (UDA) they provide since 2006. Each contract holder has a target for the number of UDAs, they have to achieve over the year running from 1 April to 31 March (Daly et al., 2013). There are two ways in which people obtain private dental care from a dentist in the UK: out of their pocket or dental insurance arrangements (Robinson et al, 2004).

Within the UK there are various types of oral health personnel: dental nurses, dental hygienists, orthodontic therapists, dental therapists and dental technicians and the range of duties and treatments that each group is permitted to undertake is specified in regulations that are amended in the light of clinical advancement and are published in the

Scope of practice. For example, dental hygienists were not initially permitted to give any form of local anaesthesia, but now they are permitted to give infiltration anaesthesia, because they are needed in addition to dentists to get more effective service (Audrey et al., 1993).

2.8.3 Dental practice in Europe

In Europe, there are numerous distinct health systems, each with unique characteristics regarding the services offered, organizational structure, coverage, and funding. They range from a sizable public dental program, such in Scandinavian nations, to statutory illness insurance programs in Central Europe, to private services without government involvement in Southern Europe. Different member states' healthcare systems and services are undergoing union-progressive adjustments. Aging populations and changes in demographic and socioeconomic characteristics of populations pose a challenge to health care systems because they have an impact on the incidence of diseases, the rising demand for treatment, the nature of the care given, and other factors. Globally, between 6 and 10% of the national health budgets are devoted to oral care in countries in the European region. It has been estimated that approximately € 54 billion were spent on oral care and that around 900,000 health professionals are involved in providing dental care in Europe. Although several European nations accept periodontology, it is not explicitly recognized by the European Union Dental Directives. There are several sorts of auxiliary recognized across Europe, but dental hygienists are present in the majority of them (Daly et al., 2013). Decentralization and deregulation of oral health services have been more common in Central and Eastern European nations in recent years. A growing number of people are unable to afford private dental care as a result of privatization. Third-party payment systems have been implemented in a few Eastern European nations, although preventative care is not given top attention. Particularly among low-income populations, there has been an increase in demand for advanced therapy. Moreover, many children are not covered because the school dental services previously offered in most Eastern European countries have been eliminated (WHO, 2005). The failure of third-party carriers to reimburse dental practitioners for preventive and extensive reconstructive therapies constitutes an important barrier and explains their slow adoption (Tomar & Cohen ,2010). The cost of periodontal care often results in low or no reimbursement, depending on the payment scheme. On the other hand, oral health care systems often do

not provide sufficient coverage for people who belong to disadvantaged groups or certain ethnic minorities, the homeless, the handicapped, the housebound, and seniors (Ziller et al., 2015). In these countries, there is a lack of insurance coverage for dental treatments and of the older people who cannot afford to cover their oral health expenses. Even dental care programs for frail and dependent elderly within health care systems are rare. However, in certain countries, programs are designed specifically for the elderly. For example, in Denmark municipalities have been required to provide systematic, outreach oral health care almost free of charge, to dependent elderly (Daly et al., 2013).

2.8.4 Ireland

The Irish oral healthcare system is a hybrid model with a public/private mix of service provision, predominantly organized based on fee-per-item remuneration (Woods, 2017). The system is structured around three long-standing publicly funded schemes: The Public Dental Service for all children and adults with special needs and provided by salaried dentists, the Dental Treatment Services Scheme for low-income adults, and the Dental Treatment Benefit Scheme for insured persons, the latter two both provided by private independent dental practitioners. Ireland currently has a dentist density ratio of 6.1 dentists per 10,000 inhabitants. In 2014, 83% of expenditure on oral healthcare was from out-of-pocket payments by patients, with less than 1% of overall government expenditure on healthcare allotted to oral healthcare. After the economic downturn of 2008 and the severe recession that followed in Ireland, substantial cutbacks in government expenditure resulted in extensive cuts to the public sector supply of dental services and the extent of cover provided by the publicly-funded schemes (Woods, 2017). The Department of Health has recognized the major post-recessionary challenges facing the Irish health system, not least, significantly reduced budgets and capacity deficits, and acknowledges the need for change in Ireland's health service. In 2014, a three-year project commenced at the Department of Health, to develop a new national oral health policy for Ireland. Ireland has very restricted dental coverage for the whole population (Johnston & Sara, 2020). Publicly funded dental services are delivered via three schemes: Public Dental Service (PDS), Dental Treatment Services Scheme (DTSS), and the Dental Treatment Benefit Scheme (DTBS) (Woods et al., 2017). A significant proportion of the population (20% in 2016) are not eligible for any scheme and must either purchase private dental insurance or pay out of pocket for private dental care. The ‘Public Dental Service’

(PDS) is the only state-funded dental care for children and special needs populations, delivered by salaried dentists directly employed by the state. The PDS aims to “target” children for dental care in “three designated classes in primary and secondary schools”. The practice of targeting first emerged as a rationing mechanism in response to economic constraints in the 1980s by targeting two age ranges associated with the eruption of permanent teeth (ages 7–8 and 11–12) while emphasizing the need for improved orthodontic services. There is no further access to State-supported dental services for any child under age 16, except in the event of an emergency. The PDS has suffered significantly from austerity measures first introduced in 2009 with a 20% reduction in staffing levels. It was further impacted by the COVID-19 pandemic with 23% of dental professionals redeployed to COVID-19 related work. Access to care is determined by age rather than need and despite recommendations to the contrary, it remains the policy guidance under which dental services for children and special needs groups operate in 2021 (Henry et al., 2021). Oral surgery and maxillofacial surgery is delivered either by secondary or tertiary services. The base budget for orthodontics is currently approximately €16 million per year. This includes some oral surgery and restorative treatment costs and, in most cases, oral and maxillofacial surgery. The type of remuneration or payment system can influence the amount and type of service provided. In Ireland's hybrid system of dental delivery, dentists are remunerated in three ways: salaried, fee-per-item, and fee-per-item with co-payment (Woods et al., 2017).

2.8.5 The Nordic countries

A "Nordic welfare model" with universality (the right to social security), a strong public sector, and tax funding based on citizens' legal rights, equality of treatment, and high social benefits is shared by the Nordic countries. Charity and philanthropy have not contributed significantly to welfare services (Allin et al, 2004). The Nordic countries' respective healthcare systems each have unique traits, and each is undergoing transformation. In many aspects, the welfare state was invented in Denmark, Finland, Norway, and Sweden, which had social democratic governments both before and after World War II (Saltman et al., 2005). Later, the NHS in the UK had an impact on them, but with strong regional or local governmental institutions, the emphasis on a decentralized health program of health services in taxes has increased. Expenditures on

health have remained less than 11 percent, and are similar among the Nordic countries (Frenk, 2010).

Commonly, personal income taxes collected at the regional (Sweden, Norway, Denmark) or municipal (Finland) levels of government contribute between 50 and 70 percent of the funds for the health system. The majority of the balance is derived from general revenues that the government of the country collects through value-added or excise taxes as well as individual or corporate income taxes (Allin et al., 2004). With supplementary subsidies for medical education, the national funds are dispersed as block grants to reduce interregional disparities. Ambulatory visits are covered by national sickness funds. Long-term care for the elderly is funded by local governments. Patient co-payments were first implemented in Finland in 1993 and account about 2% to 3% of county health spending in Sweden. Because of the Scandinavian countries' widespread prosperity and well-established social security systems, the user fees do not pose a considerable difficulty (Saltman, 2005).

2.8.6 Sweden

Sweden is the third-largest country in Western Europe after France and Spain, with ten million inhabitants, giving a population density of only 23 inhabitants per square kilometer with an uneven distribution. The county council/regional income tax of about 12% paid on personal earnings is the main source of funding for healthcare in Sweden. In 2015, 71% of county council services were paid for by this tax. The rest is largely funded at the federal level, with just 4% of it coming from fees. 7,777 dentists were clinically active in 2014, equating to an average of 80 dentists per 100,000 people with considerable regional variation (Woods, 2017). Most of them (4,156) work in the public sector, slightly fewer than half (3,400) in the private sector, and about 5% in education and administration. There were 885 specialist dentists in 2014. A substantial number of Swedish dentists, some 770, were registered with the UK's General Dental Council in 2015. Of the 4,177 dental hygienists, 86% are currently working in oral healthcare. They can operate independently from other dental services and a number of them own their clinics/offices. They are allowed to diagnose caries and periodontitis and refer patients to a dentist. In Sweden, 85–95% of children and young people (3–21 years) are seen by public dentists and the rest by private ones. Children's and adolescents' dental care is financed solely by county council taxation and the cost in 2016 was £2.3 billion.

Adult dental care is financed by patient fees and national tax revenues. To encourage routine and preventative treatment based on individual requirements, the Public Distribution System adopted a new payment model (Contract Care) in 2008 (Andrén Ands, 2015). All county councils now provide the "Dental Care for Health" model, which is based on capitation rather than the conventional "Fee for Service". A dentist or dental hygienist undertakes an examination and evaluates the future needs for dental treatment before the patient can sign the contract. Afterward, the patient is offered an individually tailored 'home-care program', based on the risk classification for the next three years, against an annual or a monthly fee. The contract covers all examinations, preventive and conservative care, including single crowns, and emergency care (Pälvärinne et al., 2018).

2.8.7 Germany

Germany is the largest member state of the European Union, both in terms of population and number of dentists and dental team members, with 80.5 million inhabitants and 69,236 active dentists, 182,000 dental nurses, and 54,000 dental technicians in 2012. General dental practitioners in private practice provide almost all oral healthcare under a health insurance scheme (Ziller et al., 2015). Currently, 86 percent of Germans are covered by a statutory sick fund, which pays for a legally required standard oral healthcare package delivered by dentists under contract with the health insurance system. A smaller number are privately insured. Good dental healthcare is widely available, and in 2013, 80 percent of individuals visited a dentist. Healthcare expenditure in Germany has long been considered high. Dental auxiliaries can only work under the supervision of a dentist; they cannot practice independently. High dental technician to dentist ratios have been and continue to be a defining characteristic of German dentistry (Busse et al., 2014).

2.8.8 Spain

The second-largest European Union Member State with an area of 504,645 km^2 and is the fifth most populated one with a total of 46.5 million inhabitants. In December 2014, there were 33,346 active dentists with a ratio of 1:1394 dentist population ratio. The Spanish National Health System provides comprehensive cover for general health, but very little oral healthcare for adults. Only emergency care and oral surgery (dental extractions) for adults are provided in publicly funded clinics. The vast majority of oral

health care is provided in the private sector and over 90% of dental professionals work in the private sector. Nevertheless, children aged 7–15 years are covered (with some restrictions) by publicly funded oral healthcare with different care models, depending on the local health authority, and some of them are funded by a capitation system which was introduced 25 years ago (Bravo et al., 2015).

2.8.9 South-East Asia

Oral diseases such as dental caries, periodontal diseases, tooth loss and oral cancer have emerged as a major public health problem. In view of the prevalence of risk factors and inadequate access to and affordability of preventive and curative oral health services, oral diseases have a growing impact on the health and well-being of people. Oral health services in these countries are mainly treatment oriented with few exceptions. The workforce is also inadequate and dentists prefer to practice in urban settings, which worsens the situation in rural areas. Some countries depend on utilization of dental health technologists, dental therapists, dental nurses or primary health care workers, but even using these paraprofessionals, the health care coverage of the population is still inadequate. The lack of oral health policies in some countries precludes not only proper intervention but also the designing and implementation of health promotion and disease prevention activities. The inadequacy of economic resources and properly trained personnel also prevents the recording and dissemination of data on disease prevalence and trends which could serve as a basis for developing adequate strategies. Capacity building of local oral health personnel on research and policy development is limited. Educational curricula need to be reoriented towards preparing primary oral health care workers and oral hygienists. Thus, considerable challenges remain in South-East Asia. It should be noted that Thailand has made impressive systematic efforts to develop oral health goals and regularly monitors the prevalence of disease conditions. Oral health promotion and prevention activities are available to specific population age groups (WHO, 2009).

2.8.10 Saudi Arabia

In the field of dentistry, the services provided by the Saudi Ministry of Health have been divided into three levels: The first level are the dental clinics in the primary health care centers. This level serves all members of the community affiliated with the

center and provides primary health care like primary fillings, extraction, and treatment of emergency cases, in addition to providing preventive services. The second level are the dental clinics in the dental departments of the hospitals. This level provides specialized treatment services for referrals to clinics from Primary health care centers such as oral minor operations and fixed and removable prostheses. The third level is the dental clinics located in the dental centers. Advisory is a level that provides advisory services in all disciplines, as well as providing dental training services.

In the Saudi health care system, dental lab technicians are the technicians working in the laboratory, and each of them works in a specific field according to his expertise and technical capabilities. Qualifications and Experience; Bachelor's degree in Dental Technician from College of Applied Medical Sciences or Dental technician diploma with experience in the field of work according to specialization. Organizational position; they are directly related to the chief technician of the laboratory and work in the field of specialization assigned to them (The Organizational Regulation of Dental service, 2004).

2.8.11 Nigeria

The essential features of the health care system in Nigeria are its comprehensive nature, multisectoral inputs, community involvement, and collaboration with non-governmental providers of health care. The evolution of health care in Nigeria from a very limited colonial health service (British colonial period) to a centrally managed service with serious underfunding, and then to a more universal system, reflects post-independence trends in many countries (Tulchinsky & Varavikova, 2014). Facing a population explosion and contracting economies, African countries went through a very difficult transition in the 1980s and again in the first decade of the twenty-first century. Health information systems are inconsistent with limited reliability for policy and decision-making within the country and regionally. Whilst most developed countries of the world have oral health policies that are targeted toward oral disease prevention, a major barrier to improving oral health in the African Region is the absence of oral health policies to guide oral health activities (WHO, 2005). Some of the factors that can influence the health policy environment in low and middle-income countries are the kind of health system operated by the country, their purchasing power, the influence of the private sector and the level of international influence on the health system (Meessen et al., 2017). In Nigeria, there is a high burden of oral health diseases, poor coordination of

health services and human resources for the delivery of oral health services. In Nigeria PHC workers include nurses, community health officers, and community health extension workers (Braimoh, Ogunbodede, & Adeniyi, 2014). The result of a study conducted in 2014 reveals that PHC workers in Nigeria do not have adequate knowledge of common oral diseases and would thus benefit from training programs to enable them to provide oral health care as an integral part of general health (Braimoh et al., 2014).

2.8.12 Libya

Libya is a large nation in North Africa that has 1,800-kilometer border with the Mediterranean Sea. It is the fourth-largest country in Africa and the seventh-largest country in the world, with a total area of 1,760,000 km^2. Its borders are the Mediterranean Sea to the north, Tunisia and Algeria to the west, Egypt and Sudan to the east, Chad and Niger to the south, and Tunisia and Algeria to the west. The population was approximately six million in 2012. (WHO, 2013).

Figure 2.11: Map of Libya

The health care system in Libya in 2011 collapsed as a result of the increased demand imposed during and after the revolution (El Oakley et al., 2013). Even more the Libyan health system faces workforce issues due to a lack of skilled personnel, poor distribution, and the exodus of both domestic and foreign skilled professionals, especially in the wake of the war and the ensuing political and economic issues. An absence of inter-sectoral approach between the Ministry of Health and Education to make informed decisions about spending the limited resources available on the cadres that meet current health system goals and requirements has also contributed to the situation's escalation (Jabeal, 2018). There are 8.9 dentists per 10,000 people in Libya (WHO, 2022). In light of its small population, Libya is one of the nations with the highest proportion of dentists. The planning and development of oral health services and workforce have been carried out with little proof of the dental needs of the population, as data on oral health is limited. The majority of dentists are part of the governmental and private sectors of Libya's oral healthcare system. For creating and developing oral health services, there is insufficient evidence of the population's dental needs due to a lack of data. Unfortunately, the biological approach underlies government spending on oral health, prioritizing initiatives for diagnosis and treatment above those for prevention (Huew et al., 2012a). The government's system for maintaining oral health in Libya mostly relies on routine checkups, minor oral surgery, teeth scaling, and restorations, with little emphasis placed on preventive measures (Peeran et al., 2014). Contrarily, there are private dental offices that provide a variety of services in oral health care for individuals who can afford it (Huew et al., 2021). In Libya, there are numerous public dental institutions from which dentists can graduate after six years of education. Numerous dental schools with private funding have also been created. This has contributed to the steady increase in the number of dentists in Libya (Jabeal, 2018).

Although dentistry is a vital part of the larger health care system, which is a component of society's entire social welfare system and dentists should be aware of the fundamental components of the healthcare system they are a part of as health providers, the city of Benghazi lacks a lengthy description of the Libyan oral healthcare system. This research attempts to explain the oral health care system in Libya in terms of its main components in order to close this information gap.

Study aim:

Description of Libyan oral health care system in terms of the structure, function, personnel, funding, reimbursement, and target group.

The objective of this study is to describe:

- How the Libyan oral health care system is structured.
- What the Libyan oral health care system set out to achieve.
- Who delivers the work in the oral health care system of Libya.
- Where the funds are derived from.
- Methods of payment and remuneration for oral health personnel in Libya.
- Which groups are prioritized.

3. Methods and materials

3.1 Study design

This study followed Yin's single descriptive, exploratory case study approach and employed three data collection and analysis strands. The case study design was chosen because it allows an in-depth understanding of the phenomenon understudy by collecting data from different sources of evidence, known as triangulation. Triangulation means the use of multiple sources of data or multiple approaches to enhance the validity of the study. Therefore, a single descriptive, exploratory case study with a mixed study design that included quantitative and qualitative methods of data collection was used. A cross-sectional self-administered paper-based questionnaire was used for quantitative data collection, whereas a semi-structured face-to-face interview was used for qualitative data collection. In addition, a narrative review of previous studies, Libyan Health Law of 1973 and governmental reports were used to extract, analyse, synthesize and report the findings (documentary analysis). Case studies are most commonly associated with qualitative research and data, but quantitative data can be incorporated where appropriate. The case study has been the common research strategy in psychology, sociology, political science, business, medicine and public policy. The case study requires a high degree of depth and breadth, with careful attention to showing how the evidence supports the conclusions reached. Semi structured interviews, questionnaires and documentary analysis were used to collect data from study participants.

3.2 Outline of the case study design

According to Yin 2014, in the case study, the case (this can be individuals, organizations or groups), propositions (this is what the case study trying to answer) and the boundaries of the case must be determined to avoid unnecessary data collection and save time and resources. Therefore, these important steps are:

1. Formulating appropriate research questions that will shape the structure of the study to come (propositions).
2. Define what the 'case' in your case study.
3. The research questions should be clear so that it provides what aspects of the cases are of interest, it will not be feasible to investigate every aspect of your chosen cases (boundaries).

3.2.1 Propositions

The propositions are used to guide the data collection and discussion. Each proposition serves to focus the data collection, determine direction and scope of the study and together the propositions form the foundation for a conceptual structure/framework (Stake, 1995). In case of exploratory studies, propositions may not be present due to the fact that the researcher does not have enough experience, knowledge, or information from the literature upon which to base propositions. For those of more familiar with quantitative approaches to experimental studies, propositions can be equated with hypotheses in that they both make an educated guess to the possible outcomes of the experiment/research study. In the light of the nature of our study and its objectives, following propositions were assumed:

- Libyan oral health care system is structured as primary, secondary and tertiary level of care.
- The Libyan oral health care system set out to achieve promotive, curative, and preventive goals.
- Dentists, nurses, dental technicians are the providers of dental care.
- The Libyan health care system is funded by state public treasury in governmental sector and out of pocket or insurance in private sector.
- Methods of remuneration for oral health personnel in Libya are mainly by fixed salary in public sector and a percentage agreed upon between the dentist and the employer, or a salary for nurses according to the number of working hours.
- Special needs, children and older people are prioritized in the Libyan health care system.

3.2.2 Case definition

In the present study, the case is defined as the oral health care system as it exists in the city of Benghazi, Libya. Therefore, the study was limited geographically to the city of Benghazi, which is located on the Libyan coast in the eastern Province.

The city of Benghazi is the second largest in the country, with around one million inhabitants who descends from different Libyan tribes and cities. The study is conducted

in the health care facilities, which include both public and private sectors. All settings of providing health care in the city of Benghazi were involved in the data collection.

These include hospitals, policlinics, private dental practices, special care centers, university clinics, and other places such military and volunteer clinics.

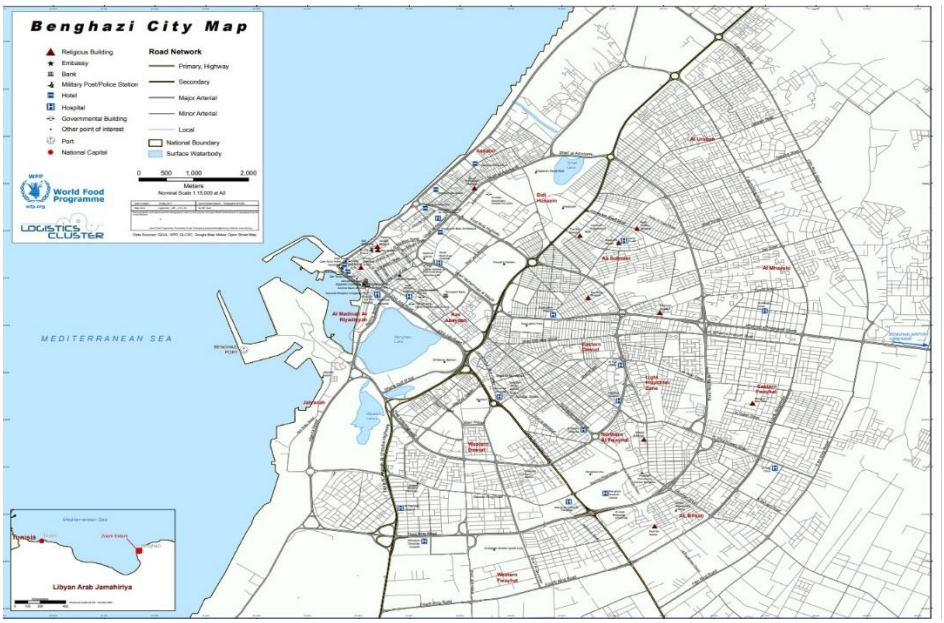

Figure 3: Benghazi city map

3.2.3 Boundaries of the case

Boundaries require researchers to scope their study. Researchers choose a bounded context which can contain a person, an organization, a class, a policy, or any given unit of study. Boundaries also help a researcher to define what will not be included in the study. The Libyan oral health care system was described in terms of the components of oral health care system, summarized as following:

- Oral health care structure: primary, secondary or tertiary. This included health care settings
- Function: promotive, protective, preventive, diagnostic, curative and rehabilitative measures.
- Personnel: education, professional development, qualifications skills, experience, distribution, workforce numbers, reimbursement and training.
- Funding: taxation, insurance (either compulsory or voluntary) or out of pocket.

- Reimbursement: fee for service, capitation, diagnostic related-payment, or salaried.
- Target group: older people, schoolchildren, mother and baby groups, disadvantaged people.

3.3 Participants

This study included all those we could reach from health care workers working in the public and private health sectors who agreed to participate in this study. Following service providers were recruited for the study (Table 3.1).

Table 3.1: Description of key informants of interviews

Number	Gender	Age	Current job
1	F	48	Health administrator in the public health sector
2	F	43	Dentist in the public health sector
3	M	49	Dentist and faculty member
4	M	38	Dental technician
5	M	35	Dental technician in the public and private health sector
6	F	42	Dental nurse in public and private health sector
7	M	23	Oral hygienist
8	M	38	Dentist in public and private health sector
9	M	43	Works in the field of medical insurance
10	F	36	Dental nurse in public and private health sector
11	M	36	Legal advisor in the public health sector
12	F	35	Dentist in public and private health sector
13	F	32	Dentist and owner of private clinic
14	M	53	Health administrator in the public health sector
15	M	36	Health administrator in the public health sector
16	M	47	Dentist and owner of private health sector and faculty member
17	F	32	Dentist in public health sector
18	F	36	Dentist in public and private health sector
19	F	44	Dental nurse in public and private health sector
20	M	37	Manager of public health center
21	M	50	Manager of general hospital
22	M	47	Dentist and faculty member

Stakeholders

Policy makers, owners, insurance staff, and administrative personnel

Dental practitioners

Dentists working in various health care facilities were invited

Dental Auxiliaries

Non-dentists who work in the dental field were recruited (Oral hygienists, nurses, technicians)

3.4 Cross-sectional survey

A cross-sectional survey using a self-administered questionnaire was conducted among dental practitioners in the city of Benghazi. The cross-sectional study in this case study relied on the diversity in the selection of health institutions in which the questionnaires were distributed, as the questionnaires were distributed to dentists in different health institutions located in different areas of the city of Benghazi. Out of 150 questionnaires handed out to the dentists, a total of 121 questionnaires were received.

3.4.1 Design and development of the survey

The questionnaire was designed by the main researcher and the questions were developed based on the boundaries of the case study. A pilot study among 10 dentists was carried out to pre-test the questionnaire for clarity and understandability. They were asked to complete the questionnaire and provide feedback regarding each question. They were particularly asked to indicate their understanding of each question, and to give suggestions regarding ways to improve wording and the categories given in close-ended answers. Their feedback was supplemented by cognitive interviewing (Ritchie et al., 2013 & Willis, 2004). Two participants were interviewed while completing the questionnaire, in a think-loud exercise to gain further understanding as how dentists would interpret each question responses (Beatty & Willis, 2007). Most of the feedback received was related to question wording, which were then re-phrased to tighten comprehensiveness of the questionnaire. The participants in the questionnaire piloting process were not included in the final sample. Few questions have been modified based

on the comments that came about them. The question format and questionnaire layout were refined over extensive discussion with the supervisor. A variety of open-ended as well as close-ended structured and yes/no, questions were used. A free text response section was included at the end of each structured question to enable participants to add any further responses. The final questionnaire comprised of 26 open ended and close-ended questions, distributed over 6 sections (Appendix 1):

- Oral health care system structure.
- The oral health services provided by the system.
- The oral healthcare workforce.
- Oral health care funding.
- Methods of payment and remuneration for oral health personnel in Libya.
- Target population that are prioritized for oral health care delivery.

3.4.2 Administration of the survey

The questionnaire was handed by the main researcher to the dentists while working in their practice. The principal investigator introduced herself to the dentist and explained the aim of the study. She was available (via phone) to clarify any issue that was not understood by the participants. The questionnaires were collected within a week from the reception desk or immediately upon the request of the participants.

3.4.3 Sampling

The convenience sampling strategy was used because of the exploratory nature of the study. However, dentists were recruited from various dental practices to reflect the range of dental care provided in the city. Therefore, the sample was drawn from the Specialized Center for Dental Treatment and Education/ Benghazi, health centers and polyclinics in different areas of the city of Benghazi, public specialized centers and hospitals as well as several private dental clinics and centers.

3.4.4 Survey data analysis

Statistical Package for the Social Sciences (SPSS) was used to analyze and manage the data. Descriptive analysis was undertaken to summarize the distribution of study sample characteristics and the distribution of different answers to survey questions.

The free text questions were analyzed using quantitative content analysis strategy. The answers were first categorized and then counts of responses were computed.

3.5 Qualitative interviews

Semi structured interview with a purposeful sample of the key informants (Managers of oral health centers and hospitals, dentists of various specialties with experience in the field, nurses, dental technicians, and officials in the affairs of medical insurance) was recruited for qualitative data collection. We were introduced to the potential participants, then explained the aim of the study and handed out study information sheets. in order to fulfil the ethical requirements of this study that the participants should be given enough time to decide whether or not they will take part. before commencing data collection, a consent was obtained.

All the interviews were audio- recorded and undertaken in a quiet non clinical room. Topic guides were used for each interview, which were modified iteratively after each interview and throughout the study to accommodate issues noticed in the interviews. No particular order of questions was followed, allowing the participants to freely connect different topic areas. The interviews started with an open question: How do you can describe oral health care system in Libya? The interview was conducted using topic guide (Table 3.2) (Britten N., 1995). The sample was continuing until saturation was reached. Saturation is defined as "data adequacy" and operationalized as collecting data until no new information is obtained (Morse, J. M., 1995).

Table 3.2: Interview guide for collecting the qualitative data from study participants

Activity	Comments/Questions	Approximate Time
Introduction	• Introduce your self. • Explain goals of interview. • Review interview method, use of data, confidentiality, and so on.	10 min
Open question	How do you can describe oral health care system in Libya?	5 min
Discussion Questions	• How the Libyan oral health care system is structured? • What the Libyan oral health care system set out to achieve? • Who delivers the work in the oral health care system of Libya? • Where the funds are derived from? • What are the methods of payment and remuneration for oral health personnel in Libya? • Which groups are prioritized?	20 min
Finally	• Do you have anything you want to say?	

Qualitative data analysis:

All The interviews were audio-recorded then transcribed verbatim as soon as they were collected by the principal investigator. The framework analysis (Ritchie et al., 2013) was used. It started with a familiarisation stage that involved listening to the audiotapes, reading and re-reading of the manuscripts, to become immersed in the data and to gain an overview of ranges and diversities of the gathered material. The analysis was performed using a preliminary coding framework based on the components of oral health care system. As the analysis progressed the preliminary framework was refined and adjusted according to the emerging themes that were then explored in the subsequent interviews. Thus, analysis was undertaken concurrently with data collection. Constant comparison across interviews was applied so that emerging themes were based on converging the interpretation of all sets of data. Hand highlighting of key ideas was carried out on hard copy for all the transcripts, then potential themes, subthemes and codes were identified. Initial codes were then systematically applied to all transcripts until all data has been assigned suitable codes. Only data that showed a relevance to research questions were coded. Because interview data may be subjective and ambiguous (Pannucci et al.,2010), validity of analysis has been achieved with the participation of an experienced researcher other than the principal investigator in the analysis. After that, the opinion of a third person from outside the dental field was taken in the analysis. A discussion was held between the three researchers to remove unsupported themes, create new themes, reduce homogenous themes together, and split heterogeneous ones. Finally, the themes were organised into overarching fewer themes. Then data extracts were selected to be presented in the research context.

3.6 Document analysis:

A documentary analysis is a systematic procedure for reviewing documents, requiring data be examined and interpreted to elicit meaning and gain empirical understanding of a given topic (Bowen, 2009). This systematic documentary analysis aimed to examine the relevant reports, policies, service documents, academic publications and other literature that have been collected from published sources, including the Ministry of Health (MoH), Ministry of Manpower (MoM) and the World Health Organization (WHO). The potential limitations of documentary analyses include: an absence of detail, low retrievability or

biased selectivity (Yin, 1994). Qualitative and quantitative content analysis was applied to the documents.

3.7 Ethical consideration

Ethical approval for this study was obtained from the Research Ethics committee at the faculty of Dentistry, University of Benghazi. To maintain the anonymity, no personal identifiers were used in the questionnaire or interviews and the participants were allowed to withdraw from the study at any time, with no penalties associated with refusal or withdrawal from participation. Consent was implied by answering to the questionnaire or conducting the interview.

4. Results

4.1 Quantitative results

4.1.1 Sociodemographic characteristics of survey responders

Table 4.1 shows the sociodemographic characteristics of questionnaire responders. Out of 150 questionnaires handed out to the dentists, a total of 121 questionnaires were received. They had complete and reliable information, suitable for data analysis, giving a response rate of 80.6%. The participants aged between 23 and 63 years of age, and almost three quarters of them were females (73.6%). The majority of them were considered themselves GDPs (89.3%) although some of them had a specialty diploma. More than three-quarters of the participants get Bachelor of Dental Surgery (BDS) only and the rest of them had Master of Science (MSC) (10.7%) or Doctor of Philosophy (PhD) degree (0.8%). The participants worked in different health sectors: governmental sector only (33.9%), private sector only (26.4%) and both (39.7%).

Table 4.1: Sociodemographic characteristics of questionnaire responders

Variable		N (%)
Gender	Male	32 (26.4)
	Female	89 (73.6)
Professional status	GDP	108 (89.3)
	Specialist	13 (10.7)
Degree	BDS only	91 (75.2)
	MSC	13 (10.7)
	PhD	1 (0.8)
	Speciality Diploma	16 (13.2)
Works in	Private only	32 (26.4)
	Public only	41 (33.9)
	Both	48 (39.7)
Variable	Mean (SD)	Min- Max
Age	34 (6.4)	23- 63
Years of experience	7.8 (6.7)	1- 40

4.1.2 Professional development and the continuous education

Figure 4.1 illustrates the professional development and the continuous education of the participants, as the vast majority of them received post-graduate (PG) courses and attended conferences. Most of the participants attended courses and local and international conferences related to conservative dentistry (50.4%), endodontics and fixed prosthodontics (38%). On the other hand, oral medicine and preventive dentistry were the least attended courses (3.3% and 1.7%, respectively)

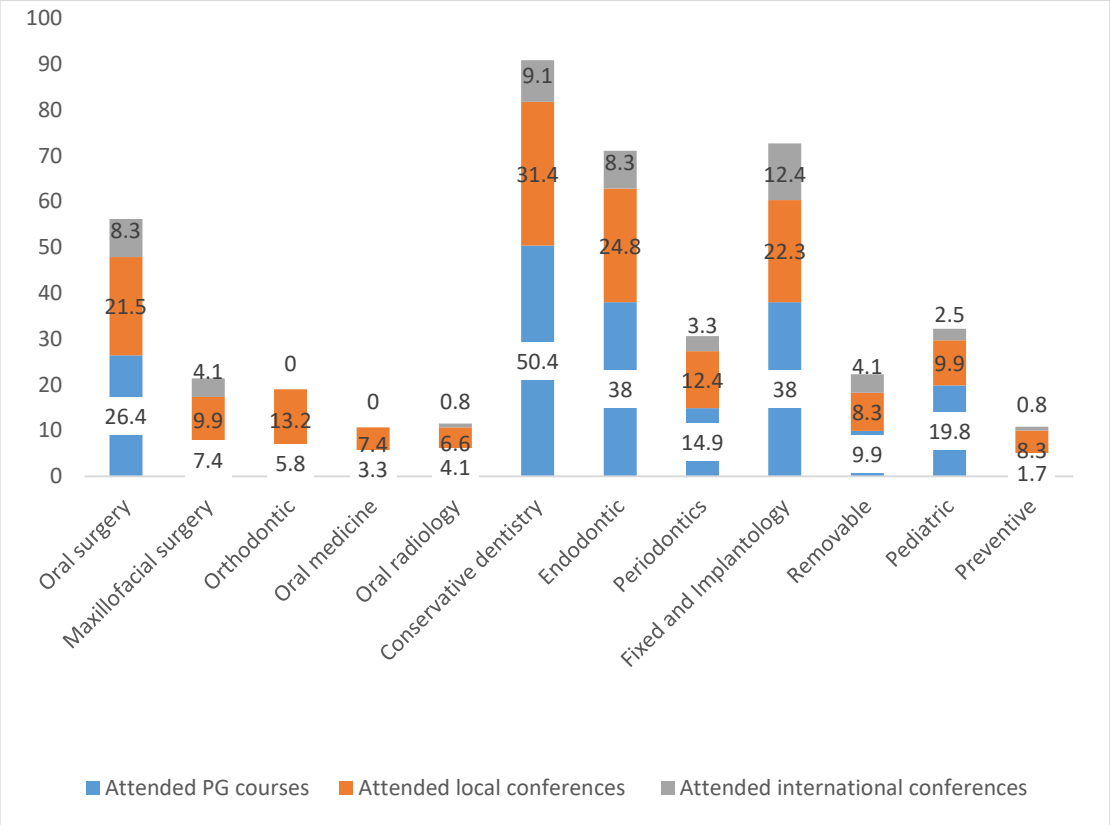

Figure 4.1: Professional development of the study participant (percentage)

The figure below shows that nearly a third of the participants who agreed that they need training courses, answered with fixed prosthodontics and implantology courses (29.6%). The second and third highest percentages were for cosmetic dentistry (13%) and endodontic (14.8%). Only a small number of respondents (1.9%) answered that they need training courses in maxillofacial surgery, conservative dentistry and information technology (Figure 4.2). Some participants did not indicate their need for training (9%).

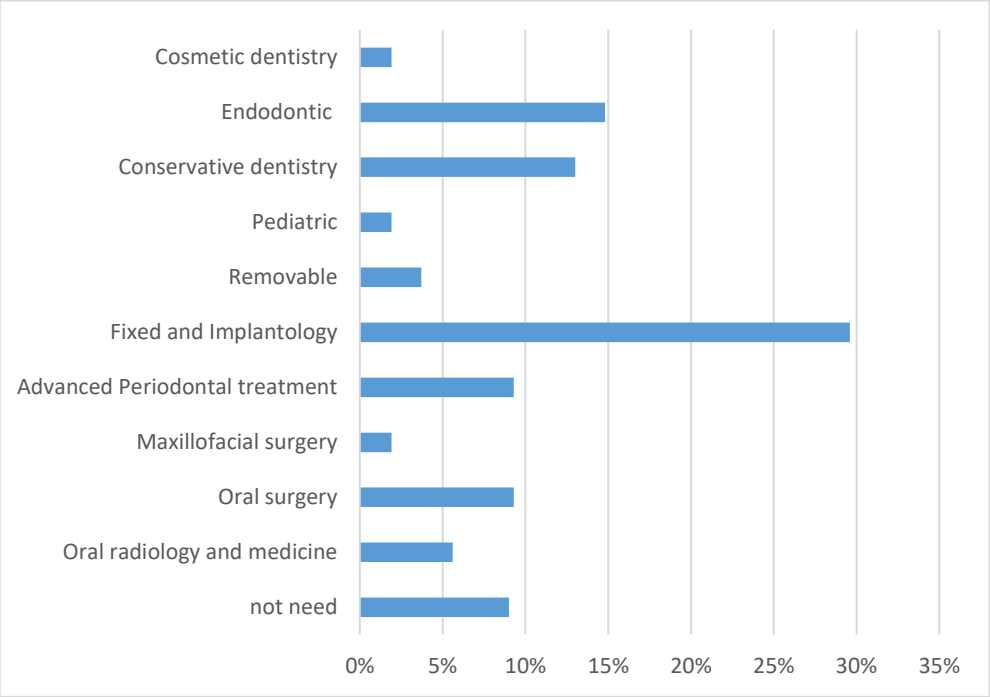

Figure 4.2: The perceived need of training courses among study participants

4.1.3 Characteristics of the dental facilities in city of Benghazi

Table 4.2 illustrates some of the main characteristics of the dental facilities in city of Benghazi. More than a third of the participants that worked in governmental health sector were working in the Specialized Dental Center (39.3%) and all of them agreed that this center provides training courses for nursing staff and dentists in most departments. The remaining two-thirds were distributed as following: working in dental clinic in one of the polyclinics (24.7%), dental clinic affiliated to the dental department in public hospitals (5%), motherhood and childhood office (1.12%), dental clinic affiliated to a center for special needs people (2.25%), Health educational institution such as a dental college (21.35%), Al Jala Teaching Hospital for Surgery and Trauma (1.12%), Military medical services (1.12%) and Al kiesh Specialized center and Primary Health Care (3.4%).

Most of the participants who work in the private sector were from dental centers that offer a variety of services (82.5%) and none of them indicated that there is a dental center in Benghazi that offers dental services in one specific specialty. In terms of ownership of private health sector, practices owned by several dentists as partners was the most common type (55%). With regard to the availability of training, the study participants indicated that 44.4% of health care facilities provide training courses, but almost two-thirds of the participants (64%) said that those were for nursing staff, not for doctors.

Table 4.2: Characteristics of Libyan oral health care facilities in city of Benghazi

Variable	Subcategories	N (%)
Type of public facility	Dental clinic in one of the poly clinics	22 (24.7)
	Dental clinic affiliated to the dental department in public hospitals	6 (6.7)
	Primary Health Care Office (Motherhood and Childhood)	1 (1.12)
	The Specialized Dental Center	35 (39.3)
	Dental clinic affiliated to a center for special needs people	2 (2.25)
	Health educational institution such as a dental college	19 (21.35)
	Al kiesh Specialized center and Primary Health Care	3 (3.4)
	Al Jala Teaching Hospital for Surgery and Trauma	1 (1.12)
	Military medical services	1 (1.12)
Type of private facility	Dental department in a private clinic or hospital	9 (11.25)
	Dental clinic only has one or two dental chairs	7 (8.75)
	Dental center that offers a variety of services	66 (82.5)
	Dental center that provides specialized service	0
	Health educational institution that provides dental services such as the International University	2 (2.5)
	Private training centers	1 (1.25)
Ownership of private health sector	Owned by one dentist	21 (26.25)
	Owned by several dentists as partners	44 (55)
	Owned by an investor from outside the dental field	5 (6.25)
	Owned by several dentists and outside investor	2 (2.5)
	Don't know	8 (10)
Availability of training	Yes	54 (44.6)
	No	67 (55.4)

4.1.4 Qualifications of the nursing staff in dental health facilities

This section of the questionnaire required respondents to give information on qualifications of the nursing staff, they were asked to indicate whether nursing staff have general or dental nursing diploma or other qualifications. It can be seen from the data in table 4-3 that the total number of responses for this question was 118. Nearly one fifth (19.5%) of them answered that there were nurses had general nursing diploma, 10% answered with dental nursing diploma and 14.4% answered with both. The table also shows that there is a group of respondents who indicated to other qualifications, such as dental technician, dental hygienists, non-medical specialties or without an academic qualification. There were more than 40% of participants who did not know the answer to this question (42.4%).

Table 4.3: qualifications of the nursing staff in dental health facilities in Benghazi (n=118)

Qualifications of the nursing staff	**N (%)**
General Nursing Diploma	23 (19.5)
Dental Nursing Diploma	12 (10)
Some of them are general nursing and some of them have a diploma in dental specialty	17 (14.4)
Dental hygienist	3 (2.5)
Dental technician	1 (0.8)
Taking first aid courses	2 (1.7)
Non-medical specialties	6 (5)
Without an academic qualification (with experience)	4 (3.4)
Don’t know	50 (42.4)

4.1.5 Function

Table 4.4 shows the distribution of dental services provided in the public and private sectors. As can be seen, more than half of participants reported that the available dental services in public sector institutions are simple extraction (94.3%), scaling and polishing (85.3%), minor oral surgery (74%) simple fillings (69.6%), general childcare (64%), root canal treatment for anterior teeth (56%) and removable prosthesis (53.9%). More than a quarter and less than half of the participants indicated that public sector provided more services such as root canal treatment for posterior teeth (31.4%), advanced periodontal treatment (26.9%) and preventive services (44.9%). Only a small number of respondents indicated that fixed prosthodontics (16.8%), specialized child dental care (16.8%), cosmetic dental care (8.9%) and major oral surgery (2.2%) were available in public sector. Most of the participants indicated that all dental services are available in the private sector except for diagnostic services such as biopsy (30%) and CBCT (42.5%) and major oral surgery that it is available in public sector only (Table 4.4).

Table 4.4: Function of public and private oral health sector in Benghazi

Type of service	Dental services provides	Public N (%)	Private N (%)
Diagnostic services	Biopsy	18(20.2)	24(30)
	OPG	42(47.1)	64(80)
	CBCT	3(3.3)	34(42.5)
General dentistry	Simple extraction	84(94.3)	79(98.8)
	Scaling and polishing	76(85.3)	79(98.8)
	Direct restoration (composite, amalgam)	62(69.6)	79(98.8)
	Root canal for anterior teeth	50(56)	78(97.5)
	Preventive dentistry (fluoride, sealant)	40(44.9)	65(81.2)
	Health advice on diet and oral hygiene	37(41.5)	49(61.2)
Specialized care	Minor oral surgery	66(74)	76(95)
	Major oral surgery	2(2.2)	0
	Advanced periodontal treatment	24(26.9)	64(80)
	Fixed prosthesis	15(16.8)	76(95)
	Removable prosthesis	48(53.9)	74(92.5)
	Cosmetic care	8(8.9)	65(81.2)
	Endodontics of posterior teeth	28(31.4)	76(95)
	Dental implants	4(4.5)	68(85)
	Orthodontics	16(18)	67(83.7)
General child care	Diagnosis, pulp therapy and exodontia	57(64)	71(88.7)
Specialized childcare	Space management and oral habits , interceptive orthodontics	15(16.8)	61(76.2)

4.1.6 Funds in the private sector

This section of the questionnaire required respondents to give information on the way in which the payment is taken from the patient (Figure 4.3). Just under half of those who answered this question reported that the reimbursement is taken from the patient through out-of-pocket payments (45.7%) and other reported that it was through partial subscription from the patient's employer for certain services (17.3%), subscription from the patient's employer for certain services in full (16%) or by contracting with a medical insurance company (14.2%).

Only a small number of respondents indicated that subscription from the patient's employer was open to all services (6.2%). One participant chose an option (other) and commented that in the private educational places, the patient pays a small amount and the trainees pay the rest.

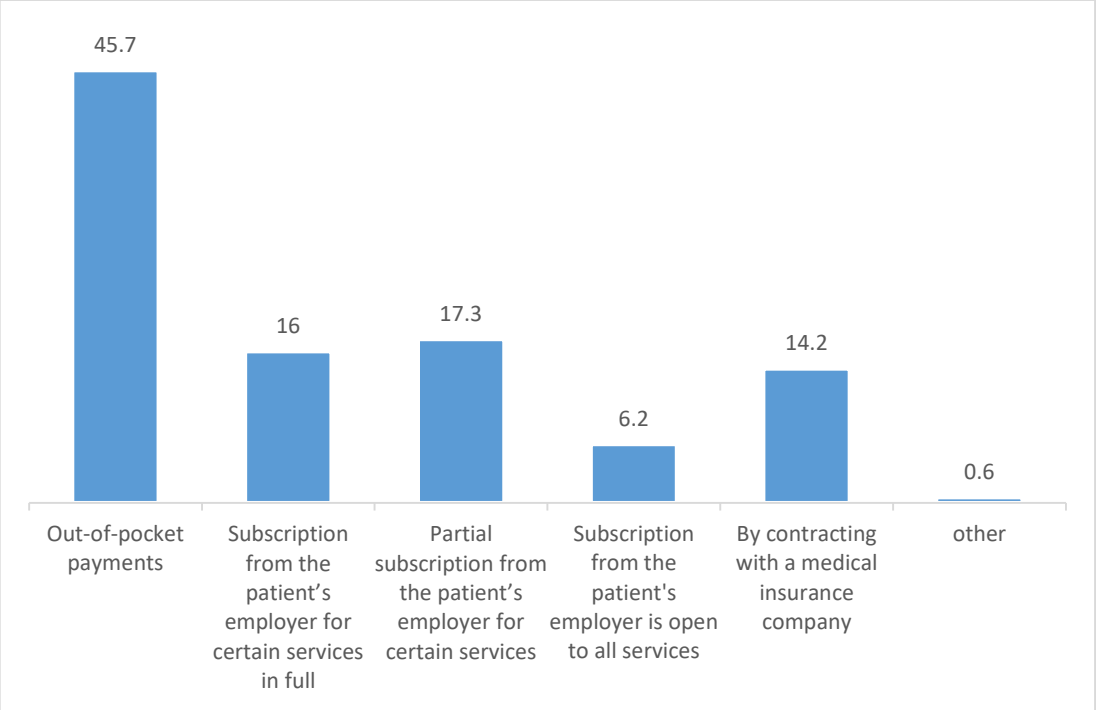

Figure 4.3: Funds in the private sector of Libyan oral health care system in Benghazi (percentage)

4.1.7 Insurance

From the pie chart, it can be seen that the participants who worked in the private sector indicated that the dental services that are not covered by insurance are dental implants (20.8%), orthodontics (19.5%), dental cosmetic services (11.7%), fixed prosthesis (10.3%) and removable prosthesis (3.9%). The rest did not answer the question (33.8%).

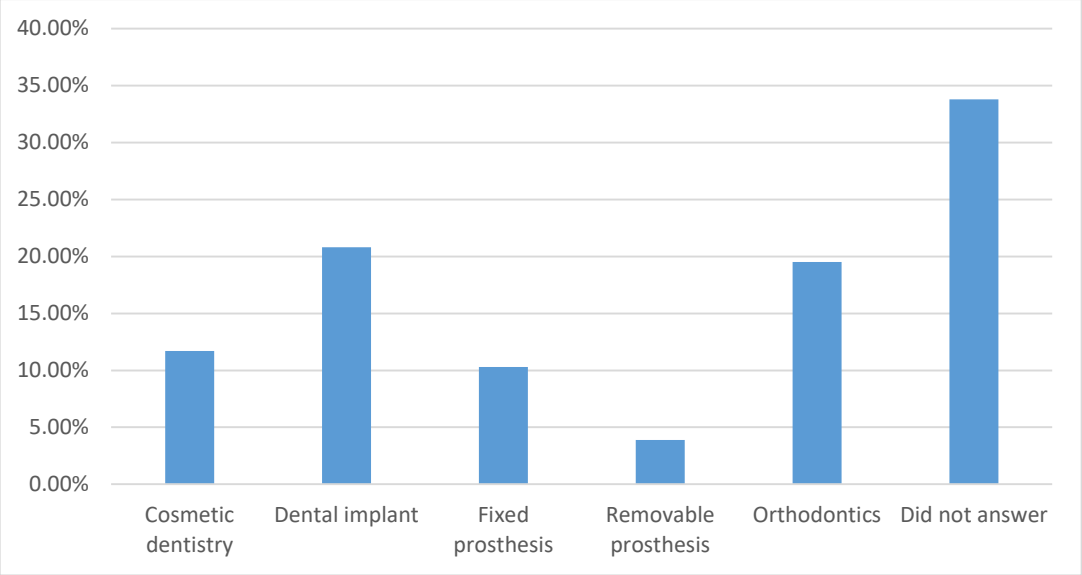

Figure 4.4: Dental services that are not covered by insurance in private sector of oral health system in Benghazi

4.1.8 Reimbursement

It is apparent from Table 4.5 that the vast majority of those surveyed and worked in the private sector indicated that dentists who worked in private sector were paid for his work in the manner of fees according to the type of service (fee for service, 97.5%).

Table 4.5: ways of reimbursement in the private oral health sector in Benghazi

Variable	Subcategories	N (%)
Reimbursement	Fee-for-service	78 (97.5)
	Capitation	1 (1.25)
	Salaried	1 (1.25)
	Other	0

4.1.9 Target groups

In response to the question: 'Is there a target group for dental treatment in the place you work?', most of responses were 'No' (81.8%), but there were a small number of respondents indicated that some of the public health care facilities provide dental services for target groups which are Psychiatric patient, Army personnel, Children with special needs, People with special needs (adults and children), Diabetics, Hospital kidney patients and Maxillofacial trauma patients (Table 4.6).

Table 4.6: Target groups in the oral health care system in Benghazi

Question	Answer	Percentage
Is there a target group for dental treatment in the place you work?	Yes	8.3%
	No	81.8%
	Don't know	9.1%
Types of target groups	Psychiatric patient	0.8%
	Army personnel	0.8%
	Children with special needs	0.8%
	People with special needs (adults and children)	0.8%
	Diabetics	2.5%
	kidney patients	0.8%
	Maxillofacial trauma patients	0.8%

4.2 Qualitative analysis

The analysis is triangulated by different sources of information which included interviews with key informants involved in dental service as well as a documentary analysis. A framework analysis was conducted to describe the health care system in the city of Benghazi. The themes were predetermined, however, the analysis allowed for the emergence of sub themes. Six themes were predefined and guided the analysis. These are: 1. Structure, 2. Function, 3. Oral health personnel, 4. Funding, 5. Reimbursement and 6. Target group.

4.2.1 Structure

Structure refers to how the care system is organized and its levels of care. Generally, the Libyan health care system is a hybrid system that has both governmental and private sectors. The governmental sector is mainly run by the Ministry of Health (MOH). However, there are other governmental parties which provide health services.

Integrated dental services

The administration as well as the provision of dental services is integrated within the medical services and hence follow the general policy of the Libyan health care system (Appendix 2). The Libyan health care system can be described at two levels of administrative hierarchy.

1. The national-level: these are health care facilities and services that affiliate directly to the MOH and include rural, specialized and central hospitals.

2. The local level represented by regional Health Service Administration (HSA) that is responsible for health units, centers, polyclinics and primary health care facilities (appendix 5).

- Informant (20) "*Institutions that are financially independent, such as the Salmani Specialised Center, report directly to the Ministry of Health".*
- Informant (14) "*A public clinic, a rural hospital, a general hospital, a teaching hospital like al-Jalaa, a specialized center, and these are directly affiliated to the Ministry of Health".*

- Informant (3) "*Rural hospitals, general hospitals, teaching hospitals and specialized centers affiliated with the Ministry of Health".*
- Informant (15) "*We, as a health services administration, report directly to the Ministry of Health and provide only primary health care services. We are divided into: Occupational health, School health, Evaluation and follow-up, Communicable diseases, Motherhood and childhood".*
- Informant (1) "*The Department of Health Services directly affiliated with Ministry of Health. We have within the Department, the Office of Medical Services, several departments for dentistry, including the School Health Department and the Department of Operation of Dental Services in the health centers and polyclinics".*
- *96 public hospitals, 25 specialized hospitals, 18 central hospitals, 21 general hospitals, and 32 rural hospitals are among the 1,424 primary healthcare facilities in Libya. Many of the general, rural hospitals and primary healthcare facilities have dentistry clinics attached to them. By legislation, hospitals in Libya are independent bodies (Alkoshi et al., 2015*).

The informants highlighted that there is no separate administration of dental services at any of these levels or any of Libyan healthcare policy documents. Although there is a separate dental center, which provides both general and specialized dental care, its administration affiliates directly to the MOH. The dental services at HSA are provided as part of medical service at health care centers, units and primary health care centers under the supervision of HSA which has an internal office known as medical services which includes a dental officer who is technically responsible for supervising dental services. In addition, large specialized hospitals provide dental services, which is also supervised by medical services unit.

- Informant (20) "*There are dental departments in hospitals and large centers that are directly affiliated with the Ministry of Health, and of course the Salmani Specialized Center".*
- Informant (14) "*There is no public hospital that has a dental department separate from the management of the place in which it is located. Dental services are provided as any other medical services".*
- Informant (1) "*Dental services are among the rest of the services in the school health department, and there is no separated consideration".*

- Informant (11) "*Here, the dentists do not have a separate department, but rather follow the Medical Affairs Department in the center, then this department follows the director of the center, then the Ministry of Health".*
- Informant (13) "*There is no general hospital or public clinic that has a dental department separate from the management of the place in which it is located".*
- Informant (17) "*There is only the Salmani Specialized Center. It is the only place that specializes in dentistry and is completely separate from any party. It is directly affiliated with the Ministry of Health and funded by the Ministry directly".*
- Informant (16) "*The Director of Health Services Department reports directly to the Ministry of Health".*

Non-MoH dental services

Dental services in Libya are also provided by health care facility that do not belong to MoH. These can be classified as educational and include teaching hospitals and training centers; and service-oriented such as health care facilities that belong to ministries of defense and interior and the solidarity institution and the MoH has no influence over them.

- Informant (11) "*There are two things that must be differentiated between them. There are educational hospitals that report to ministry of health, such as al-Hawari and al-Jalaa. As for the Dental College on Jamal Street, this is an educational health institution, but it is affiliated with the Ministry of Education".*
- Informant (17) "*Ibn Zahr Health Center building for the Ministry of the Interior because they appointed dentists and were planning to create a health institution that provides dental services to the workers in the Ministry, but after that the Ministry of Health, in agreement with the Ministry of Interior, brought a medical staff to the building, and the Health Services Department sometimes give us some materials and health requirement, but we as dentists follow the Ministry of Interior and take our salaries from them".*
- Informant (2) "*Not all health institutions are affiliated with the Ministry of Health, as there are places that provide dental services and are affiliated to ministries other than the Ministry of Health".*
- Informant (16) "*Those who follow social solidarity, they provide dental services for certain groups".*

Health care policies and its application

The health care policy in Libya support the concept of primary health care and universal coverage. Although the system is implicitly organized to provide primary, secondary and tertiary levels of care, the distinction between these levels in dental services is not clear. Health facilities at different administrative levels provide similar services. In addition, the health care policy appeared to be not applied accurately in the dental sector since some informants believe it has received less attention than other specialties and they are not aware of health care policies.

- informant (11) "Before, this center was a polyclinic that provided services at the first level of care, and after that we became a specialized center that was supposed to provide services at the second level, but the dental department still offer the first level of care because dental services are expensive and not important".
- Informant (3) "*There is a clear and explicit health law, but the problem is in applying it".*
- Informant (14) "*Imposed as a health system, after examining the student's mouth in the school health, the student is transferred to the polyclinics in the same region of the school to treat his dental problems, but this does not happen".*
- Informant (3) "*The rural and teaching hospital is under secondary, that is, it is affiliated directly with the Ministry of Health and is supposed to provide a high level of care, whether in terms of treatment or prevention".*
- Informant (15) "*Health care falls under the first level as a structure primary and it is represented in motherhood, childhood, health units and centers, and it is care that is provided to all citizens, such as serums and vaccines, and it is completely free and has a relationship with health security, meaning that it is the responsibility of the entire state and it can never renounce it or enter any kind of investment services. Emergency dental services must be available".*
- Informant (13) "There *is no clear polices from the syndicate or the MoH to define the rules of working in dental services".*
- Informant (1) *"although I have been working in dental administration for years, I have no idea about the organization of dental service".*

4.2.2 Function

The function component of a health care system is concerned with the types of services provided by this system.

Treatment oriented:

Although the Libyan health care system is built up to provide both primary health care, secondary and tertiary levels, the oral health services in Libya are primary treatment oriented The preventive dental services and oral health surveillance are considered part of primary health care, these services are not available anymore and are currently provided as part of volunteer activities by some NGOs.

- Informant (1) "*Most of the dental services provided in the Libyan health system are curative, and the role of prevention is almost non-existent".*
- Informant (2) "*We, as a medical association, provide awareness services and medical surveys, but all this is done through individual efforts far from the state".*

Malfunctioning governmental sector

The governmental services are mainly diagnosis and tooth extraction and these are not always available. This has been attributed to low priority of dental service, limited resources and poor maintenance of dental units.

- Informant (1) "*All of us, as polyclinics, have dental services in level of primary health care only such as examination, extraction, and emergency, and in some of the clinics they have simple fillings. But it is very rare. I mean, what is always available is only extraction".*
- Informant (3) "*The services required from the public sector are supposed to be all services related to pain removal, whether with or without treatment, such as pulp extirpation, extraction, simple filling, RCT, as well as other services such as partial denture, complete denture, meaning all services except for orthodontics and fixed prosthodontics. But in reality, the state is currently unable to provide except for simple needs such as examination and simple extraction, due to the lack of capabilities".*

- Informant (11) "*In the Diabetes Center, we only have regular examination and extraction".*
- Informant (14) *The student is supposed to go with the transfer paper to the combined clinic of the same area where the school is located, but unfortunately, this is not the case".*

An exception of this is The Specialized Center for Dental Treatment and Education/ Benghazi, which provides several dental services including restorative, pediatric, surgical and prosthetic dental services. However, they still not providing some service such as preventive dentistry, fixed prosthodontics, dental implant and orthodontic care which are provided in the private sector only (Appendix 4).

- Informant (16) "*The Salmani Specialised Center, which really works well. The rest of public sector only focuses on emergencies".*
- Informant (20) "*We, in Al-Salmani, are the only ones who have a real administrative hierarchy. We provide therapeutic services and educational services in addition to training and development. At the same time, 90% of dental services are here except for an implantology and an orthodontic department. We even thought about changing the place in order to expand and for Maxillofacial surgery".*
- Informant (4) "*The only place in the public sector that provides all dental services is Al-Salmani. People even come from suburbs like Sidi Khalifa and Alkwyfia".*

Thriving private sector

The informants highlighted the fact that most of dental services are provided in the private sector that has freedom and resources to provide the whole range of dental system

- Informant (14) "*The whole range of dental services is provided in the private sector".*
- Informant (11) "*Private dental centers are well-equipped with dental facilities, although some centers are equipped with more advance facilities than others".*

Unmet dental treatment needs

Documentary analysis of dental literature showed that more than half of Libyan adolescents have dental caries at dentine level and that most of them had untreated dental caries. The situation is worse in primary dentition where nearly three quarters of the children have dental caries and most of it was untreated. In addition, dental caries was the most common reason for tooth extraction in Libyan 2nd, 3rd and 4th decades, and periodontal problems were the most common reason for loosing anterior teeth among Libyan adults (Appendix 4).

Byahatti &Ingafou (2011)

'Dental caries was the main causes of tooth loss during the 2nd, 3rd and 4th decades. While periodontal diseases were the prevalent etiological factor during the 4th, 5th, 6th and 7th decades of life. The posterior teeth most frequently extracted due to dental caries were lower first molars (43.92%). Whereas anterior teeth were more frequently extracted due to periodontal diseases (28%) with the remaining posterior teeth also being extracted (7%)'.

Arheiam er.al (2020)

'Untreated caries remains the main component of DMF index. These observations make it unlikely that the reduction in caries level is the result of improved dental care. This pattern of DMF components has been observed in many previous studies among Libyan children,37,38 and it seems to be an outcome of poor dental services and low attention paid to oral health. This finding, however, sheds light on the provision of restorative and preventive dental services in Libya and highlights the need for further research to understand why filled and missing teeth components of DMF were very low.'

Emerging dental speciality

Facial aesthetics and cosmetic care is new area that has emerged recently and attracted many dental practise. Although it is not part of the dental curriculum at dental schools, the dentists working in this area usually received short training courses and specialize in this area which is provided in the private sector only.

- Informant (22) "*Their attitudes are more towards cosmetics, and some dentists have even turned to Botox and fillers, and they are taking courses on them. We expect a big increase in the coming years for dentists who work on botox, fillers, threads, and everything related to facial cosmetics".*
- Informant (13) "*We have facial cosmetics services with Botox and fillers at our dental center, where dentists work".*

4.2.3 Oral personnel (dental workforce)

Dentists:

The health care personnel in Libya are mainly dentists. There is an increasing number of dentists graduated every year from the faculty of dentistry, University of Benghazi as well as other private dental education institutions in the city such as Libyan international medical university. It is estimated that there is a round 2200 dentists in the city of Benghazi (Figure 4.5).

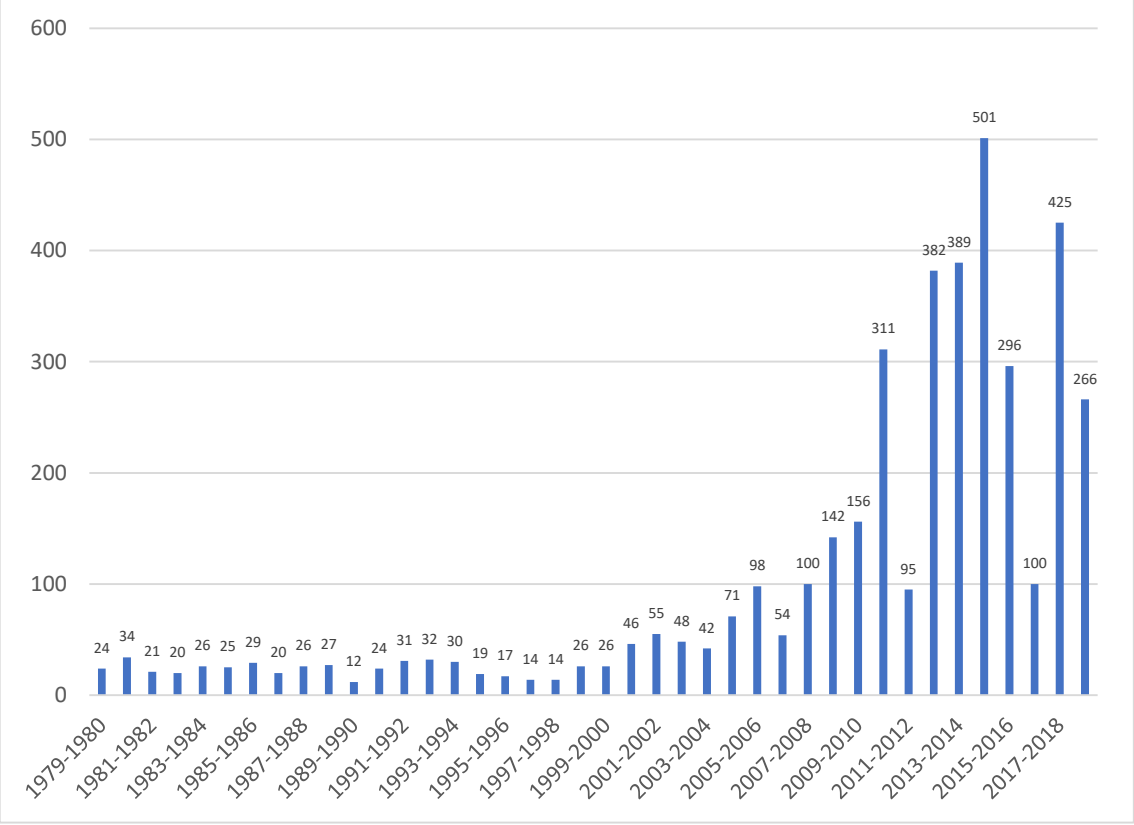

Figure 4.5: Numbers of dental graduates at the University of Benghazi between 1979 and 2018. Source: Registrar's office, faculty of Dentistry, University of Benghazi

Dental auxiliaries

Dental auxiliaries in the Libyan health care system includes, lab technicians, dental hygienist and therapist. These are graduated from the high institute of medical technology. However, there is shortage in Lab technicians and many practices have technicians from Syria and Egypt.

- Informant (4) "*Most of the technicians are graduates of higher institutes and colleges. For example, the Higher Institute of Medical Professions grants a high diploma in medical technology specializing in dental technology after three years of study".*

Dental nurses:

Most of nurses are not primarily trained to be dental nurses and they received intensive training at dental clinics or training centres and hence the quality of their training is questionable. However, there are a few dental nurses who were qualifies from a nursing school and receiving official dental nursing training but now there is no public institution to teach dental nursing, wherefore there is a persistent shortage in qualified dental nurses specially in the private sector.

- Informant (6) "*I am a graduate of the Health Institute, and I graduated in 1999 with an intermediate diploma in dentistry, but unfortunately the institute graduated only 3 batches, after which it was closed. As we graduated as a dental health technician, we did not know whether we were nurses, technicians, or doctor's assistants".*
- Informant (16) "*The shortage of nursing exists and is evident in the private sector, as they are always looking for nurses".*
- Informant (17) "*The nurses are all graduates from intermediate or higher nursing institutes. I have never met anyone from a nursing school, and most of them have nothing to do with nursing at all.*
- Informant (10) "*Most of the nursing stuff is a general nursing diploma. It is very rare to find a dental specialty".*

- Informant (7) "*There is currently no place for dental nursing, and most of those who work in dental nursing are either people who do not understand the field of health at all and have taken courses, or either general nursing and have been trained".*
- Informant (13) "*In general, most of their qualifications are general nursing, after which they are given a number of dental courses and they work as dental nurses".*
- Informant (2) "*Some few have a diploma in dental specialization, but according to what I just heard in Benghazi, there is no public place that offers a diploma in dental specialization.*

Dental specialists

There are specialists in all dental specialities. Most of them work in the educational institution and contribute to providing health care in the private sector. Although there is sometime deficiency in some specialities such as orthodontics and maxillofacial surgery, recently there is increasing numbers of dental specialist in restorative and paediatric dentistry (Figure 4.6).

- Informant (3) "*There is a shortage, but a lack of specific abilities and specializations, not a shortage of numbers".*
- Informant (22) "*At the level of Benghazi, there is a great shortage of specialists in Orthodontics and Maxillofacial surgery".*

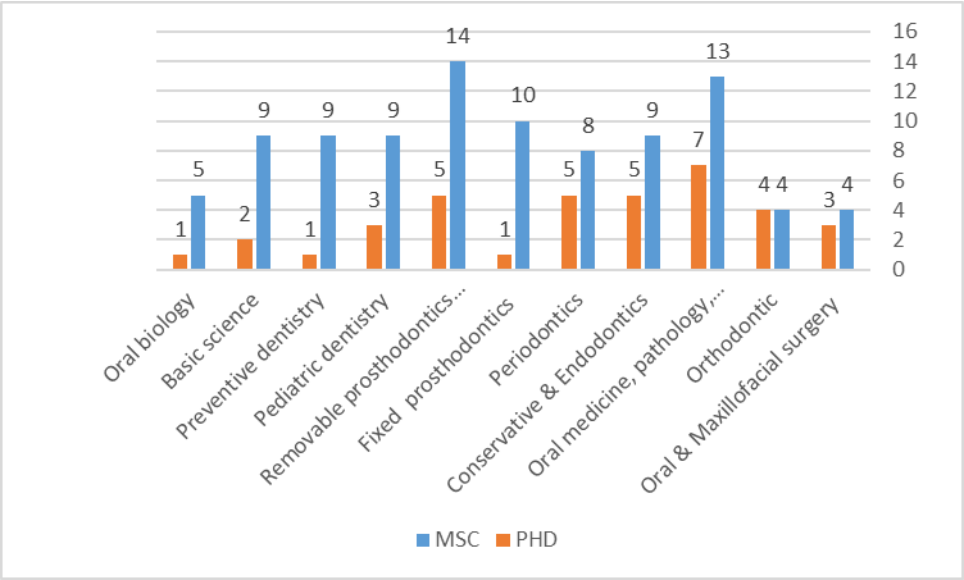

Figure 4.6: Academic qualifications and specializations for faculty members at the University of Benghazi (numbers). Source: faculty of Dentistry, University of Benghazi

Education and training

Training to be a dentist is obtained officially from the recognized faculties of dentistry. However, there is no clear continuous education programs or clear requirement to renew licencing. In addition, recently there is increasing number of private training centres and diplomas for dentists who often received insufficient undergraduate training because of large number of dental students beyond the capacity of dental school.

- Informant (22) "*Large numbers of doctors are trying to develop themselves, taking courses, attending workshops, and even those who travel to Egypt for training courses, because most of them want to develop themselves because they know that this will help them in their work. They did not get enough training in college".*
- Informant (13) "*These topics we did not study well in college, and it is assumed that there should be subjects taught for these subjects so that we develop ourselves in everything, including the ethics part and ways of communicating with patients because we are doctors".*

4.2.4 Funding

National funding

The Libyan health care system is funded by the ministry of finance. There is no separate funding for dental services. All dental equipment and consumable materials are provided by the department of medical supplies in the MOH.

5 Informant (3) "*Distribution is through the medical supply device, which practices bids at the level of the Libyan state, in which all general and specialized supplies, general and specialized medicines, and chemical medicines are distributed, and distribution takes place based on need".*

6 Informant (1) "*We take every need through the medical supply of the Ministry of Health. and supply deficiencies by bidding with private companies to obtain materials that are not available from the medical supply device".*

7 Informant (2) "*The Libyan public sector is free, as the funding is provided by the Ministry of Health, the medical supply device".*

8 Informant (20) "*Funding for the public sector is through Ministry of Finance".*

While HSA and its affiliate facilities has no role in purchasing materials or equipment, the general and central hospitals and specialized centers which affiliate directly to the MOH has the opportunity to get direct fund to obtain materials not available in the medical supplies department.

- Informant (20) "*We occasionally request funding from the Ministry of Health for contracts with private businesses to buy materials that are not offered in the central pharmacy".*

Donations:

Because of the deteriorated funding on health care in recent years, many companies fulfilled their social role and provide donation to support the provision of dental care.

- Informant (17) "*The dental department is affiliated with the hospital administration and is funded by the hospital administration and donations".*
- Informant (15) "*In recent years, there are no possibilities at all, so private organizations and companies help us, because the public sector does not even have the price of booklets for examining students' mouth".*

Private sector funding:

The private sector is self-funded through direct payment from service users, co-payment of service users and their insurance companies and there is full payment by special contracts with private insurance companies.

- Informant (13) "*Private is funded personally and not by the state".*
- Informant (9) "*In private, financing is done through the fees paid by patients and insurance companies".*

4.2.5 Reimbursement

The reimbursement in the Libyan health care system is divided into following categories:

Salaried:

The dental staff are paid fixed salaries with annual increase and this is mainly for those working in the governmental sector as well as nurses in the private sector.

- Informant (16) "*All public sector workers receive a fixed salary.*
- Informant (11) "*Dental workforce receives a fixed salary, whether a doctor, technician or nurse".*

Fees-for-service

The dentists are paid a pre-agreed proportion of the income he made, which is usually between 40% and 70% of the income. This system of reimbursement is applied in the private sector for dentists and dental technicians working in private laboratories.

- Informant (16) "*In the private sector, according to the agreement between the employer and the doctor, because it is not governed by law. It is usually a percentage for each service provided".*
- Informant (22) "*For doctors, a percentage of his total work ranges from 40 to 60% for the general practitioner, according to his reputation and experience, and 70% for specialists.*
- Informant (3) "*In private through a specific percentage agreed upon in advance between the doctor and the clinic management, so that from each case he works*

on, he takes a percentage of the total amount of his payments, this case according to the type of services that were provided".

- Informant (5) "*The dental technician in the private sector receives a rate ranging from 40% to 50% for hand work only, and has nothing to do with materials or maintenance".*

4.2.6 Target group

The public sector provides primary health care for children, older people, physically, mentally and medically compromised patients through dental care facilities distributed through the system. However, there is no priority group defined in the polices. In addition, special care groups usually receive dental care in governmental institution and no private services available to them.

- Informant (3) "*The psychiatric hospital has a dental department to provide dental services to psychiatric patients. The services provided are simple and surgical extractions, simple fillings and root canal treatment, and scaling".*
- Informant (18) "*Al-Ruwaisat Center for the Disabled is affiliated with the Ministry of Social Affairs, and any case of physical or mental disability is transferred to it. It provide oral diagnosis, Extraction, Simple restoration and scaling".*
- Informant (2) "*In the health sector, diabetics, for example, are referred to the dental department in order to provide them with services, since sugar has effects on oral health, and most of them are elderly and more susceptible to dental diseases".*
- Informant (20) "*There are places that have priorities, such as centers for communicable diseases, kidneys, diabetes, mental illnesses, and the disabled, where dental services are provided, just like the rest of the health services available there, within the allocation that the state allocates to these centers".*

5. Discussion

5.1 Overview of the study design:

A case study is an established research design that is commonly used in social and health care disciplines to develop a comprehensive and detailed understanding of a particular phenomenon or event in its real-life context (Crowe et al., 2011; Yin, 2014). Data for a case study might be collected using qualitative, quantitative or a combination of both. The choice between these depends on the context of the study and the epistemological position of the researcher (Merriam & Tisdell, 2015). In this research project, a mixed case study approach was used to allow a multi-faceted oral health care system (Crowe et al., 2011; Merriam & Tisdell, 2015 & Yin, 2014). This approach lends itself well to answer descriptive, exploratory and explanatory research question and it is mainly used to address what and how research questions, related to a contemporary real-life event that is poorly delineated from its context, which the researcher has little or no control over it (Yin, 2014). It produces an intensive and comprehensive description and analysis of the phenomenon of interest, giving rise to in-depth and better understanding and sometimes theory building (Merriam & Tisdell, 2015). A major advantage of the case study approach is the collection of data from multiple sources which allows the triangulation of collected evidence (Baxter & Jack, 2008). It also enables a longitudinal approach of data collection which deepens the understanding of the phenomenon of interest (Ghauri, 2004). Moreover, a case study offers the researcher a flexibility in terms of its time line and methods used (Simons, 2009).

Stake (2000), categorised case studies according to researcher's focus and interest. A case study is labelled intrinsic when the case itself is of interest to the researcher. This differs from instrumental case study where the researcher explores understand a more general phenomenon through studying the case. This can be done using a single case or several case studies to form a collective understanding of the phenomenon (Stake, 1995 & Stake, 2000). Therefore, we consider our study as both a single case and extrinsic.

A variety of data collection tools were used to inform the study. Qualitative data were collected for this study using a sequence of semi-structured interviews, and document analysis. Because there are no previous studies conducted in this area of research and in the Libyan setting, there was no ready-made questionnaire that could be used as a guide

for us in collecting quantitative data. Therefore, we started with a set of interviews based on the six basic components of health care system (Gift et al., 2007) to determine more details of the questions included in the questionnaire. The main purpose of the questionnaire was to confirm the information received in the interviews through closed questions and to complete the exploratory purpose of the study through open questions. Therefore, the study approach did not require a large sample of the participants in the questionnaire as much as it required diversity among them.

5.2 Main findings

In today's complex world, it can be challenging to say precisely, what a health system is, what it consists of, and where it begins and ends. The system would include surveillance of the population's oral health status and needs and be evidence-based, effectual, cost-effective, sustainable, equitable, comprehensive, ethical and culturally competent (Tomar & Cohen, 2010). Gift and Andersen (2007) suggest that healthcare systems can be divided into several aspects. Structure, Function, Personnel, Funding, Reimbursement and Target population. The aims of this study were to describe Libyan oral health care system in city of Benghazi in terms of the structure, function, personnel, funding, reimbursement and target group. Therefore, the findings of the present study are structured to describe the oral health care according to suggested six components.

5.2.1 Structure

As mentioned in the literature review, one of the most complicated and dynamic features of a health care system is its structure. Most systems have three levels: primary, secondary, and tertiary (Daly et al., 2013). Primary care is a care of the "first contact" of the individual with the health care service, which is provided in ambulatory settings by qualified health professionals (general practitioner, family doctor, or nurse) when a patient comes, usually for the first time, with specific symptoms or signs of disease. Secondary care is general specialist care, delivered by a "general specialist doctor" for more complex conditions which could not be resolved by the general practitioner or primary professional care level. The tertiary or central level of care is sub-specialist care, including particular services, which might be delivered in specialized institutions or by highly specialized health professionals (Donev et al., 2013). The qualitative data showed that most of the key informants considered the Libyan oral health structure is unclear

which consistent with Asmri (2020) who indicated that there is not enough information on oral health care structure in the Eastern Mediterranean Region.

The Health Ministry offers free dental care to people of all ages at public dental clinics, which are frequently dispersed around cities. The oral health care system can be generally described as integrated into medical services. Although similar situation of integration is observed in other countries such as Saudi Arabia, this is different from the situation in the United states and almost all European countries where oral healthcare operates outside the mainstream healthcare system (Tomar & Cohen, 2010 & Sinclair etal., 2019). As result of the integration, the oral health care is forced to be adapted into medial service, in order to fit into two main levels of care provision. These are the primary care level represented by the HSA, which provide PHC and other general health services, and the secondary-tertiary level that is represented by regional hospitals and specialized centres. However, it is worth noting that the structure of dental services in the second and third levels of health care is not clear. Although the results of questionnaires and interviews confirmed the existence of dental services in hospitals and specialized centres that are supposed to provide the second and third levels of health care (Daly et al., 2013), these services are usually general dental services that still provided on Health Services Administration facilities like simple extraction and simple filling. Therefore, there is a need to define the different levels of oral health care in the Libyan health care system. Interestingly, Interviews with the key informants indicated that there is no clear or applied policy related to oral health care, with low priority to dental services.

The current study showed that the Libyan health care system is generally organized into governmental and private sectors. Our data showed that secondary and tertiary levels of care are provided in the private and one public specialized dental center that offers primary and secondary dental care and dental training programs in the city of Benghazi. In addition, not all governmental dental facilities belong to the MoH. There are other governmental institutions that provide oral health services (Figure 5.1). On the other hand, the dental services in the private sector are provided in a range of dental facilities such private polyclinics. Hospitals and specialized dental center (Figure 5.2). This adds to the situation of complexity and vagueness in the Libyan oral health care system and make it difficult to monitor the quality and the provision of dental care.

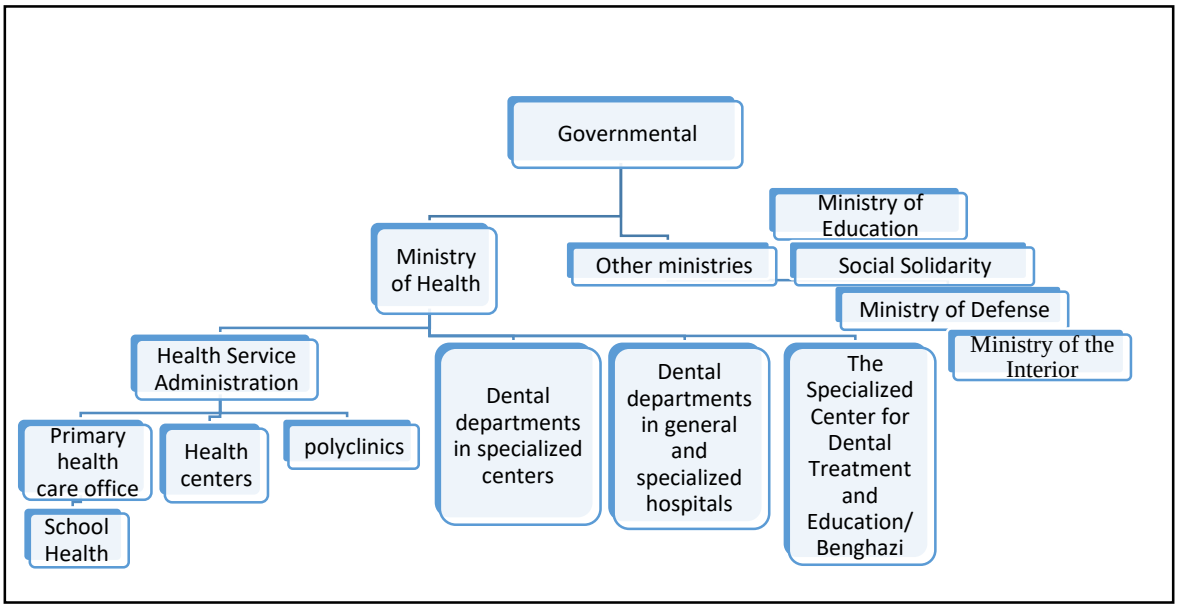

Figure 5.1: Governmental structure of oral healthcare system in city of Benghazi

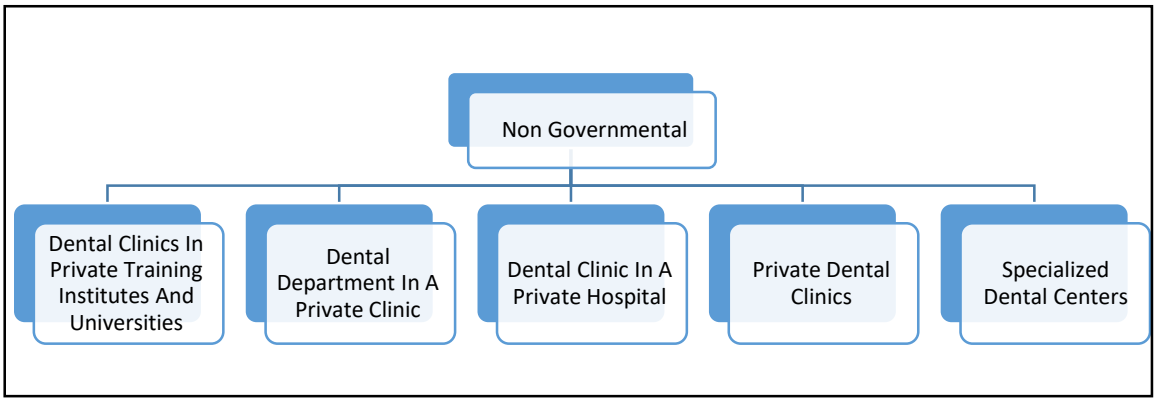

Figure 5.2: Non-governmental structure of oral healthcare system in city of Benghazi

5.2.2 Function

Through the results of qualitative and quantitative analyses, it became clear that the Libyan oral health care system is similar to the systems of many countries in the world in terms of function and being a treatment-oriented system. However, dental service provided in most of public sector restricted to routine oral examinations and teeth extraction. This is in contrast to the private sector that provides all kinds of dental services. With the exception of the Specialized Center for Dental Treatment and Education, which is the only public institution in Benghazi that provides all dental services except for maxillofacial surgery, orthodontics and implants.

This outcome is comparable to many governmental dental health care services such as Spanish National Health System and NHS in England, in which the publicly funded dental clinics only offer limited services such as emergency care and oral surgery and the vast majority of oral health care is provided in the private sector (Bravo, 2015). The same is the case in some other European nations (Pälvärinne et al., 2018), Africa (WHO, 2005) and Eastern Mediterranean Region (WHO, 2009) where the public sector is limited to simple fillings and extraction and does not focus on preventive services in dentistry. Also, these results are consistent with previous studies in Libya which suggested that the governmental oral health system in Libya focuses mostly on routine oral examinations, minor oral surgery, tooth scaling, and simple restorations with little attention paid to preventive treatments (Peeran et al., 2014).

Although most oral health conditions are largely preventable and can be treated in their early stages, the Global Burden of Disease Study (2019) estimated that oral diseases affect close to 3.5 billion people worldwide, with caries of permanent teeth being the most common condition (WHO, 2022). The findings of current research, which showed a significant gap in the provision of preventive oral services in the Libyan public sector, are consistent with previous studies that showing an increase in oral disease indicators and highly unmet treatment needs particularly among Libyan children (Arheiam 2020) (Appendix 3). This can be seen as a reflection of the poorly functioning health care system that fails to provide appropriate dental care and restrict services to examination only, and even if the referral is made to the polyclinics, most of the services are not available there. We found it unfair to compare these results oral health system in developed countries such as Sweden, Germany and England wherein oral health is one of public health main goals (Godson et al., 2018 & Pälvärinne et al., 2018). There is an urgent need to develop national goals of oral health care system in Libya to reduce the disease burden and quality of life impacts in the population. Although current political unrest fuels the situation of lower priority of dental services, the dental community should take steps to improve the provision of dental care and emphasize the concept of primary health care and health promotion.

5.2.3 Dental workforce

As mentioned in the literature review, each nation has a set of laws or regulations governing the employment of freshly certified oral health professionals. There are different requirements for different categories of individuals in different countries. In some nations, in addition to finishing the required training, oral health professionals are also required to pass licensure exams (Dal Poz et al, 2009). In Libya all dental schools follow almost the same education system in which students finish high school then enrol in a one-year pre-dental education program. This is followed by four years of dental education, including the traditional two years of pre-clinical dental education and two years of clinical dental education. All students are expected to complete a one-year internship to get a bachelor's degree in dental surgery (Arheiam et al., 2019). Most of dental education in Libya is provided free by the public universities, with the increasing establishment of private dental schools (Benamer & Bakoush, 2009). The results of this study suggested that while there is increasing numbers of dentists, their quality is questionable. Libya, with a population of 6.7 million, has an estimated dentist-to-population ratio of 1:400 (Arhoma & Arheim, 2022), exceeding the ideal ratio recommended by WHO, which is 1:7500 (Vundavalli, 2014). In addition, the average age of dentists has decreased due to the high number of new graduates. Furthermore, since there is no control over the number of students enrolling in dental schools, the increase is likely to continue, and many new graduates will be unable to find employment. The participants in the interviews highlighted the issue of weak dental education and insufficient training for dental students and lack of continuous education programs for working dentists with limited opportunities of professional development in Libyan health care system.

The dental workforce in Libya is comprised of dentists and dental auxiliaries (technicians and nurses). The data indicates there is increasing numbers of dental students' intakes, and more dental hygienists have recently graduated, too. However, there is a clear deficiency in qualified dental nurses and dental technicians. In addition, like in Saudi Arabia and many Arabic countries (Al-Mubarak et al., 2004), the current research indicated that there is lack of some dental specialists particularly in the field of maxillofacial surgery, orthodontics and periodontology. Different countries have different spectrum of dental care providers. For example, France and Greece have no

dental hygienists, but had clinical dental technicians. The idea of skill mix in dentistry has received much attention in recent years to optimize the provision of dental care. Skill-mix" is a term that is used to describe a model of care where the whole of the clinical team is utilized in delivering service activity. It can be further sub-divided into role-substitution and role-supplementation. The former is where different members of the dental team undertake clinical tasks instead of a dentist, whilst the latter is where team members augment the activity of a dentist (Brocklehurst, 2015). Dental auxiliaries like dental therapist and oral hygienist exist in over 50 countries where personnel operate under guidelines that allow them to provide specified services such as restorative procedures and primary teeth extraction in schools or rural areas (Brewster, 1995). They are needed in addition to dentists to get more effective service (Audrey, 1993). For example, within the UK there are various types of dental personnel: dental nurses, dental hygienists, orthodontic therapists, dental therapists and dental technicians (Daly et al., 2013). Moreover, in America the oral health care workforce has expanded to include new dental specialties and allied professional personnel (Fellows et al., 2022). The range of duties and treatments that each group is permitted to undertake is specified in regulations that are amended in the light of clinical advancement and are published in the Scope of practice.

On contrary, the role of dental hygienist is not clear in the Libyan health care system and there is no job description for them in the labour market. Therefore, the question that arises why there is dental auxiliaries in Libya if they are not even legally allowed to work on the mouths of patients? This is most likely due to the absence of defined health political plans for these issues as well as the absence of job descriptions and assignments for such individuals. In addition, there is a huge number of Libyan dentists which make it unnecessary to have dental auxiliaries. In the present study, we found that dental assistant as a profession is not present. Rather, those who usually work as dental assistants are interns or recent dental graduates. Some of those we interviewed explained that the reason is due to the Libyan dentists faced with unstable environment and economy weakened by war and improper health care and work planning policies. To face this, many graduates are equipped with insufficient training and many of them worked as dental assistant in the private sector. The present study, therefore, highlights the fact that oral health care sector in Libya is saturated with health care personnel and planning of dental work force is mandatory.

5.2.4 Funding

As mentioned in the literature review, there are three main sources of funds for health care provision: Taxation, Insurance and Out-of-pocket payments or a mix of private and public providers, that allows more flexible spending on healthcare (Daly et al., 2013 & Burazeri & Kragelj, 2013). The Libyan Health services are theoretically free for all Libyans. The current study found that governmental oral health system in Libya relies heavily on the state's general budget. It dedicates 4% of its GDP to healthcare (WHO, 2013) and the objective is to raise health care spending to 5.5 to 6 percent of GDP by 2030 (El Oakley et al., 2013). Medical tools, equipment and supplies are distributed through the medical supply device, whereas health services are provided free of charge, including dental services. In addition, the funding of dental services is not separated from the rest of the medical services and do not have a special budget. These results differ from healthcare systems in western countries that depend on taxation and compulsory or private health insurance (Burazeri & Kragelj, 2013), and some of the oral health are funding largely independent of the rest of the health care system like in UK, USA and Germany (Daly et al.,2013 & Busse et al., 2014). However, to a large extent match those observed in governmental funds health systems in the Arab countries that provide comprehensive coverage of all levels of health care completely free of charge or received at a nominal fee, but one of the main financial gaps is the dental care (Kronfol, 2012).

This study also showed that the political situation of the state after the war had a major role in the lack of health funding and capabilities and the weakness of the medical supply device in providing medical supplies and tools. However, in recent years, additional parties started contributing to the financing of the public sector, such as telecommunications companies, private institutions, associations, and charitable donations. This reflects the failure of the government to fulfill its role in funding and supporting the provision of oral health care.

As for the private oral health sector, the present study revealed that it is financed either directly out of the patient pocket or from patient's employer, either through a direct contract from the employer with the private health institution or through an insurance company and most of the insurance is based on costs that exceed those covered by a plan method. This is similar to payment system in other countries in Arab region in which the private expenditure plays an important role in Arabic health systems. Out-of-pocket

expenditure includes payment of insurance premiums, payment for private dentists, cost sharing for inpatient episodes, payment for over-the-counter goods and most importantly informal payments to health providers and hospitals (WHO, 2004). The same is evident in some western nations, like the UK, where consumers pay out of pocket or through dental insurance arrangements to receive private dental care from a dentist (Robinson et al, 2004).

Taken together, these results suggest that funding methods differ between the public and private health sector, where the public sector depends on the state's public treasury, and then the financial allocations for each health institution are distributed by the Ministry of Health or the concerned ministry. However, there is now third-party financing, such as telecommunications companies and private institutions. The Libyan healthcare system has received inadequate funding and lacked program development over extended periods of time.

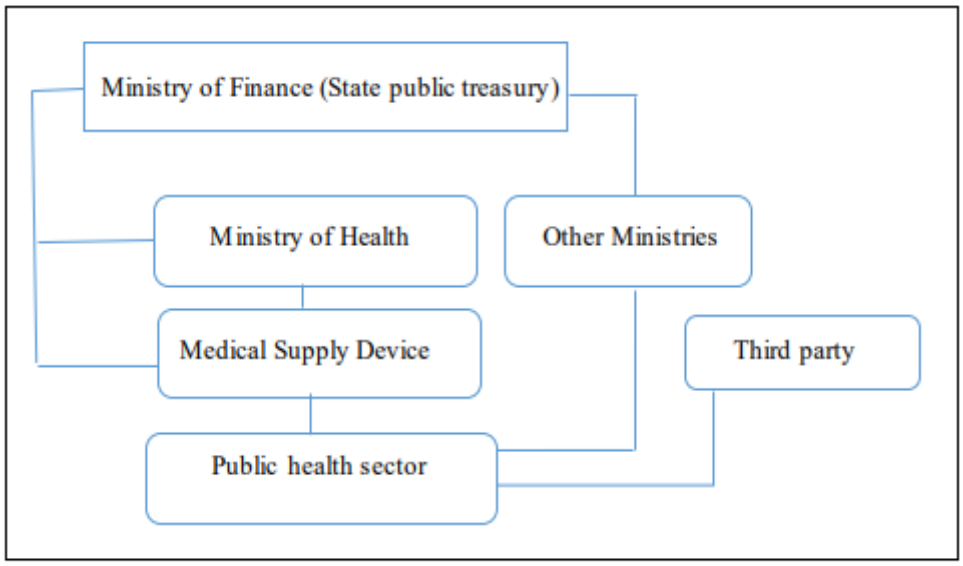

Figure 5.3: Routes of funding for public oral healthcare system in city of Benghazi

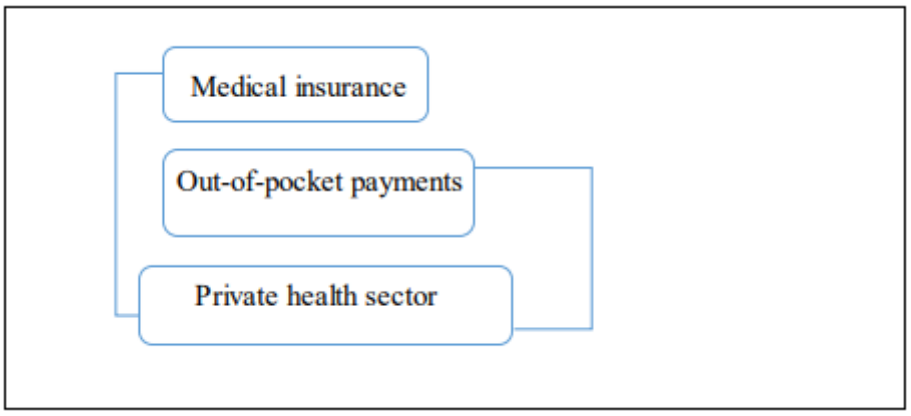

Figure 5.4: Routes of funding for private oral healthcare system in city of Benghazi

5.2.5 Reimbursement

In the current study, it was confirmed by several sources of evidence that in public sector, all oral health personnel (dentists, nursing staff and dental technician) gets paid a fixed salary with specific annual increase. Although new payment model based on capitation rather than the conventional "Fee for Service" is now widely adopted in several European countries to encourage routine and preventative treatment (Andrén Ands, 2015), this is not the case in Libya. The fixed salary system can be considered as one of the factors contributing to the public Libyan oral system's weakness because, despite its deteriorating financial situation and inability to pay for necessary dental care, it is required to pay the salaries of a sizeable portion of the dental workforce, even when there is no work for them to do.On the other hand, dentists and technicians who work in private sector are paid for their work in the manner of fees -per- service, and fixed salary for nurses and night shift doctors according to number of work hours. These findings seem to be consistent with model of remuneration in many oral health care systems like in UK and Ireland (Woods et al., 2017). This model is also similar to “diagnostic related-payment” model which used in some western countries in the case of specialists who work to provide higher levels of care, such as the second and third levels.

5.2.6 Target groups

The sixth component of health care system is its target groups. These special groups may be more vulnerable to oral disease, have greater needs, and cannot always access care. People who are members of underprivileged groups or specific racial or ethnic minorities

frequently do not receive enough coverage from oral health care systems (Ziller et al., 2015). Therefore, health systems try to provide them with priorities in terms of care and services, including dental services. The current study found that through dental care facilities scattered across the Libyan health system, the public sector provides primary health care for elderly individuals, children, and adults with physical, mental, and medical conditions. However, the policies do not designate a priority category. Additionally, special care groups typically receive dental treatment in a governmental facility and have no access to private providers. These results are similar to that observed in many other health systems around the world, where priority is given in treatment for such cases, either by providing health services for them free of charge in the public sector, or by granting them health insurance for treatment in the private sector. For example, since 1994, Denmark have been compelled to provide nearly free oral health treatment to the elderly who are dependent and in Ireland the Dental Treatment Benefit Scheme for insured people and the Dental Treatment Services Scheme for low-income adults, both of which are offered by private independent dentists (Johnston et al., 2020). In addition, 86% of Germans have access to a statutory sick fund, which covers the cost of a mandated standard oral healthcare package provided by dentists (Ziller et al., 2015). Moreover, in USA, numerous American initiatives, like those that support disadvantaged pregnant women, infants, and kids with their nutrition, contain significant positive dental public health content. As for Spain, children aged 7–15 years are covered (with some restrictions) by Spanish publicly funded oral healthcare with different care models, depending on the local health authority, and some of them are funded by a capitation system (Bravo et al., 2015).

In nutshell, our findings suggest that the Libyan oral health care system lack the policies and actions that provides special care for vulnerable groups and highlight the need for high-efficiency free medical care for the most vulnerable and disadvantaged groups, who have no other choice but receive free public healthcare with restricted function or pay out of pocket to obtain varieties of dental services from private healthcare sector.

5.3 Limitations

This study used self-administered questionnaire, which has its own limitations. While this method showed high effectiveness in collecting data from large and geographically dispersed population, a well-known problem of questionnaires is the low response rate, which decreases sample size with a subsequent risk of compromising the generalisability of survey's findings (Redmond & curtis, 2009). This caveat is clearly noticeable in studies that involve health care professionals where response rate is a relatively low, and following a downward trend (Cook et al., 2009). However, this would not be an issue in our study since we recruited a purposeful sample to cover the full spectrum of dental dentists working in different health care facilities and generalizability is not needed in such studies.

The study also used semi-structured interview and documentary analysis which while enrich the data collection and enable triangulation they have their limitations. For example, the interviews might be influenced by personal thoughts and ideas of the interviewees and can be time consuming. In addition, the documentary analysis might be limited by the availability of documents online and other grey materials. However, the researcher expanded the searching beyond online resources and contacted key informants in health care facilities to ensure covering as much resources as we can.

5.4 Conclusions

1. Oral health care is integrated within the medical services. Although it is not completely integrated, the dental services policies and structure is unclear, complex and is being the complete control of the MoH.
2. The oral health care system in Libya is treatment oriented and failed to meet the needs of the Libyan population. There is an increasing burden of oral diseases and it is expected to increase in the light of current circumstances.
3. The dental workforce in Libya is comprised of different skill mix, however, there is unequal distribution with questionable quality of dentists. There is large number of dentists, and scarcity in dental specialities, nurses and lab technicians. Dental hygienists are recently graduated but have no place in the system.
4. The funding of governmental sector in Libya is totally obtained from the state-fund as part of total budget for health care. However, recently, donations from

charities and local companies started to emerge. On the other hand, the private sector is total self-funded.

5. The reimbursement of dental care personnel in Libya fall under two main categories. These are fees per service which dominate the private sector and fixed salaries in the governmental sector.
6. Although framed with primary health care policy, the Libyan oral health care system has no specific target groups.

6. Recommendations

- There is an urgent need to set up plan to reform the oral health care system in Libya in order to restore its function.
- Future planning of dental workforce should consider improving the quality of existing dentists and redistributing the manpower across dental care personnel to enhance skill-mix and dental specialists.
- There should be separate organization and funding for governmental dental sector to enhance the planning and quality of services.
- Educational institutions should collaborate with health institution to defined the needs of health care systems and organize the production of manpower.
- Oral health care policies that defined the target groups and levels of dental care are needed in order to improve the provision of dental services and avoid duplication of efforts.

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Appendices

Appendix 1: Questionnaire for dentists working in the Libyan oral health system in Benghazi

- اسم الباحث: دكتورة عائشة العشيبي.
- عزيزي طبيب الأسنان: نرجوا منك تعبئة الاستبيان المرفق والذي سيتم استخدامه في دراسة حالة للنظام الصحي الليبي فيما يخص صحة الفم والأسنان في مدينة بنغازي.
- ستلاحظ عدم وجود بيانات تحدد هوية المشاركين وذلك حتى نمكنك من الإجابة على الأسئلة بكل صراحة وسرية.
- المشاركة في هذا البحث اختيارية وليست اجبارية.
- طريقة الإجابة تكون بوضع علامة داخل الدائرة المجاورة للخيار الصحيح أو الكتابة في حال كانت اجابتك غير موجودة ضمن الخيارات.

- العمر.....
- الجنس ◯ ذكر ◯ انثى
- ◯ طبيب أسنان عام ◯ طبيب أسنان متخصص
- عدد سنوات الخبرة .....
- هل أنت متحصل على درجة ماجستير ◯ نعم ◯ لا
- في حال الإجابة بنعم أرجوا ذكر التخصص .....
- هل أنت متحصل على درجة دكتوراه ◯ نعم ◯ لا
- في حال الإجابة بنعم ارجوا ذكر التخصص .....

• قمت بالحصول على او حضور:	دورات تعليمية أو ورش عمل	مؤتمرات علمية	
		محلية	دولية
جراحة الفم	◯	◯	◯
جراحة الوجه والفكين	◯	◯	◯
تقويم الأسنان	◯	◯	◯
طب الفم	◯	◯	◯
علم الأشعة	◯	◯	◯
علاج الأسنان التحفظي	◯	◯	◯
علاج الجذور	◯	◯	◯
علاج أمراض اللثة	◯	◯	◯

تركيبات ثابتة	◯	◯	◯
تركيبات متحركة	◯	◯	◯
طب أسنان الأطفال	◯	◯	◯
طب الأسنان الوقائي والاجتماعي	◯	◯	◯
غير ذلك	.....	.....	.....

- هل أنت متحصل على دبلوم تخصص أو دبلوم عضوية (مثل الزمالة البريطانية) لطب الأسنان؟ ◯ نعم ◯ لا
- لو كانت الإجابة (نعم) فأرجوا ذكر نوعها .....
- ما هو مجال الدورات التدريبية التي تعتقد بأنك في حاجة لها؟ .....

- تعمل لدى القطاع الصحي ◯ العام ◯ الخاص ◯ كلاهما
- عنوان المؤسسة الصحية **العامة** التي تعمل بها.....
- عنوان المؤسسة الصحية **الخاصة** التي تعمل بها.....

- ان كنت تعمل في **القطاع العام** فإن المؤسسة الصحية التي تعمل بها:
  - ◯ عيادة أسنان بإحدى العيادات المجمعة
  - ◯ عيادة أسنان تابعة لقسم أسنان بالمستشفيات العامة
  - ◯ مكتب الرعاية الصحية الأولية (الأمومة والطفولة)
  - ◯ المركز التخصصي لطب الأسنان
  - ◯ عيادة أسنان تابعة لأحد مراكز ذوي الاحتياجات الخاصة
  - ◯ مؤسسة صحية تعليمية مثل كلية الأسنان
  - ◯ جهة اخرى اذكرها.....

- ان كنت تعمل في **القطاع الخاص** فإن العيادة التي تعمل بها:
  - ◯ قسم أسنان بأحد العيادات او المستشفيات الخاصة
  - ◯ عيادة أسنان فقط بها كرسي أسنان واحد او اثنين
  - ◯ مركز أسنان يقدم خدمات متنوعة
  - ◯ مركز أسنان يقدم خدمات تخصصية
  - ◯ مؤسسة صحية تعليمية مثل الجامعة الدولية
  - ◯ جهة اخرى اذكرها.....

- ان كنت تعمل في **القطاع الخاص** فإن العيادة التي تعمل بها:
  - ◯ يملكها طبيب أسنان واحد
  - ◯ يملكها عدة أطباء أسنان كشركاء
  - ◯ يملكها مستثمر من خارج مجال طب الأسنان
  - ◯ لا أعلم
  - ◯ اخرى، اذكرها.....

Type of service	Dental services provides	Public	Private
Diagnostic services	Biopsy	◯	◯
	OPG	◯	◯
	CBCT	◯	◯
General dentistry	Simple extraction	◯	◯
	Scaling and polishing	◯	◯
	Direct restoration (composite, amalgam)	◯	◯
	Root canal for anterior teeth	◯	◯
	Preventive dentistry (fluoride, sealant)	◯	◯
	Health advice on diet and oral hygiene	◯	◯
Specialized care	Minor oral surgery	◯	◯
	Major oral surgery	◯	◯
	Advanced periodontal treatment	◯	◯
	Fixed prosthesis	◯	◯
	Removable prosthesis	◯	◯
	Cosmetic care	◯	◯
	Endodontics of posterior teeth	◯	◯
	Dental implants	◯	◯
	Orthodontics	◯	◯
General child care	Diagnosis, pulp therapy and exodontia	◯	◯
Specialized childcare	Space management and oral habits , interceptive orthodontics	◯	◯

- هل توفر المؤسسة الصحية التي تعمل بها دورات تدريبية وتطويرية للموظفين العاملين بها؟
  ◯ نعم ◯ لا
- في حال الإجابة بنعم ارجوا ذكر مجال الدورات .....

- ماهي المؤهلات العلمية لطاقم التمريض الموجود في المكان الذي تعمل فيه؟
  - ◯ دبلوم تمريض عام
  - ◯ دبلوم تمريض أسنان
  - ◯ لا أعلم
  - ◯ غير ذلك أذكرها.....

- ان كنت تعمل في **القطاع الخاص** فبأي طريقة من الطرق الأتية تتحصل على المقابل المادي لعملك؟

◯ نسبة على حسب نوع الخدمة المقدمة للحالة (مثل: خلع، حشو، تنظيف لثة، الخ)
◯ نسبة على حسب عدد الحالات بغض النظر عن نوع الخدمة المقدمة
◯ راتب ثابت
◯ غير ذلك أذكرها.....

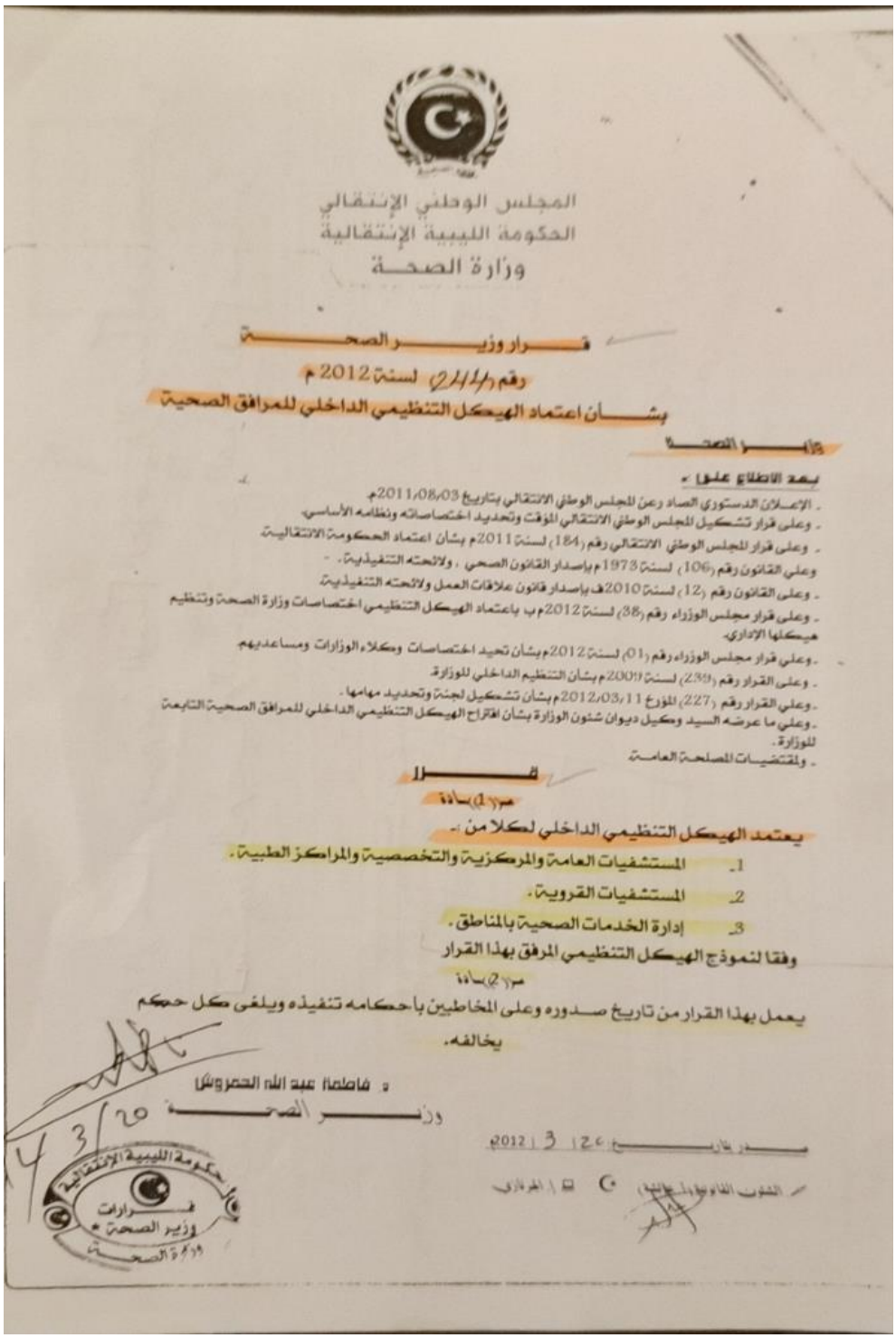
- ان كنت تعمل في **القطاع الخاص** فبأي طريقة يتم أخذ المقابل المادي من المريض؟

◯ المريض هو الذي يدفع ثمن العلاج على حسب نوع الخدمة العلاجية التي يتم تقديمها له
◯ اشتراك من جهة عمل المريض لخدمات معينة بالكامل (المريض لا يدفع جزء)
◯ اشتراك من جهة عمل المريض لخدمات معينة جزئي (المريض يدفع جزء)
◯ اشتراك من جهة عمل المريض مفتوح لكل الخدمات، وليس لخدمات معينة فقط
◯ عن طريق تعاقد مع شركة تأمين طبي
◯ لا أعلم
◯ اخرى، اذكرها.....

- لو كانت التعاقدات التأمينية غير مفتوحة لكل الخدمات العلاجية فأرجو ذكر نوع الخدمات العلاجية الغير متاحة .....

- هل يوجد فئة معينة مستهدفة للعلاج في المكان الذي تعمل فيه؟ (مثل : الأطفال, كبار السن, مرضى السكري, النساء الحوامل, ذوي الاحتياجات الخاصة وغيرها) ◯ نعم يوجد ◯ لا يوجد ◯ لا أعلم
- في حال الإجابة بنعم أرجوا ذكر الفئة المستهدفة للعلاج .....

Appendix 2: Libyan Health law and regulation (1976), structure



المجلس الوطني الإنتقالي
الحكومة الليبية الإنتقالية
وزارة الصحة

قرار وزير الصحة
رقم (214) لسنة 2012 م
بشأن اعتماد الهيكل التنظيمي الداخلي للمرافق الصحية

وزير الصحة

بعد الاطلاع على :

- الإعلان الدستوري الصادر عن المجلس الوطني الانتقالي بتاريخ 2011/08/03م
- وعلى قرار تشكيل المجلس الوطني الانتقالي المؤقت وتحديد اختصاصاته ونظامه الأساسي.
- وعلى قرار المجلس الوطني الانتقالي رقم (184) لسنة 2011م بشأن اعتماد الحكومة الانتقالية.
- وعلى القانون رقم (106) لسنة 1973م بإصدار القانون الصحي ، ولائحته التنفيذية.
- وعلى القانون رقم (12) لسنة 2010ف بإصدار قانون علاقات العمل ولائحته التنفيذية.
- وعلى قرار مجلس الوزراء رقم (38) لسنة 2012م ب باعتماد الهيكل التنظيمي اختصاصات وزارة الصحة وتنظيم هيكلها الإداري.
- وعلى قرار مجلس الوزراء رقم (01) لسنة 2012م بشأن تحيد اختصاصات ومكلاء الوزارات ومساعديهم
- وعلى القرار رقم (239) لسنة 2009م بشأن التنظيم الداخلي للوزارة
- وعلى القرار رقم (227) المؤرخ 2012/03/11م بشأن تشكيل لجنة وتحديد مهامها.
- وعلى ما عرضه السيد وكيل ديوان شئون الوزارة بشأن اقتراح الهيكل التنظيمي الداخلي للمرافق الصحية التابعة للوزارة.
- ولمقتضيات المصلحة العامة

قرار

مادة (1)

يعتمد الهيكل التنظيمي الداخلي لكلا من :-

1. المستشفيات العامة والمركزية والتخصصية والمراكز الطبية.
2. المستشفيات القروية.
3. إدارة الخدمات الصحية بالمناطق.

وفقا لنموذج الهيكل التنظيمي المرفق بهذا القرار

مادة (2)

يعمل بهذا القرار من تاريخ صدوره وعلى المخاطبين بأحكامه تنفيذه ويلغى كل حكم يخالفه.

د. فاطمة عبد الله الحمروش
وزير الصحة

صدر بتاريخ 2012/3/26

الحكومة الليبية الإنتقالية
قرارات
وزير الصحة
وزارة الصحة

Appendix 3: Statistics of the specialized The Specialized Center for Dental Treatment and Education/ Benghazi for the month of December 2021

إحصائية المركز التخصصي لطب و جراحة الفم و الأسنان التعليمي – بنغازي

عن شهر(12)ديسمبر لعام 2021

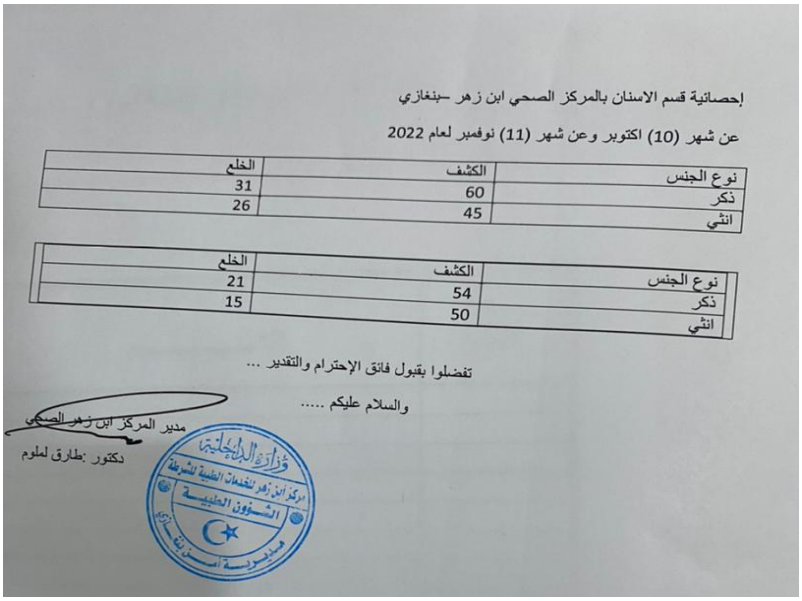
القسم	الأسبوع الأول	الأسبوع الثاني	الأسبوع الثالث	الأسبوع الرابع	المجموع
الكشف و القلع	404	455	535	318	1712
علاج اللثة	110	123	106	122	461
علاج جذور	115	131	145	139	530
علاج تحفظي	89	112	122	108	431
الأشعة	198	177	226	153	754
كشف	20	26	6	9	61
ترده	23	30	17	10	80
تعديل	9	6	12	2	29
تسليم طاقم جزئي	0	0	2	1	3
تسليم طاقم كامل	4	2	5	6	17
مجموع كل أسبوع					190
كشف	6	10	9	8	33
قلع	34	31	25	37	127
قلع جراحيا	5	4	5	10	24
قلع غرز	3	2	2	1	8
جراحة تجميل لعظم الفك	0	1	0	0	1
مجموع كل أسبوع					218
كشف و القلع	212	147	234	120	
علاج تحفظي	30	44	31	23	
علاج جذور	45	32	25	19	
مجموع كل أسبوع	287	223	290	162	962
المجموع الكلي للحالات خلال الشهر					5258

تفضلوا بقبول فائق الاحترام والتقدير...

والسلام عليكم.....

" خديجة المبسوط "

مدير مكتب توثيق المعلومات



إحصائية قسم الاسنان بالمركز الصحي ابن زهر –بنغازي

عن شهر (10) اكتوبر وعن شهر (11) نوفمبر لعام 2022

نوع الجنس	الكشف	الخلع
ذكر	60	31
انثي	45	26

نوع الجنس	الكشف	الخلع
ذكر	54	21
انثي	50	15

تفضلوا بقبول فائق الإحترام والتقدير ...

والسلام عليكم .....

مدير المركز ابن زهر الصحي

دكتور :طارق لملوم

وزارة الداخلية

مركز ابن زهر لخدمات الطبية للشرطة

الشؤون العلمية

Appendix 4: Epidemiology of oral disease in city of Benghazi

Epidemiology of dental caries in Benghazi

Author (s), Year of publication	Age group	Date of data collection	N	Publication type/journal name/Publication date	Location of data collection	Findings		
						Prevalence	DMFT	dmft
Al Sharbati et al., 2020	6-12	1993-1994	762	Eastern Mediterranean Health Journal	Primary schools in Benghazi	**All** 61.9% **12y** 50%	**12y** 1.63 **D** 1.26 **M** 0.35 **F** 0.02	
Hawew et al., 1996	12	1996	373	Community Dental Health		50%	1.17	
Ingafou et al., 2003	< 6		685	Garyounis Medical Journal				2.58
Huew et al., 2011	12	18 August 2011	791	IDJ	36 elementary public schools in Benghazi.	57.8%	1.68 **D** 1.6 **M** 0.05 **F** 0.03	
Arheiam & Omar, 2014	10-15	2012	140	International dental journal	Central medical hospital		0.569	
Ali, et al., 2017	3 age groups (< 6, 6 to 12,>12)		70	International Annals of Medicine, 2017	Benghazi children's hospital	49% (untreated caries)	0.271	2
Arheiam et al., 2020	12	between December 2016 and February 2017	1134	Community Dent Oral Epidemiol	Public schools in Benghazi	42.8%	1.09 **D** 0.9 **M** 0.1 **F** 0.1	
Elfseyie et al., 2020	6-12	2020	375	International Journal of Applied Dental Sciences		45%	1.80	

Ballo et al., 2021	six-year-old	2017	706	BMC Oral Health	Vaccination campaign in 20 PPHCC in Benghazi	71%		3.23
Elrefadi, 2022	6-30		124	Libyan Journal of Medicine	The Rehabilitation Centre of Special Needs in the city of Benghazi, Libya	%21	2	2.58

Epidemiology of gingival diseases in Benghazi

Author (s), Year of publication	Age group	Date of data collection	N	Publication type/journal name/Publication date	Location of data collection)	Findings		
						Prevalence	Index	Score
Arheiam & Omar 2014	10-15	2012	140	. International dental journal	central medical hospital	42.9%	CPITN	
Ali, et al., 2017	3 age groups (< 6, 6 to 12,>12)		70	International Annals of Medicine, 2017	Benghazi children's hospital	94.3%	EG&GS	GS2 59%
Elrefadi, et al., 2022	6-30		124	Libyan Journal of Medicine	The Rehabilitation Centre of Special Needs in the city of Benghazi, Libya	46% 54.5%	OHI CPITN	1 0

Epidemiology of oral cancer in Benghazi

Author(s)/ Year of publication	Age group	Published series	Oral cavity and pharynx tumor/cancer reported	Findings Types of cancer
Singh and Al-Sudani, 2001	All	Cancer mortality in Benghazi, Libya 1991–96	Oral cavity and pharynx cancer (Other cancers reported)	All cancer mortality constituted 8.7% (n=1221) of all deaths Oral and pharynx cancer ranked the eleventh 1.7% of all cancer deaths
Jaber, 2005	15–86	1977–2000	Minor salivary gland tumor	The two leading tumors: Pleomorphic adenoma 30.6%, mucoepidermoid carcinoma 25.3%
M. Elarbi et al., 2008	0–18	1991–2007, 17 years review; 1st article	orofacial tumors	% of all benign tumors: Odontogenic 36.5% Non odontogenic 63.5%
El Gehani et al., 2009	All	1991–2007, 17 years review; 2nd article	Benign orofacial tumors	% of cancer origin out of all cancer cases: Epithelial 82% Mesenchymal 7% Immune system 11%
Jaber and Abu-Fanas, 2010	All	1979–2004	Squamous cell carcinoma	Cases studied showed, the most common: Age: 40–70 Site: tongue 27% Clinical feature: Ulcer 30.3% Delayed detection was frequent with late clinical Stage III or IV

Epidemiology of dental fluorosis, trauma and erosion in Benghazi

Author (s), Year	Age group	Date of data collection	N	Publication type/journal name/Publication date	Location of data collection)	Findings	
						Prevalence of DF/ TDI/ DE	
Huew et al., 2012b	12-year-old		791	Community Dental Health		DE: 40.8%	
Arheiam et al., 2020	12-year-old	between December 2016 and February 2017	1134	Dental traumatology	Public schools in Benghazi	TDI:10.3%	Falling is responsible for 51% violence 18% collision 15% traffic accidents 7% Unknown causes 6% biting on hard objects 4%.
Arheiam et al.,2022	12-year-old	between December 2016 and February 2017	1125	IDJ	Public schools in Benghazi	DF: 11.1%	15% Questionable 7.8% Mild 2.2% Moderate 0.4% Severe were

Appendix 5:

حصر عدد اطباء الأسنان و التمريض و أجهزة الأسنان التابعة لأقسام الاسنان في العيادات المجمعة والمراكز والوحدات الصحية

وحدة صحية / مركز صحي / عيادة مجمعة	عدد أطباء الاسنان	عدد تمريض الاسنان	عدد أجهزة الأسنان
العيادة المجمعة العروبة	10	*	لا يوجد (صيانة)
العيادة المجمعة الفويهات	10	*	2 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator
العيادة المجمعة شهداء السلاوي	15	*	2 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator
العيادة المجمعة خالد بن الوليد	*	*	2 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator
المركز الصحي الليثي	8	2	1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator
العيادة المجمعة النواقية	7	*	1 Dental chair 0 x-ray machine 1 Auto clave 0 light cure machine 0 Amalgamator
المركز الصحي سيدي يونس	6	*	2 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator
المركز الصحي الكرامة	7	*	1 Dental chair 0 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator
المركز الصحي سيدي حسين	4	2	2 Dental chair 1 x-ray machine 1 Auto clave 0 light cure machine 1 Amalgamator
العيادة المجمعة قاريونس	16	1	1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator

2 Dental chair 1 x-ray machine 1 Auto clave 0 light cure machine 1 Amalgamator	2	12	المركز الصحى الحدائق
2 Dental chair 1 x-ray machine 2 Auto clave 1 light cure machine 1 Amalgamator	*	25	العيادة المجمعة 23 يوليو
*	*	2	الوحدة الصحية الهواري
1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	9	المركز الصحي ابن زهر
1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	7	المركز الصحي الصابري الشرقي
2 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	27	العيادة المجمعة بنغازي الجديدة
4 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator 1 Rvg (sensor	1	20	العيادة المجمعة راس اعبيدة
/	1	4	المركز الصحي شهداء ازواوة
2 Dental chair 0 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	4	المركز الصحي برقة
1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	3	العيادة المجمعة سيدي خليفة
/	/	/	وحدة صحية شهداء بنغازي
/	/	/	الوحدة الصحية اللثامة
لا يوجد(صيانة)	1	7	العيادة المجمعة حي المختار
/	/	/	المركز الصحي السلماني

2 Dental chair 2 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	10	العيادة المجمعة بنغازي المدينة
1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	1	10	المركز الصحي القوارشة
1 Dental chair 0 x-ray machine 1 Auto clave 0 light cure machine 0 Amalgamator	2	2	المركز الصحي الفعكات
1 Dental chair 0 x-ray machine 1 Auto clave 0 light cure machine 0 Amalgamator	*	2	المركز الصحي اللويفية
/	/	/	الوحدة الصحية بودريسة
1 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	*	5	المركز الصحي الكويفية
2 Dental chair 1 x-ray machine 1 Auto clave 1 light cure machine 1 Amalgamator	2	17	العيادة المجمعة بوعطني
*	*	3	المركز الصحي تيكا
*	*	1	الوحدة الصحية بوفاخرة
1 Dental chair 0 x-ray machine 1 Auto clave 0 light cure machine 0 Amalgamator	*	1	المركز الصحي الحليس
*	*	2	الوحدة الصحية قنفودة
/	/	/	الوحدة الصحية يوسف بورحيل

/ Does not exist
* No data available

النظام الصحي الليبي فيما يخص صحة الفم و الأسنان: دراسة حالة في مدينة بنغازي

مقدمة البحث : عائشة حسن فرج العشيبي

الأستاذ المشرف: د. ارحيم العوامي

المستخلص

الخلفية والهدف: لا يُعرف الكثير عن النظام الصحي فيما يخص صحة الفم والأسنان في ليبيا. تهدف الدراسة الحالية إلى وصف النظام الصحي الليبي الخاص بصحة الفم والأسنان من حيث هيكليته، وظيفته، قوته العاملة، تمويله، كيفية سداده والفئات المستهدفة للعلاج فيه.

الطرق: تم استخدام تصميم دراسة الحالة معتمدين على عدة طرق كمية ونوعية في جمع البيانات، حيث تم جمع البيانات الكمية من خلال الاستبيان والنوعية بواسطة المقابلات والتحليل الوثائقي للقانون الصحي الليبي لسنة 1973، وكذلك للتقارير والدراسات السابقة المتوفرة بخصوص النظام الصحي في مدينة بنغازي. من ثم تم إجراء كل من التحليل النوعي والكمي للبيانات التي تم تجميعها للحصول على النتائج، حيث تم استخدام النسب والترددات لتلخيص الإجابات على الاستبيان، وتحليل الإطار المعتمد على المكونات الأساسية في وصف النظام الصحي لتحليل المقابلات والوثائق.

النتائج: أظهرت النتائج أن النظام الصحي الليبي فيما يخص صحة الفم والأسنان يقدم على مستويين رئيسيين من الرعاية؛ على مستوى الدولة من خلال المستشفيات العامة والمركزية والتخصصية والمراكز التخصصية، وعلى مستوى المناطق من خلال إدارة الخدمات الصحية بالمناطق. وفي كلا الحالتين فهي مدمجة مع باقي الخدمات الطبية وتمول من قبل الحكومة من دون اعتبار خاص كهيكلية أو تمويل، مع استثناء المركز التخصصي لطب وجراحة الفم والأسنان التعليمي-بنغازي الذي يختص بتقديم خدمات الأسنان ويمتلك ذمة مالية مستقلة، والقطاع الخاص الذي يمول ذاتيًا. كوظيفة كانت الخدمات متجهة بشكل كبير للعلاج من دون الاهتمام بطب الفم الوقائي وقدمها أطباء أسنان عاميين في معظمهم، مع وجود قوى عاملة مساعدة للأطباء كطقم التمريض و الفنيين. هناك مجموعات معينة مستهدفة للعلاج في القطاع العام ولكن من دون خطط او سياسات واضحة.

الخلاصة: إن النظام الصحي الليبي من حيث صحة الفم والأسنان يعتبر ضعيف التنظيم، شبه معطل في القطاع العام، وفي الغالب متجه نحو القطاع الخاص. هناك حاجة ملحة لتطوير سياسات وخطط لتحسين النظام وإبعاده عن ظل الخدمات الطبية التي تتسبب في التقليل من أولوية طب الأسنان.