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Oral Health Status and Treatment Needs of Internally Displaced Libyan Children in Benghazi / Libya - Tawrgha Camps

By

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بِسْمِ اللهِ الرَّحْمَنِ الرَّحِيمِ

﴿ وَمَنْ أَحْيَاهَا فَكَأَنَّمَا أَحْيَا النَّاسَ جَمِيعًا ﴾

صَدَقَ اللهُ الْعَظِيمُ

سورة المائدة الآية (32)

DEDICATION

To those who taught me that great accomplishments can only be completed by patience, resolve, and perseverance...

To everyone who has supported me on my writing journey with your wishes for success.

To my nearest and dearest to my heart and soul...

I dedicate my little work to my mother, my brothers, and my whole supported family.

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Contents

Abbreviations

FDI	World Dental Federation General Assembly
IOM	The International Organization for Migration
UNHCR	The United Nations High Commissioner for Refugees
GNU	Government of National Unity
IDP	Internally Displaced Person
OHRQoL	Oral Health-Related Quality of Life
Child-OIDP	Child Oral Impacts on Daily Performance Index
COHIP	Child Oral Health Impact Profile
ECOHIS	Early Childhood Oral Health Impact Scale
SOHO-5	The Scale of Oral Health Outcomes for Five-Year-Old Children
CPQ11-14	The Child Perceptions Questionnaire For 11-14-Year-Old Children
CPQ8-10	Child Perceptions Questionnaire For 8-10-Year-Old Children
P-CPQ	The Parental Perceptions of Child Oral Health-Related Quality of Life
C-OIDP	The Child Oral Impacts on Daily Performance Index
DIDL	Dental Impact on Daily Living
OHI	Oral Health Inequality
SES	Socioeconomic Status
AIHW	Australian Institute of Health and Welfare
ICDAS	International Caries Detection and Assessment System
DMF	Decayed, Missing, And Filled
DMFT	Decayed/Missing/Filled Teeth
DMFS	Decayed/Missing/Filled Surfaces
PUFA/pufa	Pulpal Involvement, Ulceration, Fistula, And Abscess
CAST	Caries Assessment Spectrum, And Treatment

BASCD	The British Association for The Study of Community Dentistry
NHS	The National Health Service
ARCPOH	Australian Research Centre for Population Oral Health, Australia
NHANES	National Health and Nutrition Examination Survey
CDC	The Centers for Disease Control and Prevention
NIDCR	The National Institute of Dental and Craniofacial Research
NCHS	The National Center for Health Statistics
GBD	Global Burden of Disease
ECC	Early Childhood Caries
DF	Dental Fluorosis
DF	Dental Fluorosis
DE	Dental Erosion
TDIs	Traumatic Dental Injuries
CPI	Community Periodontal Index Probe

LIST OF TABLES

LIST OF FIGURES

Oral Health Status and Treatment Needs of Internally Displaced Libyan Children in Benghazi/ Libya - Tawrgha Camps

صحة الفم و احتياجات العلاج لدى الأطفال النازحين داخل ليبيا / بنغازي - مخيمات تورغاء

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Abstract

Background: In Libya, about (245,483) Libyans are still internally displaced for different reasons. Of these, about (40,000, or 8,500) heads of families, are from Tawrgha city. There are currently more than 40 IDP camps across the country. In addition, Oral health is a critical indicator that may be used to determine a person's overall health. Little is known about the oral health status and treatment needs of children living in IDP camps.

Objective: The present study was conducted to explore the oral health, treatment needs and OHRQoL of IDP children and inform future public health programs and policymakers.

Methods and materials: An observational, cross-sectional survey using both clinical examination and a self-administered questionnaire, was conducted among children of ages 8-15 years, living in tawrgha camps in the city of Benghazi. The study used both a validated, self-administered questionnaire and a clinical assessment to collect data from the participants. The questionnaire explored the socio-demographic characteristics and oral health behaviors of the participant as well as the Arabic COHIP-SF19.

Results: A total number of 358 (191 male and 167 female) IDP children were recruited. Participants showed a higher prevalence of dental caries (275, 76.6%) than Benghazi children (193, 53.20%). However, the IDP children had lower filling teeth rate (2, 0.6%) than Benghazi children (6, 6%). The data reveal that the caries prevalence was different between camps. The garuons camp showed the highest caries experience (4.26, SD=3.48), then The red crescent and sport city camps at (4.28,

SD=3.35) and (3.5, SD=2.95) respectively. the lowest caries prevalence was in alhalis camp (2.60, SD=2.69). About (149, 41.6%) of the sample showed no singe of dental fluorosis. however, the severe form of it was found in (3, 0.8%). The vast majority of the participants had no sign of injury. Only few participants have traumatic injuries. The low prevalence of dental trauma (31, 8.7%). Almost all of the study participants showed no sign of erosion (308, 86%). Additionally, the data reveals that in the overall OHEQol score tawrgha children had (58.32, SD=1352) while the Benghazi children had (61.13, SD=12.97).

Conclusion: The dental caries prevalence was high while dental erosion and dental trauma were relatively low among IDP children compared to children living in Benghazi. Camps that are away from the city center and supermarkets appeared to have lower caries rates Observed.

Chapter 1

Introduction

1.1 Introduction:

Regardless of where it takes place, any armed conflict inevitably has devastating and lingering repercussions. Countries with low to middle incomes are typically more prone to armed conflict and tend to be the least prepared to deal with the devastation that often follows a conflict. This can include death, disability, injury, destruction of property, disruption of economic activities, and diversion of resources from health care. (Sambanis, 2002; Laake et al., 2010). The immediate and direct losses of war are only the tip of the iceberg when contrasted with the long-term impacts of conflict, which are frequently under-reported and poorly recorded (Thayer, 2009; Rieder & Choonara, 2011; Sabes - Figuera et al., 2012; Arbatov, 2004; Tapp et al., 2008). There have been upheavals in several Arab states in recent years, including Tunisia, Egypt, Yemen, Libya, and Syria. Although events mostly took the shape of civil protests and conflicts between residents and police forces in Tunisia, Egypt, and Yemen, they escalated into military fighting in Libya and Syria (Lutterbeck, 2012).

According to the United Nations High Commissioner for Refugees, there were more than (70) million forcibly displaced people worldwide at the beginning of 2022 (UNHCR, 2022). This unprecedented figure includes (41.3) million internally displaced people (IDP), defined as individuals who are forced to flee their homes but have not crossed an international border and cannot return because they fear their lives are in danger. On the other hand, refugees are defined as "individuals fleeing their country of origin due to persecution, war or violence, who have been granted refugee status under international law’’ (UNHCR, 2022). IDPs live in their countries of origin but are often afraid or unwilling to return home for fear of persecution. Although many IDP face the same difficulties as refugees, they are not granted the same rights under international law. Therefore, IDP is a descriptive term, not a legal one. Nevertheless, IDP still have rights, but some governments can or unwillingly honour those rights.

Due to the experiences of violence, famine, armed conflict and persecution associated with displacement, displaced people often face a set of challenges that are distinct from those of other patient populations (Matlin et al., 2018). Healthcare systems are also subject to increased pressure in times of conflict when access to care can be weaponised against vulnerable populations, and workplace violence can jeopardise healthcare workers' safety (Fouad et al., 2017; Mohamad et al., 2021). While the

unique health needs of forcibly displaced people have been characterised in the literature, more still needs to be done internationally to translate this knowledge into effective policies and actions, particularly in oral health.

Libya is a country in North Africa with a total land area of (1,775,500) square kilometers, making it the second biggest country on the African continent. The population is reported to be around six million, and the gross national income is based on oil exports (Bank, 2009). Libya has been hit hard by conflict and political instability since a major armed rebellion broke out in February 2011, with many people forced to flee their homes. The displacement of civilians has created a humanitarian emergency, with people living in IDP camps struggling to access basic services and suffering from malnutrition and other diseases. The International Organization for Migration (IOM) is working to support these communities by offering humanitarian aid and improving living conditions in the camps. The security situation has improved dramatically since the Government of National Unity (GNU) formation in March 2021, which creates favorable conditions for the return of displaced populations (OCHA, 2022).

In Libya, about (245,483) Libyans are still internally displaced for different reasons, as the UN High Commissioner for Refugees reported in July 2021 (UNHCR, 2021). Of these, about (40,000, or 8,500) heads of families, are from Tawrgha city. There are currently more than 40 IDP camps across the country, each of which is home to thousands of people who have fled their homes to escape the fighting. The conditions in these camps are extremely poor, with many IDP living in overcrowded and unhygienic conditions with no access to medical care or safe drinking water. The IDP from tawrgha has been distributed systematically across four significant camps in the country's west. Tripoli mainly, these camps are (the Airport Road camp, the al - Falah I and II camps, the Sidi al - Sayeh camp, and the Janzour camp). In the eastern region, the tawrgha community is spread across four large camps (the garuons camp, the red crescent's first aid, the sports city camp and the alhalis Camp. Alhalis has located around (20) km to the west of Benghazi. Elsewhere, more than (470) families inhabit over (60) schools and vacant buildings. Although, the camps represent a second home for those who were forced to move. However, due to the lack of basic health facilities such as a primary health care system and the position of these camps from the city

centre, all these factors could lead the internally displaced children to be more exposed to oral health problems than non - displaced children.

Each camp is run by a local committee that is responsible for organizing camp activities and raising funds for the needs of the community. The committees are also responsible for maintaining security and order within the camp and are responsible for selecting volunteers who assist with the running of the camp. The committees operate with limited funding and resources and are therefore unable to provide adequate humanitarian assistance to all of the camp residents. One of the main challenges facing the committees running these camps is the lack of resources and funds. They are unable to adequately fund the provision of food and water to the camp residents and they often do not have enough supplies to support the medical care and education of the children living in the camps. In addition, a number of the camps have been forced to close due to a lack of basic infrastructure such as water and electricity.

Oral health is a critical indicator that may be used to determine a person's overall health (Imai & Mansfield, 2015). Furthermore, it enhances a person's physical, psychological, and social well-being (Daly et al., 2017). Most children exposed to chronic war stress will develop psychological illnesses (Imai & Mansfield, 2015). Little is known about oral health status and subjective as well as objective treatment needs of children living in IDP camps. Therefore, the present study was conducted to explore these needs and inform future public health programs and policymakers to make an informed decision and create policies to reduce disease burden among IDP communities.

Chapter 2

Literature review

2.1 Overview:

This chapter gives an overview of the basic concepts of health oral health, related inequalities and oral health related quality of life, highlighting the available literature on oral health problems among Libyan children and oral health among displaced children locally and intentionally.

2.2 Concept of Health and Health-Related Quality of Life (HRQoL):

The World Health Organization (WHO, 1946) defined health as "a state of complete physical, mental, and social well - being and not merely the absence of disease or infirmity". This definition fits well with the biomedical model of health which considers health as the absence of disease and defined by objective assessment. The patients are only passive recipients of treatment (Wade & Halligan, 2004). This approach emphasizes diagnosis and treating individuals separately from their lifestyle and living conditions. This model concentrates on the disease, illness, or disability and attempts to cure or return the physical health of the person to health status. “being sick is a biomedical process that is natural and not anything to do with our social life” (Adibi, 2014). However, this model has been criticied for several limitation such as ignoring the emotions and perceptions of patients and the role of surrounding environment.

A response to the limitations of the biomedical model, the social model is developed and it suggests that the health of individuals and communities is seen as the result of complex and interacting social, economic, environmental and personal factors rather than disease and injury. Thus, for those who adhere to social model, the determinants of health and illness are far more varied and broader in scope than those in the biomedical model (Adibi, 2014). The social model focuses on policies, education and health promotion and goes beyond the focus on lifestyle, behavior and accepts the need for social change to provide prerequisites for health. The social model has been summarized as following: “the social model locates people in social contexts, conceptualizes the physical environment as socially organized, and understands ill health as a process of interaction between people and their environments” (Adibi, 2014).

This has resulted in the paradigm shift of health and disease to social model which put more emphasis on the reasons for the illness by attempt to address of these broader; social, economic, environmental and personal factors and complex interaction rather than diseases (McCartney et al., 2019). However, this model has been criticised for ignoring important environmental and psychological factors. This led to the emergence of the bio-psychosocial model of health which incorporates the aforementioned missing dimensions of health (Engel, 1981). Therefore, the bio-psychosocial shifts the aim to achieving health by considering the wider determinants of health, rather than narrowly focusing on treating disease. The bio - psychosocial model suggests working both at individual and environmental levels to achieve the status of health. It has been suggested that the concept of health should extend to cover individual's ability to cope with social, physical and emotional challenges (Huber et al, 2011). This was reflected in Ottawa charter for health promotion (WHO, 1986) which states that, a healthy individual is the one who is able to identify aspirations, to satisfy needs, and to change or cope with the environment. Hence, there is need to examine the subjective experiences of patients (Engel, 1980). This is a key idea to the concept of 'health - related quality of life' (HRQoL) which reflect an individual's subjective appraisal and response to health or illness. The World Health Organization (WHO, 1995, p.1405) defined quality of life as "the individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". HRQoL is a multidimensional construct of physical health, psychological state, social relationships, personal beliefs and their environment.

In 1986, the WHO published as the Ottawa Charter for Health promotion which defined as the process of enabling people to increase control over, and to improve, their health to reach a state of complete physical, mental and social well - being, an individual or group must be able to identify and to realize aspirations, to satisfy needs and to change or cope with the environment. Therefore, health seen as a resource for everyday life and a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy life-styles to well - being" (McCartney et al., 2019).

2.3 Definition of oral Health:

Oral health is the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions. It is a fundamental component of health and physical and mental well-being. It exists along a continuum influenced by the values and attitudes of people and communities. It reflects the physiological, social and psychological attributes that are essential to the quality - of - life (MCcartney et al., 2019, Glick & Colleagues 2016) summarize the latest World Dental Federation General Assembly (FDI) concept of oral health 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". Further, Oral health care and therapy must take into account the patient's values, perceptions, and expectations (Findley & Weiner, 2020).

Further attributes of oral health:

- It is a fundamental component of health and physical and mental well - being. It exists along a continuum influenced by the values and attitudes of people and communities.
- It reflects the physiological, social, and psychological attributes that are essential to the quality of life.
- It is influenced by the person's changing experiences, perceptions, expectations, and ability to adapt to circumstances.

The core elements of oral health are as follows:

Disease and condition status refer to a threshold of severity or a level of progression of disease, which also includes pain and discomfort.

Physiological function refers to the capacity to perform a set of actions that include, but are not limited to, the ability to speak, smile, chew, and swallow.

Psychosocial function refers to the relationship between oral health and mental state that includes, but is not limited to, the capacity to speak, smile, and interact in social and work situations without feeling uncomfortable or embarrassed.

Driving determinants are factors that affect oral health and cover 5 main domains: genetic and biological factors, social environment, physical environment, health

behaviors 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.

Moderating factors are elements that determine or affect how a person scores his or her oral health and include, but are not limited to, age, culture, income, experience, expectations, and adaptability.

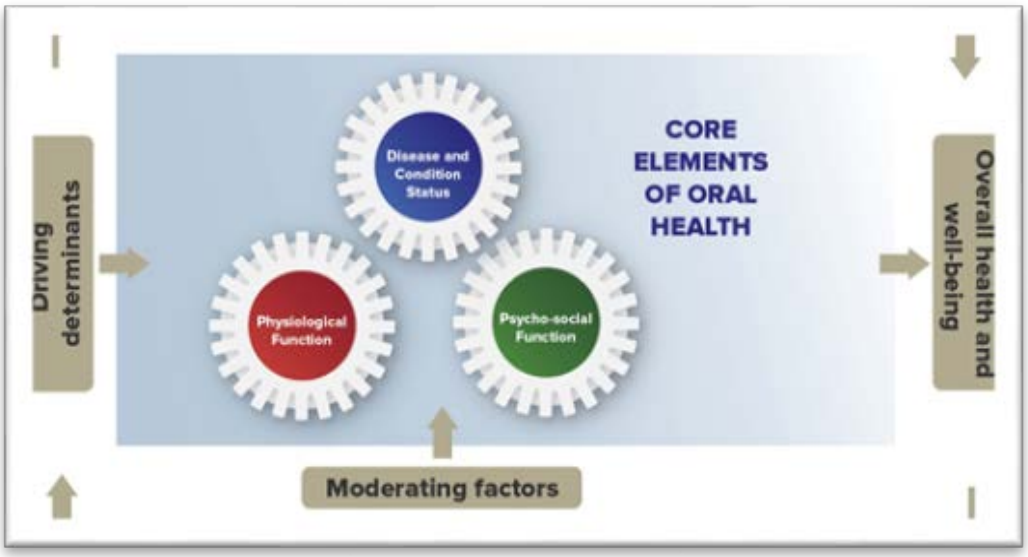

Figure 2.1 Core elements of oral health framework by FDI

2.4 Oral health - related quality of life:

The concept of oral health - related quality of life (OHRQoL) has emerged in the past few decades, and yet it has a significant participation in clinical dentistry and dental research. This has been the result of evolution in the understanding of oral health and its position within both biomedical and bio-psychosocial models. The development of the concept of OHRQoL has been adopted by oral health professionals where philosophies about health have expanded from the biomedical model of merely assessing the decayed or the remaining teeth to include assessments of the impacts and effects of oral conditions on various aspects of everyday life (Robinson, 2016). Oral health - related quality of life (OHRQoL) is that part of a person's quality of life that is affected by his person's oral health. It is a multidimensional, subjective and patient - centred measure of functional and psycho - social aspects of oral health

(Preedy & Watson, 2010). A popular definition of OHRQoL is "the impact of oral disease and disorders on aspects of everyday life that a patient or person values, that are of sufficient magnitude, in terms of frequency, severity or duration to affect their experience and perception of their life overall "(Locker & Allen, 2007).

Based on HRQoL models suggested by (Patrick & Erickson, 1993) a multidimensional model of OHRQoL has been developed. The model comprises the absence of impairment, disease and symptoms; the appropriate physical functioning related to chewing, swallowing and absence of discomfort and pain; the emotional functioning related to smiling; the social functioning associated with normal roles; the perception of excellent oral health; satisfaction with oral health; and the absence of social or cultural disadvantage due to oral health status (Gift & Atchison, 1995).

(Locker, 1998) defined OHRQoL as "an individual's assessment of how the following affect his or her well - being: functional factors, social factors, psychological factors and experience of pain in relation to oro - facial concerns". Therefore, ensuring OHRQoL involves subjective assessments of oral health, emotional and functional well - being and self - esteem; also known as 'socio - dental indicators' (Sischo & Broder, 2011).

Traditionally, clinical indicators, also known as 'Normative needs' are used for oral health assessment and services planning, which has its well-known limitations; such as overestimation of health needs and workforce, and more importantly, overlooking the impact of oral health on daily life (Gherunpong et al., 2006). Recent years have observed the development of Oral health-related quality of life (OHRQoL) measures and socio - dental indicators that reflect the broader social aspects of oral health and to overcome the downsides of traditional clinical assessment (Slade, 1997). These development also marked the paradigm shift in defining oral health needs and outcomes from a narrow biomedical to a wider bio - psychosocial approach (Sischo & Broder, 2011). This allows for a better understanding of disease and health determinants and has applications in oral health services' planning and evaluation and allocation of resources (Jokovic et al., 2004; Locker, 1996; Masood et al., 2014; Gherunpong et al., 2006). It is noteworthy here that the use of OHRQoL, measures is a complementary to clinical indicators to capture the wider picture of health OHRQoL, measures should not be used as the sole indicators of oral health. The use of Socio - dental indicators chimes with the new definition of oral health adopted by

Dental Federation General Assembly, which describes oral health as a multifaceted construct, and acknowledges the psychosocial function as a core element of oral health has been (Glick et al., 2016).

2.4.1 Measures of Oral Health-Related Quality of Life:

Most of the developed OHRQoL indicators measure either the effect or the impact of oral health on the quality of life, or sometimes they measure both the effect and the impact (Slade & Spencer, 1994). The effect of oral health on the quality of life refers to the physical, psychological and social effect whilst the impact of oral health on the quality of life refers to daily activities, ability to chew, talking to people and overall quality of life. However, Generally, the majority of the OHRQoL indices measure the effect of oral disorders on the individual's social role and their ability to work, attend school or assume parental or household duties(Locker, 1998; Weintraub, 1998). The use of OHRQoL measures to assess the effect and impact of oral health is better than using the clinical disease measure. (Okunseri et al., 2005; Slade et al., 1998).

To date many tools have been developed to assess OHRQoL, primarily of adults; such as: OHRQoL measures (Kressin et al., 1996), Social Impacts of Dental Disease (SIDD)(Cushing et al., 1986), General / Geriatric Oral Health Assessment Index (GOHAI) (Atchison & Dolan, 1990), Dental Impact Profile (DIP)(Strauss & Hunt, 1993), Oral Health Impact Profile (OHIP)(Slade & Spencer, 1994), Subjective Oral Health Status Indicators (SOHSI) (Locker, 1997), Dental Impact on Daily Living (DIDL)(Leao & Sheiham, 1996), The Oral Health Quality of Life Inventory (OH-qol), Oral Impacts on Daily Performance (OIDP)(Adulyanon & Sheiham, 1997), and UK Oral Health-Related Quality of Life Measure (OH - qol - UK)(McGrath & Bedi, 2001). All of them have been tested for reliability, internal consistency and validity. Most of them were developed following the theoretical framework which provided in the Model of Oral Health of Locker (Locker, 1988). Many of these adult OHRQoL measures have been adapted and tested for validity and reliability to be used in school aged children (Easton et al, 2008; Yusuf et al, 2006). Such as Child Oral Impacts on Daily Performance index (Child - OIDP) (Gherunpong et al, 2004), Child Oral Health Impact Profile (COHIP) (Broder et al, 2007).

2.4.2 Measures of Oral Health-Related Quality of Life in Children:

Many instruments to measure the impact of oral health on the child's quality of life have been developed during the past decades. As mentioned in the previous section, most of OHRQoL measures in children were developed from adult's tools. At first, OHRQoL measures depend on children's guardians reports (Richards Jr & Hemstreet, 2012), but recent direct children OHRQoL measures have been introduced. The development of these measures has been based on standardised approaches which ensure validity and reliability of questionnaires. The children OHRQoL instruments developed are: OHRQoL in Children (COHRQoL) (Jokovic et al., 2002a), Child Oral Impacts on Daily Performance index (Child-OIDP) (Gherunpong et al., 2004), Child Oral Health Impact Profile (COHIP) (Broder et al., 2007), Early Childhood Oral Health Impact Scale (ECOHIS) (Pahel et al., 2007) and the Scale of Oral Health Outcomes for Five -Year - Old Children (SOHO-5) (Tsakos et al., 2012).

To select an appropriate OHRQoL measure for children, certain criteria should be covered. It should be acceptable to the population, clear, easy in use and consist of generic definitions. Objective and subjective approaches and perceived importance to the child should be included within the measure domains. Moreover, the measures of OHRQoL should demonstrate satisfactory psychometric characteristics and provide a standard for the general population and to the target age group of children (Cummins, 2000; Lawrence et al., 2008). In the next section, some tools for measuring OHRQoL in Children.

2.4.3 Child Perceptions Questionnaire for 11-14-year-old children (CPQ11-14):

The CPQ 11-14 consists of thirty-seven items organised into four health domains: oral symptoms (6 items), functional limitations (9 items), emotional wellbeing (9 items) and social wellbeing (13 items). These ask about the previous three months in relation to the child's oral health conditions, the response choices for the questions are: 0 for 'never',1 for 'once/twice',2 for 'sometimes' and 3 for 'every day / almost every day'. Additionally, the questionnaire contains items to elicit global ratings of the child's oral health and the extent to which oral health conditions affect his or her overall wellbeing (Jokovic et al, 2002).

2.4.4 Child Perceptions Questionnaire for 8-10-year-old children (CPQ8-10):

The CPQ8-10 consists of 25 items divided to four health domains: oral symptoms (5 items), functional limitations (5 items), emotional wellbeing (5 items) and social wellbeing (10 items), The questions are about the frequency of events in the last four weeks in relation to the child's oral health condition. The response options are the same as for the CPQ11-14. The CPQ8-10 also contains items which provide global rating of the child's oral health (Jokovic et al., 2003).

2.4.5 The Parental Perceptions of Child Oral Health-related Quality of Life (P-CPQ):

The P-CPQ developed by Jokovic and co-workers during the same period of constructing their Child Perception Questionnaires. The questions were about events in the last three months. The range to response for questions were from 0 =never to 4 = every day or almost every day, also "don't know" responses were also included. Global ratings of the child's oral health and impact of the oral/orofacial condition on his or her overall wellbeing(Jokovic et al., 2003).

2.4.6 The Child Oral Impacts on Daily Performance Index (The Child-OIDP questionnaire):

The Child - OIDP questionnaire was developed and validated among 11-12- year-olds children in Thailand (Gherunpong et al, 2004), and was derived from the Thai version of the adult OIDP (Adulyanon & Sheiham, 1997) after applying verbal and phrases modifications to adjust the children's ability to understand and answer the questions. The C - OIDP has two forms of the same questionnaire an interviewer - administered and a self - administered form, the self - administered questionnaire is used in this validation for adolescents. Both formulas have been shown similar results. Eight activities are considered: eating, speaking, cleaning teeth, relaxing, emotion, and smiling, studying, and social contact.

2.4.7 Child Oral Health Impact Profile - Short Form (COHIP - SF19):

Although many measures have been developed to assess OHRQoL among school age children (Gilchrist et al., 2014; Jokovic et al., 2002), the Child Oral Health Impact Profile (COHIP) stands out for being both suitable for children between 8 and 15 years of age, while also evaluating both positive and negative attributes of quality of life (Broder et al., 2007). What is more, recently, a shorter version of COHIP

(COHIP-SF19) has been developed using a confirmatory factor analysis (Broder et al., 2012). Such short forms are appropriate for large surveys since they are less time consuming, easy to use and interpret and consequently more cost-effective (Jokovic et al., 2006).

However, since the initial development by (Broder et al., 2012), there has been very little published research on the cross-cultural adaptation and validation of COHIP-SF 19. Using a comprehensive cross-cultural adaptation process, the original English language COHIP - SF 19 was successfully translated and adapted to the Arabic context. The Arabic COHIP-SF 19 is satisfactorily equivalent to the original version and is valid and reliable to estimate OHRQoL in Arabic schoolchildren. However, the EFA suggested some modifications to the subscales which has been identified as an area of further assessment. Further research is required to investigate the longitudinal validity and responsiveness of Arabic COHIP - SF 19 as well as its performance among children from different age groups.

2.5 Health inequalities:

Health status of an individual is influenced by wider social, economic, and physical environment and personal attributes and behaviors, which are referred to as the ‘determinants of health’, which interact to shape the health of the individuals and the whole society (WHO, 2008). Therefore, differences in the availability of these environmental factors and the availability of resources that are necessary for achieving health, may cause variations in health, leading to inequalities in health among people and within societies. Hence, it is important to understand how the determinants of health influence the health and well-being of individuals and societies. In oral health this model provides an important conceptual shift from the biomedical/behavioural ‘downstream approach’ to an upstream approach aimed at addressing the wider determinants of oral health or the causes of the causes (Watt, 2007).

2.5.1 Definition of oral health inequality (OHI):

Patterns of social stratification resulting from the systemic "unequal distribution of power, status, and wealth among social classes” is defined as health disparities (WHO, 2010). The WHO defined oral health inequality as “Oral diseases disproportionally affect the poor and socially-disadvantaged" Within nations, social

group differences are often important. There is a social gradient in the influence of oral health on quality of life. Psychosocial, material deprivation, health activity, environmental, and selection theories are all used to try to understand group-level disparities in health (Arcaya et al., 2015). The WHO defines health inequalities as the systematic, avoidable and unfair differences in health outcomes (McCartney et al., 2019).

2.5.2 Measuring socioeconomic status (SES):

The terminology for socioeconomic status **(**SES**)** can vary widely such as social class, social stratification, social or socioeconomic position (SEP), socioeconomic factors, social disadvantage, and socioeconomic deprivation. According to the American Psychological Association (APA, 2007), socioeconomic factors are important determinants of human across the life. Broadly, education, income, and occupation are used to measure SES, these variables are considered as the traditional measures of SES (Saegert et al., 2006; Shavers, 2007; Berzofsky et al., 2014). The main purpose to calculate SES is to describe and quantify the social prevalence of a disease in order to advise health policies and minimize health inequalities. Nevertheless, any measurement of SES may be used to describe and classify health disparities whether they exist. This also allows a deeper understanding of the factors that cause health inequalities due to SES (Shavers, 2007; Tsimbos, 2010).

Different socioeconomic status is usually categorized into three levels (high, middle, and low) according to family or personal background. Differences in health conditions between social groups are essential indicators of a society's level of equality. In India, for example, are 86 percent more likely to die than people from the riche level (Braveman et al., 2000). Understanding socially patterned health inequalities necessitates the formation of concrete classes of people. Social groups can be defined by their place of residence, race/ethnicity, profession, gender, schooling, SES, and social capital or wealth according to World Health Organization (WHO, 2013). In the United States, for example, caste and race/ethnicity are particular means of stratifying and separating individuals into social classes. The degree of education contributes to social divisions in the UK. Health disparities along racial, ethnic, and socioeconomic lines are observed in both low- and high - income countries, and may be widening (Braveman & Tarimo, 2002).

2.5.3 Conceptual framework of social determinants:

Factors influence the health of the individual or population are known as determinants of health (Peres & Heilmann, 2015; Shokouh et al., 2017; Vakili et al., 2011). There were a lots of framework models described social and health inequalities. Williams' conceptual framework was oldest model and the Australian Institute of Health and Welfare (AIHW) was newest ones. The WHO model compared with other models have a systematic integrated and dynamic approach. In recent years, this model has been developed which have two categories of social determinants: A) structural determinants B) Intermediary determinants: The relation between intermediary determinants and structural determinants is created by social cohesion or social capital (Peres & Heilmann, 2015; Shokouh et al., 2017; Vakili et al., 2011).

The "structural determinants and conditions of everyday life," defined as social determinants of health, these are the root causes of health inequities within and between countries (WHO, 2008). The WHO social determinants framework is influenced by social science theories of power and control, and how they shape social, economic, and political interactions (Figure 2.2). The biological, behavioral, psychosocial, environmental and socioeconomic risk factors determine patterns of both general and Oral health inequalities. Intermediary determinants refer to how socioeconomic position influences health through the circumstances and risks for disease. No risk occurs in isolation, and many have their roots in complex chains of events spanning long periods of time. The chains events leading to an adverse health outcome can be proximal (factors act directly or almost to cause diseases which act on both micro and macro levels) or distal (further back in the causal chain and act via a number of intermediary causes) or both. In short, they are the causes of the causes. The social determinant viewpoint helps to direct attention on the wider social, community, environmental and economic distal factors that are the underlying drivers of the more proximal biological and behavioral effects on oral health patterns (Peres & Heilmann, 2015; Shokouh et al., 2017; Vakili et al., 2011).

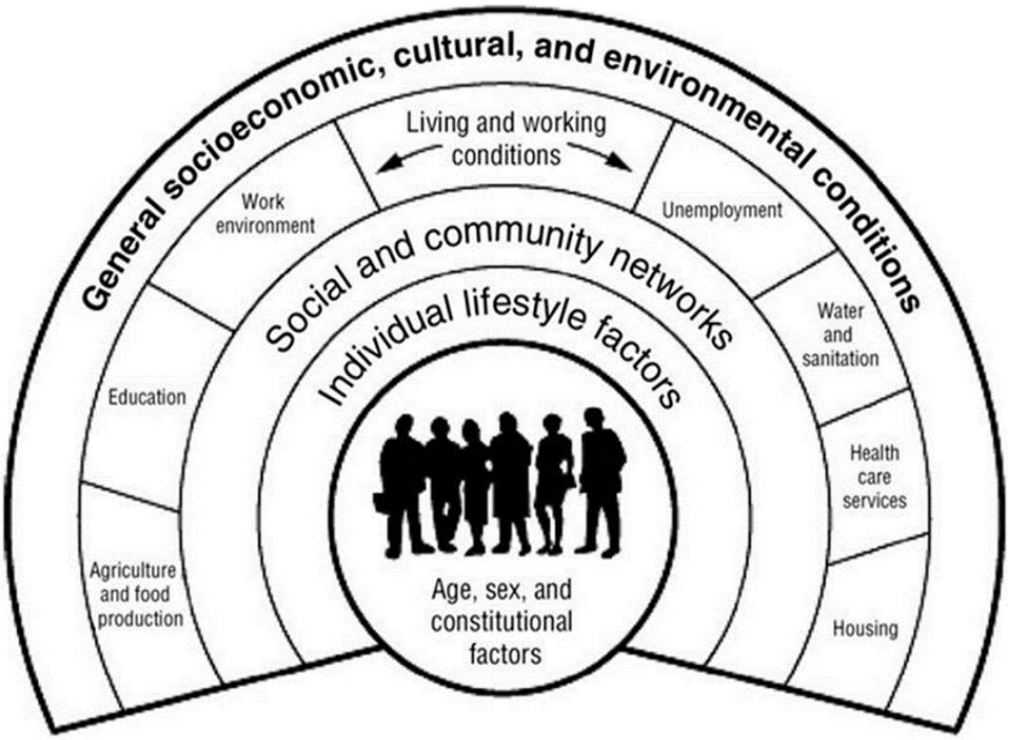

Figure 2.2: Social determinants of health

2.6 Theoretical explanations of oral health inequality:

The previous sections described the conceptual framework of health inequalities how to quantify health inequality in realistic terms but now we need to understand how differences occur. There are broad principles and various theoretical frameworks that can be applied to both the analysis of social inequality in health and the comprehension of health disparities among individuals (Arcaya et al., 2015).

2.6.1 Materialist Explanation:

Focus on the food, shelter, emissions, and other physical threats and emphasizing access to resources are all material factors that affect health outcomes via an unequal distribution of physical health threats and resources across geographies and social classes leads to social inequality in health (Sisson, 2007a).

2.6.2 Psychosocial Explanation:

Feelings of social isolation, inequality, tension, and a lack of social support have psychosocial health consequences (Sisson, 2007). Via negative psychological states have an effect on physical function because they stimulate the biological stress

response, which may result in increased inflammation, blood pressure and other outcomes (Rozanski & Kubzansky, 2005; Arcaya et al., 2015). Australian research found that memory of a supportive parental rearing style was correlated with more positive psychosocial factors for adults such as a sense of control and life satisfaction (Sanders & Spencer, 2005).

2.6.3 Behavioral Explanation:

Behavioral variations are widely used as a factor in health disparities by people from different SES backgrounds engaged in behaviors that are damaging or not to their health (Sisson, 2007).

2.6.4 Influences SES on oral lifestyle or oral behavior

Health is multifactorial, influenced by many factors like environment, lifestyle, socio-economic status (SES) (AlJehani, 2014; Damyanov et al., 2012; Kadtane et al., 2014). The "lifestyle" that is based on the interplay between living conditions background and individual patterns of behavior influences by socio - cultural and personal characteristics (Gundala & Chava, 2010). Several research linked oral diseases to individual behavior that importance for the healthy mouth and effective oral health care behaviors (Sheiham & Nicolau, 2005; Fukuda et al., 2005). There are statistically significant between the poor oral hygiene practices and higher distribution of periodontal diseases and dental caries experience among the subjects in lower SES than higher SES (Shekar & Reddy, 2011; Varenne et al., 2004; Arrica et al., 2017) may be due to mediator factors high cost of oral hygiene aids like mouthwash, inter proximal brushes or lack awareness of its role in improving dental health or their beliefs about oral care and their oral behaviors (Shekar & Reddy, 2011; Kadtane et al., 2014; Timiş & Dănilă, 2005; Broadbent et al., 2016). Some studies have searched for people with low SES are more likely to present with dental pain, dental caries, no replacement of lost teeth and periodontal diseases (Wang et al., 2017; Steele et al., 2015) because the individual behavioral patterns that damaging to their health such as high sucrose consumption and not used fluoridated toothpaste which are associated with dental caries (Petersen & Lennon, 2004; Bernabé et al., 2014; Al Saffan, 2017) or smoking is associated with destructive periodontal diseases and significantly higher among the subjects in lower SES categories (Shekar & Reddy, 2011). Some studies on children estimated SES childhood, their beliefs about oral care and their oral

behaviors, Who lived in high SES predict better oral health beliefs, self-care behaviors (such as: tooth brushing) and accesses to dental service in adolescence and adulthood (Broadbent et al., 2016). The correlation remained strong between social status and oral health even when controlling these variables (Wang et al., 2017; Park et al., 2016; Gundala & Chava, 2010). So, development of dental program should be assesses SES of population or community and added social model to the entire process to improves oral health outcomes especially among low SES (Shekar & Reddy, 2011).

2.6.5 Life course Perspective

The life course perspective to the consideration of all three types of explanations creates useful complexity in thinking about how health inequalities arise. So, life course prospective considers an individual's disease status as a marker of their past social position (Thomson et al., 2004, Shokouh et al., 2017; Sisson, 2007). The importance of early life circumstances on health in adulthood have been highlighted in birth cohort studies. The available evidence rests mainly on five cohort studies: The Newcastle Thousand Families 1947 birth cohort in England, the Dunedin Health Development Study in New Zealand, the Pelotas birth cohorts in Brazil and the Newcastle and Dunedin health study in Brazil. The data enable researchers to investigate how the 'social' becomes 'biological', or how the experience of socio-economic disadvantage may result in ill health (Heilmann et al., 2015). Existing birth cohort studies containing oral health information have not yet had sufficient time to follow up individuals into later adulthood. However, recent evidence from various European countries points at enduring impacts of early life conditions on oral health. These findings highlight that socio-economic background, health-related behaviour patterns in early life years, and previous disease experience play important roles in terms of oral health outcomes up until middle adulthood (Heilmann et al., 2015).

Life-course theory suggests there are two models: accumulative and critical models that reason for an oral health problem (Sisson, 2007). The disturbances during the development of enamel leading to an irreversible defect and increased the susceptibility to dental caries then exposure to advantage or disadvantage at different stages of life course has an accumulative effect (Heilmann et al., 2015; Sisson, 2007). Some studies show that the prevalence and severity of periodontal disease and bone loss increase with age is probably related to the length of time. Also, there is study

presented that pattern of development caries from early childhood to old age is clear, have been fairly linear, suggesting constant rates of caries over time (Heilmann et al., 2015). These results are consistent with the accumulation of risk factors along with the early life of individuals that are responsible for shaping oral health at a later-age (Heilmann et al., 2015). The evidence on the life span epidemiology applied to oral health remains limited but there is strong research for oral diseases within the complex life-course framework (Heilmann et al., 2015).

However, life course perspective places particular emphasis upon the social context and interaction between people and their environment in the passage through life advantage and disadvantage may cluster and accumulate can be created by cross-sectional or longitudinal studies, thus contributing to the creation of health and social inequalities in society (Shokouh et al., 2017; Sisson, 2007). The subsequent life events differences in early life and in uterus conditions may have an effect on later health or disease risk of physical or social exposures (Sisson, 2007). The importance of latent, pathway, and cumulative effects on later health is recognized by using a life course perspective (Krieger, 2001; Ben-Shlomo & Kuh, 2002). Individuals who grew up in poor families who receive low salaries could be more impacted by poor health. Poor nutrition during adolescence, when bones are developing, can increase the risk of bone fracture later in life. In term of oral health, the early life socioeconomic background of a child can have an effect on oral diseases of adult, this is a strong argument for the studying oral diseases within a dynamic life course framework (Heilmann et al., 2015). So, Early life circumstances can be particularly powerful in describing current health disparities.

Theoretical theories and models typically describe oral health in childhood and adulthood based on the socio-economic determinants across the life course through understanding social patterns of diseases at individual or community level (Thomson et al., 2004; Shokouh et al., 2017). There are studies linked adult oral health to socioeconomic childhood assessed by irreversible tooth loss in adulthood that may be related to low awareness of oral health diseases (Heilmann et al., 2015; Sisson, 2007a; Burton-Jeangros et al., 2015; Nicolau et al., 2007; Bernabé et al., 2011; Thomson et al., 2012; Ismail & Sohn, 1999) or investigating the role of parental education as a measure of socioeconomic status in childhood analyzed in these studies (Bernabé et al., 2011; Nicolau et al., 2007). Linked between parental education and adult oral

health related behaviors (Bernabé et al., 2009). In contrast, reported an independent association between low childhood paternal education and adult periodontal disease among a small sample of women in Brazil (Nicolau et al., 2007; Peres et al., 2007; Peres et al., 2011; Lynch et al., 1997).

caries in children continues to be a social, behavioral issue that can only be managed by recognizing the significant changes in society (Ismail & Sohn, 1999). individuals with social mobility had better dental health than those who were low at all periods of time (Poulton et al., 2002; Heilmann et al., 2015; Peres et al., 2011). Family income trajectories between birth and age 15 were only partially associated with caries then adolescents in the U.S. who had poor SES had more treatment than those that had never been poor. However, always poor had the highest prevalence of decayed teeth (Heilmann et al., 2015; Peres et al., 2011).

2.7 Common oral health problems in children:

2.7.1 Dental caries:

Dental caries is a biofilm - facilitated, sugar - fuelled, multifactorial, dynamic disease, characterised by alternative episodes of demineralization and remineralization of tooth hard tissues. It can occur at any age both in primary and permanent teeth and can cause permanent damage to tooth crown or root. However, dental caries process can be stopped or reversed unless it reached the final irreversible phase of cavity formation. This latter happens when demineralisation surpass remineralisation as a result of dominating pathological factors over protective factors. The imbalance between multiple pathological and protective factors drives the initiation of caries process and the progression of dental caries. Among the multi-factorial determinants of dental caries, lifestyle and behavioural factors are major contributors to its occurrence and severity (Selwitz et al., 2007). However, dental caries is a preventable disease provided that its risk factors are controlled.

Dental caries is a behavioural disease caused by diet-bacterial interaction in which bacteria in dental plaque ferment dietary carbohydrates (mainly sugars) to release organic acids as metabolic by-products. This results in reduction in the concentration of Hydrogen ion (PH) in dental plaque and consequently disturbance in the physiological balance between the tooth and the surrounding environment. Tooth demineralisation (loss of tooth minerals) occurs when the PH decreases to levels

below critical PH in the enamel, which is accepted as 5.5 (Arens, 1999). This decline in PH happens within (3-5) minutes after the exposure to fermentable carbohydrates and stays below the critical level for 20 minutes. Buffering effect of saliva in an increase in PH and a remineralisation (precipitation of minerals) of tooth surface from calcium and phosphate and possibly fluoride if they are available in the oral environment (Featherstone, 2008). A full recovery to the resting levels occurs after (45-60) minutes (Rugg-Gunn & Nunn, 1999).

Dental caries is a continuous disease process, with alternating episodes of demineralisation and remineralisation of dental hard tissues. The initial stages of caries are asymptomatic, with symptoms starting after the carious lesion has progressed into dentine (Selwitz et al., 2007). Visible caries (cavity formation) is the last and irreversible phase in this process. It occurs when demineralisation outstrips remineralisation. A sustainable PH below (5.5) results in net mineral loss. Until this point, an intervention can be made, the demineralisation can be reversed, and cavity formation avoided, by interfering with or eliminating factors fostering the demineralisation (Featherstone, 2004; Featherstone, 2008).

The aetiology of dental caries is multifactorial. It involves a complex interplay of social, biological, environmental, and behavioural factors (Selwitz et al., 2007; Harris et al., 2004b; Fisher-Owens et al., 2007). However, there are four conditions that must coexist to initiate dental caries. These are cariogenic bacteria, fermentable carbohydrates (mainly sugar), a susceptible host and sufficient time. Cariogenic bacteria and fermentable carbohydrates must coexist in a quantity and quality, sufficient to produce ample amount of acids and to cause a significant and prolonged drop in plaque ph (Rugg-Gunn & Nunn, 1999; Moynihan, 1995).

There are several modifying factors which can foster or counterbalance the effect of PH drop and hence tip the caries process toward either halting or progressing to cavitation (Selwitz et al., 2007). For example, while the availability of calcium and phosphate in saliva is an important contributor in remineralisation and recovery of plaque PH to its resting level following the exposure to fermentable carbohydrates (Stookey, 2008), the diminished or impaired salivary flow increases food retention and encourages a cariogenic environment (Kidd, 2005). Similarly, the use of fluoride increases enamel resistance to acid dissolution by lowering the critical PH and enhancing remineralisation (Featherstone, 2008). On the other hand, teeth that have

thin enamel, immature enamel or enamel defects such as hypoplasia are less resistant to bacterial demineralisation (Tinanoff et al., 2002).

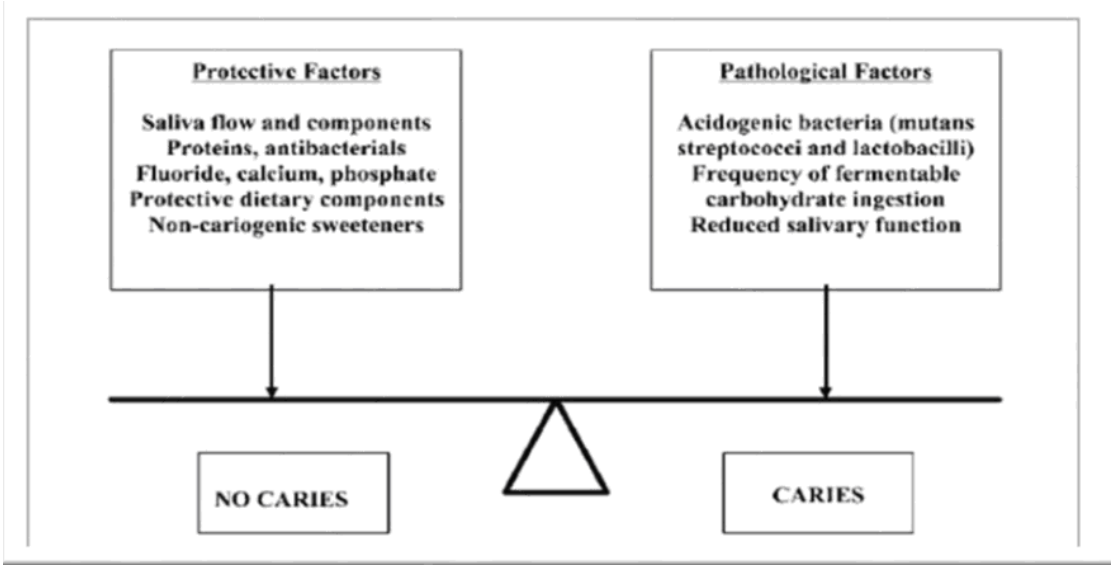

Figure 0.3: Risk factors associated with development of dental caries

To put this into the perspective of this thesis, dental caries develops when the cariogenic potential of consumed sugars and cariogenic bacteria in dental plaque outstrip the counterbalancing effect of preventative factors in the oral environment such as adequate levels of fluoride (Featherstone, 2000). Therefore, fermentable carbohydrates are one of the aetiological factors behind the development of dental caries. Although other factors (such as fluoride, salivary flow, oral hygiene, and enamel defects) may alter its progression, unhealthy patterns of consumption of fermentable carbohydrates may be too extensive and result in demineralisation and the development of dental caries.

Socially patterned dental caries disproportionately impact the most socioeconomically disadvantaged persons and groups in society. It increases continuously over the life span, reaching maxima in certain age groups. Consumption of sweets is a required cause of dental caries, but optimum exposure to fluoride, which promotes remineralization, is crucial for preventing disease development. A frequent schedule of dentist visits, mostly for check - ups, is also considered a dental caries risk factor (Peres et al., 2019). Upstream social structural macro conditions (distal determinants)

determine the extent, shape, and nature of social networks (intermediate determinants), which provides opportunities for psychosocial mechanisms (proximal determinants), composed of social support, social influence, social engagement, person-to-person contact, and access to material resources and goods, which in turn influence general and dental health through three distinct pathways: i.e. Health behaviour, health environment, and health outcomes. Individual psychosocial factors - biology and behaviour - will determine health outcomes. This paradigm can also be used to gain a comprehensive understanding of dental caries figure (2.4).

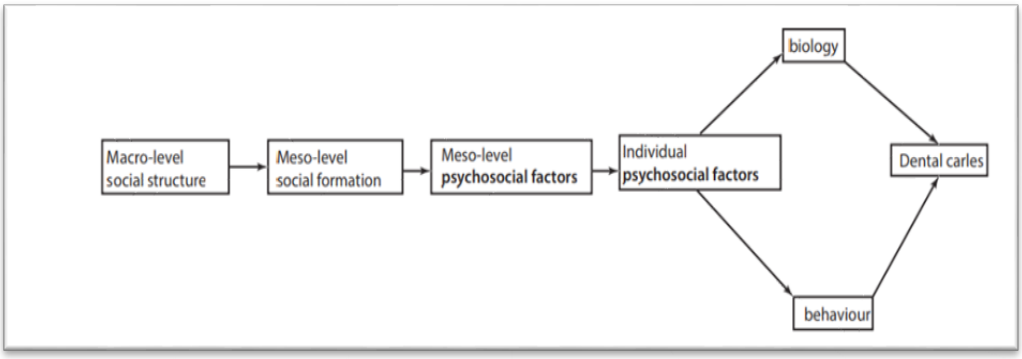

Figure 2.4: Psychosocial factors influencing dental caries

(Adapted from Martikainen et al., 2002)

2.7.2 Measuring Dental Caries:

There have been several recent advances in techniques for assessing caries prevalence in a population (Graham J. M et al.,1997; Fisher & Glick, 2012; de Souza et al., 2014; Nyvad, 2004; Ismail et al., 2007; Sheiham & Maizels, 1987; Monse et al., 2010). Caries lesions are evaluated by these techniques using varying diagnostic cut offs. According to the International Caries Detection and Assessment System (ICDAS) (Ismail et al., 2007), some techniques can quantify early non - cavitated enamel lesions, which are only visible after the tooth surface has been dried. According to the Caries Assessment Spectrum and Treatment (CAST) (de Souza et al., 2014), some people may spot early non - cavitated enamel lesions without drying the tooth surface. The decayed, missing, and filled (DMF) index (Klein et al., 1938) has been the gold standard for detecting caries from dentin lesions since the 1940s. The prevalence rates obtained from each technique are affected by this shift in diagnostic threshold.

2.7.3 DMF Index:

The DMF index is one of the easiest and regularly adopted indices, which evaluates caries experience by counting the number of decayed, missing, and filled teeth related to caries in permanent teeth. The DMF index was not the first approach to quantify the decay, but it is certainly the most known index to record caries experience, and it has endured since the beginning of the previous century. This index was created by (Klein & E. Palmer, 1938) and it is a quantitative measure of the cumulative caries experience in individuals or a population. Caries experience is documented by examining three DMF-specific components: 'decayed' (aspects of disease morbidity), 'missing' (tooth mortality), and 'filled' (treatment availability for restorations) (treatment access for restorations). Because caries rates indicate past and present caries experience, their values are greatly impacted by the age of the patients under evaluation. A tooth (DMFT) or surface (DMFS) can be taken as the unit of analysis and should be included only once in one of the three categories of the index. The total DMFT of a person can range from 0 (no decaying, missing, or filled teeth) to 28 or 32 (if third molars are properly included) (if third molars are strictly included). DMFS index per individual can range from 0 to 128 or 148, depending on whether the third molars are included in the score. The analogous index for evaluating dental caries in primary dentition was described by Gruebbel (Gruebbel, 1944), and it reflects the number of afflicted primary teeth range from 0 to 20 (dmft), considering the full primary dentition. The dmfs index score ranges from 0 to 88 surfaces (five for each posterior tooth and four per anterior tooth) (Cappelli & Mobley, 2008).

The Components of the DMF/ dmf index are recorded independently, with 'D' component signifying decaying, 'M' missing owing to caries, and 'F' filled due to caries. Teeth are omitted if they have not erupted, are congenitally absent and supernumerary, restored for any cause other than caries, or removed for any reason than caries as, for instance, due to orthodontic therapy. Teeth with restorations and with recurrent caries are considered as decaying teeth. For primary dentition, the component 'm' also comprises those primary teeth that are suggested for extraction. In some ages the difference between teeth excised owing to caries and those that have naturally exfoliated is unclear and the category of missing teeth may be neglected (df index). DMF / dmf indices provide us a close perspective of the dental care use by studying the combination of 'M' and 'F' components, while the component 'D' gives

us features of present disease morbidity. The main advantage of these indices is the opportunity of investigating the number of people affected by the disease, the number of teeth or surfaces that require treatment, the estimation of the proportion of teeth that have been treated, and the percentage of teeth that have been extracted due to decay. Statistical data permits the evaluation of programmes, and the assessment of preventative measures as well as the estimation of the need for financing sources, and activities in oral health. On the other hand, there are some limitations related DMF/dmf indexes. In general, these indices provide equal weight to missing, untreated decay, and repaired teeth. DMFT has little discriminating power in communities where the prevalence of the illness is minimal. The computation of component 'D' does not consider teeth or surfaces at risk (denominator) in the person, and component 'F' is impacted by the variation in the dentist's choice to restore (Burt, 1997). DMFS is impacted by the over - or underestimating of the component 'M'. In adults and the elderly, it may be biased because of the difficulties in determining the purpose for extraction. At this phase of life, periodontal disease is one of the primary causes of tooth loss (Liljestrand et al., 2015). It is unclear if a researcher can estimate the number of surfaces of the removed tooth that have been impacted by caries, at the moment of extraction. The initial suggestion from 1937 indicated the assignment of three surfaces to each removed tooth since allocating five surfaces would be overestimating the actual caries experience of the teeth (Bodecker, 1939). Researchers suggest a careful analysis of how many surfaces should be categorized as being previously decayed on an extracted tooth, particularly in research involving oral health inequalities.

2.7.4 International Caries Detection and Assessment System: ICDAS Index:

A novel approach for describing the caries experience and allowing the prospective study of the incidence of the illness in different demographic groups was created by a team of international researchers from 2001 to 2005. International Caries Detection and Evaluation System was suggested in 2007 to standardize caries assessment across countries (ICDAS). Given that more than 30 distinct methods existed for assessing and documenting caries at the time, this index was developed in an effort to standardize data on caries prevalence. The index suggests distinguishing and tracking the first phases of the illness prior to cavitation. Therefore, the ICDAS standard

mandates pre-exam dental cleaning of any kind, even if professional prophylaxis is preferred. In addition, the use of compressed air is required to expose the early visible indications of caries. Therefore, more time must be spent on training and calibrating the examiners, and the test itself must be more thorough and extended (Pitts, 2004). According to the histological categorization proposed by (Ekstrand et al., 1995), the clinical phases of caries lesions have been defined, ranging from the detection of a white spot in pits and fissures, which would require drying to be observed, to the observation of cavitation in the dentin level. The diagnostic procedure permits visual differences in cases of shade, with greyish, brownish, or blueish tones in dentin but with apparent enamel integrity, and therefore without a cavity. The ICDAS codes are two-digit numbers. The former describes any fillings, crowns, or sealants already affixed to the tooth. The second number indicates the caries severity code. When compared to the histological examination of removed teeth as a gold standard, studies find that the index has an adequate level of reliability (power to replicate repeated measurements) and validity (Ekstrand et al., 2007; Ismail et al., 2007; Nelson, S et al., 2011). Logistical issues are posed when employing this indicator in large - scale investigations, such as nationwide surveys, due to the requirement to follow an initial cleaning routine and the drying of the surfaces to be studied. However, the index tends to overestimate caries prevalence when looking at the early stages of the illness, which makes it difficult to compare to studies that used a more conventional approach indicator.

2.7.5 Pulpal Involvement, Ulceration, Fistula, and Abscess: PUFA Index:

To assist to fill the gap in indices describing the impact of untreated cavitated carious lesions on a tooth and its surrounding tissues, the PUFA index was created (Monse et al., 2010). It suggests a scoring system for a tooth with obvious pulpal involvement related to caries, including the presence of a visible pulp, ulceration of the oral mucosa due to root particles, a fistula, or an abscess. Even if an odontogenic infection affects both the primary tooth and its permanent successor, as shown in Table 2.1, a separate PUFA index will be issued to each tooth. The index ranges from 0 to 32 teeth for permanent dentition and from 0 to 20 teeth for primary dentition, each of which indicates the number of teeth that fulfil the PUFA / pufa diagnostic criteria.

2.7.6 The British Association for the Study of Community Dentistry: BASCD:

The British Association for Dental Care and Dentistry (BASCD) helps the National Health Service (NHS) coordinate dental surveys across the country (Pitts et al., 1997). When calculating the BASCD index, it's necessary to look at the teeth from the surface level only. Surfaces might be healthy (S), decaying (1, 2, or 3 for arrested, dentine, and pulpal involvement, respectively), or filled based on the codes (4, 5, and R for filled and decayed, filled with no decay, and filling that needs replacing). Codes are assigned to missing teeth based on their cause, such as caries (6), orthodontics (7), or trauma (T).

Table 2.1. Codes for PUFA index

Code (Permanent/primary)	Description
P/p	Pulpal involvement: the opening of the pulp chamber is visible or the coronal tooth structures have been destroyed by the carious process and only roots or root fragments are left
U/u	Ulceration due to trauma: sharp edges of a dislocated tooth with pulpal involvement or root fragment shave caused traumatic ulceration of the surrounding soft tissues, e.g., tongue or buccal mucosa
F/f	Fistula: a pus releasing sinus tract related to a tooth with pulpal involvement is present
A/a	Abscess: a pus containing swelling related to a tooth with pulpal involvement is present

2.7.7 Caries Assessment Spectrum, and Treatment: CAST Index:

This index was last updated in 2014 and includes measurements of caries in enamel, dentine, and pulp at various phases of development. Included teeth that have had fissure sealant applied, teeth that have been filled due to dental caries, teeth that have been extracted due to dental caries, and teeth that have progressed to the advanced

phases of a carious lesion progression in the pulpal and surrounding tissue. The index codes range from 0 to 8 and are a hybrid of those used by ICDASII and PUFA (de Souza et al., 2014).

2.7.8 Australian Research Centre for Population Oral Health, Australia: ARCPOH:

The Australian Research Centre for Population Oral Health (ARCPOH) at the University of Adelaide uses a coding scheme based on a hierarchy of dental caries epidemiology conditions. An individual code is assigned to each of the tooth's surfaces (five for the posterior teeth and four for the anterior teeth). Cavities (D), Recurrent Caries (R), Unsatisfactory Fillings (U), Other Fillings (O), Fissure Sealants (Z), and (S) refer to tooth's enamel and dentin, respectively (sound). When two diagnoses are present at the same time, the higher priority code should be noted. If two situations are equally likely, the one with the lowest priority code is the one that gets recorded. Only including the third molars, that have been documented as being present are checked for caries. Each of the 32 tooth locations is then assigned a code to indicate whether or not it has a tooth (P for present, E for absent, M for not replaced), a root fragment (R for decaying, S for unaffected), or an implant (I). In cases when a tooth is lost and the patient is 45 or older, the missing surface is automatically attributed to caries. When recording children in the caries index, it is necessary to inquire as to the cause of tooth loss (code O, absent due to causes other than caries and replaced; code A, absent due to reasons other than caries and not replaced). The existence of a crown installed for whatever cause on a permanent tooth is individually coded (C), and root fragments are classified as all coronal surfaces deteriorated. D (codes D + R + S), M (codes M or E), and F (codes F + U) are all parts of the DMT/S indices used in the National Australian Oral Health Surveys to estimate the prevalence and severity of dental caries (Barrington et al., 2019).

2.7.9 National Health and Nutrition Examination Survey: NHANES:

The United States' National Health and Nutrition Examination Surveys (NHANES) included concerns about oral health form 2011 due to the efforts of the CDC, the NIDCR, and the CDC/NCHS. Initially, the number of teeth necessary for function is determined; this number will serve as a baseline against which other tooth-related evaluations, such as caries, may be compared. Each type of tooth has a unique code:

(1) for primary teeth, (2) for a permanent tooth, (3) for a dental implant, (4) for a missing tooth, and (5) for a piece of the permanent dental root (5). Analyzing the presence of caries involves inspecting each tooth's surface. All dental problems are coded, with separate categories for decaying and filled teeth (5 surfaces). Wisdom teeth, or the third molars, are not included in the caries scoring system (Fleming E et al., 2018).

2.8 Prevalence of dental caries globally:

Recently in 2016 a review on the global burden of oral disease reports the Oral disease and conditions as one of the most common public health problems globally and have significant socio-economic impact in terms of cost of healthcare, school or work absence, and individual's daily lives and self-esteem. There severity range is from painful but treatable like dental caries to life-threatening, such as oral cancer (Jin et al., 2016).

Dental caries is an ubiquitous, global, dynamic, disease which still represents a considerable burden for many individual patients and groups in society' (Selwitz et al., 2007). The US Surgeon General called dental caries a 'silent epidemic' (U.S. Department of Health and Human Services, 2000; Benjamin, 2010). Despite the decline of caries incidence and severity in many developed countries, caries remains as a major cause of tooth loss in children and can have serious health consequences, such as odontogenic infections, and even mortality. A global review of oral health published by WHO highlighted that "despite great improvements in the oral health of populations in several countries, global problems still persist, particularly among poor and disadvantaged population groups in both developing and developed countries". Oral diseases such as dental caries are major public health problems worldwide and poor oral health has a profound effect on general health and quality of life (Petersen, 2003). Caries is the 4th most expensive chronic disease to treat (Petersen, 2008). Furthermore, if left untreated, caries may cause severe pain and mouth infection (Selwitz et al., 2007), which affects children's school attendance and performance (Jackson et al., 2011).

According to GBD 2010 Study the 10th most prevalent of all the 291 oral disease and injuries is untreated caries in primary teeth and affecting 621 million children worldwide (9%) of the global population(Marcenes et al., 2013). The GBD 2010

Study and systemic review/meta-analysis show in a period of 20 years since 1990 until 2010, the global age-standardized prevalence of dental caries in deciduous teeth was static at (9%). The prevalence reached its peak at 6 years old of age. The evidence also shows the prevalence of untreated caries in primary teeth remained relatively fixed in all regions of the world over the 20 years studied, in north Africa and middle east it was (8.4-9) in (1990-2010) respectively (Kassebaum et al., 2015).

2.9 Dental caries prevalence in Libyan children:

A few studies have looked at the prevalence and severity of dental caries in Libyan children's first dentition. In 1991, a cross-sectional survey was done in the suburbs of Tripoli, including 720 participants from school children in grades 5 and 6 in the Hadba Sargia region of Tripoli. According to the findings, 410 children (56.94%) of the whole research group had at minimum one DMFT score (Baccush & Nayak, 1991). According to (Hawew et al., 1996), dental caries affected (48%) of 6 and 12-year-old children in Benghazi, with mean dmft 2.32 and DMFT 1.17. The prevalence of dental caries was 61.9 percent in research conducted by (Al - Sharbati et al., 2000) in Benghazi in (1993-1994) and published in 2000, with a sample of 762 6-12-year-old schoolchildren. A study on caries prevalence in pre - schoolers was published in 2003 found that 58 percent of the 685 pre - schoolers in the study, which was done in Benghazi, had carious primary teeth, with a mean dmft of 2.58 (Ingafou et al., 2003). In 2014 In Benghazi, a cross-sectional study was undertaken in which the dental caries experiences and periodontal treatment requirements of 70 children with type 1 diabetes aged 10 to 15 years were compared to those of 70 age and gender-matched controls. Each group had 70 youngsters in it (45 males and 25 females) The number of decaying teeth ($P = 0.037$) and the number of missing teeth were greater in diabetic children (Arheiam & Omar, 2014). However, in the year 2020 During the Libyan crisis, a cross-sectional study was done to investigate the impact of decreasing sugar consumption on caries experience among 12-year-old Libyan students. The data was obtained during the war in order to compare the findings to data collected before the crisis in 2007. In comparison to 791 pre-conflict samples, a random sample of 1134 12 - year - olds was recruited from public schools in Benghazi. Caries prevalence was (42.8%) during the conflict, which was lower than the (56.8%) pre - conflict (Arheiam, et al., 2020). Another research that came out recently was cross-sectional research conducted in Tripoli in 2021, a convenience sample of 1934 children in first

grade (age 6-7 years, n = 1000) and seventh grade (age 11-12 years, n = 934) were included. With a mean dmft of (3.7, 78.0) percent of 1000 first-graders experienced decay in their primary teeth. With a mean DMFT of 1.7, (48.2%) of 934 seventh graders had caries in their permanent teeth. Socioeconomic status was shown to be the most important determinant of caries prevalence (Alraqiq, et al., 2021).

10.2 Dental caries and socio - demographic factors, oral health behaviours and feeding behaviour:

Dental caries is a multi-factorial disease with many factors related to individual's characteristics, behaviours and oral environment affecting the initiation and progression of dental caries. It is well recognized that oral health behaviours comprise a key determinant of dental caries, with regular brushing, using fluoridated toothpaste; regular dental visits and less consumption of sugars being the main favourable behaviours associated with lower risk of dental caries. Administering a pacifier dipped in sugar substance to the child were associated with overall caries experience (Declerck et al., 2008; Slade et al., 2006). It is suggested that cooling the child food by mothers mouth is a risk factor, as the principal source of bacterial infection of the child is via 'vertical transmission 'from mothers or the primary caretaker (Caufield et al., 1993; Milgrom et al., 2000).

The socio behavioural risk factors have been found to play significant roles in the occurrence of dental caries in both children and adults worldwide(Petersen, 2005). The results of a review paper on the prevalence of childhood dental caries in 22 different countries confirmed that ECC is related to the SES level of the family strictly (Bernabeé & Hobdell, 2010). A previously published comprehensive review including studies from Europe, Africa, Asia, the Middle East and North America reported many risk factors are associated with ECC, but the main one is low socioeconomic status of the parents, with a prevalence of ECC is about (70%) in socially disadvantaged groups (Milnes, 1996). Several studies over years demonstrate that the socioeconomic status is the fundamental factor related to dental of caries. The significant association between social class (household employment) and caries experience proved to be twice that of the association between toothbrushing and caries and nearly three times that between sugar confection and caries (Gibson & Williams, 1999).

By searching in the literature many systematic reviews were conducted to review the association between dental caries and socioeconomic status (oral health inequalities), dietary and oral behaviours. A systematic review evidence of dental caries related risk factors included seventy -three studies and reported 106 risk factors having noticeable association with caries in children of 6 years and younger. Low parental or maternal education (in 11 studies) and low income (in 4 studies) were significant risk factors. More frequent sweetened snacks especially between meals (in 9 studies), long duration of breast feeding for more than 12 months (in 11 studies), nocturnal breast (in 1 study) and bottle feeding (in 9 studies), frequency of teeth brushing (in 11 studies) and age of starting brushing indicated as main factors associated with ECC (Harris et al., 2004).

Another systematic review of dental caries in children of (0 - 6) years and associated risk factors included 55 studies conducted in 28 countries reported. This review found that lower socioeconomic status is associated with higher caries prevalence and severity. Interestingly, parental educational attainment was found to be the prime predictor of a range of health risk factors over and above the income and occupation. In 48 of 55 studies low parental educational level associated with higher caries level. This is partly because parents with high educational levels have better knowledge, skills and more positive attitudes towards sugar intake and oral health behaviours. With regards to early life feeding behaviours, nocturnal bottle feeding with milk and sugary liquids (in 10 studies), nocturnal breast feeding (in 3 studies), delayed age of both bottle and breast weaning especially in age older than 12 months (in 7 studies), and bedtime sweets and sugary liquids (in 10 studies) were identified as risk factors for caries. Seven studies found no effect of the breast and bottle feeding on dental caries. In 30 studies feeding behaviours such as sweetened solid snacks and liquids between meals are strongly associated with high risk of caries. Oral hygiene habits were also assessed in this review. Six out of nine studies reported a significance correlation between the delayed age (older than 12 months) to start teeth brushing and high risk of caries. More frequent brushing (in 7 studies) and parental supervision during brushing (in 11 studies) are associated with lower caries levels (Hooley et al., 2012).

A more recent review in 2014 confirmed that high prevalence of childhood dental caries is strongly related to the socioeconomic status of the family (parents especially maternal educational level and income) and they are the most decisive factors involved. High frequency consumption of sugary liquid in bottle especially at night and solid sugared snacks between meals considered of the most significant caries risk factors. Furthermore, the results showed an association between the frequency, long duration and nocturnal breastfeeding and high risk for ECC (Congiu et al., 2014).

Many studies found that statistically there is no significant difference in the prevalence of caries between male and female children (Al Sharbati et al., 2000; Al-Malik & Rehbini, 2006). For example, a cross-sectional study on a sample of 813 children aged 2 to 6 years in Davangore (India), found no statistically significant difference by gender in terms of ECC and found an association between dental caries and Children who were bottle fed and used dummy/pacifier (Tyagi, 2008).

Dietary habits are significant in the development of chronic diseases and influence the development of dental caries (Moynihan & Petersen, 2004). Extravagant sugars amounts and frequency are major causes of dental caries and the risk of caries is high if population exposure to fluorides is inadequate (Petersen et al., 2005). Despite of the well-known relation between high sugar consumption and high caries levels, there an evidence of balance between good and bad habits by way between consistent and frequent teeth brushing and highly cariogenic diet appear to be important in regard to caries (Wendt et al., 1996). This is confirmed by (Gibson & Williams 1999) who concluded that ‘children who brushed their teeth twice a day or more, consumption of sugars and sugary foods did not appear to be associated with caries’.

2.11 Dental Fluorosis (DF):

As reported by Dean (Moulton, 1942), even in places where fluoride levels are ideal (1 ppm), (12.2%) of children still had mild or very mild fluorosis. When compared to children living in locations with high fluoride levels, those living in areas with low fluoride levels had a percentage of roughly (1%). These records were compiled back when fluoride in water was the sole option. They have been used as a benchmark to determine how much fluoride is safe to use in water supplies without increasing the risk of fluorosis. When fluoride was first introduced in various forms, in the second part of the past century, significant shifts occurred. No longer is water the sole place

to get your daily dose of fluoride. Fluorosis in children has been observed to be on the rise in both occurrence and severity in studies conducted all over the world. There has been a rise in the occurrence of fluorosis in both fluoridated and non - fluoridated locations in North America, according to several research that has looked into the issue (Driscoll et al., 1983; Driscoll et al., 1986; Ismail et al., 1990; Ismail et al., 1998; Leverett, 1986; Szpunar & Burt, 1987; Heller et al., 1997). Despite the fact that these studies used varying scales to quantify fluorosis, it was generally agreed that the condition has been steadily worsening since the 1970s. More evidence of an increase in fluorosis in non-fluoridated areas was also found in the studies (Leverett, 1986; Pendrys & Stamm, 1990). Most of the differences were seen in the milder types of fluorosis, with the frequency ranging from (4.4%) to (55.0%) in non-fluoridated regions to (11.4%) to (80.9%) in fluoridated areas (Clark, 1994). Similar patterns were seen in reports of fluorosis prevalence throughout European nations (Clarkson & O'Mullane, 1992; Wenzel & Thylstrup, 1982; Woltgens et al., 1989; Retty, I. A. Et al, 2016). There has been an uptick in the occurrence of fluorosis, as noted by a review of research by Rozier (Rozier, 1999). The upward tendency was more pronounced in non-fluoridated regions than in fluoridated ones. The prevalence of moderate to severe fluorosis was low, affecting just around (1.3%) of children in the United States. The author stated that the rise in fluorosis incidence was primarily due to people's own actions. The incidence of dental fluorosis skyrocketed in Australia during the decades of the 1980s and the 1990s (Puzio A. et al., 1993; Riordan, 1993). The incidence and severity of dental fluorosis have decreased as these fluoride sources have been reduced (Do & Spencer, 2007; Riordan, 2002). Fluorosis in Australian children is extremely minor to mild, according to the latest big population-based National Child Oral Health Study (Do, L. et al., 2016). In both fluoridated and non-fluoridated areas, (0.1%) of the population had moderate to severe fluorosis (TF score of 4 or above). The majority of Australian children used toothpaste with a low dose of fluoride, and around (80%) of Australian children lived in fluoridated regions. This supports the conclusion reached by several researchers (Pendrys & Katz, 1989; Wong et al., 2010) that fluoride toothpaste has a major influence in the onset of dental fluorosis. Dental fluorosis was measured using the TF Index in a few additional minor studies conducted in a variety of European nations, and the results showed widely variable prevalence rates. Both in fluoridated and non-fluoridated locations, the frequency of fluorosis at the TF score of 3+ was generally low. The frequency of

moderate to severe fluorosis has been shown to be minimal in studies conducted in the United States using the Dean Index. Moderate to severe fluorosis was found to be uncommon in both fluoridated and non-fluoridated regions of New Zealand, according to the country's National Oral Health Survey. However, Different researchers have found varying prevalence estimates for enamel fluorosis. (32%) of Welsh children10 compared to (32%) of Nigerian children (Akpata & Jackson, 1978). Using the DDE score of the (FDI, 1982), (48.9%) of children from south Wales were found to have enamel defects (Al et al., 1975). In England, fluorosis was (54%) prevalent in fluoridated areas and (23%) prevalent in fluoride-deficient areas (Tabari et al., 2000). In Iran, fluorosis prevalence was (61%) (Mahvi et al., 2016).

2.11.1 Dental Fluorosis (DF) prevalence in Libya:

Al - Jabal - Gharby - University in Zawia, Libya conducted a survey of male and female patients who visited the faculty of dentistry's outpatient department. From October 2009 through December 2010, our outpatient clinic saw (6,244) patients, ranging in age from 6 months to 61 years. In this investigation, fluorosis was shown to have a prevalence of (63.34) percent overall (3955 of 6244 patients). The incidence was somewhat greater among males (64.27%) than among women (62.28%) (KL, S. T. Et al., 2013). Another study was a part of a cross-sectional assessment of variables of oral health in 2015 School students aged between 6 and 16 years old of both genders from rural and urban locations. The participants in this study found that in (2.3%) of the children that were investigated had enamel fluorosis. The percentage of males affected by fluorosis was (1.9%), whereas the percentage of girls affected was (2.7%). (Ergieg, 2019). Moreover, a recent study was conducted to assess the prevalence of DF, its risk factors, the effect on oral health - related quality of life (OHRQoL), and the relationship between DF and caries in Libyan schoolchildren. 15%, 7.8%, 2.2%, and 0.4%) of the 1125 children who took part in the research were classified as having questionable, mild, moderate, or severe DF, respectively. Private school students had a lower risk of developing DF (odds ratio, 0.55; 95% confidence range, 0.35- 0.83; P =.007). More decrepit surfaces, higher DMF scores, and lower COHIP-SF19 and its socioemotional well-being subscale scores were all linked to moderate-severe DF (Arheiam et al., 2022).

2.12 Dental erosion (DE):

Dental erosion has been defined as progressive irreversible loss of hard dental tissues by a chemical process not involving bacteria (WHO, 2003). Several studies were focused on DE prevalence globally. (52%) of 5 - 6 - year - olds had at least one damaged primary incisor, according to the National Survey of Child Dental Health in the UK in 1993, which measured dental erosion of primary and permanent maxillary teeth of 17061 children aged 5-15. In (24%) of these kids, the erosion had already reached the dentine or pulp of their teeth. Dental erosion has become increasingly common over time and across age groups, according to epidemiological research (Nunn et al., 2003). The prevalence of tooth erosion is considerable in children and adolescents; in Belgaum, India, for example, around a third of children aged 5-6 years old had signs of dental erosion (Deshpande & Hugar, 2004). In Saudi Arabians between the ages of 19 and 25, 28% of the maxillary front teeth showed signs of dental degradation (Johansson et al., 1996). In a study of British children aged 12 in 1753, researchers found that (59.7%) had tooth erosion and (2.7%) had erosion into dentine in the counties of Leicestershire and Rutland (Dugmore & Rock, 2004). There was no significant difference in the incidence of dental erosion between the sexes among the 389 Brazilian children aged 12 years old who were surveyed. The total prevalence of erosion was (26%), with erosion into enamel being the most common kind (65%) (Correr et al., 2009). Among 354 boys aged 5-6 in Saudi Arabia, (95%) were found to have erosion, and 34% had erosion deep enough to affect the dentine or pulp. Erosion was present in (95%) of 862 males aged (12-14), and (26%) of those cases extended into the dentine or pulp (Al-Majed et al., 2002). Over (80%) of the maxillary incisors and (30%) of the primary molars showed wear in the dentine in a study of patients admitted to a dental hospital in England (Millward et al., 1994), and the incidence of dental erosion was (38%) for 178 children aged 4-5 (Millward et al., 1994).

2.12.1 Dental erosion prevalence in Libya:

They are very few studies that focusing on the DE experiences among Libyan population. The first study was a cross-sectional observational study was carried out in Benghazi, in 2010. A random sample of 791 participants aged 12 - year - old schoolchildren was taken. The study found that in (40.8%) of subjects, dental erosion was detected, with enamel erosion impacting (32.5%), dentine erosion affecting (8%),

and pulp erosion affecting (0.3%) of patients. (Huew et al., 2011) Another recent study that conducted in Benghazi city Libya, in 2020. The study sample was 180 school children The mean age was 12.3 years, the study result was out of 180 subjects 70 (38.9%) had experience of dental erosion. (Huew & Ali, F., 2020)

2.13 Traumatic dental injuries (TDIS):

There are physiological and psychological consequences of sustaining dental damage in a traumatic event. As children begin to walk, they are more likely to suffer injuries from falls, car accidents, and sports that persist well into adolescence. Most dental injuries affect the anterior teeth, which can have a negative impact on one's ability to talk, chew, and smile. A cross-sectional investigation of aspects of dental health of 2015 school going Libyan children aged between 6 and 16 years old of both genders from both rural and urban areas was conducted in 2015. The study showed that 3.6% of participants were suffering from TDIs (O.Ergieg et al., 2020). The most recent study was conducted in Benghazi city / Libya between December 2016 and May 2017. The study showed that out of 1134 participants included in this study (10.3%) of 12-year-old Libyan children had this (Arheiam et al., 2019).

2.14 Oral health among IDP children:

A scoping review was conducted to synthesize available evidence on the oral health of, and access to oral health care by refugees and similar population (Keboa et al., 2016) .The oral diseases covered in the included studies were dental caries experience, periodontal disease, orthodontic treatment need, enamel fluorosis , oral lesions, and traumatic dental injuries. Dental caries experience and periodontal status were frequently assessed in accordance with the World Health Organization recommendations, using the Decayed, Missing and Filled Teeth index (DMFT/dmft). Surveys to assess oral health status and treatment needs of participants used a variety of instruments and took place in different settings: IDS camps, hospitals, and community organizations. Self - administered or interviewer - administered structured questionnaires were combined with an oral health examination to collect data in most cases. The target group included the following: refugees from one source country, refugees from more than one source country, or a mix of refugees and other vulnerable population groups. Overall, across the studies it is clear that the refugee populations had a high burden of oral disease. Although disease prev alence varied

from one study to another, levels were consistently higher among refugees compared to the least privileged populations in the host countries. Two exceptions included rare oral health conditions: orthodontic treatment needs and enamel fluorosis, which were similar in refugee and host populations. Self-perceived and professionally assessed oral treatment needs were largely unmet in this population. The treatment needs varied across the studies. Treatment needs were described as immediate or urgent and included prophylaxis, restorative, extractions, and rehabilitative care. Treatment of dental caries (fillings, root canal therapy, and tooth extractions) and periodontal disease were most urgent. Access to oral health care and utilisation of dental services were limited. Access to and utilization of oral health care services is determined by the health care system, society, and personal oral health beliefs and behaviours. The health care policy of the host country is a key element in determining access to oral health care. For example, in Sweden and Finland, both asylum seekers and refugees who have been granted permanent resident status can receive oral health care funded by the government. In Canada, only persons recognized by the federal government as refugees before arrival in Canada can benefit from care; however, this is only for emergency and basic dental care and only for their first twelve months in the country. Overall, there was a low rate of utilization of oral health care services even in settings where the migrants did not need to pay for such services. Further, the interval between expressed treatment needs and time to completion of treatment was longer for this population compared to that of nationals. For example, Zimmerman and colleagues estimated that it took double the time to complete the same treatment procedure in this population compared to the time it took Swedish nationals (Zimmerman et al., 1990). Legislation can limit the extent of treatment this population can benefit from. In refugee camps, the limited access to oral health care services is mainly due to a shortage or an unavailability of dental professionals. Under such conditions, oral health care is often limited to tooth extractions. At the individual level, previous oral care experiences and beliefs can influence oral hygiene and practices and care-seeking behaviour for the individual and his/her dependents. Further, the process of migration and adapting to a new culture can influence the use of dental services.

15.2 Research Gap:

Little is known concerning the extent of oral health burden experienced by the growing number of IDP and refugees globally. Likewise, searching literature revealed little research being done on oral health status and treatment needs of Libyan children, especially the impact of the political unrest on oral health. As far as the author concerned, no previous studies addressed caries inequalities, oral health of IDP children or OHRQoL.

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CHAPTER 3

AIMS AND OBJECTIVES

3.1 AIM:

The aim of this study was to assess oral health status, treatment needs and oral health-related quality of life among tawrgha children, aged 8 to 15 years old, who are internally displaced in the Benghazi area.

3.2 OBJECTIVES:

In order to achieve its aims, this study is going to assess multiple objectives, as following:

1. To assess caries experience of IDP children using DMF/dmf indices according to WHO criteria.
2. To assess the social and behavioral determinants of dental caries.
3. To assess the occurrence and distribution of dental erosion, traumatic dental injuries, dental fluorosis and oral mucosal lesions, using WHO criteria.
4. To assess oral health-related quality of life impacts among IDP children using COHIP-SF19.

CHAPTER 4

METHODS AND MATERIALS

4.1 Overview:

As mentioned in the previous section, the aim of this research was to assess the oral health status, treatment need, and OHRQoL of internally displaced Libyan children. To do so, both questionnaires and clinical examinations were used as part of a cross-sectional survey.

4.2 Study Design and setting:

An observational, cross-sectional survey using both clinical examination and a self-administered questionnaire, was conducted among children of ages (8-15) years, living in tawrgha camps in the city of Benghazi. This design was adopted because it allows inexpensive and time-efficient data collection and provides information required for planning, evaluation and monitoring of oral health status, services and interventions.

The study was conducted in the city of Benghazi, which is the capital of the Cyrenaica (one of the three main historic provinces of Libya). Benghazi is located on the eastern Libyan coast and hosts nearly one million inhabitants. The internally displaced tawrgha's community is spread over four large campuses in Benghazi, hosting around 800 families. One campus is located outside the city at nearly 25 kilometers west of the city Centre, hosting nearly 270 families and is known as alhalis camp. The other three camps are located inside the city. These are the sports city camp (more than 60 families), the Red Crescent's camp, located in the city center and hosts more than 100 families. The fourth camp is known as garuons camp which is named after the garuons district in the western part of Benghazi and hosts more than 350 families.

4.2.1 Garuons camp:

With 350 households, it is the biggest tawrgha camp in Benghazi city. The camp's name derives from its location in garuons' neighbourhood. The camp is located in the western part of the city of Benghazi. This camp was built following the 2011 war on the site of a corporate camp that operated in Libya before to the conflict. Due to the conflict in the city of Benghazi, the resident's families of this camp were forced to relocate and face displacement in 2014. The location of this camp is what distinguishes it from others; it is situated in the center of a densely populated neighbourhood, close to supermarkets that sell a range of products and items. In addition, the camps have a small grocery shop and a small polyclinic that offers

inhabitants with extremely rudimentary medical care. However, dental care facilities are ignored.

4.2.2 Alhalis camp:

Is the second biggest camp for the tawrgha community in Benghazi city in terms of both size and number, and it has around 270 resident families. The camp can be found to the west of the city of Benghazi and is around 20 kilometres away from the city's core. The camp was established after the crisis in 2011 and was constructed on an existing camp that belonged to one of the companies that had been operating in Libya before the conflict. Due to the war that broke out in Benghazi city at the beginning of 2014, this camp was one of the two that had to be evacuated and relocated for the second time. The location of the camp is in an open region with a low population density, thus there are few food shops nearby. However, there is just one little store inside the camp that sells basic food items. However, the camp includes a polyclinic building that lacks the most basic medical supplies. Unfortunately, there is no dental facility in the camp or its vicinity. It is the only camp in the main while that has a school for its children, covering all study years from kindergarten to high school.

4.2.3 Red crescent camp:

This camp is home to more than one hundred households. This was the first camp established for the displaced families of tawrgha. From 2011 to 2013, this camp was managed by the Libyan red crescent, which assisted the inhabitants. However, in 2014, due to the Libyan conflict, the red crescent was unable to provide even the most basic support to the families. The camps were constructed upon the rubble of a former company camp in Libya. However, the location of the camp is far from the markets, but there is a small store inside the camp that provides the resident family with essentials. There is no dental facility at the camp's small polyclinic, which provides only rudimentary services to the residents.

4.2.4 Sports city camp:

The sports city camp is the smallest of Benghazi city's four main camps. Located just across the street from the red crescent camp, which until 2013 was considered a single camp. There are now roughly sixty displaced families living there. Is the only camp without a local shop and while it has a polyclinic, it only offers minimal medical care.

4.3 Participants:

4.3.1 IDP group:

The study population comprised internally displaced children aged between 8 and 15 years of age and have been living in one of the tawrgha camps in Benghazi. Unfortunately, creating a sampling frame was impossible because of logistic reasons and a lack of a precise database for those living in the camps. Therefore, a convenience sample was used to select the participating children. Given that the most recent survey of school children in Benghazi demonstrated that (43%) of children had dental caries. A minimum sample size of 351 children was required to estimate the proportions of oral conditions in tawrgha children at a (95%) confidence interval and (5%) error margin.

The recruitment of participants involved, firstly, contacting the manager of each camp to obtain permission to access the camps and to invite participants to take part in the study. The aim of the study was explained to the managers and the information sheet was provided as part of the questionnaire. The Children were invited and informed about the study by the camp manager in each camp who handed out the questionnaires to the families and inform them about the date and time of the clinical examination. Camp managers acted as gatekeepers who contacted the families and provided them with all the information about the study and answered any inquiries about what we going to do. The consent to take part in the study was implied by attending the examination appointment, and explicitly by returning a complete and signed questionnaire.

4.3.2 Inclusion criteria:

- Internally displaced Children living in tawrgha camps
- Children aged (8- 15) years
- Provided consent

4.3.3 Exclusion criteria:

- Internally displaced Children who are younger than 8 years or older than 15 years
- Live outside the camps in Benghazi city

- Refused to consent
- Child had any systematic or mental problem.

4.3.4 Control group:

A comparison group of Benghazi children who were matched for age and gender of IDP group and lives in the city of Benghazi. The sample was selected from school children aged (8-15) years of age. The data for control group was collected as part of other study running at the same time to assess caries experience among school children in Benghazi.

4.4 Data collection:

The study used both a self - administered questionnaire and a clinical assessment to collect data from the participants.

4.4.1 Questionnaire:

The questionnaire was paper based, adopted from previous study conducted among Libyan children (Arheiam, et al., 2020). The questionnaire was piloted among a group of tawrgha children to ensure its face validity, understandability and practicality of self - administration. The final questionnaire (Appendix B) was in Arabic and comprised of two sections. The first section was focusing on the socio - demographic characteristics of the participants (age, gender, parental education and occupation). The second part covered oral health behaviors of children (oral hygiene, dietary habits, dental visits) as well as the Arabic COHIP-SF19 (Arheiam et al., 2017).

The questionnaires were distributed by the research team, to parents of children who met the inclusion criteria. The questionnaire was handed out at least 3 days before the examination date. The completed questionnaires were then revised by the principal researcher and missing answers were clarified and completed with parents on the examination date.

4.4.2 Clinical examination:

The examination was Carried out using a disposable mouth mirror and Community Periodontal Index probe (CPI) while the child was seated on an ordinary chair under daylight. Modified WHO Oral Health Assessment Form (2013) for children was used for recording oral health status of the participants. The clinical assessment started with

extra - oral examination intra - oral examination of dentition status (for caries and its consequences, erosion, TDI, DF and any oral mucosal lesion). All maxillary and mandibular teeth were examined for dental caries. Teeth were examined in a systematic way from right to left and upper then lower jaws.

The examination of mucosal lesions started by examining:

1. Labial mucosa and labial sulci (upper and lower).
2. Labial part of the commissures and buccal mucosa (right and left).
3. Tongue (dorsal and ventral surfaces, margins).
4. Floor of the mouth.
5. Hard and soft palate.
6. Alveolar ridges / gingiva (upper and lower).

The dental examination forms contained the diagnostic criteria codes for the examiner's quick reference, demographic information (ID number, date of birth, gender, and school number) and a dental charting with designated cells for coding the entry of dental caries, dental erosion, dental fluorosis, dental trauma and oral soft tissue lesion (Appendix C).

All examinations were conducted according to WHO criteria as following:

4.4.3 Dental caries

The tooth was considered decayed if it has a lesion in a pit or fissure, or on a smooth tooth surface, has an unmistakable cavity, undermined enamel, or a detectably softened floor or wall. The criteria for diagnosing a tooth status and the coding are as follows in Table (4.1).

DMFT Dental caries indices: tooth (DMFT, dmft):
The D component includes all teeth with codes 1 or 2. While the M component includes teeth that had code 4. Additionally, The F component includes teeth with code 3.

Table 4.1: WHO caries assessment criteria (WHO, 2013)

Coding		Tooth status
0	A	Sound crown.
1	B	Carious crown.
2	C	Filled crown, with caries.
3	D	Filled crown, with no caries.
4	E	Missing tooth, due to caries.
5	-	Permanent tooth missing due to any other reason.
6	F	Fissure sealant.
7	G	Fixed dental prosthesis abutment, special crown, or veneer.
8	-	Unerupted tooth (crown).
9	-	Not recorded.

4.4.4 Enamel fluorosis scores:

In the WHO the only score that was written down in the form is the most sever score in the whole dentition.

To detect or diagnose the fluorosis condition in children the Dean's index criteria is the used as following:

- 0 = Normal. Enamel surface is smooth, glossy, and usually a pale creamy white color
- 1 = Questionable. The enamel shows slight aberrations in the translucent normal enamel, and which may range from a few white flecks to occasional spots.
- 2 = Very mild. Small, opaque, paper - white areas scattered irregularly over the tooth but involving less than (25%) of the labial tooth surface.
- 3 = Mild. White opacities of the enamel involve more than (25%) but less than (50%) of the tooth surface.

- 4 = Moderate. The enamel surfaces show marked wear, and brown staining is frequently a disfiguring feature.
- 5 = Severe. The enamel surfaces are severely affected, and the hypoplasia is so marked that the general form of the tooth may be affected. There are pitted or worn areas and brown stains are widespread; the teeth often have a corroded appearance
- 8 = Excluded (e.g., a crowned tooth)
- 9 = Not recorded

4.4.5 Dental erosion scores:

Degree of dental erosion is recorded according to the tooth with the highest score of erosion. In addition, the number of teeth included is recorded.

- 0 = No sign of erosion.
- 1 = Enamel lesion.
- 2 = Dentinal lesion.
- 3 = Pulp involvement.

4.4.6 Traumatic dental injuries score:

The severity of dental trauma can be measured in terms of the number of teeth involved. Along with the degree of trauma. However, The Teeth were affected by dental trauma are coded as following:

- 0 = No sign of injury.
- 1 = Treated injury.
- 2 = Enamel fracture only.
- 3 = Enamel and dentine fracture.
- 4 = Pulp involvement.
- 5 = Missing tooth due to trauma.
- 6 = Other damage.
- 9 = Excluded tooth.

4.4.7 Calibration:

Clinical data were collected by three investigators under one main researcher Before starting the main survey, a pilot study was conduction 22 subjects of similar age group in the Department of Pedodontics in the specialized center of Benghazi for oral and dental surgery and dentistry for the purpose of training and calibration of examiners before the study began, however, to make sure that all examiners were calibrated even after the study had started, the inter and intra examiner reproducibility take place during the whole process.

4.4.8 Training an assistant:

Two Internal dental students were trained to be an assistant by the main researcher. The assistant helped with the preparation of all the materials which were used in the dental examination sessions and in guiding each subject from and to examination area. In addition, the assistants were trained in scribing data by initially including an explanation of the coding system of dental examination form followed by training in the proper method of transcribing the dictated diagnostic information onto the dental examination forms. The same assistant accompanied the examiner on every camp's visit involving dental examination, to help in entering the diagnosed criteria codes on the examination form.

4.5 Ethical clearance and informed consent:

Informed consent was obtained from parents / guardians and permission had been taken from school authority prior to the clinical examination of children. Ethical clearance was obtained from the Ethical Research Committee of University of Benghazi. Every participant has the choice to withdrawal at any time during the study (Appendix A).

4.6 Statistical analysis:

The questionnaires and examination charts were coded as identify participants. The data was then entered on excel sheet before being uploaded on SPSS software. Frequencies and proportions were used to describe the socio - demographic characteristics of study sample and the self - reported oral health behaviours, and the responses to COHIP - SF19 items as well as the distribution of dental conditions. Mean and standard deviation were used to provide summary statistics of total number

of decayed teeth in primary and permanent teeth (D total). Independent sample t test and one-way ANOVA test were used to compare D - total and COHIP - SF19 scores at p value ≤0.05. logistic regression models were developed to assess the predictors of caries and filled teeth.

CHAPTER 5

RESULTS

5.1 Description of study sample:

Table (5.1) shows the characteristics of study participants who were recruited from tawrgha camps in Benghazi. A total of 358 children aged (8 -15) years (average=9.7), out of 460 children invited to take part in the study, were included in the present study. This gives a response rate of (77%). The females were comprising less than half of the study sample (167, 46.8%). The majority of fathers and mothers were not university taught (283, 79%) and (208, 58%), respectively. The participants were recruited from different camps in Benghazi city. The first camp was alhalis, from which almost half of the participant was recruited (172, 48%). The second-largest group of participants was recruited from garuons camp with (73, 20.4%). The red crescent camp came in third place in the number of participants with 61 representing (17%) of the sample. The lowest recruitment number was from sports city camp with 52 participants which represent (14.5%).

Table 5.1: sociodemographic characteristics of the study sample (N=358)

Variables		**N (%)**
Gender	Male	191 (53.2)
	Female	167 (46.8)
Father Education level	Less than university	283 (79.1)
	University education or higher	75 (20.9)
Mother Education level	Less than university	208 (58.1)
	University education or higher	150 (41.9)
Camps distribution	Alhalis camp	172 (48)
	Red Crescent camp	61 (17)
	Garuons camp	73 (20.4)
	Sport city camp	52 (14.5)
Age	Mean (SD)	Min- Max
	9.7 (4.6)	8-15 Yrs

Table 5.2: sociodemographic characteristics of the control group (N=364)

Variables		N (%)
Gender	Male	160 (44)
	Female	204 (56)
Father Education level	Less than university	181 (49.7)
	University education or higher	183 (50.3)
Mother Education level	Less than university	163 (44.8)
	University education or higher	201 (55.2)
Age	Mean (SD)	Min- Max
	10.7 (2.8)	8-15 Yrs

5.2 Oral health problems among IDP children:

5.2.1 Dental caries experience

Figure (5.1) depicts the proportion of IDP children with decayed teeth. A total of 275 children (76.6%) had at least one decayed tooth, compared to (53.2%) in the control group ($p \leq 0.001$). Only two IDP children had tooth restorations compared to 22 children from the city of Benghazi figure (5.2) Overall, the average number of decayed teeth was (3.38, SD= 3.28). Figure (5.3) shows the disparities in dental caries experienced among the several camps. The greatest number of decayed teeth was found in the red crescent camps and garuons camps, with a mean of (4.26, SD= 2.95) and (4.26, SD= 3.48), respectively. Alhalis camps, on the other hand, had the lowest rate of dental decay in their children (2.60, SD= 2.69). The sport city camps was relatively higher (3.50, SD= 2.95).

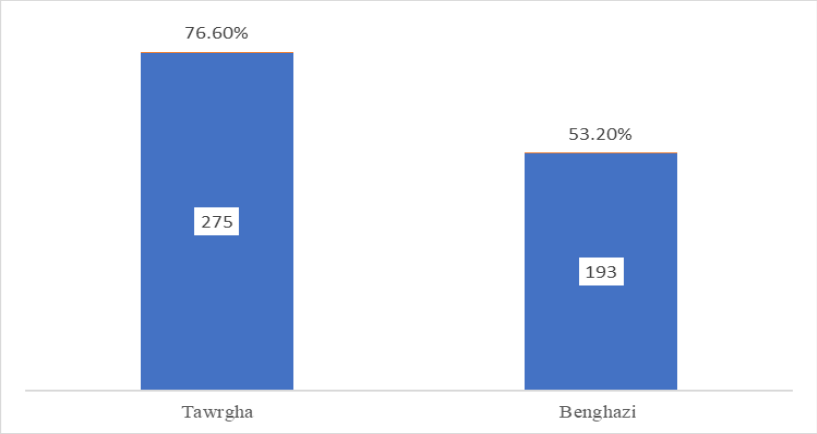

Figure 5.1: Comparison of proportions of decayed teeth between IDP children and normal population

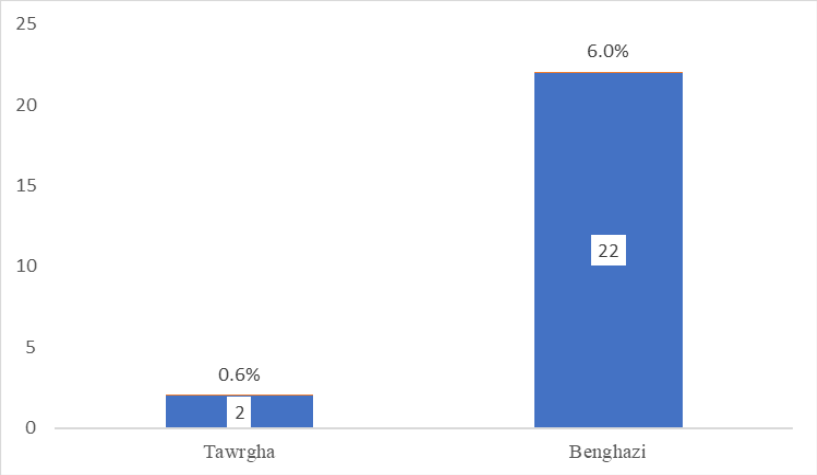

Figure 5.2: Comparison of proportions of filled teeth between IDP children and normal population

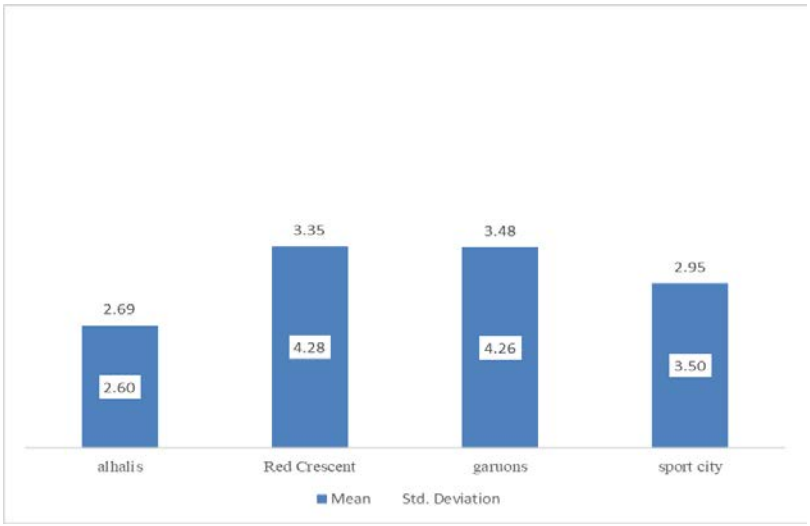

Figure 5.3: Comparison of average number of decayed teeth in IDP camps

5.2.2 Dental fluorosis:

Figure (5.4) illustrates the distribution of fluorosis among the participants. The normal teeth condition is the highest trend at (149, 41.6%) while the lowest is the severe variable at (3, 0.8%). The questionable variable is nearly threefold as the very mild variable, (122, 34.1%) and (36, 10.1%) respectively. The mild and moderate variables are (32, 8.9%) and (15, 4.2%) respectively. Sever condition variable was the lowest at (3, 0.8%).

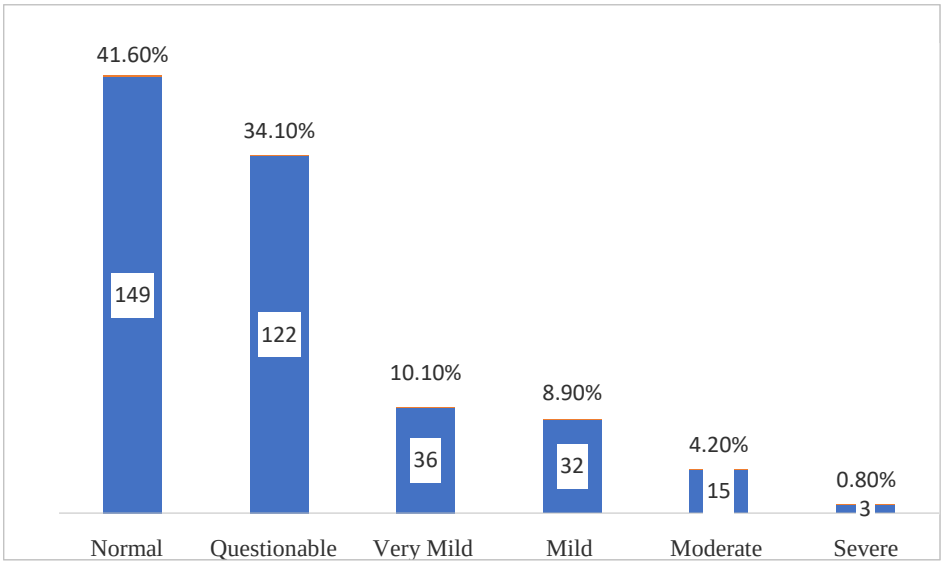

Figure 5.4: Prevalence and severity of fluorosis among IDP children

5.2.3 Erosion:

Figure (5.3) illustrates the prevalence of erosion and its severity among IDP children. The vast majority of the participants had no sign of erosion with (308, 86.0%). However, the enamel lesion, dental lesion, and pulp involvement variables were (47, 13.1%), (2, 0.6%), and (1, 0.3%) respectively.

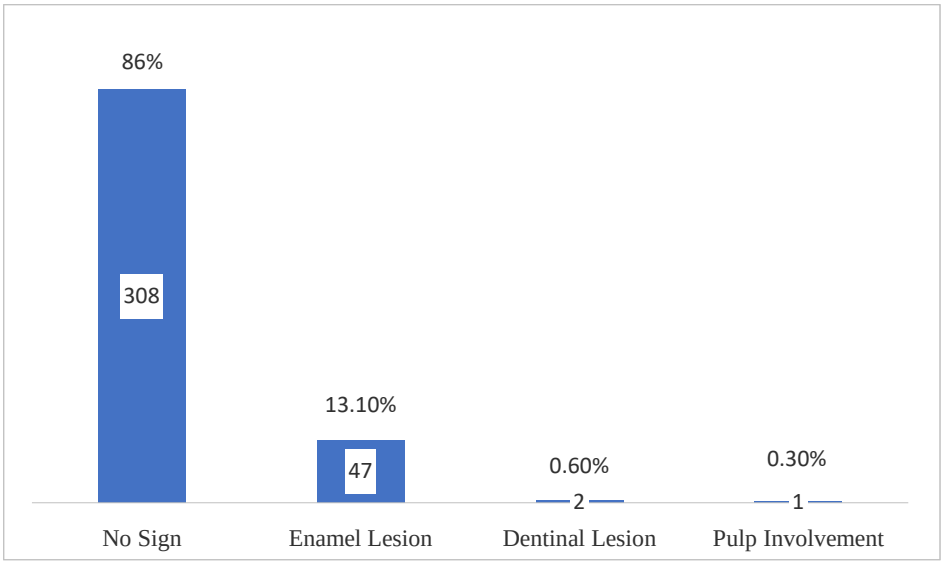

Figure 5.5: Prevalence and severity of erosion among IDP Children

5.2.4 Dental trauma:

Figure (5.6) represents the trauma status among the participants. The vast majority of the participants had no sign of injury with (327, 91.3%). Moreover, both treated injury and missing tooth due to trauma variables show the same vale (1, 0.3%). However, the enamel and dentine fracture variables are higher than the pulp involvement variable at (8, 2.2%) and (3, 0.8%) respectively. The second highest variable was enamel fracture which was (18, 5%).

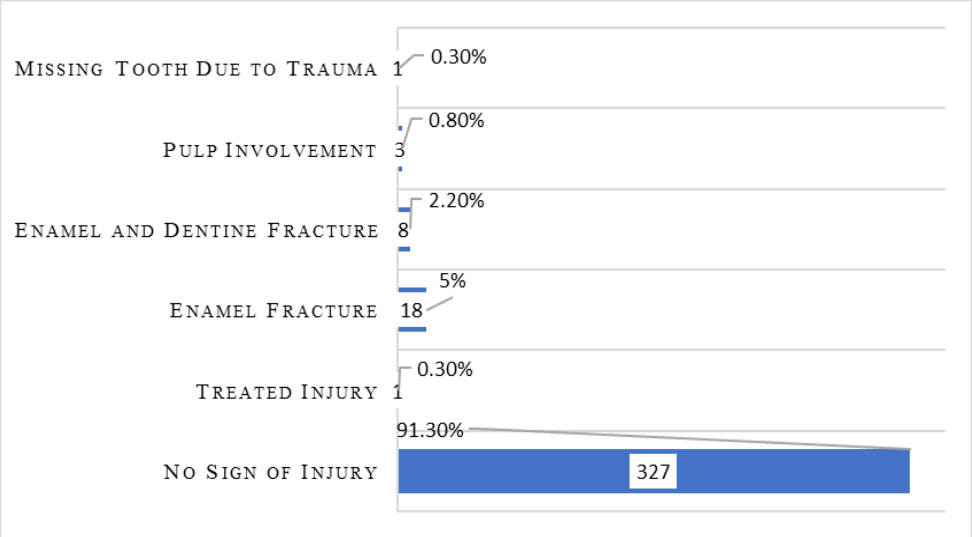

Figure 5.6: The frequency and severity of traumatic dental injury in IDP children

5.2.5 Oral Lesions:

Figure (5.7) represents the oral lesion condition among the participants. Almost all the participants had no sign of any oral lesion conditions with (351, 98%) where the ulceration, abscess and other conditions variables at (2, 0.6%), (4, 1.1%) and (1, 0.3%) respectively

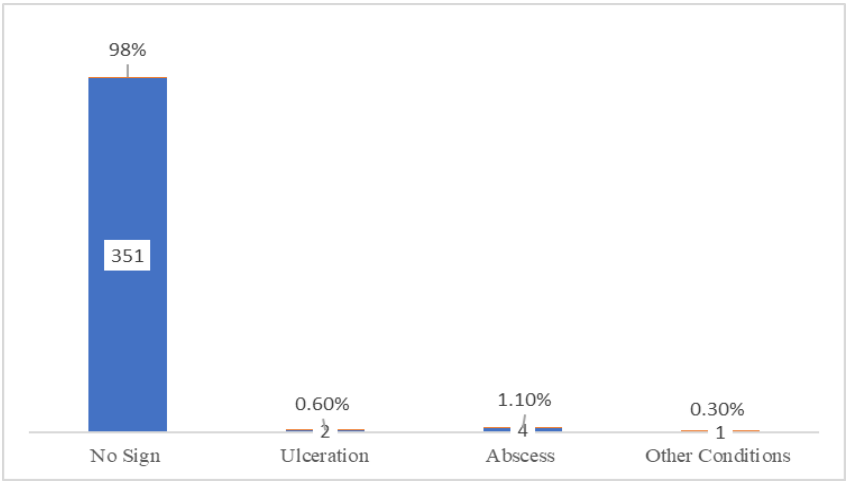

Figure 5.7: The oral lesion condition experiences among IDP Children

5.3 Oral health Behaviors:

Figure (5.8) below shows the frequency of oral habits among IDP children. The majority of respondents reported regular consumption of bedtime sugar (284, 79.3%) and tablespoons added sugar, twice or more (258, 72.1%). Regarding the question of how often you drink juices, the regular consumption was just above the half of respondents (189, 52.8%). About the response to oral hygiene questions. The number of the participant were regularly flossing (48, 13.4%) and brushing (131, 36.6%). A small number of participants reported regular visits to the dentist (2.5%).

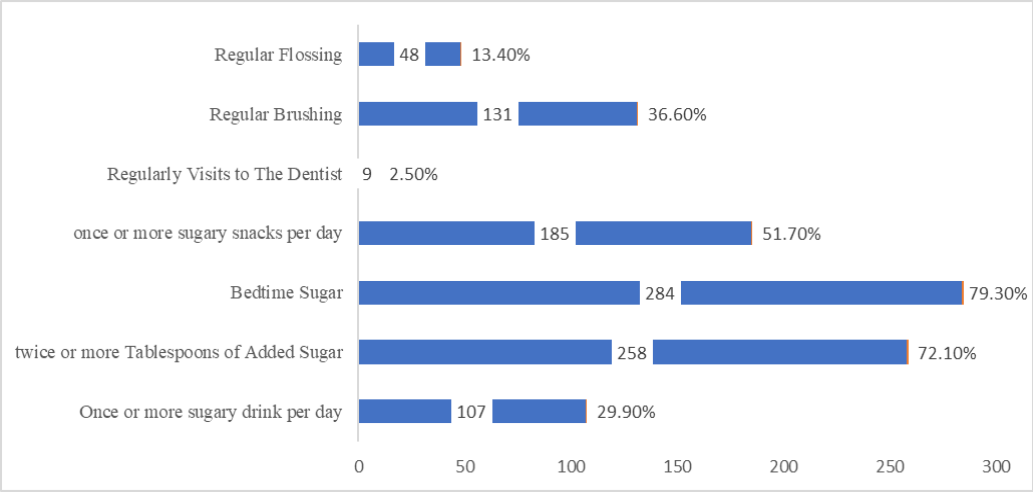

Figure 5.8: self - reported oral health behaviors among IDP children

5.4 Comparison of caries experience, risk factors and dental care:

Table (5.3) shows comparisons of average number of decayed teeth by oral behaviors of IDP children. No statistically significant differences were observed. However, higher caries rates were observed in relation to irregular dental visits, brushing and flossing teeth, and frequent intake of sugars. Table (5.4) shows comparison of sugar intake by socio-demographic properties of the study sample. The intake among IDP was higher compared to Benghazi controls (p=0.000).

Table 5.3: Comparison of decayed teeth by sociodemographic characteristics and oral health behaviors of IDP camp sample (N=358)

Variables		Mean (SD)	P-value
Frequency of visits to the dentist	Irregular	3.39 (2.98)	0.123
	Regularly	2.22(2.05)	
Number of times brushing teeth	Regular	3.14 (3.20)	0.332
	Irregular	3.48(3.04)	
Frequency of flossing	Regular	2.83(2.62)	0.153
	Irregular	3.43(3.17)	
Sugary drinks	Frequent	3.62(3.47)	0.372
	Irregular	3.26(2.96)	
Bedtime sugar	Regular	3.51(3.12)	0.057
	Irregular	2.75(2.99)	
Snacking sugar	Once or more per day	3.58(3.32)	0.152
	Irregular	3.11(2.83)	

*p<0.05, ** p<0.01, *** p<0.001

Independent sample t test was used to compare subgroups.

Table 5.4: Comparisons of regular intake of sugary drinks according to the characteristics of the whole study sample (n=716)

Variable		Regular sugar N (%)	P value
Gender	Male	373 (31.4)	0.070
	Female	343 (28.0)	
Mother Education	No University	453(31.1)	0.059
	University	263(27.5)	
Father education	No University	392(29.0)	0.370
	University	324(30.7)	
Residency	Benghazi	136 (37.4)	0.000***
	IDP-camp	189 (52.6)	

*p<0.05, ** p<0.01, *** p<0.001

Chi-Square test was used to compare subgroups.

5.5 Inequalities in caries and restorative care:

The unadjusted logistic regression models for caries and filled teeth as outcome variables are presented in table (5.5). The analysis showed that being female [OR:1.23,95%CI (1.05, 1.45), p=0.010], a regular consumer of sugary drinks [OR:1.92, 95%CI (1.60,2.31), p<0.001], and living in IDP camp [OR:2.87, 95%CI (2.08,3.95), p<0.001] were associated with increased risk of having decayed teeth. On the other hand, being a regular brusher of teeth [OR: 0.82, 95%CI (0.70,0.97), p=0.019], and father university education [OR:0.79, 95% CI (0.66, 0.93), P: 0.004] were associated with lower risk of having tooth decay. The unadjusted regression models for filled teeth showed that the father's university education [OR:1.75 (1.22, 2.53), p<0.002], mother's university education [OR:1.93 (1.34, 2.79), p<0.001], and being a regular brusher of teeth [OR:1.83, 95%CI (1.24, 2.97), p=0.001], were associated with having restored teeth. However, being a resident of a refugee camp was associated with a lower chance of having restorations.

Table 5.5: Unadjusted binary logistic models for caries and fillings

Variable		**Binary logistic models for Caries**		**Binary logistic models for Fillings**	
		OR (95%CI)	**P value**	**OR (95%CI)**	**P value**
Gender	Male	Reference		Reference	
	Female	1.23 (1.05, 1.45)	0.010*	1.17(0.81, 1.67)	0.394
Mother Education	No University	Reference		Reference	
	University	0.99(0.85,1.19)	0.965	1.93 (1.34, 2.79)	0.000***
Father education	No University	Reference		Reference	
	University	0.79(0.66, 0.93)	0.004**	1.75 (1.22, 2.53)	0.002**
Brushing frequency	Irregular	Reference		Reference	
	Regular	0.82 (0.70,0.97)	0.019*	1.83 (1.24, 2.97)	0.002**
Sugary drinks	Irregular	Reference		Reference	
	Regular	1.92 (1.60,2.31)	0.000***	1.06 (0.72,1.57)	0.776
Residency	Non-refugee	Reference		Reference	
	Refugee-camp	2.87 (2.08,3.95)	0.000***	0.09 (0.02, 0.38)	0.001**

*p<0.05, ** p<0.01, *** p<0.001

Unadjusted binary logistic models for caries (present vs absent) and filling (present vs absent), as outcome variables.

Table (5.6) presents the adjusted binary logistic models for caries as an outcome variable. Models 1 included father education as a predictor and gender and behavioural variables as covariates. The significant association with the father's education disappeared (p =0.149). Significant associations remained also for sugar intake [OR:1.86 95%CI (1.54, 2.36), p=0.007], tooth brushing [OR:84 95%CI (0.70,0.99),p=0.028] and gender [1.25(1.06,1.48) [p<0.01] .Model 2 added living in IDP camps. The significant association was between caries and living in refugee camp [OR:2.67, 95%CI (1.88,3.82), p<0.001], regular brushing [p=0.048]and being female[p=0.027].

Table 5.6: logistic regression analysis of the association between caries and SEP indicators and covariates.

Variable		**Model 1 Socio-Behavioral**		**Model 2 Refugee status**	
		OR (95%CI)	P value	OR (95%CI)	P value
Gender	Male	Reference	0.007**	Reference	0.027
	Female	1.25(1.06,1.48)		1.45(1.04, 1.99)	
Father education level	No University	Reference	0.149	Reference	0.908
	University	0.88(0.74,1.05)		1.03(0.65,1.61)	
Brushing frequency	Irregular	Reference	0.028*	Reference	0.048*
	Regular	0.84(0.70,0.99)		0.70(0.51,0.99)	
Sugary drinks consumption	Irregular	Reference	0.000***	Reference	0.277
	Regular	1.86(1.54, 2.36)		1.20 (0.86,1.65)	
Residency	Non-refugee			Reference	0.000***
	Refugee-camp			2.67(1.88,3.82)	

*p<0.05, ** p<0.01, *** p<0.001

Adjusted binary logistic models for caries as an outcome variable (present vs absent).

Model 1 included socio-behavioral factors (gender, father’s education, brushing frequency, and sugar intake), model 2 added residency type as a covariate.

Table (5.7) shows adjusted binary logistic models for teeth filling as an outcome variable. Model1 included parental education and tooth brushing. The significant associations remained for tooth brushing [OR:1.49, 95%CI (1.14, 2.59), p=0.012], and mother's education [OR:1.69, 95%CI (1.12, 2.56), p=0.012], but disappeared for father's education. Model 2 included living in a IDP camp residency. The only significant association was that residents of IDP camp were less likely to have restored teeth [OR:0.21, 95%CI (0.09, 0.42), p=0.002].

Table 5.7: logistic regression analysis of the association between filled teeth and SEP indicators and covariates

Variable		**Model 1 Socio-Behavioral**		**Model 2 Refugee status**	
		OR (95%CI)	P value	OR (95%CI)	P value
Mother Education	No University	Reference		Reference	
	University	1.69 (1.12, 2.56)	0.012*	2.01 (0.79, 5.13)	0.182
Father education	No University	Reference		Reference	
	University	1.49 (0.98, 2.25)	0.59	0.70 (0.28, 1.72)	0.768
Brushing frequency	Irregular	Reference		Reference	
	Regular	1.71 (1.14, 2.59)	0.010*	1.36 (0.54, 3. 43)	0.531
Residency	Non-refugee			Reference	
	Refugee-camp			0.09 (0.21, 0.42)	0.002**

*p<0.05, ** p<0.01, *** p<0.001

Adjusted binary logistic models for caries as an outcome variable (present vs absent).

Model 1 included socio-behavioral factors (gender, father's education, school type, brushing frequency, and sugar intake), model 2 added residency type as a covariate

5.6 Oral health related quality of life:

Figure (5.9) shows the response of IDP children to the oral health section of the COHIP-SF19. The highest impact was related to toothache (219, 61.2%) while the lowest was for the (bleeding gum) at (156, 43.6%). Nevertheless, the (bad breathing) was the second-highest variable at (180, 50.3%). Changing teeth color and teeth spacing or tilting questions were almost the same at (173, 48.3%) and (167, 46.6%) respectively.

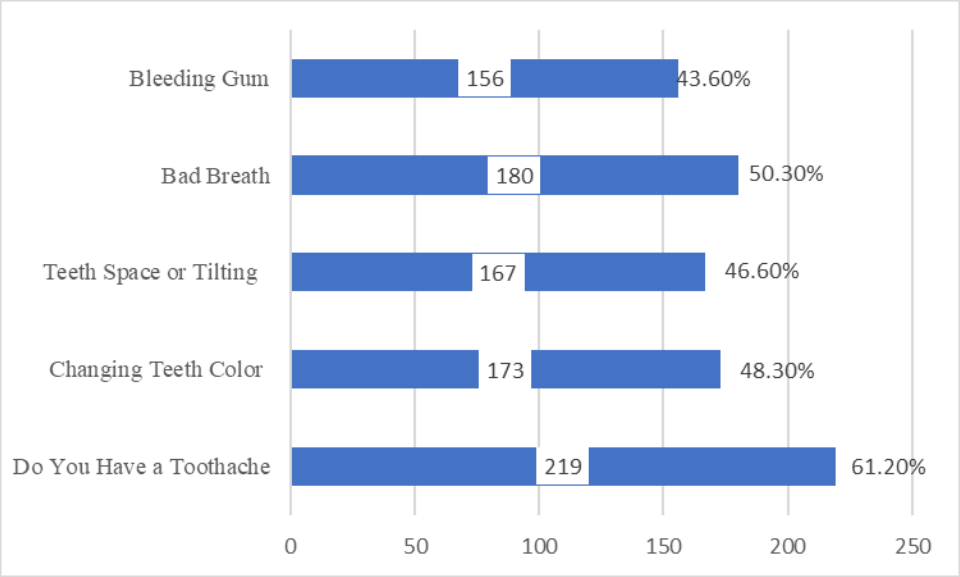

Figure 5.9: Oral health impact of quality of life among the sample

Figure (5.10) illustrates the response of the participants to the oral functions section of the COHIP-SF19 items. The highest impact was related to difficulty to eating (146, 40.8%). The lowest value was in response to the (difficulty pronouncing words) question at (100, 27.9%). Moreover, the response to both difficulty brushing teeth and difficulty sleeping because of the teeth questions was (110, 30.7%) and (124, 34.6%) respectively.

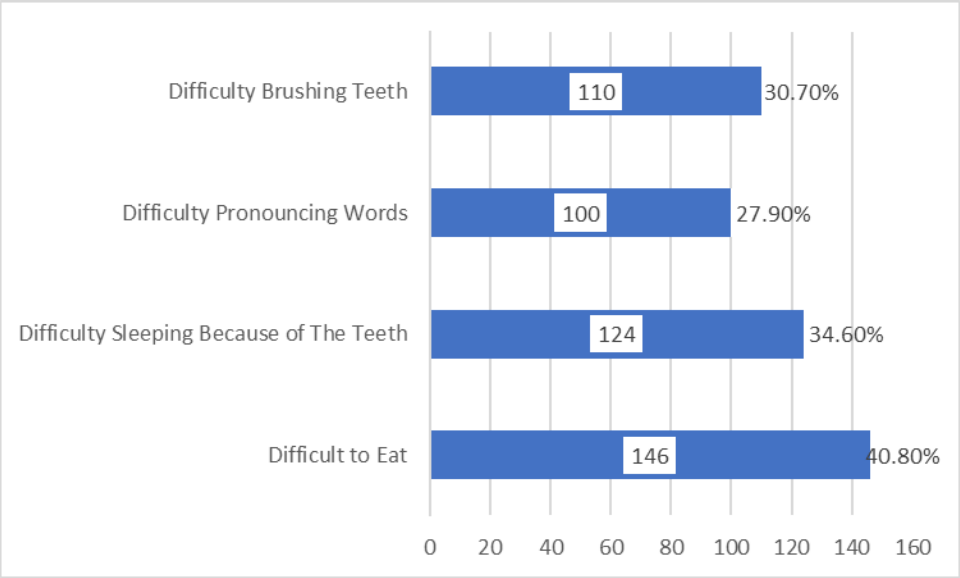

Figure 5.10: Oral function impact on quality of life among IDP Children

Figure (5.11) shows the response of the participants to the psycho - social status section of the COHIP-SF19 items. The (feeling good looking) question and (feeling confident because of the teeth) questions were the highest with very near values at (191, 53.4%) and (184, 51.4%). The (unwilling to speak or read) question shows a lower value than other variables at (78, 21.8%). In the graph the (missed school because of your teeth) question show value at (85, 23.7%). The response to the (where you bothered because of your teeth) question was at (89, 24.9%) while the (worried about what people think of you) question at (84, 23.5%). The variable (felt a difference in the general appearance) question was (87, 24.3%). A considerable amount of the participant responds to the (Avoid smiling or laughing) question at (96, 26.8%). The last two variables (Feeling confident because of the teeth) and (Feeling good looking) at (116, 32.4%) and (121, 33.8%) respectively.

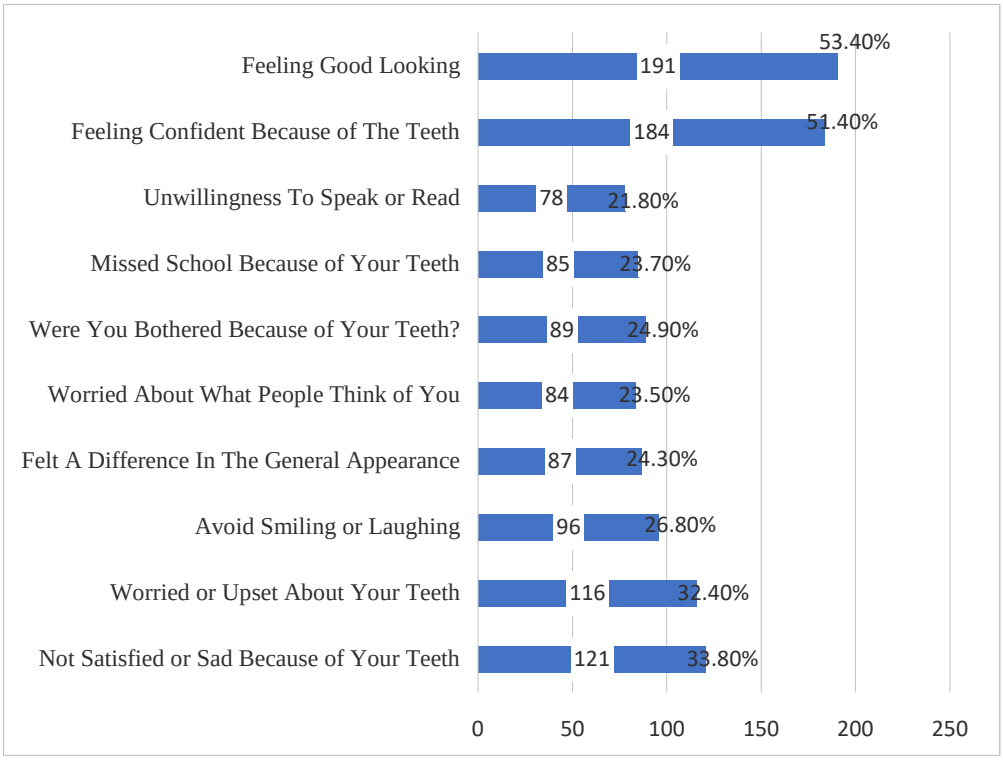

Figure 5.11: Responses of IDP children to COHIP - SF19 items (agree/strongly agree)

Table (5.8) displays the correlations between COHIP-SF19 score and a variety of socio-demographic factors, including parental education, sugar intake, and the number of times a day a child brushes and flosses their teeth. No significant differences were observed (P> 0.05).

Table 5.8: comparisons of COHIP - SF19 scores according to socio - demographic status

Variables		COHIPSF19 Mean (SD)	P-value
Father's educational level	University or higher	60.00 (11.48)	0.296
	Less than University	57.86 (14.03)	
Frequency of visits to the dentist	Irregular	56.89 (14.30)	0.208
	Regularly	62.00 (7.45)	
Number of times brushing teeth	Regular	59.38 (11.87)	0.359
	Irregular	57.68 (14.44)	
Frequency of flossing	Regular	55.30 (12.39)	0.162
	Irregular	58.84 (13.66)	
Juice	Frequent	57.36 (13.55)	0.524
	Infrequent	58.70 (13.53)	
Bedtime sugar	Regular	58.35 (13.32)	0.957
	Irregular	58.23 (14.28)	
Snacking sugar	Once or more per day	57.33 (14.67)	0.299
	Irregular	59.29 (12.28)	
Mother's educational level	University or higher	56.98 (15.04)	0.237
	Less than University	59.31 (12.26)	

Independent sample t test was used to compare subgroups.

Figure (5.12) reveals that COHIP -SF 19 scores were higher among Benghazi children than tawrgha children. In tawrgha, the score was (58.32, SD=13.52), whereas the COHIP - SF19 score was (61.13, SD=12.97) for Benghazi. The function variable was found to be (14.31, SD=3.01) in Benghazi and (13.21, SD=3.69) in tawrgha. Additionally, the oral health variable was (14.82, SD=4.58) and (13.82, SD=5.13) in Benghazi and tawrgha, respectively. Psychosocial scores in Benghazi (31.01, SD=8.45) and in tawrgha found (30.21, SD=3.69) . All difference were statistically significant.

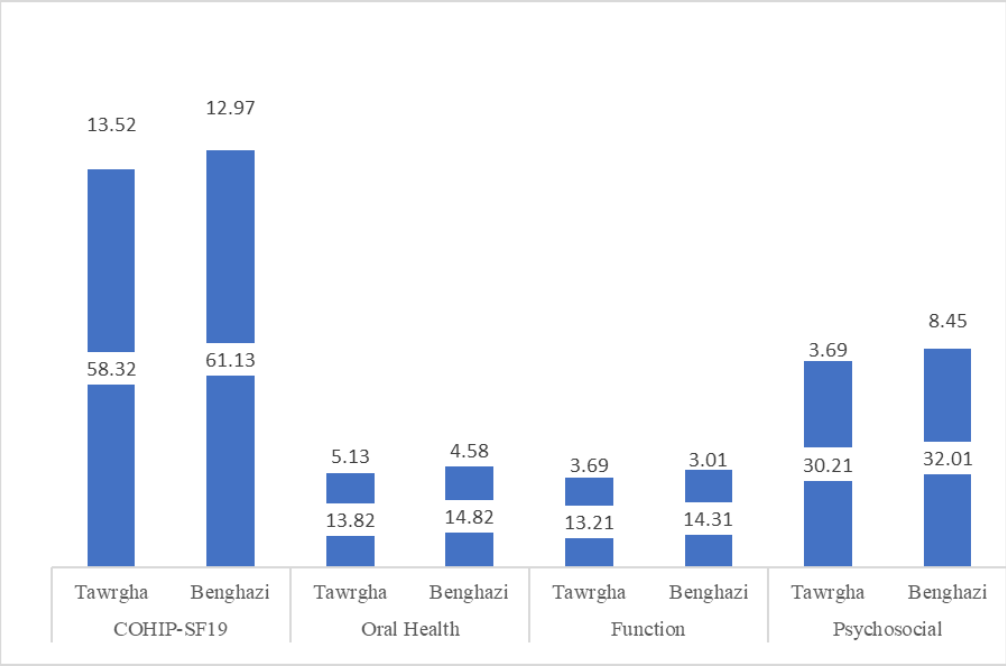

Figure 5.12: Comparison of overall COHIP - SF19 and its subscales between tawrgha children and Benghazi

CHAPTER 6

DISCUSSION

6.1 Overview:

The current research was set out to assess the oral health status and treatment needs of Libyan children living in tawrgha camps of IDP families from tawrgha, to our best of knowledge this is the first study of its kind in Libya. Therefore, the findings of the present study can have important implication of dental care providers, planners and decision makers. Our study collected both subjective and objective clinical data to provide an enhanced picture on the current oral health problem and utilization of care by such underprivileged groups. These included self - report questionnaires to collection socio - demographc data, oral health behaviours and quality of life. Using WHO form and criteria, the researcher collected information of oral diseases' indicators. This type of studies allows the collection of information relevant to the outcome and its associated characteristics among the partakers (Levin, 2006). A questionnaire survey is a well - established research technique that is quick and cheap and provides an objective means of investigating people's characteristics, mainly in descriptive and interpretive studies. (Robson & McCartan, 2016). It is commonly used in medical research since it allows a systematic collection of information, usually about attitudes and practices of patients and health professionals as well as delivery and evaluation of health services (Mandal et al., 2000). Questionnaires can be self-administered wherein respondents complete the questionnaire by themselves on internet or after receiving it by post, or it can administered by the investigator in an interview either face - to - face or using telephone (Robson & McCartan, 2016).

Although many measures have been developed to assess OHRQoL among school age children (Gilchrist et al., 2014; Jokovic et al., 2002), the Child Oral Health Impact Profile (COHIP) stands out for being both suitable for children between 8 and 15 years of age, while also evaluating both positive and negative attributes of quality of life (Broder et al., 2007). What is more, recently, a shorter version of COHIP (COHIP-SF19) has been developed using a confirmatory factor analysis (Broder et al., 2012). Such short forms are appropriate for large surveys since they are less time consuming, easy to use and interpret and consequently more cost - effective (Jokovic et al., 2006).

In the present study the researchers opted not to assess gingival status because the sample size is comprised of children with mixed dentition and adolescents which may increase the chance of having gingival bleeding not related to plaque and poor oral hygiene.

6.2 Study sample:

A total of 358 children aged (8 - 15) years were included in the present study, with a response rate of (77%). Oral health surveys are undertaken to provide estimates of the dental health and behaviors of populations or population subgroups. However, the integrity of the data from sample surveys may be compromised by one or more sources of sampling and nonsampling error. An important source of nonsampling error is the failure to collect data from some of the individuals comprising the sample. Consequently, the response to a sample survey, and the direction and magnitude of bias induced by nonresponse, need to be taken into account when using estimates derived from sample surveys. Although the response rate to a survey is usually used as an indicator of the quality of the data it provides, nonresponse error is a function of nonresponse and the extent of differences in the characteristics of responders and nonresponders. However, the response rate in our study is considered acceptable given than above (60%) is widely accepted in oral health research. (Yip et al., 2013), however, the non-response might be caused by out of control circumstances, such as the participants became selectivity in responding to postal questionnaires with interesting or relevant research topic (Tan & Burke, 1997; Kaner et al., 1998). The value of research topic has been singled as the most important determinant for response rate in questionnaire surveys (Kaner et al., 1998; Tan & Burke, 1997). In addition, no incentive was provided, which could have increased the response rate. Incentives are recognised as strong booster to response rate in questionnaire studies (Edwards et al., 2007).

Nevertheless, although most of literature focus on response rate in questionnaire surveys, it is not necessarily a key indicator of collected data quality (Shelley et al., 2012). A more important and direct indicator of response quality is the non-response bias which results from differences between respondents and non - respondents (Dillman et al., 2014), and this can occur equally in surveys with high and low response rates (Groves & Peytcheva, 2008). By looking into the socio - demographic characteristics of the participants, it can be seem that they represent the full spectrum

of the study group. The females were comprising around the half of the study sample, fathers and mothers were from educational backgrounds, and participants were recruited from different camps.

In the present study, data from a comparison group from Libyan children living in Benghazi was used for comparison. However, this data was collected as part of another study conducted at the same time to assess caries experience in Benghazi. Although this data was only appropriate to compare caries, its risk factors and OHRQoL and comparison of other oral conditions was not possible, many recent studies have been conducted in the area to assess TDI, DF, DE.

6.3 Main findings:

The present showed that the majority of children (76.6%) had at least one decayed tooth, compared to around half of the participants included in the control group from the city of Benghazi. This finding agrees with several previous reports demonstrating that children form socially deprived groups had poorer health in general and high burden of dental caries. For example a previous study among children demonstrated that Children from the most deprived areas had significantly more untreated decay and missing teeth (Sweeney et al., 1999). This study's findings also support the notion that living in a deprived neighbourhood is positively associated with dental caries and suggestive of decreased dental visits, even after adjusting for several individual socioeconomic characteristics(van Meijeren-van Lunteren et al., 2021). The contextual determinants of oral health, especially the physical and social environment may contribute to inequalities in oral health. This association can be mediated through unhealthy dietary behaviours such frequent consumption of sugars, poor oral hygiene and lack of early preventive care by dentists and availability of dental health services in the area where individuals live. The present study demonstrated contextual differences in the consumption of sugar intake which is a primary risk factor for dental caries. In addition, parental education was not a significance factor in explaining the variations caries experience or differences in sugar consumption, when controlled for other factors.

Interestingly, IDP children in alhalis camp had the lowest caries experience as compared to other camps. This camp is located at 20 KM distance from the city of Benghazi and had no supermarket. On the other hand, garuons camp has direct access to variety of stores and the highest caries rate, followed by red crescent which has supermarket inside. Interestingly, Sports city camp has no supermarket and lower caries rate. There are several pathways via which living in a deprived area such as camps could affect oral health. First, neighbourhoods can influence health via their physical characteristics (Macintyre et al., 2002). In our study, accessibility to supermarkets appeared to be associated with caries experience, but these associations need to be assessed in further studies using observational qualitative methods. (Larson et al., 2009). Second, several theories exist through which the social environment in neighbourhoods could affect individual health. For example, it has been suggested that neighbourhood safety, social connectedness and local institutions may affect health and corresponding behaviours. (Diez Roux & Mair, 2010). Other theories note that individuals living in the same neighbourhoods adapt their behaviours according to how others in the same geographical and social area behave (Chitewere et al., 2017). Overtime, predominant behaviours in an area can become a collective habitude, making the relation between neighbourhoods and health status bi-directional. This implies that the unfavourable oral health outcomes found in deprived neighbourhoods could reflect oral health-related behaviours of their inhabitants. However, individual behaviours such as sugar intake and brushing frequency had little influence on our results when controlled for the living environment. Therefore, one possible reason for the higher caries and lower treatment rates among IDP children is attributed to difference in living circumstances rather individual characteristics of the participants.

Interestingly, it was obvious that IDP children had much less restored teeth than their peers living in Benghazi. This finding is not surprising given that no dental unites were available in the IDP camps. In addition, dental restoration of children’s teeth is generally low among Libyan children. Many studies conducted among Libyan children showed a similar pattern of highly unmet treatment needs (Fakroon et al., 2015; Arheiam & Omar, 2014). The proportion of children who filled teeth varied by the mother's education level and self-reported brushing frequency. This finding is consistent with previous studies that reported social inequalities in caries care levels (Watt & Sheiham, 1999; Qin et al., 2021). Moreover, children from lower SEP were

also less likely to maintain their oral hygiene, which agrees with the findings of several studies conducted in different countries that demonstrated inequalities in tooth brushing behaviours among children (Levin & Currie, 2009; Polk et al., 2010). However, controlling these for living in IDP camp, eliminated behavioural and social class variations. Overall, a very small number of participants reported regular visits to the dentists (2.5%). Therefore, it can be suggested wider contextual environment is responsible for these variations in caries care levels.

The vast majority of IDP had no sign of erosion. However, the enamel lesions were affecting more than tenth of participants. Much higher proportion of enamel erosion was reported among 12 years old Libyan children. This might be attributed to lower consumption of carbonated drinks among IDP children (Huew et al., 2012). However, further research is needed to assess the risk factors of dental erosion among IDP children. Several factors have been implicated in the etiology of dental erosion, depending on the origin of the acid, extrinsic (usually caused by acids in food) and intrinsic (caused by endogenous acid) erosion can be distinguished. The presence and severity of erosive defects depend on various parameters such as nutrition, saliva, general diseases, and mechanical stress by abrasion and attrition. As an example, dietary habits which involve frequent intake of acidic food and beverages, occupational acid exposure, as well as certain drugs or diseases that affect saliva flow rate are accompanied by an increased risk of erosive dental hard tissue defects. By a thorough clinical examination and an accurate anamnesis, various erosion-related risk factors can be identified and strategies to reduce or eliminate these factors be identified (Kanzow et al., 2016). In addition, the study sample was comprised of children in the age of mixed dentition and hence, the data collected from different age groups and making comparisons might be biased.

The vast majority of the participants had no sign of injury. Only few participants have traumatic injuries. The low prevalence of dental trauma (8.7%) is lower than that reported in Benghazi children. It’s unclear why. However, the etiology of trauma varies widely and it could be attributed to lower physical activity and engagement in fighting games among these children. Further research is needed to fully understand this observation. There is a considerable body of literature addressing the distribution and determinants of TDIs among children and adolescents worldwide. There is wide variations across different countries, with observations of TDIs prevalence rates

ranging from (4%) to (50%) In the Africa and Middle East Region, TDIs are estimated to affect (15%) of schoolchildren (Abid et al., 2015). The causes of TDIs are generally classified into biological (e.g., Overjet), environmental (e.g., Material deprivation) and behavioural (e.g., Risk-taking). Biological factors such as, Inadequate lip coverage and increased Overjet have been pointed as primary Predisposing factors to dental trauma. Demographic aspects, such as, gender and age are also associated, with boys being more affected. Moreover, prevalence tends to raise with age, as a result of cumulative effect of these injuries. Many studies showed that falls and collision are the most common causes for dental injury. However, these causes varied in different age group. For example, in adolescents, sport activities and assaults often cause TDIs. While in per-school and school age children, falls, hyperactivity and playground accident are the most common causes(Cortes et al., 2002).

Dental fluorosis was observed in nearly quarter of IDP children had some form of fluorosis though small proportion of them had the sever form. This is much higher than that observed among 12 - year Libyan children in Benghazi. Dental fluorosis is a developmental disorder of teeth caused excessive ingestion of fluoride during tooth development. The prevalence of dental fluorosis varies largely across and within countries, which is ascribed to variations in the exposure to fluorides during tooth development (Pendrys, 2000). The World Health Organization (WHO) recommended that fluoride in drinking should not exceed 1.5 mg / L, in order to prevent harmful effects of fluoride (Petersen & Kwan, 2004; Malago et al., 2017). A review of studies on DF in Mexico found a prevalence range between (15.5%) and (100%) were reported, with higher of DF in areas where fluoride levels exceed 1.5mg/L in drinking water (Aguilar - Díaz et al., 2017). However, nowadays, it has been recognized that there are other sources of fluoride exposure such as food and tea, the two main sources remain fluoridated water and fluoridated toothpaste (Buzalaf, 2018; Pendrys, 2000). The use of toothpaste by young children has been identified as a potential risk factor for DF (Wong et al., 2010; Mejàre, 2018). Therefore, total fluoride intake will not depend only on its availability in water but also on exposure from other sources. The optimum daily consumption of fluoride for children has been empirically determined to be in the range of 0.5-0.7 mg / kg of body weight (Buzalaf, 2018), however, DF resulting from the consumption of as low as 0.03 F/ Kg /day has been

reported (Mascarenhas, 2000). Systematic reviews of literature have suggested that the optimum fluoride level in water gives a chance of around (12%) of having dental fluorosis with aesthetic concerns (Iheozor-Ejiofor et al., 2015; Goodarzi et al., 2016). The comparison of DF levels in the present study with that reported in other studies should be approached with caution since there is dose-response relationship between the severity of DF and levels of fluoride in drinking water and other sources as well as the duration or time of exposure to fluorides (Browne et al., 2005). We were not able to assess the concentration of fluoride in water sources and hence future work is needed to understand the association between water supply and fluorosis. In the previous study among western Saharan refugees children living in an area of 2 ppm, (6-7) year - old children and (11-13) year-old children examined, (36.9%), and (4.2%) were free of fluorosis, respectively (Almerich - Silla et al., 2008).

The oral lesion condition among the participants. Almost all the participants had no sign of any oral lesion conditions with 351(98%) where the ulceration, abscess and other conditions variables at 2(0.6%), 4(1.1%) and 1(0.3%) respectively. This finding has nothing to do with the regular utilization of dental care and reflects the use of dental services if needed. Although small numbers were reported, they may indicate some form of neglection or inaccessible dental services.

Another aim of the study was to assess oral health-related quality of life impacts among IDP children. The analysis showed that the highest impacts were related to toothache and bleeding gum in oral health section of the COHIP - SF19; difficulty to eating in oral function, and around half of the children were feeling confident about their teeth and good looking in the psychosocial section. These findings together that oral has significant impacts on the quality of life of IDP children. Although no previous research was conducted on quality of life of IDP children, these findings fits well with the dental literature about OHRQoL in children which shows variation in oral health impacts in different cultures and environmental circumstances (Kragt et al., 2017). Although many studies have suggested the inequalities in quality of life, no significant difference were observed when total COHIP - SF19 scores were compared by social and behavioral characteristics of the IDP children. However, lower scores were noted when comparing IDP with Benghazi children. Dental caries higher among IDP group and hence it is not surprising to see higher impacts on quality of life among IDP children (Petersen et al., 2005; Marcenes et al., 2013). Dental caries can cause

severe pain (Selwitz et al., 2007b; Tickle et al., 2008), sepsis and tooth extraction (Pine et al., 2006), significant impact on school attendance (Jackson et al., 2011), and self-esteem (Goodwin et al., 2015). It could be the case that the overall environment in the IDP camp is responsible for such differences. Therefore, our study also offers a materialist explanation of oral health inequalities, which stresses the role of factors beyond individuals' control (Sisson, 2007). The association between oral health and its related quality of life appeared to be influenced by contextual factors. Put simply, life hardships created by a IDP camp environment may resulted in structural, material and economic restraints on the purchasing power of the affected population (Barratt, 1997), who tend to prioritize what is necessary over what is considered indulgence (Duquenne & Vlontzos, 2014; Theodoridou et al., 2017). For instance, toothbrushes might be an added opulence for parents who look for safety, shelter and essential resources to live.

The inequalities in children's OHRQOL found in the present study indicate that policies and interventions aimed to promote oral health behaviors and prevent oral disease as well as discomfort among socially deprived are highly warranted. Based on our study, these strategies should take social disadvantage into account along with the other mediating factors such as oral health behaviors, cultural differences, or self - esteem and could involve education, social benefits for dental treatments, or introducing insurance covering various kinds of dental treatments.

6.4 Study limitations:

Certainly, some limitations of the present study need to be discussed. First, as in every observational study, our results might be affected by residual confounding, although we have constructed the fully adjusted models to assess the independent effects of different family SEP indicators. Yet, family SEP is a complex concept, and we did not include all kinds of family SEP indicators, as, for example, income or housing indices. Second, in this study, children's' OHRQoL was assessed by self-report questionnaires which might have introduced information bias. However, the tool used was validated in the Libyan culture and proved to be valid for collecting data from such young population. In addition, the study used DMF index which may underestimate caries experience since it only considers caries at dentine level and ignores non - cavitated caries lesions. However, the indices were used in both study groups and, hence, if any variability exists it would be evenly distributed.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions:

- The study showed that IDP children had higher caries rates, lower number of dental restorations compared to Benghazi children.
- The levels of dental erosion and dental trauma were relatively low although comparable to children living in Benghazi.
- Dental fluorosis was relatively higher among IDP children
- Higher consumption of sugars, irregular dental visiting and lower maintenance of oral hygiene was observed among IDP children .
- Poorer oral health related quality of life was reported among IDP children.
- The study showed that camp environment is associated with poorer oral health.
- Camps that are away from the city center and supermarkets appeared to have lower caries rates.

7.2 Recommendations:

- Oral health promotion programs are required to prevent dental caries and other health problems among IDP children.
- Future research is needed to fully understand the pathways of inequalities in distributions of oral health conditions among IDP children.
- IDP camp should be provided by dental unit and trained staff to provide appropriate dental care.
- Application of non-restorative dental treatment such fluoride varnish and Atraumatic treatment should be part of dental curriculum to enable dentists to provide possible care in areas such as IDP camps.
- Policies and strategies to provide affordable dental care and reduce access to health care facilities should be developed to reduce the disease burden and quality of life impacts among IDPs.

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APPENDICES

APPENDICES A

Participant Consent

إقرار الموافقة على المشاركة في البحث Patient Consent Form:

أنا الموقع أدناه قد فهمت المعلومات المقدمة لدي عن البحث وقد تمت الإجابة على كافة أسئلتي بشكل مرضي، أوافق على المشاركة في هذا البحث، مع احتفاظي بالحق في أن أنسحب من البحث في أي وقت دون سبب ومن دون وقوع ضرر علي او تحيز ضدي في أي وقت. وقد أبلغت بأهداف البحث والبيانات - العينات التي سيتم جمعها وكيفية التعامل مع هذه البيانات العينات بعد الانتهاء من البحث.

وأنا أفهم أن جميع المعلومات التي أدلي بها أو يتم جمعها عني ستعامل بسرية تامة ولن تعلن بأي شكل قد يؤدي إلى التعريف بهويتي. يكون الاستثناء الوحيد لذلك أن تكون المعلومات مطلوبة من قبل القانون. كما أوافق على أنه يمكن نشر بيانات البحث مع مراعاة سرية المعلومات كما ذكر أعلاه.

اسم وتوقيع ولي أمر الطفل: .....

اسم الطفل :.....

التاريخ: .....

APPENDICES B

QUESTIONNAIRES BOOKLET

عزيزي الطفل تهدف هذه الدراسة إلى معرفة مدى تأثير الظروف الاجتماعية على صحة الفم والأسنان ولهذا نطلب منكم تزويدنا ببعض المعلومات التي تفيدنا في البحث. سنتعامل مع هذه المعلومات بسرية كاملة بحيث لا يمكن تمييزكم أو معرفة معلومات تدل على هويتكم.

رقم العينة: .....

1.	**ما هو المستوى الدراسي للأب**	
أ.	تعليم ابتدائي أو اقل	
ب.	تعليم أعدادي أو تعليم ثانوي	
ج.	جامعي \ معهد عالي	
د.	ماجستير \ دكتوراه	
2.	**ما هو المستوى الدراسي للأم**	
أ.	تعليم ابتدائي أو اقل	
ب.	تعليم أعدادي أو تعليم ثانوي	
ج.	جامعي \ معهد عالي	
د.	ماجستير \ دكتوراه	
3.	**عنوان السكن (اسم المخيم)**	
أ.	مخيم الحليس	
ب.	مخيم قاريونس	
ج.	مخيم الهلال الأحمر	
د.	مخيم المدينة الرياضية	

- **العادات والسلوكيات المتعلقة بصحة الفم:**

4.	**كم مرة تغسل أسنانك بالفرشاة؟**	
أ.	مرتين أو أكثر في اليوم.	
ب.	مرة في	
ج.	أحيانًا في الأسبوع	
د.	أبدا	
5.	**كم مرة تقوم بتنظيف أسنانك بخيط الأسنان**	
أ.	مرتين أو أكثر	
ب.	مرة في اليوم	
ج.	أحيانًا في الأسبوع	
د.	أبدا	
6.	**كم مرة تشرب العصائر السكرية والمشروبات الغازية**	
أ.	4 مرات أو أكثر في اليوم	
ب.	3 مرات في اليوم	
ج.	مرتين في اليوم	
د.	مرة في اليوم	
هـ.	أحيانًا في الأسبوع	
و.	أبدا	
7.	**كم عدد ملاعق السكر التي تضاف عادة إلى الحليب والشاهي أو حليب والكاكاو**	
أ.	4 أو أكثر	
ب.	3	
ج.	2	
د.	1	
هـ.	0	

8.	**كم مرة تتناول وجبات خفيفة سكرية (شكولاطة ، حلويات ، بسكويت)**	
أ.	4 مرات أو أكثر في اليوم	
ب.	3 مرات في اليوم	
ج.	مرتين في اليوم	
د.	مرة في اليوم	
هـ.	أحيانًا في الأسبوع	
و.	أبدا	
9.	**كم مرة تتناول وجبات خفيفة ومشروبات سكرية قبل وقت النوم بساعة واحدة ؟**	
أ.	دائما	
ب.	غالبا	
ج.	بعض الأحيان	
د.	أبدا	
10.	**كم عدد الوجبات الخفيفة (بين الوجبات) التي تتناولها يوميًا**	
أ.	3 مرات أو أكثر في اليوم	
ب.	مرتين في اليوم	
ج.	مرة في اليوم	
11.	**كم مرة تشرب عصير الليمون أو المشروبات الغازية يوميا**	
أ.	4 مرات أو أكثر في اليوم	
ب.	3 مرات في اليوم	
ج.	مرتين في اليوم	
د.	مرة في اليوم	
هـ.	أحيانًا في الأسبوع	
و.	أبدا	
12.	**12. كم مرة تزور طبيب الأسنان**	
أ.	بانتظام للفحص علي صحة الأسنان	
ب.	عندما يكون لدية مشكلة في الأسنان فقط	

COHIP-SF 19

Libyan version

نرجو قراءة كل جملة جيدا واختيار الإجابة التي تصف شعورك وحالتك في الأشهر الثلاثة الماضية فيما يخص أسنانك و فمك و وجهك

Items	دائما	غاليا	أحيانا	غالبا لا	لا
صحة الفم					
هل لديك الم بأسنانك / وجع أسنان.					
هل لديك أسنان تغير لونها / أو عليها بقع.					
هل لديك اعوجاج في أسنانك أو فراغات بينها.					
هل لديك رائحى كريهة بالفم.					
هل لديك نزيف باللثة.					
الحالة الوظيفية للفم و الأسنان.					
هل لديك صعوبة في تناول طعامك المفضل بسبب أسنانك.					
هل لديك صعوبة في النوم بسبب أسنانك.					
هل لديك صعوبة في لفظ كلمات معينه بسبب أسنانك.					
هل لديك صعوبة في تنظيف أسنانك.					
الحالة الاجتماعية و النفسية.					
هل أنت غير راض أو حزين بسبب أسنانك، فمك أو وجهك.					
هل أنت قلق أو منزعج بسبب أسنانك، فمك أو وجهك.					
هل تتجنب الابتسام أو الضحك بسبب أسنانك، فمك أو وجهك.					
هل شعرت باختلاف مظهرك العام بسبب أسنانك، فمك أو وجهك					
هل يساورك القلق لما يعتقده الناس عنك بسبب أسنانك، فمك أو وجهك.					
هل تمت مضايقتك أو أطلق عليك ألقاب من قبل بقية الأطفال بسبب أسنانك، فمك أو وجهك					
هل تغيبت عن الدراسة بسب أسنانك، فمك أو وجهك					
هل شعرت بعدم الرغبة في الكلام أو القراءة بصوت غالى في الفصل بسبب أسنانك، فمك أو وجهك					
هل شعرت بالثقة بسبب أسنانك، فمك أو وجهك					
هل شعرت بأنك حسن المظهر وجذاب بسبب أسنانك ، فمك أو وجهك					

For professional use only
Responses are recorded as 'never' = 0, 'almost never' = 1, 'sometimes' = 2, 'fairly often'= 3, and 'almost all of the time' = 4. Scoring of the negatively-worded items was reversed. Higher COHIP-SF 19 scores reflect more positive OHRQOL, while lower scores reflect lower OHRQOL. See Table 2 for COHIP-SF item details.

APPENDICES C
Clinical Examination Form

World Health Organization

Oral Health Assessment Form for Children, 2013

Leave blank (1)–(4) | Year (5)–(6) | Month (7)–(8) | Day (9)–(10) | Identification No. (11)–(14) | Orig/Dupl (15) | Examiner (16)–(17)

General information: Sex 1=M, 2=F (18) | Date of birth (19)–(24) | Age in years (25)–(26)

(Name)

Ethnic group (27)–(28) **Other group** (29)–(30) **Years in school** (31)–(32) **Occupation** (33)

Community (geographical location) (34)–(35) **Location** Urban (1) Periurban (2) Rural (3) (36)

Other data (37)–(38) **Other data** (39)–(40)

Other data (41)–(42) **Extra-oral examination** (43)–(44)

Dentition status

	55	54	53	52	51	61	62	63	64	65		
	17	16	15	14	13	12	11	21	22	23	24	25	26	27
Crown (45)														(58)
Crown (59)														(72)
	85	84	83	82	81	71	72	73	74	75		
	47	46	45	44	43	42	41	31	32	33	34	35	36	37

Periodontal status

	55	54	53	52	51	61	62	63	64	65		
	17	16	15	14	13	12	11	21	22	23	24	25	26	27
(73)														(86)
(87)														(100)
	85	84	83	82	81	71	72	73	74	75		
	47	46	45	44	43	42	41	31	32	33	34	35	36	37

Gingival bleeding

Scores
0 = Absence of condition
1 = Presence of condition
9 = Tooth excluded
X = Tooth not present

Primary teeth	Permanent teeth
	Status
A	0 = Sound
B	1 = Caries
C	2 = Filled w/caries
D	3 = Filled, no caries
E	4 = Missing due to caries
–	5 = Missing for any another reason
F	6 = Fissure sealant
G	7 = Fixed dental prosthesis/crown, abutment, veneer
–	8 = Unerupted
–	9 = Not recorded

Enamel fluorosis (101)

Status
0 = Normal
1 = Questionable
2 = Very mild
3 = Mild
4 = Moderate
5 = Severe
8 = Excluded (crown, restoration, "bracket")
9 = Not recorded (unerupted tooth)

Dental erosion

Severity (102)

0 = No sign of erosion
1= Enamel lesion
2 = Dentinal lesion
3 = Pulp involvement

No. of teeth (103)–(104)

Dental trauma

Status (105)

0 = No sign of injury
1 = Treated injury
2 = Enamel fracture only
3 = Enamel and dentine fracture
4 = Pulp involvement
5 = Missing tooth due to trauma
6 = Other damage
9 = Excluded tooth

No. of teeth (106)–(107)

Oral mucosal lesions

Condition		Location	
(108)		(111)	
(109)		(112)	
(110)		(113)	

Condition:
0 = No abnormal condition
1 = Ulceration (aphthous, herpetic, traumatic)
2 = Acute necrotizing ulcerative gingivitis (ANUG)
3 = Candidiasis
4 = Abscess
8 = Other condition
9 = Not recorded

Location:
0 = Vermillion border
1 = Commissures
2 = Lips
3 = Soft
4 = Buccal mucosa
5 = Floor of mouth
6 = Tongue
7 = Hard and/or soft palate
8 = Alveolar ridges/gingiva
9 = Not recorded

Intervention urgency (114)

0 = No treatment needed
1 = Preventive or routine treatment needed
2 = Prompt treatment (including scaling) needed
3 = Immediate (urgent) treatment needed due to pain or infection of dental and/or oral origin
4 = Referred for comprehensive evaluation or medical/dental treatment (systemic condition)

صحة الفم و احتياجات العلاج لدى الأطفال النازحين داخل ليبيا / بنغازي - مخيمات تاورغاء

قدمت من قبل:

عبدالقادر محمد الحشاني

تحت أشراف:

د.ارحيم احميدة العوامي

الملخص

خلفية البحث: في ليبيا، لا يزال حوالي (245483) ليبيًا نازحين داخليًا لأسباب مختلفة. ومن بين هؤلاء، هناك حوالي (40،000)، من مدينة تاورغاء. يوجد حاليًا أكثر من (40) معسكرًا للنازحين داخليًا في جميع أنحاء البلاد. بالإضافة إلى ذلك، تعد صحة الفم مؤشرًا مهمًا يمكن استخدامه لتحديد الصحة العامة للشخص. لا يُعرف سوى القليل عن حالة صحة الفم والاحتياجات العلاجية للأطفال الذين يعيشون في مخيمات النازحين داخليًا.

الهدف من البحث: أجريت الدراسة الحالية لاستكشاف صحة الفم واحتياجات العلاج و جودة الحياة للأطفال النازحين داخليًا وإبلاغ برامج الصحة العامة وصانعي السياسات في المستقبل.

الطرق والمواد البحث: تم إجراء مسح مقطعي بالملاحظة باستخدام كل من الفحص السريري والاستبيان الذاتي ، بين الأطفال الذين تتراوح أعمارهم بين (8 - 15) عامًا، والذين يعيشون في مخيمات تاورغاء في مدينة بنغازي. استخدمت الدراسة كلاً من استبيان تم التحقق منه ذاتيًا وتقييمًا سريريًا لجمع البيانات من المشاركين. استكشف الاستبيان الخصائص الاجتماعية والديموغرافية وسلوكيات صحة الفم للمشارك بالإضافة إلى استخدام مقياس جودة الحياة المترجم للغة العربية.

نتائج البحث: تم اختيار ما مجموعه (358) (191 ذكر - 167 أنثى) من الأطفال النازحين داخليا. أظهر المشاركون انتشارًا أعلى لتسوس الأسنان (275، 76.6%) من أطفال بنغازي (193، 53.20%). ومع ذلك ، فإن معدل حشو الأسنان لدى الأطفال النازحين (2، 0.6%) أقل من أطفال بنغازي (6، 6%). تكشف البيانات أن انتشار تسوس الأسنان كان

مختلفًا حتى بين المخيمات. حيث أظهر معسكر قاريونس أعلى نسبة للتسوس (4.26، SD=3.48)، ثم معسكر الهلال الأحمر والمدينة الرياضية عند (4.28، 3.35= SD) و(3.5 ، SD=2.95) على التوالي. بينما كان أدنى انتشار للتسوس في مخيم الحليس (2.60، SD=2.69). حوالي (149، 41.6%) من العينة لم تظهر أي أعراض تسمم بالفلور في الأسنان. ومع ذلك ، وجد الشكل الحاد منه في (3، 0.8%). بينما الغالبية العظمى من المشاركين ليس لديهم أي علامة على الإصابة به. عدد قليل فقط من المشاركين لديهم إصابات في الآسنان. انخفاض معدل انتشار إصابات الأسنان (31، 8.7%). لم يُظهر جميع المشاركين في الدراسة تقريبًا أي علامة على التعرية (308، 86%). بالإضافة إلى ذلك، تكشف البيانات أنه في مجموع نقاط جودة الحياة ، كان لدى أطفال تاورغاء (58.32، SD=1352) بينما كان لدى أطفال بنغازي (61.13، SD =12.97).

الاستنتاج: كان انتشار تسوس الأسنان مرتفعاً بينما كان تآكل الأسنان وإصابات الأسنان منخفضين نسبياً بين الأطفال النازحين مقارنة بالأطفال الذين يعيشون في بنغازي. كما تمت ملاحظتها أن المعسكرات البعيدة عن وسط المدينة ومحلات السوبرماركت لديها معدلات تسوس اقل.

جامعة بنغازي

كلية طب الأسنان

قسم طب الفم الوقائي

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