Oral Health Quality of Life in Children with Cerebral Palsy: Parental Perception

Sumaya M. Ammar Muneeb Nouri, BDS

A thesis submitted for the requirements for the degree of Master of Sciences in Pediatric Dentistry

FACULTY OF DENTISTRY
KING ABDULAZIZ UNIVERSITY
JEDDAH-SAUDI ARABIA
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In the Name of Allah,

The Most Gracious, The Most Merciful.

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To my little sister & all the children suffering from cerebral palsy.

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Sumaya M. Nouri

ABSTRACT

Oral health-related quality of life (OHRQOL) has been defined as “a multidimensional construct that reflects among other things, people’s comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health”. Cerebral palsy (CP) is the most common form of neuromuscular disability affecting children. It is generally agreed that this population of children has higher rates of poor oral hygiene and gingivitis and that may further affect their quality of life. The aim of this study was to assess the oral health and the parents’ perception of the OHRQOL in children with CP and compare it with healthy children in Jeddah.

Materials and Methods: The sample consisted of 63 children with CP recruited from 8 disability centers, and a control group of 99 healthy children recruited from 5 elementary schools. The ages of the children in both groups were from 6-12 years. An oral examination was conducted in the schools/centers of the children by calibrated examiners after receiving parental consent assessing the teeth, the gingival health, and the oral hygiene. The Franciscan Hospital for Children Oral Health-Related Quality of Life (FHC-OHRQOL) was used to measure the OHRQOL. This questionnaire consisted of 4 sections. In section I the parents were asked to rate their child’s current oral problems/symptoms. In section II the parents were asked to rate the impact of their child’s current oral health on their daily life. Section III consisted of questions related to parents’ concerns about their child’s oral health. In section IV, a visual analog scale (VAS) was used for each of 4 questions to assess parent’s perceptions of their child’s oral well-being and overall QOL.

Results: The number of working mothers and the fathers’ level of education in the CP group were significantly lower (*p*= 0.029) and (*p*=0.002) respectively. Significantly more children in the CP group were taking medication (*p*=0.000) and were previously hospitalized (*p*=0.000). There was a statistically significant difference between the CP and control groups in the number of dental visits (*p*=0.000), frequency of sugar intake (*p*=0.021), frequency of daily brushing (*p*=0.026), and the supervision of brushing (*p*=0.000). More children in the CP group had bruxism (*p*=0.000) and food pouching (*p*=0.000). The examination showed no significant difference in the health of the teeth and gingiva and in the level of oral hygiene. The OHRQOL showed no significant difference in the number and severity of the oral symptoms. A significant difference was found in the number and severity of the daily life problems and the parental concerns. In section IV, children in the CP group had significantly lower scores in the four questions indicating lower quality of life.

Conclusion: The oral health status of children with CP is not significantly different from that of normally developing children but the OHRQOL of children with CP is significantly lower than that of normally developing children.

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LIST OF SYMBOLS AND TERMINOLOGY

ABR	Auditory Brainstem Response
CDC	Center for Disease Control and Prevention
CP	Cerebral Palsy
COHIP	Child Oral Health Impact Profile
COHRQoL	Child Oral Health-Related Quality of Life
CHILD-OIDP	Child Oral Impact Daily Performance
CSHCN	Children with Special Health Care Needs
DMFS	Decayed, Missing and Filled Surface
D	Decayed Tooth (Permanent)
d	Decayed Tooth (Primary)
dft	Decayed and filled tooth (Primary)
DMFT	Decayed, Missing and Filled Tooth
EEG	Electroencephalography
ECOHIS	Early Childhood Oral Health Impact scale
F	Filled Tooth (Permanent)
f	Filled Tooth (Primary)
FHC-OHRQOL	Franciscan Hospital for Children Oral Health-Related Quality of Life
GA	General Anesthesia
GE	Gastroesophageal
GT	Gastric Tube

HRQOL	Health-Related Quality of Life
KSA	Kingdom of Saudi Arabia
M	Missing Tooth (Permanent)
NG	Nasogastric
NIDCR	National Institute of Dental and Craniofacial Research
NCPP	National Institute of Neurological Disorders and Stroke
OHI	Oral Hygiene Index
OHRQOL	Oral Health-Related Quality of Life
QOL	Quality of Life
OHI-S	Simplified Oral Hygiene Index
SCPE	Reference and Training Manual of the Surveillance of CP in Europe
SPSS	Statistical Product and Service Solutions
TORCH	Toxoplasmosis, Other (Coxsackie Virus, Syphilis, Varicella-Zoster Virus, HIV, & Parvovirus B19), Rubella, Cytomegalovirus, Herpes Simplex.
UN	United Nations
US	United States
VAS	Visual Analogue Scale
WHO	World Health Organization
WHOQOL	World Health Organization Quality of Life
WHOQOL-BREF	World Health Organization Quality of Life-BREF

Chapter I

Introduction

Oral health is part of general health and it is essential to the quality of life (QOL) (Petersen, 2003). In recent years, the concept of oral health-related quality of life (OHRQOL) has been introduced, expanding the array of traditional medical factors that have been assessed when measuring QOL outcomes in health care settings (Baens-Ferrer et al. 2005). The United States Surgeon General's report on oral health which defines OHRQOL as

"a multidimensional construct that reflects (among other things) people's comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health" (US Department of Health and Human Services, 2000).

Measures of OHRQOL document the functional and psychosocial outcomes of oral disorders. It is now generally accepted in the research community that they are as essential as clinical indicators when assessing the oral health of individuals and populations, making clinical decisions, and evaluating dental interventions, services, and programs (Jokovic et al. 2004). As researchers started to recognize the importance of OHRQOL, they have begun and continue to develop measurement instruments.

Basically, there are two main categories for OHRQOL evaluation methods and they are: the global self evaluation method and the socio-dental indicators (Nuca et al. 2007).

Dental caries is one of the most common chronic childhood diseases worldwide, and its susceptibility extends throughout life. The damage caused by dental caries is not only limited to tooth cavitation, their consequences reach beyond that and could alter the child's daily life. Severe dental caries can decrease children's QOL. Children with sever dental caries are subjected to pain, distress, disfigurement, infections, as well as eating and sleep disturbances. They are also at a higher risk of hospitalization. High treatment costs and loss of school days will consequently diminish their ability to learn which eventually lowers their QOL. It was also found that caries affect nutrition, growth and weight gain (Sheiham, 2005).

It is currently estimated that up to 4% of the population in Saudi Arabia has functional disabilities which limit their independence (Al-Turaiki, 1997). The WHO defines an individual with a handicap as

"one who, over an appreciable time, is prevented by a physical or mental condition from full participation in the normal activities of his/her age group, including those of a social, recreational, educational, and vocational nature" (Salako and Jeboda, 1985).

Cerebral palsy (CP) is the most common form of neuromuscular disability affecting children (Dougherty, 2009). It has been defined as

"a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behavior, and/or by a seizure disorder” (Bax et al. 2005).

Information on the prevalence of CP in Saudi Arabia is limited, but anecdotal evidence suggests that it is one of the most common disabling conditions in Saudi Arabia. (Wyne, 2007). It is estimated that half of CP cases have no underlying identifiable cause. The etiologies however can be classified according to the timing of the insult as prenatal, natal, or postnatal or according to the actual cause which could be either congenital or acquired (Jan, 2006).

The Developmental Medicine & Child neurology 2005 proposed a classification with four major dimensions: (1) Motor abnormalities: This includes the nature and typology of the motor disorder as well as the Functional motor abilities. (2) Associated impairments including presence or absence of associated non-motor neurodevelopmental or sensory problems. (3) Anatomic and radiological findings: this includes the Anatomic distribution and the Radiological findings. (4) Causation and timing: Whether there is a clearly identified cause, as is usually the case with postnatal CP or when brain malformations are present, and the presumed time frame during which the injury occurred, if known (Bax et al. 2005).

Children with special health care needs (CSHCN) are at increased risk for dental disease. Neuromuscular, acquired, or genetic disorders often cause alterations or defects in skeletal and facial structures, tooth number and morphology, eruption pattern, and malocclusion. Medications required by CSHCN are known to cause intrinsic and extrinsic tooth discoloration, gingival enlargement, and xerostomia. Other medications containing sweeteners have been shown to increase the incidence of caries. It is generally agreed that this population of children has higher rates of poor oral hygiene, gingivitis, and periodontitis (Guare Rde and Ciamponi, 2003; Mitsea et al. 2001; Boraz, 1989; Ohmori et al. 1981).

Very few studies were found concerning the OHRQOL of children with CP in Saudi Arabia. In light of this finding, it became essential to grant more effort in providing information in that direction. The aim of this research is to assess the oral health and the parental perception of the OHRQOL in children with CP in Jeddah, Saudi Arabia.

Chapter II

Review of Literature

2.1. Definition of Health

The World Health Organization (WHO) defined health as

"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948).

Health has also been defined as

"a positive concept emphasizing social and personal resources, as well as physical capacities" (WHO Ottawa Charter for Health Promotion, 1986).

In light of the previous definitions, it can be understood that the measurement of health and the effects of health care must not only include an indication of changes in the frequency and severity of diseases, but must also incorporate an estimation of the person's well being. This can be determined by measuring the improvement in the quality of life related to the provided health care (WHOQOL, 1997). The definitions also pointed out three dimensions of well-being; physical well-being, which comprises the ability to function normally in daily life activities such as bathing, dressing, eating, and moving around, mental well-being, which implies that the cognitive abilities are intact and that there is no burden of fear, anxiety, tension, despair, or any other negative emotion, and social well-being which relates to being able to participate in society, engage in interactions with others, and to fulfill the roles as a family member, a friend, or a worker. (US Department of Health and Human Services, 2000).

2.2. Quality of Life (QOL)

Chronic diseases affect approximately 18% of children (Clarke and Eiser, 2004). Although sometimes cure is not possible, survival rates have improved substantially for many conditions, leaving the patient in a state that requires daily self-management and restricting his'/hers physical and social activities. Consequently questions are increasingly raised about the quality of life (QOL) of children with chronic disease (Clarke and Eiser, 2004).

The WHO defines QOL as
"the individuals' 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" (WHOQOL, 1997).
It is a wide-ranging concept that is affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs, and by their relationship to prominent features of their environment (WHOQOL, 1997).

In the 1980s, the search began for ways to supplement the traditional measures of morbidity and mortality and health was beginning to be appraised by the public health community as a multidimensional construct (Patrick and Erickson, 1993). The idea of health-related quality of life (HRQOL) and its determinants have evolved since then to include the aspects of overall QOL that affect either the physical or mental health

(McHorney, 1999). On an individual level, this consists of the physical and mental health perceptions and their associates which include health risks, the functional status, social support, and the socioeconomic status. On a community level, HRQOL takes account of the resources, situations, policies, and practices that influence the population’s health perceptions and functional status (CDC, 2002).

For children, measuring the QOL has proved to be difficult, but a number of generic and disease-specific instruments have been developed (Eiser and Morse, 2001). Generic measures were constructed in order to assess and compare the health status in persons with different diseases. They may also provide valuable information for comparing between sick and healthy populations. These instruments are generally well validated but they lack the sensitivity to detect small yet clinically significant changes in QOL over time or after receiving treatment for specific diseases (Chassany et al. 2002). Disease specific measures are more appropriate for use in clinical trials intended to assess a particular treatment outcome. These measures contain questions that are prone to be affected by the specific disease or treatment and are therefore more sensitive to clinically significant changes (Clarke and Eiser, 2004).

Several instruments have been developed to measure HRQOL and its related concepts, among them were the Medical Outcomes Study Short Forms (SF-12 and SF-36), the Sickness Impact Profile, and the Quality of Well-Being Scale (CDC, 2002).

The WHO with the help of 15 collaborating centers around the world developed two instruments for measuring QOL in 1997, the (WHOQOL-100) and the (WHOQOL-BREF). During the process of developing those tools, the essential aspects of QOL and the methods of asking about it were outlined based on statements made by patients with a variety of diseases, by healthy people, and by health professionals in a variety of cultures (WHOQOL, 1997).

2.3. Oral Health Related Quality of Life (OHRQOL)

The influence of oral health on people's physical and psychological state is recognized. It alters the way they grow, look, speak, chew, taste food, socialize and enjoy life. It also affects their feeling of social well-being (Sheiham, 2005). In children, the presence of sever dental caries worsens their QOL; it makes them more liable to suffer from pain, discomfort, deformity, and acute or chronic infections. It also subjects them to high treatment costs, increases their risk of hospitalization and forces them to miss school which consequently diminishes their ability to learn (Sheiham, 2005). The presence of caries affects sleeping, nutrition, growth and weight gain. Children of three years of age with nursing caries weighed about 1 kg less when compared with control children. This was attributed to toothache and infection that alter eating and sleeping habits, dietary intake and metabolic processes. Disturbed sleep affects glucosteroid production. In addition, there is suppression of hemoglobin due to depressed erythrocyte production (Sheiham, 2005).

In recent years, the concept of oral health-related quality of life (OHRQOL) has been introduced, expanding the array of traditional medical factors such as symptom and functional status that have been assessed when measuring QOL outcomes in health care settings (Baens-Ferrer et al. 2005). OHRQOL has been described as a multidimensional concept including: survival; absence of symptoms; absence of pain or discomfort; the oral cavity's adequate physical/mechanical functioning; social-emotional functioning; ability to perform self-care; limitation on activities related to role; perceptions of oral health; and satisfaction with oral health (Gift and Atchinson, 1995; Kressin et al.1996).

2.3.1. Definition of OHRQOL

Several definitions have been proposed for the OHRQOL and they range from being simple to being more rigorous and complex. An example of the simple definition is the one proposed by the United States Surgeon General's report on oral health which defines OHRQOL as

"a multidimensional construct that reflects (among other things) people's comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health" (NIDCR, 2000).

The more rigorous definitions are usually the product of research designed to conceptualize oral health and OHRQOL (Al-Shamrany, 2006). In 1995 Gift and Atchinson developed a multidimensional concept of OHRQOL based on the structure of the HRQOL model proposed by Patrick and Erickson (1993). According to that model, OHRQOL includes survival (which means the absence of oral cancer and the presence of teeth); absence of impairment, disease or symptoms; appropriate physical functioning in relation to chewing and swallowing; absence of discomfort and pain; proper emotional functioning associated with smiling; 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 condition. They also defined OHRQOL as a "self report specifically pertaining to oral health-capturing both the functional, social and psychological impacts of oral disease" (Gift and Atchinson, 1995).

2.3.2. Measures of OHRQOL

OHRQOL measures document the functional and psychosocial outcomes of oral problems. It is generally accepted in the research community that they are as important as clinical indicators when assessing the oral health of individuals and populations, making clinical decisions, and evaluating dental interventions, services, and programs (Jokovic et al. 2004). As researchers started to recognize the importance of OHRQOL, they have begun and continue to develop measurement instruments. Fundamentally, there are two main categories for OHRQOL evaluation methods: the global self evaluation method and the socio-dental indicators (Nuca et al. 2007).

The global self-evaluation method is an intuitive assessment method, based on individual's answer to a single question (Inglehart and Bagramian, 2002). The answers are usually simple. This type of evaluation can be applied to all kinds of social categories, and can be incorporated as a part of more detailed questionnaires. The effectiveness of this evaluation method consists in its ability to examine features associated with oral health self-perception; it also gives positive alternatives to answers, thus measuring the negative impact of the oral health status, as well as the positive one. This type of questionnaires should strictly be used for the assessment of OHRQOL and not for measuring the real oral health, which needs objective evaluation for its assessment. Because the global self-evaluation measures represent the simplest method of assessing OHRQOL, they can be applied on a large scale such as national surveys and community oral health programs, and can also be used for validation of the more thorough multiple-item questionnaires (Nuca et al. 2007).

The second method for assessing OHRQOL is the use of multiple-item questionnaire or socio-dental indicators. Socio-dental indicators are defined as "evaluation of the level where the oral health status disturbs the functioning social role and gives major behavior changes, such as incapacity of work, attending school or undertaking parental or household duties" (Locker, 1996).

These indicators evaluate the relationship between oral health and QOL using the answers given to specific, multiple-item questions organized in questionnaires. Among these questions, some are based on function, some on pain and discomfort, while others evaluate the self-estimated image of the individual and his/her social contacts. This method attempts to describe specific experiences and to tries to comprise the entire definition of the OHRQOL concept (Nuca et al. 2007).

Many OHRQOL measuring instruments have been developed, some of them are aimed for adults while others are specifically directed for children and are adjusted to suit their understanding capabilities and interests. Examples of the measures directed for children include the Child Oral Impact Daily Performance (CHILD-OIDP) questionnaire which has 9 questions covering the following domains: performance in eating, speaking, oral hygiene, sleeping, appearance, emotions, social contacts (Gherunpong et al. 2004), the Child Oral Health Impact Profile (COHIP) (Broder and Wilson-Genderson, 2007), and the Child Perception Questionnaire (Jokovic et al. 2002). Furthermore, some instruments are directed to a specific age group, Child Oral Health-

Related Quality of Life (COHRQoL) which has three different forms for the age groups from 6 to 7 years, 8 to 10 years and 11 to 14 years (Jokovic et al. 2004).

In some instances where the children are too young or incapable of answering a questionnaire as with the children with special health care needs (CSHCN), measures directed to the parents/caregivers are very useful. Examples of these instruments include the Early Childhood Oral Health Impact scale (ECOHIS) (Pahel et al. 2007) and the Michigan Oral Health-related Quality of Life Scale which has a Child and Parent/Guardian versions (Filstrup et al. 2003). One instrument was found that tackled the parents of CSHCN, it is the Franciscan Hospital for Children Oral Health-Related Quality of Life (FHC-OHRQOL). This tool was developed to describe the children's oral symptoms and daily life problems and the parents' concerns related to oral health for their CSHCN and to examine the effectiveness of oral rehabilitation under general anesthesia at improving OHRQOL, as reported by parents (Baens-Ferrer et al. 2005).

2.4. Dental Caries

Dental caries is among the most common chronic childhood diseases worldwide; people are at risk for developing this disease throughout their lifetime. Caries formation involves a complex interaction over a period of time, which takes place between acid-producing bacteria, fermentable carbohydrate, and many host factors including teeth and saliva (Selwitz et al. 2007).

2.4.1. Dental Caries in Saudi Arabia

In Saudi Arabia caries is still considered a major problem despite all the effort to control the disease. A study done in 2008 by Wyne showed that overall caries prevalence among a sample of 798 preschool children was 74.8%. Another study showed a higher percentage of 93.7% among 12 to 14 year old children in Riyadh (Al-Sadhan 2006).

In 2006 a study by Al-Malik and Rehbini assessing the prevalence, severity, and pattern of dental caries in age 6 to 7-year-old children from military primary schools in Jeddah, Saudi Arabia, found that caries was diagnosed in 96% of the children and only 4% were clinically caries free. They also found that the mean dmft in that group of children was 8.06.

A study on the caries prevalence and its relation to water fluoride levels among school children in the central province of Saudi Arabia, found that caries prevalence in primary school children was 91.2% in both Riyadh and Qaseem. Among the intermediate school children, caries prevalence was higher in Riyadh (92.3%) than in Qaseem (87.9%). They also found no linear correlation between water fluoride level and caries experience in these children (Al-Dosari et al. 2004). In 2002, Wyne et al. found that caries prevalence among Saudi primary school children of Riyadh was 94.4%.

2.5. Gingivitis and Periodontal Disease

Gingivitis is defined as

“an inflammation involving only the gingival tissues next to the tooth”.

The most common form of periodontal disease is marginal gingivitis which could start in early childhood. (McDonald et al. 2004). Periodontitis is the inflammation of the gingiva and deeper supporting tissues of the periodontium characterized by pocket formation and destruction of the surrounding alveolar bone (McDonald et al. 2004). In children, pocket depth may vary due to the natural process of exfoliation and eruption. If the periodontal condition was healthy, the pocket depth may vary between 1 to 2 mm. In the mixed dentition however, it may increase up to 3 mm and then in the permanent dentition the pocket depth generally decreases again to between 1 and 2 mm. Pocket of 5 mm or more indicates periodontal breakdown (Petit and van der Velden 1997).

2.5.1. Gingivitis and Periodontal Disease in Saudi Arabia

In Riyadh, they assessed the oral health status among children of National Guard personnel with ages ranging between 5-12 years and found that Gingivitis was present in 100% of the children and was considered moderate to severe in 14% (Al-Banyan et al. 2000). Also in Riyadh, a study assessing the prevalence of periodontal disease in Saudi children found that among 6 year old children, 59% had a healthy periodontal condition, and 40% had bleeding. And among 9 year old children 42.9% had healthy periodontium, 48.7% had bleeding and 7.8% had calculus. In the 12 year old group, the percentage of children with healthy periodontal conditions was 32%, for children with bleeding it was 52% and for children with calculus it was 16% (Guile et al. 1990).

2.6. Oral Health and OHRQOL

The damage caused by dental caries is not only limited to tooth cavitation, their consequences reach beyond that and could alter the child’s daily life. Severe caries reduce children’s QOL (Sheiham, 2005).

In a study done to investigate the effects of early childhood caries on children’s OHRQOL it was found that children with early childhood caries have significantly lower OHRQOL than children without early childhood caries as assessed both by the children and the parents/ guardians at baseline. The children with early childhood caries who received dental treatment had a significantly improved OHRQOL at the follow-up assessment when compared with their baseline measurement as measured both with the children’s self-ratings of OHRQOL and the parents’/guardians’ perception of their child’s OHRQOL (Filstrup et al. 2003).

A study was conducted on Sudanese schoolchildren to evaluate the OHRQOL using an Arabic-translated version of the Child-OIDP inventory; it showed that a significant relationship, with an average moderate intensity was found between the presence of dental caries and the OHRQOL (Nurelhuda et al. 2010).

In Thailand, a study was conducted assessing the relationship between oral diseases and the OHRQOL in schoolchildren. They found that gingivitis was the most common oral disease; however dental caries was found to affect children's OHRQOL the most. Dental caries impacted on various daily life performances while gingivitis and calculus related to psychosocial aspects in 12-year-olds (Krisdapong et al. 2012).

2.7. Children with Special Health Care Needs (CSHCN) in Saudi Arabia

An individual with a handicap has been defined as

“one who, over an appreciable time, is prevented by a physical or mental condition from full participation in the normal activities of his/her age group, including those of a social, recreational, educational, and vocational nature" (Salako and Jeboda, 1985).

It is estimated that10% of the world's population experience a form of disability or impairment. The number of people with disabilities is growing due to population growth, ageing, emergence of chronic diseases and medical advances that preserve and prolong life. (WHO Disability and Rehabilitation Action Plan, 2006-2011). Among persons with disabilities are those who have long-term physical, mental, intellectual or sensory impairments which when interacting with various barriers may get in the way of their full and effective contribution to society. (UN, 2006).

In Saudi Arabia, under the Labor and Workman Law, article 51, a person with disability is defined as

"any person whose capacity to perform and maintain a suitable job had actually diminished as a result of a physical or mental infirmity".

The Kingdom has focused on person with disability since initiation of its social and economic development plans two decades ago, with the government providing modern and appropriate welfare means for person with disabilities to help them adapt to society, the environment, and life by taking into consideration their intellectual, psychological, physical and livelihood features (Country Profile on Disability, 2002).

Despite the medical statistics compiled by the Ministry of Health for its annual reports, there were no regular and reliable reports on the numbers, types, or geographical distribution of disability (Country Profile on Disability, 2002). It is currently estimated that up to 4% of the population in Saudi Arabia has functional disabilities which limit their independence (Al-Turaiki, 1997). The Profile on Welfare & Disability in the Kingdom of Saudi Arabia. 2000, shows that the percentage of disabilities categorized as congenital and including CP is 35.3% (Country Profile on Disability, 2002).

When studying caries prevalence and treatment needs of medically compromised children in Saudi Arabia, Brown (2009) found that a total of 91.9% of medically compromised children had evidence of caries and a high proportion of them were untreated. Al-Qahtani and Wyne (2004) found in their study on blind, deaf and mentally retarded female children in Riyadh that the caries prevalence and severity in all the three groups of female special children were very high, and the number of children with good oral hygiene was very low.

2.8. Cerebral Palsy (CP)

Cerebral palsy (CP) is the most common form of neuromuscular disability affecting children. As more individuals with CP continue to live in community settings, rather than institutions, and as their life spans increase, dentists will be responsible for providing a continuum of oral health care to this population from childhood and throughout later life (Dougherty, 2009).

Basically, CP is a static encephalopathy with a delayed developmental presentation. It may appear to deteriorate over time, however, changes are actually the result of the problems becoming more obvious as the child grows (Nelson and Ellenberg, 1985). The region of the brain affected or damaged is directly reflected by the consequential disabilities. It is a motor disorder; in addition, it can be associated with developmental disabilities, such as cognitive impairment, depending on the degree of brain damage that has occurred. There is no cure for this lifetime condition, but therapy, education, and technology make the most of each child's potential by improving functional abilities and QOL (Jones et al. 2007).

2.8.1. Definition of CP

The definition of CP has changed through the years, as researchers have increased their knowledge of the disorder in its various permutations. In 2004, an International Workshop on the Definition and Classification of Cerebral Palsy was held, with support from United Cerebral Palsy Research and Educational Foundation, the Castang Foundation, and the National Institute of Neurological Disorders and Stroke. Attendees at this meeting agreed on an updated definition of CP as follows:

"Cerebral palsy (CP) describes a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behavior, and/or by a seizure disorder" (Bax et al. 2005).

2.8.2. Prevalence of CP

CP is a common pediatric disorder occurring in about 2 to 2.5 per 1000 live births (Jan, 2006). Information on the prevalence of CP in Saudi Arabia is limited (Wyne, 2007). In a recent community based study it was found that the prevalence of CP in Saudi Arabia was 2.34 in every 1000 (Al-Salloum et al. 2011). A study of neurological diseases in the eastern province of Saudi Arabia reported a prevalence ratio of 5.3 in every 1000 individuals among the Saudi population (Al-Rajeh et al. 1993). Another study which covered 99,788 live births in a military hospital from the year 1984 to 2003 in Riyadh, the capital city of Saudi Arabia has reported a relatively high CP incidence of 0.41% (Al-Asmari et al. 2006). Anecdotal evidence also suggests that it is one of the most common disabling conditions in Saudi Arabia (Wyne, 2007).

In developing countries the prevalence of CP was found to range between 1.5 to 5.6 cases in every 1000, while it ranged from 2 to 2.5 in developed countries (Abdel-Hamid et al. 2011). In Turkey, the prevalence of CP was determined to be 4.4 per 1000 live births (Serdaroglu et al. 2006), while in China and India the prevalence was ranging from 2 to 2.8 per live births (Gladstone, 2010). In the United States, CP prevalence varied by site, ranging from 2.9 per 1000 8-year-olds in Wisconsin to 3.8 per 1000 8-year-olds in Georgia. The average prevalence of CP across the four sites was approximately 3.3 per 1000 8-year-old children (Kirby et al. 2006).

2.8.3. Etiology of CP

Up to 50% of CP cases have no identifiable underlying etiology. However, the etiologies can be classified according to the timing of the insult as prenatal which is the commonest, natal, or postnatal. Another etiologic classification system depends on the actual cause such as congenital (developmental, malformations, syndromic) or acquired (traumatic, infectious, hypoxic, ischemic, TORCH infections and others) (Jan, 2006).

Congenital brain malformations are among the important known prenatal causes of CP. Other prenatal causes include vascular problems such as, middle cerebral artery occlusion, and maternal infections during the first and second trimesters of pregnancy (rubella, cytomegalovirus, toxoplasmosis). Less common prenatal causes of CP include metabolic disorders, maternal ingestion of toxins and rare genetic syndromes (Reddihbough and Collins, 2003).

Problems during labor and delivery such as obstructed labor, hemorrhage or cord prolapse may compromise the fetus by causing hypoxia. Severe hypoglycemia, untreated jaundice and severe neonatal infection may can also be responsible for the occurrence of CP (Reddihbough and Collins, 2003).

Infections and injuries are the most common causes of postnatal (acquired) CP in developed countries (Reddihbough and Collins, 2003). The introduction of new vaccines will hopefully reduce the numbers of children with meningitis that leads to subsequent neurological sequelae. Accidental injuries such as motor vehicle accidents and near-drowning episodes, and non-accidental injuries may result in CP. Other causes of postnatal acquired CP include apparent life threatening events, cerebrovascular accidents and following surgery for congenital malformations. Meningitis, septicemia and other conditions such as malaria remain extremely important causes of CP in developing countries (Reddihbough and Collins, 2003).

It is important to distinguish between the risk factors and the known causes of the disease. For some children who have CP, there appears to be no particular event but rather, a sequence of events, the caused the motor damage. This has led to the concept of “causal pathways” which are a sequence of interdependent events that culminate in disease (Stanley et al. 2000).

Risk factors may be present before or during pregnancy, during labor and birth, and in the period shortly after birth. The Risk factors that occur before pregnancy could be divided into maternal factors such as, delayed onset of menstruation, irregular menstruation or long inter-menstrual intervals (Torfs et al. 1990), low socioeconomic level (Dolk et al. 2001; Dowding and Barry, 1990), parity of three or more (Topp et al. 1997).

A range of maternal medical conditions is also associated with CP. These include mental retardation, seizure disorders, hyperthyroidism, or with the administration of thyroid hormone and estrogen in pregnancy (Nelson and Ellenberg, 1985). Paternal and sibling factors are rarely reported. Older paternal age is more frequent in those with athetoid/dystonic type of CP (Fletcher and Foley, 1993). Motor deficit in a sibling has been reported as an association with CP in the Collaborative Perinatal Project of the National Institute of Neurological and Communicative Disorders and Stroke (NCPP) (Nelson and Ellenberg, 1985).

Risk factors that occur during pregnancy include preeclampsia. It was found that preeclampsia is associated with an increased risk of CP in term infants (Collins and Paneth, 1998), but this association does not seem to exist in preterm infants (Murphy et al. 1995, Spinillo et al. 1998). Antepartum hemorrhage is found to increase the risk of CP associated with preterm birth, but not to add any further risk (Stanley et al. 2000).

The increased risk of both mortality and CP in multiple births has been known for many years. Multiple pregnancies are associated with preterm delivery, poor intrauterine growth, birth defects and intrapartum complications (Reddihbough and Collins, 2003).

In monochorionic twin pregnancies, death of one twin is recognized as being an important risk factor for the surviving co-twin having CP. The death of one twin may impair the neurological development of the survivor throughout gestation (Pharoah and Cooke 1997). Meta-analysis of four studies has demonstrated that the antenatal death of a co-twin is associated with a six-fold increase in rate of cerebral palsy per twin confinement, or an 11-fold increase in rate per child (Stanley et al. 2000).

Major events can occur during labor that can cause perinatal asphyxia, these include prolapsed cord, massive intrapartum hemorrhage, prolonged or traumatic delivery due to cephalopelvic disproportion or abnormal presentation, a large baby with shoulder dystocia and maternal shock from a variety of causes (Stanley et al. 2000). When considering these factors, it is important to remember that it may not be the event itself that is the causal factor, but rather that the event is simply associated with one or more true causal factors (Reddihbough and Collins, 2003). Substantial evidence has recently emerged that intrauterine exposure to infection, particularly chorioamnionitis, in the latter stages of pregnancy and during labor, is a strong risk factor for CP, particularly in preterm infants (Murphy et al. 1995; Nelson and Willoughby, 2000; Walstab et al. 2002).

The accessibility to neonatal intensive care units and high technology diagnostic procedures has led to the increased survival of premature infants, in some of whom CP later becomes apparent. Fertility treatments, including in vitro fertilization, have also elevated the number of premature children being delivered (Reddihbough and Collins, 2003).

CP risk increases with decreasing birth weight (Murphy et al. 1995). Birth weight is dependent on both gestational age at delivery and intrauterine growth. The risk of CP increases with decreasing age at delivery, and the length of gestation is the strongest determinant of CP (Stanley et al. 2000). The high numbers of low birth weight infants with CP may be due to their survival and subsequent development of brain damage from complications of their immaturity such as intraventricular haemorrhage. Alternatively, these children may have been damaged before birth and the same influences that damaged them may also have been the cause of their preterm birth (Reddihbough and Collins, 2003).

Reported risk factors in the preterm infant include patent ductus arteriosus, hypotension, blood transfusion, prolonged ventilation, pneumothorax, sepsis, hyponatremia, total parenteral nutrition, seizures, and parenchymal damage with appreciable ventricular dilatation detected by cerebral ultrasound. Neonatal seizures, in particular, are strongly associated with the risk of cerebral palsy (Murphy et al. 1997).

The incidence of several brain based developmental disabilities including CP is higher in males than females (Tioseco et al. 2006). A recent analysis of a large European dataset of 4500 children with CP, including both term and preterm births, found that the incidence of CP was 30% higher in males than females (Jarvis, 2005). This study also showed that the likelihood of more severe CP was greater at the extremes of birth weight, with the risk of severe CP increased almost fourfold for male infants with birth weights at the 97th centile and 16 times higher for male infants at the 3rd centile. In another recent report on the incidence of neurological and developmental disability after extremely preterm birth, it was found that males had a significantly increased incidence of severe disability, CP, and low scores for cognitive functioning at 6 years of age (Marlow, 2005).

2.8.4. Classification of CP

Conventional classification schemes for CP have focused principally on the distribution and pattern of affected limbs (for example hemiplegia or diplegia or paraplegia) with an added modifier describing the predominant type of tone or movement abnormality (e.g. spastic or dyskinetic), but it has become apparent that additional characteristics must be taken into consideration for a classification scheme to contribute substantively to the understanding and management of this disorder (Bax et al. 2005).

Classification often requires making difficult decisions about where to draw the borders within ordinal or quantitative measures. Some degree of arbitrariness is inevitable. Assignment of individuals with the diagnosis of CP to distinct clinical groups is not simple and will differ depending on the characteristic(s) chosen as the foundation for classification. No one single approach has emerged as definitive; depending on the purpose of the classification, certain characteristics or combinations of characteristics may be more useful than others. For example, in assessing the effectiveness of a new treatment for a specific type of tone abnormality, the nature of the motor disorder and the level of functional motor ability are likely to be paramount, whereas determining service delivery needs will require the consideration of associated impairments. (Bax et al. 2005).

The Developmental Medicine & Child neurology 2005 proposed a classification with four major dimensions:

Motor abnormalities:

a. Nature and typology of the motor disorder: The type of abnormal resting muscle tone or involuntary movement disorder observed or elicited is usually assumed to be related to the underlying pathophysiology of the disorder, and may also reflect etiological circumstances. Individuals with CP have traditionally been grouped by the predominant type of motor disorder, with a ‘mixed’ category available in those cases when no one type dominates. This strategy has been adopted by the classification system described in the Reference and Training Manual of the Surveillance of CP in Europe (SCPE), which divides CP into three groups based on the predominant neuromotor abnormality: spastic, dyskinetic, or ataxic, with dyskinesia further differentiated into dystonia and choreoathetosis. Any additional tone or movement abnormalities present should be listed as secondary types. The term ‘mixed’ should not be used without elaboration of the component motor disorders.

b. Functional motor abilities: The World Health Organization International Classification of Functioning, Disability and Health, along with several other recent publications, has sensitized health professionals to the importance of evaluating the functional consequences of different health states. The functional consequences of involvement of the upper and lower extremities should, therefore, be separately classified by using objective functional scales. Bulbar and oromotor difficulties are common in CP and can produce important activity limitation, but there is as yet no activity limitation scale for such functions. A high priority in research is to develop a scale for speech and pharyngeal activity limitation in CP. In the meantime, the presence and severity of bulbar and oromotor involvement should be recorded. Although activity limitation is important, the extent to which motor disorders affect the ability to participate in desired societal roles is also an essential consideration. However, at present the evaluation of participation restriction (formerly termed ‘handicap’) in CP is not well developed, and reliable categorization of children on the basis of this aspect of daily life is, therefore, not yet possible (Bax et al. 2005).

Associated impairments:

In many individuals with CP, other impairments interfere with the ability to function in daily life and may at times produce even greater activity limitation than the motor impairments that are the hallmark of CP. These impairments may have resulted from the same or similar pathophysiological processes that led to the motor disorder, but they nonetheless require separate enumeration. Examples include seizure disorders, hearing and visual problems, cognitive and attentional deficits, and emotional and behavioral issues. These impairments should be classified as present or absent; if present, the extent to which they interfere with the individual’s ability to function or participate in desired activities and roles should be described (Bax et al. 2005).

Anatomic and radiological findings:

a. Anatomic distribution: The pattern and extent of the motor disorder in CP with regard to different anatomic areas should be specified. Previous classification schemes included only the extremities and required a subjective comparison of severity in the arms and the legs. Notably missing from current anatomic classification schemes is a description of truncal and bulbar involvement. It is clearly important to distinguish unilateral from bilateral motor involvement, and categorization based on this distinction has good reliability. However, even this distinction can be blurred because many children with primarily unilateral CP may also have some degree of motor involvement on the opposite side and some children with primarily bilateral involvement may have appreciable asymmetry across sides.

b. Radiological findings: Until recently, correlations between radiographic findings and clinical presentation in CP were weak. However, advances both in imaging technology and in quantitative motor assessments are changing this picture. The goal of categorizing all patients on the basis of specific radiographic findings will require more development before implementation, but in agreement with the recommendation of the American Academy of Neurology neuroimaging findings should be obtained on all children with CP whenever feasible (Bax et al. 2005).

Causation and timing:

It is increasingly apparent that CP can result from the interaction of multiple risk factors, and in many cases no identifiable cause can be found. Therefore, although every reasonable effort should be undertaken to investigate causes or causal pathways, clear-cut categorization by cause is unrealistic at the present time. Timing of insult should be noted only when reasonably firm evidence indicates that the causative agent, or a major component of the cause, was operative in a specific time window. Although recording adverse events in the prenatal, perinatal, and postnatal life of a child with CP is recommended, clinicians should avoid making the assumption that the presence of such events is sufficient to permit an etiological classification that implies a causal role for these events in the genesis of CP in the affected individual (Bax et al. 2005).

2.8.5. CP and Mental Retardation

Cognitive impairment is not a feature found in all children with CP. However, there is a relationship between the severity of CP and the degree of mental retardation. Children with spastic quadriplegic CP have greater degrees of mental retardation than children with spastic hemiplegia (Russman and Ashwal, 2004). It is estimated that more than 50% of these individuals have some level of intellectual disability. Much lower rates are observed in individuals who have ataxic and dyskinetic forms of CP. Prevalence rates of intellectual disability in these groups are estimated in the range of 20% to 30% (Dougherty, 2009). Other factors associated with increased cognitive impairment include epilepsy and cortical abnormalities seen on neuroimaging (Jan, 2006).

2.8.6. CP and Epilepsy

It is estimated that up to 36% of children with CP have epilepsy, with onset in the first year of life found in 70% (Zafeiriou et al. 1999). Focal seizures with or without secondary generalization are the most common with frequently focal Electroencephalography (EEG) abnormalities (Jan, 2002). Epilepsy may be an indicator of the severity of neurological damage as in quadriplegic CP, or cortical insult as in hemiplegic CP (Fennel and Dikel 2001). Children with spastic diplegic CP are at a lower risk for epilepsy mainly because their pathology mostly involves the periventricular white matter (Jan 2006).

2.8.7. Manifestations and Complications Associated with CP

Children with CP may well suffer from feeding, nutrition and growth problems. About 30% are undernourished, and many show reduced linear growth below the third percentile (Eltumi and Sullivan 1997). Although growth delays appear to be multifactorial in origin, the leading cause appears to be poor nutrition secondary to pseudobulbar palsy. This is an upper motor neuron disorder resulting in poor coordination of sucking, chewing, and swallowing. In addition, gastroesophageal (GE) reflux results in regurgitation, vomiting, and possible aspiration. GE reflux can be a source of pain and food refusals in the difficult-to-feed child. Early nasogastric (NG) or gastrostomy tube (GT) feedings can be solutions to these problems with improved growth and greater family satisfaction (Stevenson et al. 1995). NG tube feeding can be used for short-term nutritional support. However, on a long-term basis, NG feeding is not socially acceptable and can be associated with nasal discomfort, sinusitis, irritation of the larynx, and recurrent tube blockage or displacement. Surgically placed GT provides a long-term solution to the feeding disorder in conjunction with treating the associated GE reflux (Eltumi and Sullivan 1997).

Constipation is a common problem in children with CP. It results from multiple factors, those includ poor feeding, reduced water intake and immobility. The long-term solution for this problem involves increased consumption of water, juices, fruits, and vegetables. Initiating bowl evacuation is recommended and requires a combination of laxatives and enemas or suppositories. Afterward, a schedule of softening agents such as artificial powdered fiber with dietary modifications can result in more regular and softer bowel movements(Jan, 2006). Sitting on the toilet daily after the main meal takes advantage of the gastro-colic reflex and may be further encouraged occasionally using glycerin suppositories (Dormans and Pellegrino 1998). With effective bowel management programs, many children can attain reasonably regular bowl movements (Jan, 2006).

Drooling is another common problem found in 30% children with CP (Siegel and Klingbeil 1991). It is not usually related to increased production of saliva unless an irritating lesion is present, such as dental caries or throat infection. Drooling is usually due to mouth opening and/or swallowing difficulties due to pseudobulbar palsy (Jan, 2006). It is may not be socially acceptable and can lead to aspiration, skin irritation, and articulation difficulties (Siegel and Klingbeil 1991). Management of this difficult problem is not very helpful. Anticholinergic medications, such as glycopyrrolate, decrease salivation by blocking parasympathetic innervation. Side effects of this drug include irritability, sedation, blurred vision, and constipation (Toder, 2000). Scopolamine is another anticholinergic agent that is available as a skin patch (Jan, 2006). Surgical re-routing of salivary ducts is an option, but may lead to increased aspiration (Toder, 2000). Recent studies suggest that botulinum toxin injection into the parotid and submandibular glands may be an effective in reducing excessive drooling (Bothwell et al. 2002).

Other manifestations of CP include sleep disorders which are common particularly in children who have visual impairment, occurring in up to 50% of cases (Jan, 2000). These children often have disturbed sleep patterns with fragmented sleep and frequent nocturnal awakenings, which is highly troublesome for parents. Medications that improve the sleep-wake cycle may also decrease spasticity and improve daytime behavior (Jan, 2000: Tanaka et al. 1997). Hypnotics are generally effective for short periods but lose their effect in a few days due to tolerance. Melatonin is a recently developed natural compound with a phase setting effect on sleep. It is the hormone of darkness as the detection of darkness by visual receptors drives the hypothalamus to stimulate the pineal gland via sympathetic pathways to increase melatonin secretion (Jan, 2000). Visual impairment weakens the ability of the child to perceive and interpret the multitude of cues for synchronizing their sleep with the environment. This makes these children susceptible to circadian sleep-wake cycle disturbances. Up to 80% of children had a dramatic response to a 3-mg melatonin dose at bedtime with a reduction in delayed sleep onset, nocturnal awakening, and early arousals. The drug has minimal side effects and no tolerance or dependence (Jan, 2006).

Children with CP, mainly preterm infants, are at increased risk for visual impairment, including retinopathy of prematurity, myopia, strabismus, glaucoma, and amblyopia (Menaker and Batshaw 1997). If not diagnosed and managed early, visual deficits can interfere with developmental progress and rehabilitation. Screening for this problem is recommended and it includes acuity, eye movements, and fundoscopy. (Jan, 2006).

Hearing may also be affected in children with certain CP. Etiologies as Kernicterus, post-meningitis, and congenital rubella, increase the risk for hearing loss. If not diagnosed and treated early, hearing loss can interfere with developmental progress and rehabilitation, thereby contributing further to developmental delays. Screening is recommended, including behavioral audiometry, auditory-evoked brainstem responses (ABR), or transient evoked otoacoustic emissions (Jan, 2006).

2.8.8. CP and Oral Health

In Riyadh, Al-Hammad and Wyne conducted a study on the caries experience and oral hygiene status of children with CP, they divided their sample into three groups according to age. The first group was 3-6 years old and had a mean dmfs score of 18.8. The second group was 7-9 years old and had a mean DMFS score of 23.4, and the last group was 10-12 years old and had a mean DMFS score of 20.5. In all the groups the highest component was the decayed. They concluded from this study that caries experience of CP children in Riyadh was very high, and that very few of these children have good oral hygiene (Al-Hammad and Wyne 2010).

A study done in China found that there was a significant difference in the gingival health status between preschool children with and without CP. The children with CP had higher plaque and gingival index scores, however, the caries experience was found to be similar between the 2 groups (Du et al. 2010).

A Brazilian study assessed the prevalence of untreated dental caries in children with CP; they found that the proportion of children that presented at least one tooth affected by untreated caries was 49.5 % (De Camargo and Antunes, 2008). Another Brazilian study found significantly higher decayed, missing, and filled tooth surfaces scores in children who had CP when compared with a control group of children who did not have disabilities. The investigators of this study also noted that the children who had CP had higher plaque indexes, food residue, and rates of mouth breathing than the control group. This could help account for the higher caries rate (Rodrigues dos Santos et al. 2003).

Pope and Curzon did not find significant differences in the levels of decayed, missing, and filled teeth between children who had CP and a control group of children who did not have disabilities. However, they did find that the children who had CP had more untreated decay than the nondisabled children, indicative of difficulties people who have disabilities often have in accessing care. They also found that the oral hygiene and gingival health were worse in the study group (Pope and Curzon, 1991).

2.9. CP and the OHRQOL

Very few studies concerning the assessment of OHRQOL in children with CP were found. In one study from Hong Kong, assessing the HRQOL and OHRQOL of preschool children with CP, it was found that they both were significantly more compromised among children affected by CP than for preschool children without CP, highlighting the effects that CP has on general and oral health (Du et al. 2010).

A study was conducted in 2005 comparing the parental perception of OHRQOL in CSHCN before and after complete dental rehabilitation under general anesthesia. They found that Family caregivers of CSHCN report a variety of oral symptoms, daily life problems, and concerns attributable to their child’s oral health that impact the child’s and family’s QOL. In addition, they found that oral rehabilitation under general anesthesia is effective at minimizing or alleviating symptoms, problems and concerns and improving QOL for CSHCN and their families. (Baens-Ferrer et al. 2005)

In Saudi Arabia a study was conducted assessing the oral health knowledge of parents of Saudi children with CP, the found that the overall oral health knowledge and attitude of parents of children with CP was satisfactory (Wyne, 2007).

In order to help children with CP achieve better OHRQOL we must have the adequate information regarding their status and needs, and due to the small amount of research done in Saudi Arabia in this area, this study aims to assess the parental perception of the OHRQOL in children with CP and to compare this to an examination findings.

Chapter III

Aim of the Study

The purpose of the present study is to:

1. Assess the parental perception of the OHRQOL in a group of children with CP in centers for CSHCN in Jeddah, Saudi Arabia.
2. To compare the parental perception of the OHRQOL of children with CP with that of normally developing children in the control group.
3. To assess the oral health status of children with CP and compare it with that of normally developing children in the control group.
4. To compare the oral health status of children with CP with the parents’ estimation of the children’s OHRQOL.

Chapter IV

Materials & Methods

4.1. The Study Design

The Study was a case- control design; it involved a group of children with CP acting as the cases, and a group of normally developing children acting as controls. The aim of the study was to compare between the two groups in relation to their oral health and their parents' perception of the children's OHRQOL. The oral health was assessed by conducting a brief oral examination of the teeth, gingiva and the oral hygiene. The OHRQOL was measured using the Franciscan Hospital for Children Oral Health-Related Quality of Life (FHC-OHRQOL) questionnaire (Baens-Ferrer 2005).

4.2. Ethical Considerations

The research was approved by the Research Ethics Committee of the Faculty of Dentistry in King Abdul Aziz University (Appendix 1). The nature of the study was explained to the parents through the informed consent that was sent to them; in case of agreement they were requested to sign the written consent and provide their phone number. Further explanation was provided during the telephone interview. In addition, a brief report on the child's oral health during the telephone interview was provided and the parents were free to ask any questions related to their child's oral health. Upon request, parents were also provided with a simplified written form explaining briefly their child’s oral health status and treatment needs. After the interview, the examination form and questionnaire form of each child received a code number and names were omitted to ensure secrecy and privacy.

4.3. The Study Location and Duration

The study took place at eight centers of disability one of which was a public center and the rest were private. And for the control group, it took place at five elementary schools two of which were public and the remaining three were private. All centers and schools were in Jeddah, Saudi Arabia. The research required multiple visits to the included centers and schools in order to get the necessary data. The work took place at the beginning of the second year of the master program and was continued throughout the rest of that year and the following year (total 2 years).

4.4. The Sample

4.4.1. Study Group (CP Group)

The study group targeted children with CP, who are enrolled in centers for rehabilitation of CSHCN in Jeddah. In order to obtain the study group, an estimate of the number of children suffering from CP, who are currently attending centers for CSHCN in Jeddah, KSA was obtained by using a directory of the private and public centers in Makkah region issued in 2009 by king Abdullah bin Abdul-Aziz Disabled Children Association. The directory listed 32 centers that received children with CP (Appendix 2).

Of the 32 listed centers, some were excluded from the research according to the inclusion and exclusion criteria.

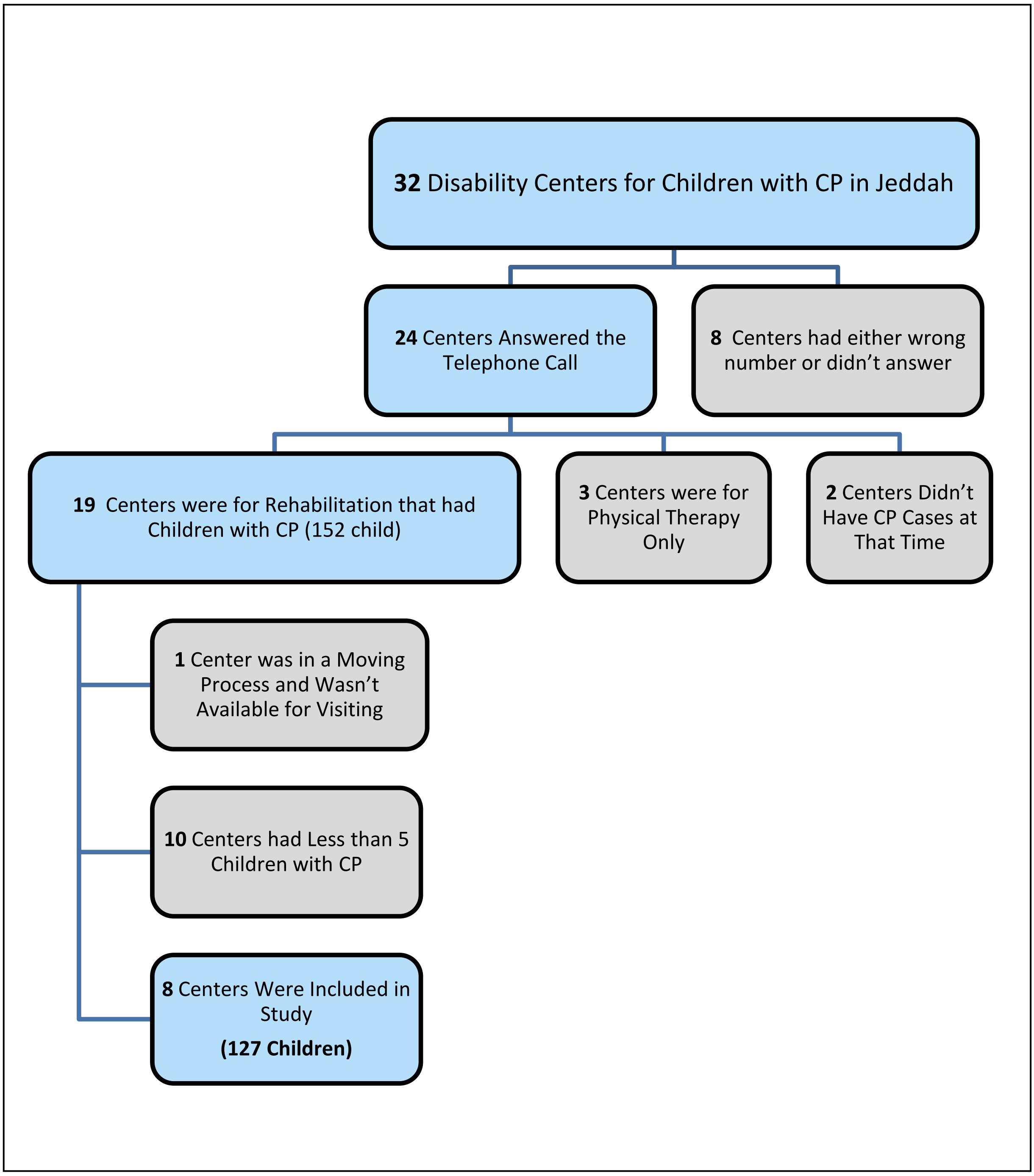
The inclusion criteria for the centers were:

1. Center must provide a full rehabilitation program.
2. Center must have at least 5 children with CP at the time of the research.

The exclusion criteria for the centers were:

1. Centers that provided wrong contact information.
2. Centers that were unwilling to participate in research work.
3. Centers that reported poor parental cooperation in research work.
4. Centers that had less than 5 children meeting the inclusion criteria.
5. Centers that provided physical therapy only and not a complete rehabilitation program.

A total of 24 centers for CSHCN were contacted, the remaining 8 either didn't answer, or provided a wrong number. Of those 24, only 19 centers provided full rehabilitation programs while the others either provided physical therapy only or didn't have CP cases at the time of the research. Of the 19 centers, 8 centers with a total f 127 children were included in the study based on inclusion criteria. One of those was a public center and the remaining 7 were private centers (Appendix 3). The 8 centers that were chosen received an official letter from the Faculty of Dentistry in King Abdul Aziz University explaining briefly the aims of the research and requesting their cooperation. The letter was delivered personally by the researcher to ensure proper understanding and agreement. After they have agreed to participate a number of consent forms were sent to the center and they were requested to distribute them to all the children that meet the research criteria. The total number of the children who received the consent forms and questionnaires were 127 children with CP. Figure 4.1 demonstrates the sampling process in the CP group.



*Grey boxes were excluded from the sample.

Figure 4.1: The process of collecting the sample for the CP group.

4.4.2. Control Group

This group included normal developing children recruited from regular private and public elementary schools for boys and girls, all fulfilling the same inclusion criteria of the CP group except for having any mental or physical disability.

The schools for the control group were randomly selected from the same areas of the included centers for disability which were concentrated in the center and northern regions of the city. This was done to ensure that a similar socioeconomic level will be found in the CP and control group. Lists of the schools on those areas were obtained and five schools were selected, three private (1 for girls and 2 for boys) and two public (1 for girls and 1 for boys) schools. Two private boys' schools were selected because the first school provided very poor response. Consequently, another school had to be selected and that school received a higher number of consent forms to overcome the deficiency.

A letter from Faculty of Dentistry in King Abdul Aziz University was delivered to the chosen schools explaining briefly the aim of the research and requesting their cooperation. Letters were delivered personally by the researcher to ensure proper understanding and agreement. When the chosen schools agreed to participate, 40 children in the requested age group were randomly selected from the 6 levels of elementary school using the students' names lists. Because one of the boys' private schools obtained additional amounts of consents, a total of 320 children received consent forms.

4.5. The Study Protocol

After an adequate amount of consents forms were distributed to each center and school, the centers and schools were followed up by telephone to inquire about the number of returned consent forms. When most of the children in that center had parental consents, a date was set for the examination visit. Examinations were conducted by three calibrated examiners in the centers/schools. All examination findings were recorded on a pre-designed form. After the examination, a copy of the questionnaire was sent to the parents with the child in order for them to answer the visual analogue scale (VAS) part of the questionnaire and to have an idea about the questions before the telephone interview. The next step was the telephone interview to fill out the questionnaire. This was accomplished by 2 investigators who called the numbers provided in the consent form in order to interview one of the parents and fill out the questionnaire with them.

4.6. Pre-Test Survey

The FHC-OHRQOL instrument was published in English, and was translated by the researcher to Arabic in order for it to be applicable for use in our society. Prior to the use of the Arabic-translated version of the FHC-OHRQOL questionnaire, a pre-test survey was conducted to test the response of parents and to ensure proper understanding and comprehension of the questions. A sample of eight children with CP who were attending in the university hospital pediatric neurology clinic was selected from the waiting area. The mothers were interviewed by the examiner to fill out the questionnaire while they were waiting for their appointment. The response to the questionnaire was good and no alterations were required.

4.7. The Consent Form

The participants found eligible to enter the study were required to fill out a consent form. This form explained briefly the aim and methods of the research they are about to participate in and the value of this work for the future of dental care of children with disability. It also insured complete secrecy of private information and the freedom to withdraw when ever participating becomes inconvenient.

In that form the parent had to provide the name, age, name of center or school and whether the child has any medical problems. They were also requested to provide their name and how they are related to the child. Contact information was required in the form of a telephone number (land line or mobile) and the preferred time for calling. No participants were included in the study before an informed consent form was signed by their parents. All the data was presented in the study except for the identity of the participants (Appendix 4, 5).

4.8. The Questionnaire

The questionnaire that was used in this research constituted of four parts. The first three parts were pre-structured by the researcher based on a thorough review of the literature, and the fourth part was the Franciscan Hospital for Children Oral Health-Related Quality of Life (FHC-OHRQOL) questionnaire (Baens-Ferrer 2005).

4.8.1. Demographic Data (Form A)

The first part of the questionnaire (Form A) contained a set of questions concerned with the demographic data (Appendix 7). Parents had to provide the name, date of birth, gender, telephone number (mobile and land line), number of siblings, the order of the child in the family whether first, second, third or more, both parents' education level, and whether the mother is working or not. The education level choices were college, diploma, school or illiterate. The aim of these questions was to inquire about the child's family and their socioeconomic level.

4.8.2. Medical History (Form B)

The second part was concerned with the medical history (Form B) and it contained a list of common medical conditions where parent had to check (Yes) if the child suffers from that problem or (No) if not. Children with seizures were not excluded from the study. Two more questions were added also, the first one asking if the child takes medication on regular basis and if he does the names should be mentioned. The second was regarding previous hospitalization and the reason for it. This was mentioned to know if any of the children had dental treatment done for them under GA, or if they have had tonsillectomy and adenoidectomy (Appendix 7).

Questions on the medical history of the child are important to rule out any other medical condition. It is also essential for the researcher to know if medication is being taken on regular basis because some of those medicines contain sugar and this may affect the caries level of the children who are taking those medications (Siqueira et al. 2007).

4.8.3. Dental History (Form C)

The third part was concerned with the oral and dental history of the child (Form C) and it included eight multiple choice questions where the parent had to choose one of the presented answers (Appendix 8). The first question was on the number of dental visits, whether the child went once, twice or more, or never visited the dental office in his life. The reason for those visits whether it was due to pain or as part of a comprehensive treatment plan or just for regular check up was the second question. The third question was about the frequency of sugar consumption, the fourth was about the frequency of brushing. The fifth was about and supervision of brushing, whether the child brushes unsupervised, or whether the parent brushes or only supervises the child while brushing or whether someone else supervises the brushing. The last three questions were (Yes or No) questions asking whether the child practiced any of the following habits: food pouching while eating, mouth breathing or tooth grinding.

4.8.4. The FHC-OHRQOL (Form D)

The fourth and last part of the questionnaire consisted of the Franciscan Hospital for Children Oral Health-Related Quality of Life (FHC-OHRQOL) questionnaire (Baens-Ferrer 2005). This questionnaire was originally used by its founders to describe the symptoms, daily life problems and parental concerns related to oral health for children with special health care needs, and to examine the effectiveness of oral rehabilitation under general anesthesia at improving quality of life. It consisted of four sections. Section-I titled “child’s oral problems/symptoms consists of fifteen items in which caregivers were asked to rate their child’s current oral problems/symptoms including: spontaneous toothache, pain with hot or cool foods, pain with chewing, bad taste or bad breath, pain with sweets, bleeding with brushing or flossing, pain for no reason, broken teeth, dry mouth, painful bleeding gums, mouth sores, mouth blisters, swelling of the face, sore jaw, and headaches.

Section-II titled, “your child’s daily life,” contained 13 items in which caregivers were asked to rate the impact of their child’s current oral health on their daily life (i.e. “does your child have difficulty getting to sleep because of tooth/mouth pain?”). The items in this section were: difficulty eating, acts irritable, refuses certain foods, difficulty getting to sleep, wakes up from sleep, acts aggressive, difficulty paying attention, behavior trouble, avoids meeting people, misses school, experiences jokes about teeth, avoids smiling because of ugly teeth and avoids smiling because of missing teeth.

Section-III titled “parental concerns” consisted of 9 questions related to parent/caregiver concerns about their child’s oral health (i.e. “how often do you feel worried about your child’s teeth or mouth interfering with their eating and nutrition?”). The items in this section were: eating and nutrition, anger about oral problems, schoolwork and attendance, missing sleep, parent missing work, change family plans, disrupt family life, unfinished chores and interferes with friendships.

In these three sections, each item was rated on a 4-point scale: never (0); hardly ever (1); some of the time (2) or all of the time (3).

In section-IV, a 13-cm visual analog scale (VAS) was used for each of 4 questions to assess parent’s perceptions of their child’s oral well-being and QOL. The questions were:

1. What is your opinion of the appearance of your child’s teeth and mouth?
2. How do you think your child’s oral health is compared to other individuals of the same age?
3. How do you feel about your child’s overall oral well-being?

4. How would you rate your child’s overall QOL?

The VAS was constructed with “excellent” and “poor” at the ends of the scale and “good” in the center for questions 1, 3, and 4. For question 2, the VAS was anchored with “better than others his/her age” and “much worse than others his/her age” with “about the same as others his/her age” in the center (Appendix 9). Parents were instructed to mark the answer on the copy of the questionnaire that was provided for them after the examination and to return it with the child the next day.

The FHC-OHRQOL had to be translated to Arabic in order to be used in this research; translation was done by the researcher (Appendix 10), unfortunately, due to the time limit, this translation could not be verified by testing, in order to overcome this, it was administered through telephone interview to ensure proper understanding by parents. These interviews were separately conducted by two interviewers. However, in order to avoid any ambiguity about any item on the questionnaire, a clear, mutual understanding of all items by the two interviewers was necessary.

4.9. The Examination

The examinations of children were conducted by three calibrated examiners (two females and one male) and were held in the schools and/or centers of the children. The help of a male examiner was needed only in the elementary schools for boys due to school restrictions.

Several calibration sessions were held and the three examiners were trained to achieve agreement in order to ensure standardization of the examinations. A flash light was used to provide better visibility; disposable mirrors and gauze were used to facilitate the examination. Gentle physical restraints including mouth props or assistant holding the child’s head were sometimes used with children who were unable to provide adequate cooperation or those with excessive bodily movements. All the examination findings were recorded on a pre-designed form (Appendix 11). Extra-oral findings like scars and bruises were recorded on that form along with any obvious intra-oral findings such as abscesses, or intra-oral lesions. Dental caries, plaque, calculus and oral hygiene were also recoded.

4.9.1. Dental Health

The DMFT/dft was measured to determine the dental health; only missing permanent teeth were recorded, primary missing teeth were not recorded to avoid the misleading effect of exfoliation. Dental caries were diagnosed visually after drying and removing of debris from the teeth using a piece of gauze. The caries levels were categorized according to the WHO classification as very low (0-1.1), low (1.2-2.6), moderate (2.7-4.4), high (4.5-6.5) or very high (>6.6) (WHO 1997).

4.9.2. Gingival Health

In assessing the gingival health, no probing or pocket depth measurement was conducted due to the difficult behavior of the children with CP and to ensure the safety of the child and examiner during the examination process. The gingiva was examined and the Visual Periodontal Index was used to assess the health status of the gingiva. This index was constructed to be used as a visual screening instrument that can be administered by a school nurse or health care worker. It provides them with defined criteria to identify students with severe gingival inflammation in order for them to refer them to the dentist for further examination and treatment. (Cappelli and Brown 2002).

The scoring of the of the Visual Periodontal Index went as follows: (0) if the gingival tissue was healthy, appearing pink and firm; (1) if there was swelling and redness of the gingiva next to the tooth surface(s) either localized or generalized; (2) the gingival tissue appears bright red, gross loss of contour (form), and/or visible bleeding along gum margin (Cappelli and Brown 2002). Each child was given a score accordingly representing their gingival health status.

4.9.3. Oral Hygiene

Oral hygiene was recorded using Green and Vermilion’s Simplified Oral Hygiene Index (OHI-S) (Greene and Vermilion 1964). The OHI-S differs from the original Oral Hygiene Index (OHI) in the number of the tooth surfaces scored (6 rather than 12), the method of selecting the surfaces to be scored, and the scores, which can be obtained. The criteria used for assigning scores to the tooth surfaces are the same as those used for the OHI.

The OHI-S, like the OHI, has two components, the Debris Index and the Calculus Index. Each of these indices, in turn, is based on numerical determinations representing the amount of debris or calculus found on the preselected tooth surfaces. The six surfaces examined for the OHI-S are selected from four posterior and two anterior teeth. In the posterior portion of the dentition, the first fully erupted tooth distal to the second bicuspid (15), usually the first molar (16) but sometimes the second (17) is examined. The buccal surfaces of the selected upper molars and the lingual surfaces of the selected lower molars are inspected. In the anterior portion of the mouth, the labial surfaces of the upper right (11) and the lower left central incisors (31) are scored. In the absence of either of these anterior teeth, the central incisor (21 or 41 respectively) on the opposite side of the midline is used.

When scoring the debris, (0) was given when no debris or stain are present, (1) when there is soft debris covering not more than one third of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered, (2) when the soft debris is covering more than one third, but not more than two thirds, of the exposed tooth surface, and (3) when soft debris were covering more than two thirds of the exposed tooth surface (Green and Vermilion 1964).

For scoring the calculus, (0) was given when no calculus was present, (1) when calculus was found covering not more than third of the exposed tooth surface, (2) calculus is covering more than one third but not more than two thirds of the exposed tooth surface, and (3) when it is covering more than two third of the exposed tooth surface (Green and Vermilion 1964).

The indicated teeth were examined visually, and the amounts of debris or calculus were recorded separately in the examination sheet. Oral hygiene was considered good when the score was from 0-0.9, fair if the score was from 1-1.9 and poor if the score was >2 (Oredugba and Akindayomi 2008).

In the centers for disability, upon the teachers’ request, the examinations were sometimes conducted in the class rooms. They said that children cooperated better when they were among their friends and in a familiar environment, which was found to be true in most cases. Otherwise, the child would be brought to a different room (the nurse room and the physical therapy room were the most commonly used) that had a reclining chair or a bed to facilitate the examination. A nurse or a teacher accompanied each child to assist in communication and restraint. In the elementary schools, the examinations were always held in a different room and never in the classroom.

A simplified report of the child's oral health according to the findings of the conducted examination was provided upon request.

4.10. Withdrawal and Dropout

Participants were free to withdraw from the study at any time, and were registered as a dropout if absent or unable to come for examination; the reasons for their absence were stated in their forms.

4.11. Statistical Analysis

All data were entered in the SPSS version 18, and the inferential statistical tests carried out were: the independent t-test for equal variance, the Welch's test for unequal variance, and the Chi square test to determine relationships between the variables. The Pearson correlation test was used to determine the correlation between the examination findings and the OHRQOL questionnaire and to determine the intra-examiner reliability. The Cronbach alpha was used for measuring the inter-examiner reliability. Significance was set at $p < 0.05$.

Chapter V

Results

This study was a case-control design and it included two groups of children with ages ranging from 6 to 12 years. The first group was the group of children suffering from CP (CP group). The children in this group were recruited from 8 centers for disability in Jeddah, Saudi Arabia, 1 of which was a public center while the remaining were private. From all the centers included in the study 63 children consented and were included in the study (38 from the private centers, 25 from the public center).

The second group was the control group which consisted of 99 children recruited from public (44 children) and private (55 children) elementary schools for boys and girls in Jeddah, Saudi Arabia.

5.1. Reproducibility of Intra-Oral Indices

To assess intra-examiner and inter-examiner reliability for recording DMFT, 10 full arch teeth were examined by three examiners. The same teeth were examined a week later. The intra-examiner reliability was determined using the Pearson correlation test and it was 0.997 (p= 0.000). For the inter-examiner reliability the Cronbach's alpha was used and it was 0.999 indicating strong agreement.

To assess inter-examiner reliability for recording the gingival condition and the oral hygiene, 10 participants were examined by the three examiners using the Visual Periodontal Index criteria and the OHI-S respectively. The inter-examiner reliability was determined using Cronbach's alpha was used and it was 0.998 for the Visual Periodontal Index and 0.997 for the OHI-S also indicating strong agreement.

5.2. Response Rates

Table 5.1 demonstrates in detail the response of the centers for CSHCN both private and public. The response rates in the CP group were similar between the private and public centers with the average of 52%.

Table 5.1: Response rates of centers for CSHCN in the CP group.

Center	Number Sent	Number Returned	Response Rate (%)	Number Examined	Number Completed	Response Rate (%)	Number of Boys	Number of Girls
CP Group								
Public Center*								
Center 1	46	25	54.3	25	25	54.3	11	14
Private Centers**								
Center 1	30	14	46.7	14	14	46.7	8	6
Center 2	10	4	40	3	3	30	1	2
Center 3	10	5	50	5	5	50	2	3
Center 4	5	2	40	2	2	40	1	1
Center 5	9	6	66.7	5	5	55.6	4	1
Center 6	5	2	40	2	2	40	2	0
Center 7	12	8	66.7	7	7	58	1	6
Total	**127**	**66**	**51.9**	**63**	**63**	**49.6**	**30**	**33**

*Disabled Children's Association.

1. **Help Center.
2. **Eithar Center for Rehabilitation.
3. **I Will Be Center for Special Needs.
4. **Jeddah's Special Needs Center.
5. **Nojoud Center for Special Needs.
6. **Al-Hanan Center.
7. **Badghish Rehabilitation and Care Center.

Table 5.2 demonstrates in detail the response rates of each school in the control group, both private and public. In the control group, the average response rate of the private and public elementary schools was 34.4%.

Table 5.2: Response rates of schools in the control group.

School	Number Sent	Number Returned	Response Rate (%)	Number Examined	Number Completed	Response Rate (%)
Control Group						
Public Schools						
Boys	40	27	67.5	22	19	47.5
Girls	40	25	62.5	25	25	62.5
Private Schools						
Boys	200	42	21	40	40	20
Girls	40	16	40	16	15	37.5
Total	**320**	**110**	**34.4**	**103**	**99**	**30.9**

5.3. Demographic Data

Table 5.3 demonstrates the percentage distribution of the demographic characteristics of the children in the CP and control groups.

5.3.1. Age

The mean age of the children in the CP group was 8.05 (±2.098) years, while the mean age in the control group was 9.19 (±2.108) years. The control group was found to be older by 1.14 years which was found to be statistically significant. (*p*=0.001), this difference is not clinically important because all the children are in the same age group.

5.3.2. Type of School/Center

There was no significant difference in the distribution of children between private or public schools or center. In the CP group almost 40% of the children were from public centers and 60% were from private centers and in the control group 44.4% were from public schools and 55.6% were from private schools.

5.3.3. Gender

The two groups consisted of 73 female children, 33(52.4%) in the CP group and 40 (40.4%) in the control group, and 89 male children, 30(47.6%) in the CP group and 59 (59.6%) in the control group. There was no statistically significant difference found in the gender distribution between the two groups.

5.3.4. Number of Siblings

In the CP group, only 39 (61.9%) children had more than 2 siblings, while 69 (69.7%) children in the control group did. There was no significant difference between the groups regarding number of siblings, whether less than 2 siblings or more.

5.3.5. Order of Child

Of all the children in the CP group, 34 (54%) were the third or more child in the family, while only 19 (30.2%) were the first born child and 10 (15.9%) were the second child. In the control group the majority were also the “third or more” child in their families. There was no significant difference between the two groups.

5.3.6. Mother’s Occupation

Regarding the mother occupation, it was found that 54 children (33.3%) of the total sample had working mothers. In the CP group 15 (23.8%) children had working mothers, while 39 (39.4%) children in the control group did. This difference was considered statistically significant (*p*=0.029).

5.3.7. Parents’ Education

The results show that illiteracy was uncommon among the total sample, only 10 children (7 in the CP group, 3 in the control group) had one illiterate parent, of those parents 2 (1.2%) were fathers and 8 (4.9%) were mothers.

College was the most commonly found level of education. In the total sample more than half of the mothers and fathers had college education level, and higher percentages were found among the parents of children in the control group. The father’s education showed statistically significant difference between the groups (*p*= 0.002). On the other hand, the mother’s education showed no significant difference between the two groups.

Table 5.3: Percentage distribution of the demographic characteristics for the CP and control groups.

Demographic Variables	CP Group		Control Group		X^2	*p*-value*
	(n= 63)	(%)	(n= 99)	(%)		
Type of Center/School						
Public	25	39.7	44	44.4	0.36	0.550
Private	38	60.3	55	55.6		
Gender						
Male	30	47.6	59	59.6	2.23	0.092
Female	33	52.4	40	40.4		
Number of Siblings						
2 or less	24	38.1	30	30.3	1.05	0.196
More than 2	39	61.9	69	69.7		
Order of Child						
First	19	30.2	16	16.2	4.48	0.106
Second	10	15.9	20	20.2		
Third or More	34	54	63	63.6		
Mother’s Occupation						
Not working	48	76.2	60	60.6	4.21	0.029
Working	15	23.8	39	39.4		
Father’s Education						
Illiterate	2	3.2	0	0	14.87	0.002
School	31	49.2	25	25.3		
Diploma	6	9.5	9	9.1		
College	24	38.1	65	65.7		
Mother’s Education						
Illiterate	5	7.9	3	3	6.23	0.101
School	23	36.5	27	27.3		
Diploma	2	3.2	11	11.1		
College	33	52.4	58	58.6		

***Is significant when $p<0.05$.**

5.4. Medical History

Table 5.4 demonstrates the percentage distribution of the medical history findings in the CP and control groups. The children included in the study were free from any medical condition other than CP in the CP group. This was confirmed through asking about the medical history.

5.4.1. Medication

Parents were asked if the children were taking any kind of medication on regular basis, and if they do, to give the name of that medication. It was found that 3 (3%) of the controls were taking medications 2 of which were only nutritional supplements and one was using an ointment for skin allergy.

In the CP group 20 (31.7%) children were taking medication on regular basis. The medications were mainly anticonvulsants, Depakine (6 children), Depakote (1 child), Topamax (2 children), Keppra (2 children), Lamictal (2 children), Tegretol (2 children), Revotril (2 children), Clobazam (1 child). One antipsychotic Resperdal (1 child), and an antidepressant Norpramin (1 child). The difference between the two groups in relation to taking medication was statistically significant (*p*= 0.000).

5.4.2. Previous Hospitalization

The parents were asked to report if the child has been previously hospitalized and to mention the reason for it. The reasons were categorized as dental related, tonsillectomy or adenoidectomy and other.

It was found that of all the hospitalized children, 58.1% were from the CP group. This was found to be statistically significant (*p*=0.000). The most common reason for hospitalization in the CP group was in the “other” category (90%) this included mainly procedures related to the physical condition of the child. Only 7.1% of the children in the CP group were hospitalized for dental treatment under GA.

Tonsillectomy or adenoidectomy were the reason for hospitalization in 2.4% of children in the CP group. In the control group 12.1 % have been hospitalized for dental work, 18.2% were hospitalized for tonsillectomy and adenoidectomy and the rest (69.7%) were hospitalized due to other reasons.

Table 5.4: Percentage distribution of the medical history findings in the CP and control groups.

Medical History	**CP Group**		**Control Group**		**X^2**	***p*-value***
	(n=63)	(%)	(n=99)	(%)		
Taking Medication						
No	42	66.7	96	97	8.08	0.000
Yes	20	31.7	3	3		
Previous Hospitalization						
No	20	31.7	68	68.7	1.17	0.000
Yes	43	68.3	31	31.3		

***** Is significant when *p*<0.05.

5.5. Dental History

A summary of the percentage distribution of the dental history findings is provided in tables 5.5 and 5.6. From table 5.5, the results show that the number of children in control group who visited the dentist once or twice or even more than twice was higher than the numbers of children in the CP group. This difference was found to be statistically significant (*p*=0.000). On the other hand, the number of children who reported never visiting the dentist in the CP was 23(36.5%) children which is higher than that in the control group.

The most common reason for visiting the dentist was pain. Of the whole sample 59 (45.4%) children went to the dentist because they experienced some pain in their oral cavity. Of those, 18 (45%) children were from the CP group and 41(45.6%) children were from the control group. The second common reason for visiting the dentist was found to be for check up. In addition, the least common reason was to continue a comprehensive treatment plan. This difference was not found to be statistically significant.

The frequency of daily sugar intake was found to be significantly higher among the CP group (*p*=0.021). A significantly higher percentage of children in the CP group consumed sugary foods from 2 to 3 times per day (74.6 %). Regarding the frequency of brushing a significant difference was found between the two groups (*p*=0.026). Around half of the children in the control group were in the habit of brushing two times per day, while almost half of the children in the CP group were more likely to brush only once a day. Only 1 child reported never brushing in the control group and 3 were found in the CP group. Parents were the ones to brush the child’s teeth in 66.1% of the CP group while 27.4% only supervised while the child brushed. Around 60% of the children in the control group brushed for themselves this was found to be statistically significant (*p*=0.000).

Table 5.5: Percentage distribution of the dental history findings for the CP and control groups.

Dental History	CP Group (n=63)	CP Group (%)	Control Group (n=99)	Control Group (%)	X^2	*p*-value*
Number of Dental Visits						
Once	9	14.3	18	18.2	21.8	0.000
Twice	14	22.2	19	19.2		
More	17	27	53	53.5		
Never	23	36.5	9	9.1		
Reason for Dental Visit						
Pain	18	45	41	45.6	4.35	0.114
Comprehensive treatment plan	5	12.5	24	26.7		
Check up	17	42.5	25	27.8		
Frequency of Daily Sugar Intake						
None	5	7.9	3	3	9.72	0.021
Once	20	31.7	48	48.5		
2-3 times	30	74.6	28	28.3		
>3 times	8	12.7	20	20.2		
Frequency of Daily Brushing						
Doesn’t Brush	3	4.8	1	1	0.24	0.026
Once	33	52.4	33	33.3		
2 times	2	4.9	51	51.5		
> 2 times	5	7.9	14	14.1		
Brushing Supervision						
Parent brush	41	66.1	7	7.1	5.06	0.000
Parent supervise	17	27.4	29	29.3		
Child brush	3	4.8	59	59.6		
Other supervise	1	1.6	4	4		

* Is significant when *p*<0.05.

Table 5.6 shows that bruxism was significantly higher among the CP group (*p*=0.000), 41.3% of the children in the CP group practiced this habit while only 13% of the children in the control group did. Pouching of food showed similar findings, 25.4% of the children in the CP group and 6% of the control group pouched their food before swallowing it, this difference was found to be significant (*p*=0.000). Mouth breathing on the other hand showed no statistically significant difference between the groups.

Table 5.6: Percentage distribution of the oral habits findings for the CP and control groups.

	CP Group		Control Group		X^2	*p*-value*
	(n=63)	(%)	(n=99)	(%)		
Bruxism						
No	37	58.7	86	86.9	6.68	0.000
Yes	26	41.3	13	13.1		
Pouching of Food						
No	47	74.6	93	93.9	12.27	0.000
Yes	16	25.4	6	6.1		
Mouth Breathing						
No	48	76.2	75	75.8	0.00	0.950
Yes	15	23.8	24	24.2		

* Is significant when $p<0.05$.

5.6. Examination Results

5.6.1. Extra Oral Findings

Table 5.7 demonstrates the examination findings in the CP and control group. The first part of the examination was concerned with the presence or absence of any extra oral findings in the form of scars, scratches or any signs of injury in the face and hands. The results showed that 34.9% of the CP group showed extra oral signs while only 4 % of the control group showed similar signs. The difference was significant (*p*=0.000).

The second part of the examination was the intra oral part, where findings such as the presence of a swelling, abscess, laceration, or any sign of injury were recorded. The presence of caries and DMFT as well as the gingival health and oral hygiene were recorded.

5.6.2. Intra Oral Findings

Table 5.8 shows the means and *p*-values of the intra-oral indices in the CP and the control group. Regarding the intra oral findings the results showed no significant difference between the two groups with only one child in each group presenting with an intra oral finding in the form of an abscess.

5.6.3. Dental Caries

The presence of dental caries was recorded in 41 (65.1%) of the children in the CP group and in 62 (62.6%) of the children in the control group. There was no significant difference found in the presence of dental caries between the two groups.

The mean of the total DMFT (DMFT +dft) for the children in the CP group was 5.12 (±7.38), which is considered a high score, while for the control group the mean of the total DMFT was 4.28 (± 3.37) which is considered moderate. There was no significant difference between the two groups in regard to mean total DMFT.

The mean DMFT was higher in the control group (1.32 ±1.7) than in the CP group (0.87 ±1.51) while the mean dft was higher in the CP group 3.6 ±3.64) than that in the control group (2.89 ±2.93), but the difference for both was not significant.

The highest mean was found in the decayed primary teeth for both the CP group (2.65 ±3.37) and the control group (1.98 ±2.55), although the mean was higher in the CP group, this difference wasn’t found to be statistically significant. The only significant difference was found in the filled permanent teeth, with the mean in the CP group being (0.14 ±0.8) which was significantly lower than that in the control group (0.52 ±1.17) and the (*p*= 0.018).

5.6.4. Gingival Health

The results showed that the mean score for the CP group was 0.86 (±0.35) and the mean score for the control group was 0.82 (±0.39). There was no significant difference found between the two groups.

The majority in both groups suffered from mild to moderate gingivitis, 54 (85.7%) children in the CP group and 81 children (81.8%) in the control group. Only 27 (16.7%) children, 9 (14.3%) in CP group and 18 (18.2%) in control group had a healthy gingiva according to the Visual Periodontal Index scores.

5.6.5. Oral Hygiene

The Simplified Oral Hygiene Index (OHI-S) was used to determine the level of oral hygiene. The mean score in the CP group was 1.13 (±0.6), while the mean score in the control group was 1.14 (±0.66). There was no significant difference between the two groups in relation to oral hygiene.

Table 5.7: Percentage distribution of the extra and intra oral examination findings and the intra-oral indices for the CP and control groups.

Examination	**CP Group**		**Control Group**		**X^2**	***p*-value***
	(n=63)	(%)	(n=99)	(%)		
Extra-Oral Findings						
No	41	65.1	95	96	27.25	0.000
Yes	22	34.9	4	4		
Intra -Oral Findings						
No	62	89.4	98	99	0.11	0.746
Yes	1	1.6	1	1		
Caries						
No	22	4.9	37	37.4	0.10	0.752
Yes	41	65.1	62	62.6		
Gingival Health						
Score (0)	9	14.3	18	18.2	0.42	0.517
Score (1)	54	85.7	81	81.8		
Oral Hygiene						
Good	9	14.3	26	26.3	3.43	0.180
Fair	46	73	64	64.6		
Poor	8	12.7	9	9.1		

*Is significant when $p<0.05$.

Table 5.8: Means of the intra-oral indices in the CP and control groups.

Examination	CP Group Mean (±SD)	Control Group Mean (±SD)	t-value	*p*-value*
Total DMFT**				
	5.12 (±7.38)	4.28 (±3.37)	-0.99	0.326
DMFT				
	0.87 (±1.51)	1.32 (±1.7)	1.72	0.088
dft				
	3.6 (±3.64)	2.89 (±2.93)	-1.31	0.193
D (Decayed Permanent)				
	0.6 (±1.17)	0.67 (±1.17)	0.34	0.737
d (Decayed Primary)				
	2.65 (±3.37)	1.98 (±2.55)	-1.35	0.179
M (Missing Permanent)				
	0.13 (±0.71)	0.14 (±0.7)	0.13	0.899
F (Filled Permanent)				
	0.14 (±0.8)	0.52 (±1.17)	2.4	0.018
f (Filled Primary)				
	0.95 (±2)	0.91 (±1.67)	-0.15	0.882
Visual Periodontal Index				
	0.86 (±0.35)	0.82 (±0.39)	-0.645	0.520
OHI-S				
	1.13 (±0.6)	1.14 (±0.66)	1.6	0.112

*Is significant when $p<0.05$.

** Total DMFT= DMFT + dft

5.7. OHRQOL Questionnaire

Frequency percentages for the ratings of severity of the individual items in the FHC-ORQOL questionnaire sections I, II and III for both the CP and the control groups are presented in stacked bar graphs in figures 5.1, 5.2 and 5.3 respectively.

Figure 5.1 demonstrates that the most frequently reported as an “all of the time” oral symptom or problem in the CP group was bleeding with brushing or flossing along with broken teeth. Spontaneous tooth ache and bad breath and taste were most frequently reported as “some of the time” complains. In the This control group, bad breath or taste was the most frequently reported problem as an “all of the time” complain, while spontaneous tooth ache was the most frequently reported “some of the time” problem.

Figure 5.2 shows that the main daily life problem the parents encountered with the children in the CP group and the most the most frequently reported “all of the time” complain was the refusal of food due to a problem in the mouth of the child. Difficulty paying attention was the most “some of the time” reported complain. In the control group, refusal of food, difficulty paying attention, and behavior trouble were the most frequently reported as “all of the time” daily life problems, while refusal of food was the most frequently reported as a “some of the time” daily life problem.

Figure 5.3 demonstrates that eating and nutrition were the main concern that worried the parents in the CP group. In the control group, changing the family plans was the most frequently reported as “all of the time” concern. While concerns about eating and anger came as the most “some of the time” reported complains.

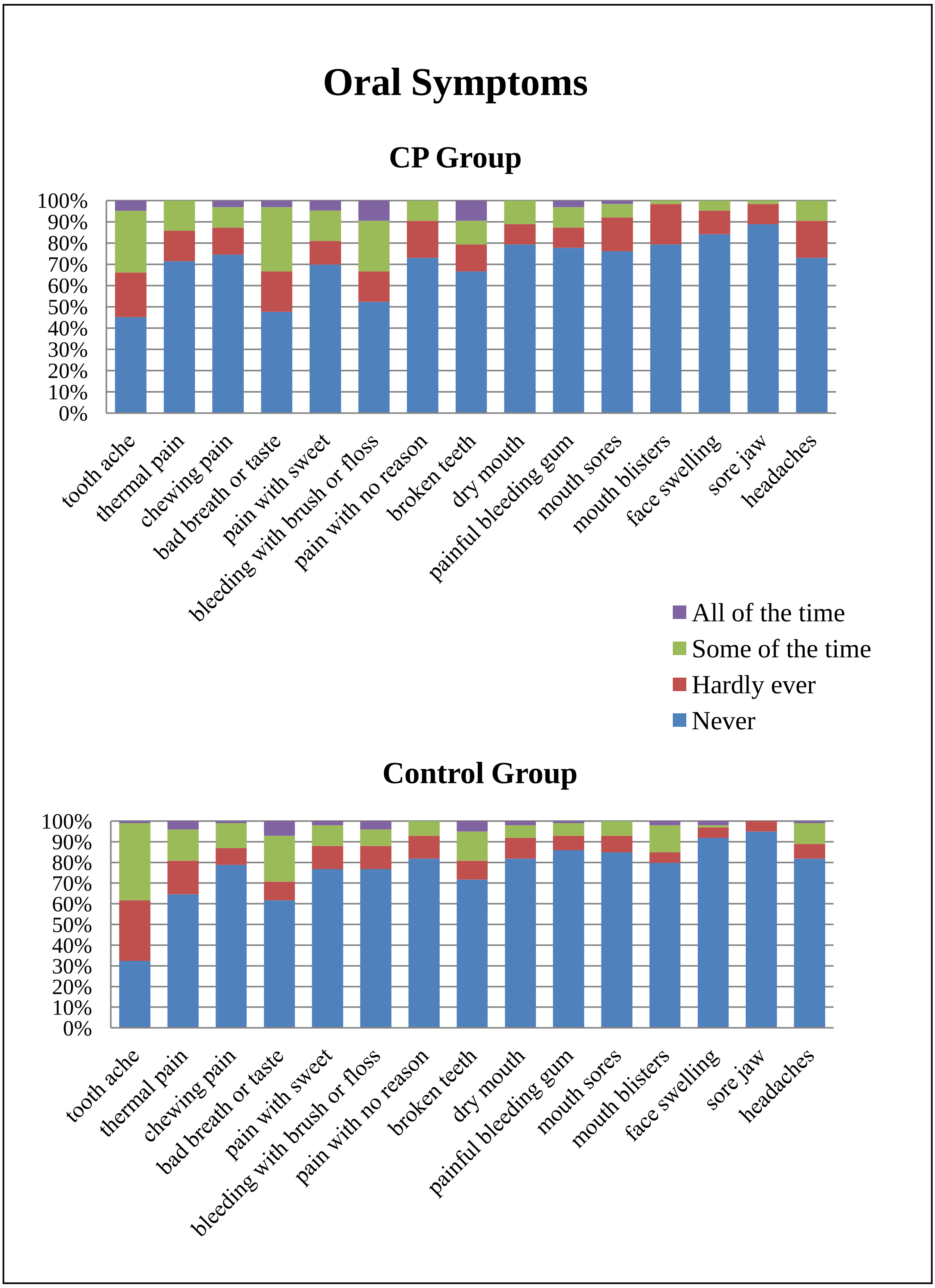


Figure 5.1: The percentage distribution of the frequency of item ratings in the CP and control groups for section I (Oral Symptoms).

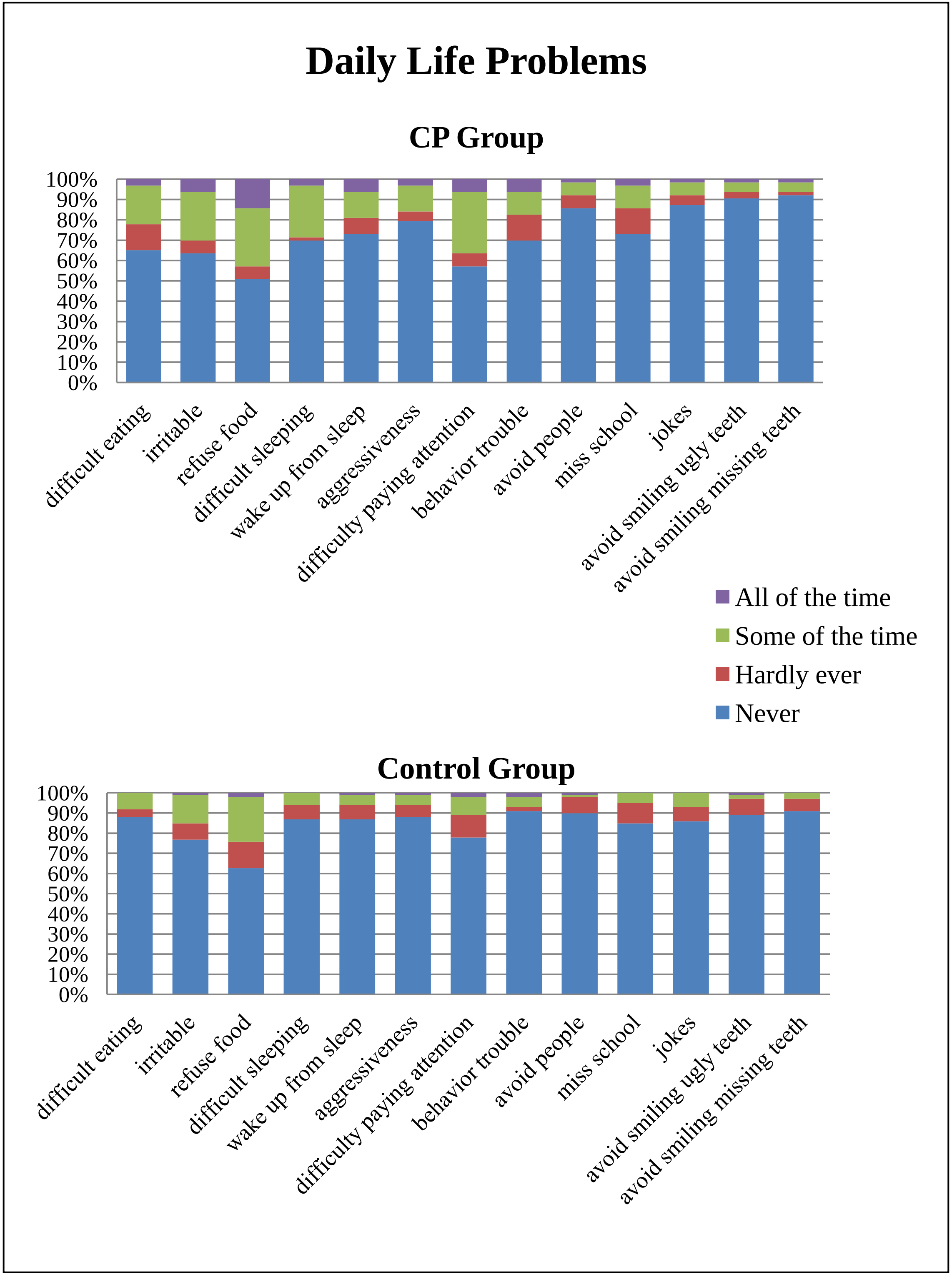


Figure 5.2: The percentage distribution of the frequency of item ratings in the CP and control groups for section II (Daily Life Problems).

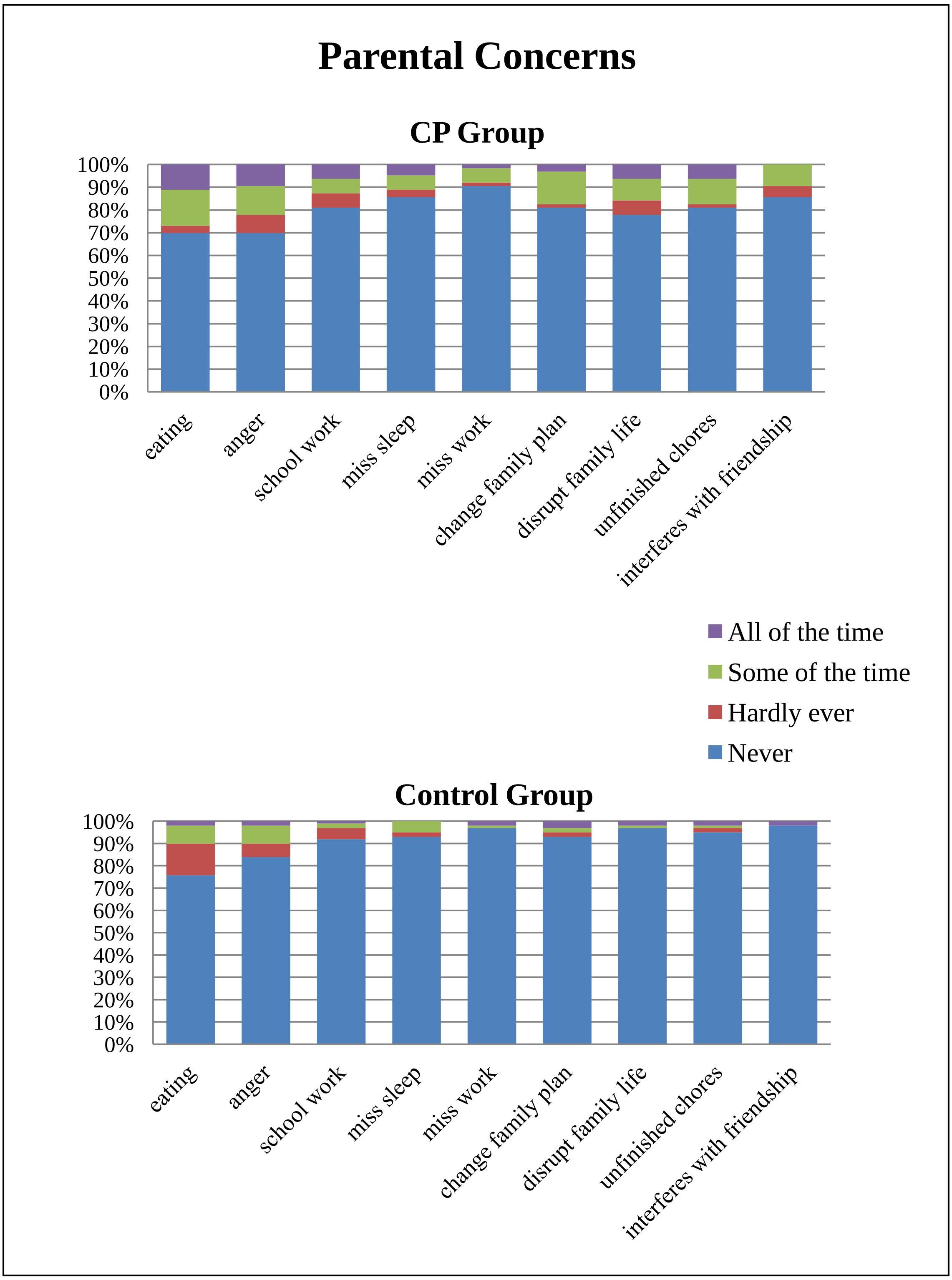


Figure 5.3: The percentage distribution of the frequency of item ratings in the CP and control groups for section III (Parental Concerns).

Table 5.9 demonstrates the means of ratings of severity and the means for the number of positive findings for sections I, II and III for the CP and control group.

Regarding the first section of the questionnaire (Daily Symptoms), results showed no significant difference between the CP group and the control group in relation to the severity ratings of the symptoms experienced by the children (p= 0.204). In sections II and III (Daily Life Problems, Parental Concerns), a statistically significant difference was found (p= 0.001, p= 0.010 respectively). In both sections the CP group showed higher severity rating indicating lower quality of life in sections II and III (Figure 5.4).

The number of positive findings, section I didn’t show any significant difference between the two groups, while in sections II and III there was a significant difference in the number of positive findings in both groups. (p= 0.004, p=0.005 respectively). The cases showed higher number of positive findings in daily life problems and parental concerns (Figure 5.5).

Table 5.9: Summary of the means of the severity ratings and number of positive findings in sections I, II and III for the CP and control groups.

OHRQOL	**CP Group (n=63)** Mean (±SD)	**Control Group (n=99)** Mean (±SD)	**t-value**	***p*-value***
Rating of Severity				
Section I (Oral Symptoms)				
	0.47 (±0.4)	0.4 (±0.35)	-1.28	0.204
Section II (Daily Life Problems)				
	0.51 (±0.55)	0.25 (±0.32)	-3.43	0.001
Section III (Parental Concerns)				
	0.41 (±0.7)	0.15 (±0.42)	-2.65	0.010
Number of Positive Findings				
Section I (Oral Symptoms)				
	4.40 (±3.96)	3.42 (±2.8)	-1.7	0.093
Section II (Daily Life Problems)				
	3.41 (±3.43)	1.93 (±2.44)	-2.98	0.004
Section III (Parental Concerns)				
	1.78 (±2.72)	0.70 (±1.48)	-2.89	0.005

*Is significant when $p<0.05$.

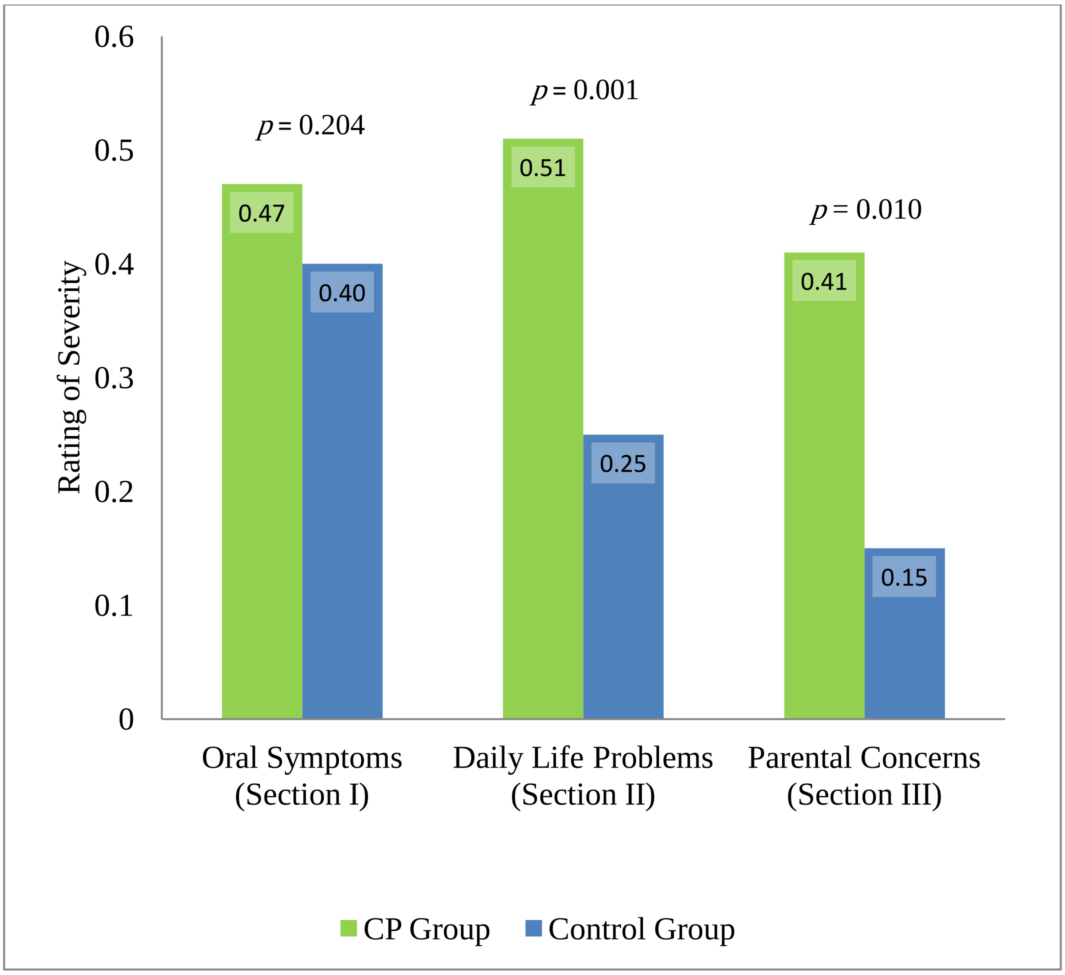


Figure 5.4: Means of rating of severity for the CP and control groups in sections I, II and III.

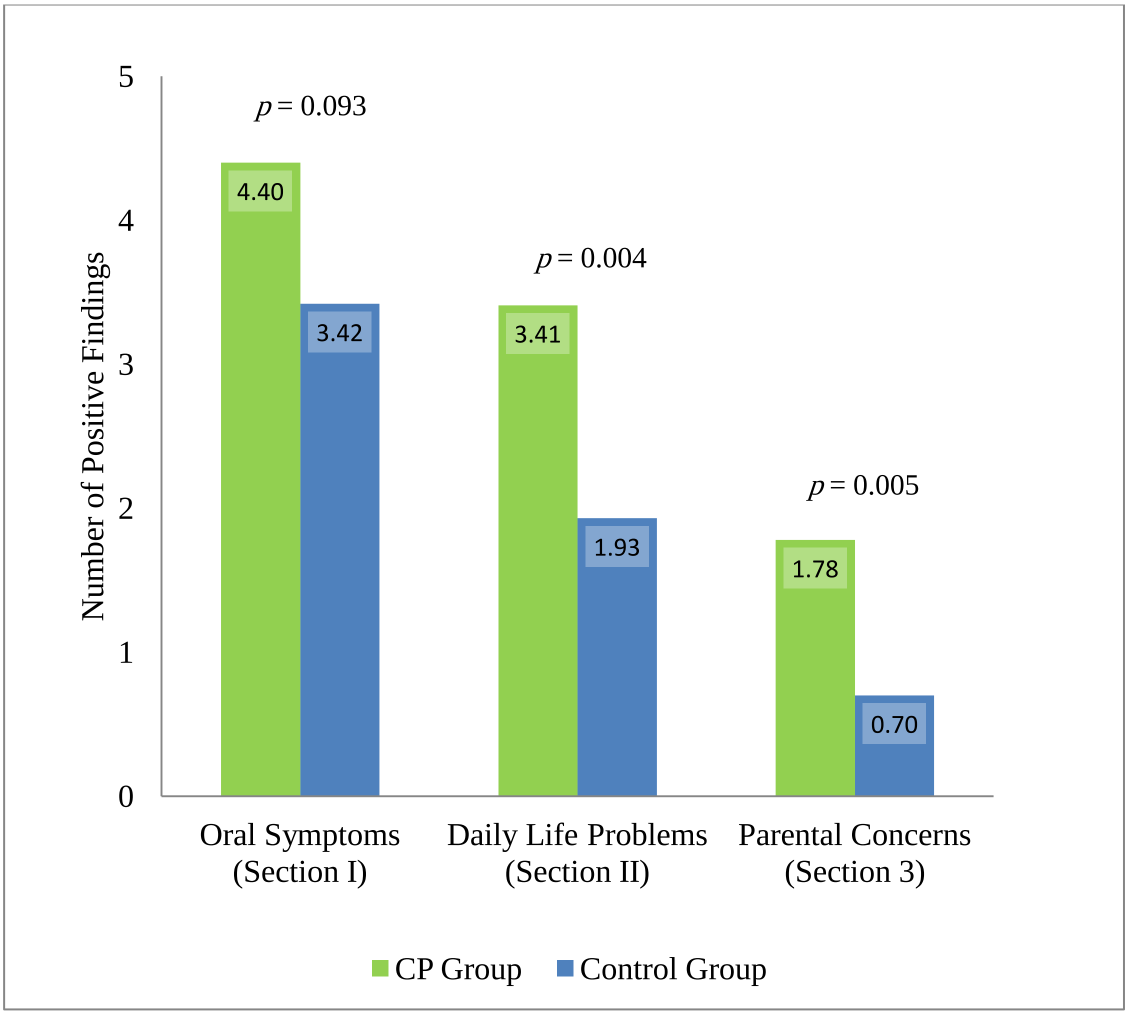


Figure 5.5: Means of number of positive findings for the CP and control groups in sections I, II and III.

Table 5.10 demonstrates the mean percentages of the VAS scores in section IV for the CP and control groups. In this section of the questionnaire the results for the 4 questions were represented in the form of percentages. The scores on the 13 cm visual analog scale were converted to percentages. For all the questions in that section, there was a statistically significant difference between the CP group and the control group with the control group showing higher mean percentages which indicates better quality of life.

Table 5.10: Mean percentages of the scores for the CP and control group in section IV.

OHRQOL Section IV	CP Group (n=63) Mean % (±SD)	Control Group (n=99) Mean % (±SD)	t-value	*p*-value*
1. What is your opinion of the appearance of your child's teeth and mouth?				
	54.73 (±24.61)	64.87 (±25.83)	2.51	0.013
2. How do you think your child's oral health compares to other children of the same age?				
	57.56 (±27.8)	66.54 (±24.6)	2.15	0.033
3. How do you feel about your child's overall oral well-being?				
	53.22 (±23.78)	67.88 (±25.92)	3.69	0.000
4. How would you rate your child's overall QOL?				
	54.25 (±21.85)	83.93 (±20.8)	8.59	0.000

*Is significant when $p<0.05$.

In figure 5.6, the means of the scores for all the questions fell in the 55% range for the CP group. For the control group, the mean scores fell in the 65% range for the first 3 questions, but in the last question the score was much higher indicating a great difference in the estimated overall QOL between the two groups.

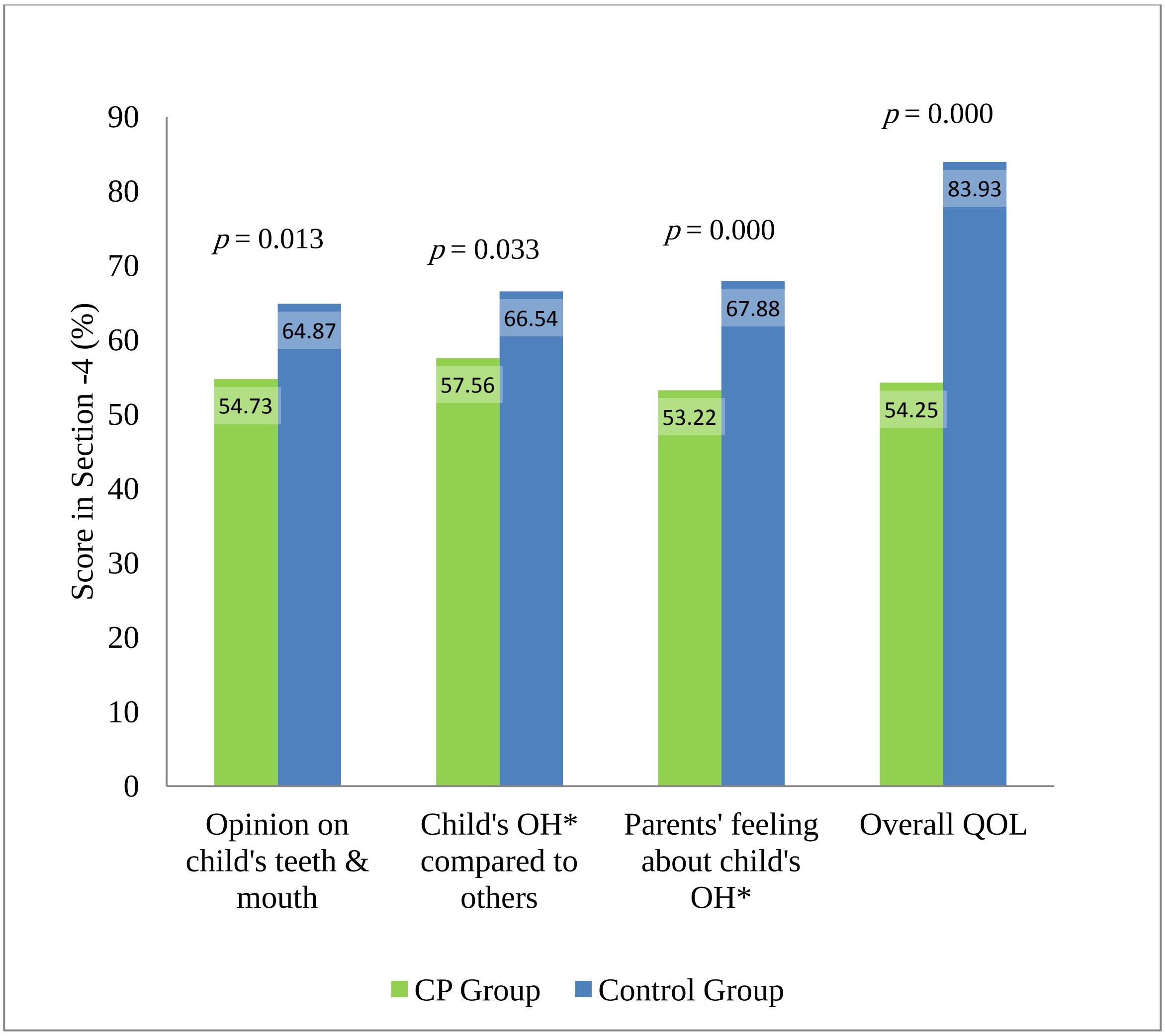


Figure 5.6: Mean percentages of the scores in section IV for the CP and control groups.

*OH: Oral Health

The Relationship between the OHRQOL and the Intra-Oral Indices

Table 5.11 demonstrates the relationship between the intra-oral indices scores and sections I, II, and III of the FHC-OHRQOL questionnaire in the CP and control groups.

5.7.1. Section I

In the CP group a weak, statistically significant relationship was found between the reported oral symptoms and the total DMFT score (*p*=0.034), while there was no statistically significant relationship found with the OHI-S and the Visual Periodontal Index scores (*p*=0.364 and *p*= 0.114) respectively. The same relationship was found in the control group.

5.7.2. Section II

There was no statistically significant relationship found between the daily life problems and the total DMFT, OHI-S or Visual Periodontal Index scores in the CP group or the control group. Problems that occurred in the daily life of the children were not affected by the status of their oral health.

5.7.3. Section III

In the CP group a medium strength statistically significant relationship was found between the reported parental concerns and the OHI-S scores (*p*= 0.005).

No relation was found in the control group with the total DMFT, OHI-S or Visual Periodontal Index scores.

Table 5.11: The relationship between the intra-oral indices scores and sections I, II and III for the CP and control groups.

Group	Test	Total DMFT	OHI-S	Visual Periodontal Index
Section I: Oral Symptoms				
CP	Pearson Correlation (*r*)	0.267	0.116	0.201
	Sig.2-tailed (*p*)*	0.034	0.364	0.114
Control	Pearson Correlation (*r*)	0.254	0.039	0.196
	Sig.2-tailed (*p*)*	0.011	0.705	0.052
Section II: Daily Life Problems				
CP	Pearson Correlation (*r*)	0.037	0.159	0.142
	Sig.2-tailed (*p*)*	0.772	0.214	0.266
Control	Pearson Correlation (*r*)	0.085	-0.010	0.158
	Sig.2-tailed (*p*)*	0.405	0.924	0.119
Section III: Parental Concerns				
CP	Pearson Correlation (*r*)	0.082	0.350	0.118
	Sig.2-tailed (*p*)*	0.522	0.005	0.358
Control	Pearson Correlation (*r*)	0.001	-0.045	0.151
	Sig.2-tailed (*p*)*	0.992	0.657	0.135

*Is significant when $p<0.05$.

5.7.4. Section IV

Table 5.12 expresses the relationship between the intra-oral indices scores and the scores in section IV of the FHC-OHRQOL questionnaire in the CP and control groups.

In the CP group, a negative, medium strength, statistically significant association was found between the first question in this section (What is your opinion of the appearance of your child's teeth and mouth?) and the Visual Periodontal index score (p=0.005), while a negative, non-significant association was found with the total DMFT and the OHI-S (p=0.054, p=0.420) respectively. In the control group, a weak, negative, statistically significant relationship was found between the first question and the total DMFT (p=0.007). No significant relationship was found with the OHI-S and the Visual Periodontal Index (p=0.348 and p=0.106) respectively.

In the CP group, a negative but non-significant relationship was found between the second question (How do you think your child's oral health compares to other children of the same age?) and the total DMFT, OHI-S and the Visual Periodontal Index (p=0.075, p=0.077, p= 434) respectively. In the control group a weak, negative, statistically significant association was found with the total DMFT (p=0.004), and a negative, none significant relation with the OHI-S and the Visual Periodontal Index (p=0.491 and p=0.062).

For the third question (How do you feel about your child's overall oral well-being?), a negative, statistically significant relation was found with the Visual Periodontal Index (p=0.000) in the CP group, while it was insignificant with the total DMFT and the OHI-S (p=0.117 and p=0.324) respectively. In the control group, a similar relation was found with the Visual Periodontal Index (*p*=0.021), the total DMFT (*p*=0.068) and the OHI-S (*p*=0.417).

For the fourth question (How would you rate your child's overall QOL?), a negative but non-significant association was found with the total DMFT and the Visual Periodontal Index (*p*=0.687 and *p*=0.104) respectively, and a positive, non-significant relationship was found with the OHI-S (*p*=0.823) in the CP group. In the control group no significant relation was found also.

Table 5.12: The relationship between the intra-oral indices scores and section IV for the CP and control groups.

Section IV Group	Test	Total DMFT	OHI-S	Visual Periodontal Index
1. What is your opinion of the appearance of your child's teeth and mouth?				
CP	Pearson Correlation (*r*)	-0.244	-0.103	-0.348
	Sig.2-tailed (*p*)*	0.054	0.420	0.005
Control	Pearson Correlation (*r*)	-0.271	-0.095	-0.164
	Sig.2-tailed (*p*)*	0.007	0.348	0.106
2. How do you think your child's oral health compares to other children of the same age?				
CP	Pearson Correlation (*r*)	-0.226	-0.224	-0.100
	Sig.2-tailed (*p*)*	0.075	0.077	0.434
Control	Pearson Correlation (*r*)	-0.290	-0.070	-0.188
	Sig.2-tailed (*p*)*	0.004	0.491	0.062
3. How do you feel about your child's overall oral well-being?				
CP	Pearson Correlation (*r*)	-0.200	-0.126	-0.452
	Sig.2-tailed (*p*)*	0.117	0.324	0.000
Control	Pearson Correlation (*r*)	-0.184	-0.082	-0.231
	Sig.2-tailed (*p*)*	0.068	0.417	0.021
4. How would you rate your child's overall QOL?				
CP	Pearson Correlation (*r*)	-0.052	0.029	-0.207
	Sig.2-tailed (*p*)*	0.687	0.823	0.104
Control	Pearson Correlation (*r*)	0.004	0.033	-0.021
	Sig.2-tailed (*p*)*	0.969	0.746	0.833

*Is significant when $p<0.05$.

5.8. The Relationship between the Intra-Oral Indices Scores and the Demographics, Medical and Dental History in the CP Group

Table 5.13 demonstrates the relationship between the scores of the intra-oral indices and the demographic characteristics in the CP group. In the CP group there was no significant association found between any of the studied demographic variables and neither of the total DMFT, OHI-S nor the Visual Periodontal Index scores.

Table 5.14 demonstrates the relationship between the scores of the intra-oral indices and the medical history in the CP group. The Medical history indicated by taking medication and previous hospitalization didn’t show any statistically significant association with any of the intra-oral indices scores used in the CP group.

Table 5.15 demonstrates the relationship between the intra-oral indices and the dental history in the CP group. When testing the association between the intra-oral indices and the dental history variables a statistically significant relationship was found between the “reason for dental visit” and the total DMFT score (p= 0.000). Post hoc tests revealed that the significant difference was in the “pain” and “check up” reasons. The mean total DMFT score in the children who reported visiting the dentist due to pain in their oral cavity was 7 (±3.46) while the mean in the children who visited for check up only was 1.81 (±1.79). The other variables in the dental history part of the questionnaire didn’t show any significant association with neither the total DMFT, OHI-S nor the Visual Periodontal Index scores.

Table 5.16 demonstrates the relationship between the intra-oral indices scores and the oral habits in the CP group. None of the habits showed a significant relationship with either of the total DMFT, the OHI-S or the Visual Periodontal Index scores.

Table 5.12: The relationship between the intra-oral indices scores and the demographic variables in the CP group.

Demographic Variables	Total DMFT (n=63)		OHI-S (n=63)		Visual Periodontal Index (n=63)	
	Mean (±SD)	***p*-Value***	**Mean (±SD)**	***p*-Value***	**Mean (±SD)**	***p*-Value***
Center Type						
Public	4.52 (±3.91)	0.603	0.99 (±0.45)	0.115	0.84 (±0.37)	0.757
Private	5.52 (±9)		1.21 (±0.67)		0.87 (±0.34)	
Gender						
Male	5.32 (±9.95)	0.839	1.02 (±0.5)	0.189	0.88 (±0.33)	0.613
Female	4.94 (±3.98)		1.22 (±0.66)		0.83 (±0.38)	
Number of Siblings						
2 or less	6.32 (±10.97)	0.316	1.21 (±0.62)	0.400	0.92 (±0.28)	0.262
More than 2	4.38 (±3.82)		1.1 (±0.58)		0.82 (±0.39)	
Order of Child						
First	7.37 (±12.13)	0.277	1.21(±0.51)	0.646	0.95 (±0.23)	0.294
Second	3.57 (±3.71)		1.91(±0.64)		0.90 (±0.32)	
Third or More	4.32 (±3.73)		1.06(±0.64)		0.79 (±0.41)	
Mother's Occupation						
Not working	4.6 (±3.72)	0.551	1.2 (±0.59)	0.065	0.86 (±0.36)	0.906
Working	6.8 (±13.8)		0.88 (±0.57)		0.87 (±0.35)	
Father's Education						
Illiterate	8 (±5.66)	0.599	1.4 (±0.85)	0.594	0.50 (±0.71)	0.446
School	6.06 (±9.71)		1.2 (±0.59)		0.90 (±0.30)	
Diploma	2.33 (±1.86)		1.13 (±0.33)		0.83 (±0.41)	
College	4.36 (±4.15)		1.01 (±0.64)		0.83 (±0.38)	
Mother's Education						
Illiterate	7.6 (±3.5)	0.573	1.48 (±0.89)	0.195	0.80 (±0.45)	0.921
School	3.48 (±3.27)		1.13 (±0.46)		0.87 (±0.34)	
Diploma	6 (±8.49)		1.75 (±0.64)		1.0 (±0.00)	
College	5.84 (±9.54)		1.04 (±0.62)		0.85 (0.36±)	

s significant when *p*<0.05.

Table 5.14: The relationship between the intra-oral indices scores and the medical history in the CP group.

Medical History	**Total DMFT (n=63)**		**OHI-S (n=63)**		**Visual Periodontal Index (n=63)**	
	Mean (±SD)	***p*-Value***	**Mean (±SD)**	***p*-Value***	**Mean (±SD)**	***p*-Value***
Taking Medication						
No	5.81 (±8.71)	0.274	1.09 (±0.62)	0.451	0.86 (±0.35)	0.942
Yes	3.59 (±3.22)		1.21 (±0.55)		0.85 (±0.37)	
Previous Hospitalization						
No	4.8 (±3.56)	0.815	0.99 (±0.56)	0.199	0.70 (±0.47)	0.051
Yes	5.27 (±8.64)		1.19 (±0.61)		0.93 (±0.26)	

*Is significant when $p<0.05$.

Table 5.13: The relationship between the intra-oral indices scores and the dental history in the CP group.

Dental History	Total DMFT (n=63)		OHI-S (n=63)		Visual Periodontal Index (n=63)	
	Mean (±SD)	*p*-Value*	Mean (±SD)	*p*-Value*	Mean (±SD)	*p*-Value*
Number of Dental Visits						
Once	3.56 (±3.36)	0.756	1.18(±0.63)	0.754	0.78 (±0.44)	0.234
Twice	6 (±3.88)		0.97 (±0.36)		0.71 (±0.47)	
More	4.1 (±3.57)		1.17 (±0.54)		0.94 (±0.24)	
Never	5.96(±11.32)		1.17 (±0.74)		0.91 (±0.29)	
Reason for Dental Visit						
Pain	7 (±3.46)	0.000	1.01 (±0.26)	0.633	0.83 (±0.38)	0.494
Comprehensive treatment plan	5.6 (±3.05)		1.24 (±0.56)		1.00 (±0.00)	
Check up	1.81 (±1.79)		1.11 (±0.67)		0.76 (±0.44)	
Frequency of Daily Sugar Intake						
None	3.54(±5.17)	0.824	1.12 (±0.65)	0.983	1.00 (±0.00)	0.297
Once	6.25(±12.08)		1.16 (±0.71)		0.95 (±0.22)	
2-3 times	4.97 (±3.7)		1.1 (±0.56)		0.80 (±0.41)	
> 3 times	3.88 (±2.64)		1.18 (±0.47)		0.75 (±0.46)	
Frequency of Daily Brushing						
Doesn’t brush	4 (±4.58)	0.806	1.37 (±1.29)	0.775	0.67 (±0.58)	0.338
Once	5.64 (±9.6)		1.17 (±0.51)		0.91 (±0.29)	
2 times	5.17 (±3.85)		1.06 (±0.62)		0.86 (±0.35)	
> 2 times	2.2 (±2.17)		1.02 (±0.68)		0.60 (±0.55)	
Brushing Supervision						
Parent brush	4.97 (±8.8)	0.945	1.34 (±0.6)	0.843	0.80 (±0.40)	0.488
Parent supervise	4.82 (±3.75)		1.04 (±0.51)		0.94 (±0.24)	
Child brush	6.33 (±2.89)		1.07 (±0.4)		1.00 (±0.00)	
Other supervise	9		0.71		1.00	

*Is significant when $p<0.05$.

Table 5.14: The relationship between the intra-oral indices scores and the oral habits in the CP group.

Oral Habits	Total DMFT		OHI-S		Visual Periodontal Index	
	Mean (±SD)	***p*-Value***	**Mean (±SD)**	***p*-Value***	**Mean (±SD)**	***p*-Value***
Bruxism						
No	5.7 (±9.16)	0.461	1.12 (±0.57)	0.901	0.84 (±0.37)	0.608
Yes	4.3 (±3.61)		1.14 (±0.64)		0.88 (±0.33)	
Pouching of Food						
No	3.8 (±3.37)	0.134	1.13 (±0.65)	0.949	0.87 (±0.34)	0.562
Yes	9 (±12.99)		1.12 (±0.42)		0.81 (±0.40)	
Mouth Breathing						
No	4.54 (±3.89)	0.500	1.18 (±0.65)	0.085	0.83 (±0.38)	0.253
Yes	7 (±13.61)		0.96 (±0.31)		0.93 (±0.26)	

*Is significant when $p<0.05$.

Chapter VI

Discussion

This research is a case-control study addressing the oral health and OHRQOL in children with CP from the parents' perspective. A comparison was made between the oral health and parents' perception of OHRQOL in the CP group and the control group. This was achieved by conducting a brief oral examination on the children in both groups and by the use of the FHC-OHRQOL (Beans-Ferrer et al. 2005).

Very few researches were found concerning OHRQOL in children with CP in Saudi Arabia. The studies that were found mainly focused on the oral health status of these children (Al-Hammad and Wyne, 2011; Brown, 2009; Al-Qahtani and Wyne, 2004), and the parents' knowledge and attitude towards oral health (Wyne, 2007).

Children with CP, due to their medical condition may not have the ability to take care of their oral health (Dougherty, 2009), and due to their cognitive status and limited communication ability may depend on their parents for recognition of their pain or distress. The pain they suffer from may be at an increased risk of staying unrecognized and underestimated (Versloot et al. 2008). Thus, special care should be given to their OHRQOL. This should be achieved through prevention and early detection of any oral health problem to avoid exacerbation and to lessen the way it may negatively affect their QOL.

Recruiting an adequate sample for the study wasn’t an easy task, especially for the CP group. From the list of centers for CSHCN in Jeddah, only two public centers were available, one of which was in the phase of changing their location and it was impossible to visit them at that time. The other center was the only public center used in this research and it provided a good number of children in the CP group.

The private centers for CSHCN in Jeddah may be abundant, but the numbers of children with CP especially were few; in some centers only 1 or 2 children with CP were found. Some of those centers reported poor parents’ cooperation in research as observed from the center’s previous experience with them. Those centers were excluded from the study sample for convenience.

The response rates in this study were higher in the CP group than that in the control group. This may indicate that centers for CSHCN are eager to participate in researches and studies for the benefit of their students.

Private centers and schools tended to have lower response rates than public. The lowest response rate was found in the boys’ private school. This school had a very low response rate at first that a much larger number of consents had to be redistributed in order to get an acceptable amount of consents that would be consistent with the rest of the schools.

The lower response rate in the private schools may be attributed to the fact that the persons in charge were more reluctant to call and follow up with the parents regarding the consents. While in the public schools they were more cooperative in this aspect.

In the centers for CSHCN, both private and public, it was found that the consent form would come back untouched in the child's backpack several times before it was returned filled out. Some centers had to call the parents to inform them that a consent form was sent with the child so they would pay attention to it. This shows that the parents of these children are stressed and although many families cope well despite the added challenges of caring for a child with a disability, evidence suggests parents of children with CP are more likely to have a variety of physical and psychologic health problems (Brehaut et al. 2004).

The literature states that the incidence of CP is higher in males (Jarvis et al. 2005). However, the sample of the present study didn't show this difference as almost 50% of the children in the CP group were females. According to what was reported in literature by Marlow et al. (2005), the severity of disability is higher and the cognitive functioning is lower in male children with CP. This may have predisposed a lower schooling or enrollment in rehabilitation programs in boys (Lemos and Kats, 2012) which was demonstrated in the present study as the sample targeted only children enrolled in rehabilitation programs.

The distribution of children in the sample was equal between private and public centers and schools. There was no significant difference found which indicates the homogeneity of the sample in this aspect.

In the CP group 61.9% of the children had more than 2 siblings in the house; also, 54% of the children in the CP group were the third or more children in the family. This may indicate that these children would receive lower attention and less care and are more prone to neglect than if they were the first or only child, especially if the family was of a low socioeconomic level. This also may be one of the reasons behind the low response rate that was found in the CP group.

The number of working mothers was found to be significantly lower in the CP group. This may be explained by the fact that mothers of children with CP don't have the time to work, and would rather stay home to take care of their disabled child. These findings were in agreement with the findings of Brehaut et al. (2004) who proved that caregivers of children with CP were less likely to work for pay and to be engaged in full time work, and that they were more likely to list caring for their families as their main activity. Additionally, it was found by Lemos and Katz (2012) that only 16.8% of the caregivers of children with CP exercised paid activities.

The father's occupation was not included in this research because no reference was found categorizing the jobs in Saudi Arabia as high socioeconomic or low socioeconomic jobs. There was no statistically significant difference regarding the mother's education level between the two groups, which was in agreement with what Brehaut et al. (2002) found. The Fathers' education level however, showed a statistically significant difference between the 2 groups. The education level of fathers in the CP group was lower, which was in agreement with the findings of Lemos and Katz (2012).

In the CP group 20 children reported using medications on regular basis most of which were anticonvulsants, while in the control group only 3 children reported taking medications on regular basis, 2 of them were taking nutritional supplement and the third was using an ointment for skin allergy. This difference was found to be significant. A significant difference was also found regarding previous hospitalization where more children in the CP group reported being previously hospitalized. This was in agreement with the findings of Jan (2005) who stated that most children with CP require a combination of physical and occupational therapy, drugs, and orthopedic and neurosurgical interventions.

The results showed a significant difference in the number of dental visits. Children in the control group who visited the dentist one time or more in their life were more than those in the CP group. While the number of children who reported never going to the dentist was higher in the CP group. This finding comes in agreement with the findings of Pope and Curzon (1991) who found that fewer children with CP visited the dentist for check up in comparison with controls, but disagrees with Oredugba (2011) who found that 15.9% of the children in the CP group reported visiting the dentist while only 1.4% of the controls did.

These findings may be explained by the fact that parents of disabled children may find it hard to take their child to the dentist due to several reasons some of which are the child's behavior and lack of cooperation the child is likely to show in the dental office, the difficult access to dental care, and the fact that most of those parents are preoccupied by the child's medical care (Wyne, 2007). The inability or unwillingness of some general dentists to treat children with special needs is an important reason for the unavailability of dental care for this group of children. A study was conducted in Saudi Arabia showed that Saudi dental students lack the confidence to render care to CSHCN even though they are willing to treat these patients (Pani et al. 2012). In the United States, they found that most general dentists thought that their undergraduate dental education did not prepare them well to treat CSHCN (Dao et al. 2005).

The significant difference found between the two groups in the frequency of sugar intake may be explained by the fact that most of the children with CP don't have control on what they eat due to their disability and cognitive state, in addition, their diet is known to be based on pasty, soft food that is rich in carbohydrate (Rodrigues dos Santos, 2003, Guaré Rde and Ciamponi, 2003; De Camrgo and Antunes, 2008).

The frequency of tooth brushing was also found to be significantly higher in the control group. This finding was not in agreement with the findings of Rodrigues dos Santos et al. (2003) who stated that the frequency of tooth brushing in the CP group of children was comparable with the normal pediatric population. Regarding the brushing supervision, the results showed a significant difference between the 2 groups. In the CP group, 66% of the parents brushed for their children. This is in agreement with the findings of Lemos and Katz (2012), who found in their sample that among 79% of the children with CP, the child's oral hygiene was performed by the caregiver.

Bruxism was found to be significantly higher in the CP group which was in agreement with the literature (Rodrigues dos Santos et al. 2003). As for food pouching which was found to be also significantly higher in occurrence in the CP group, the same study by Rodrigues dos Santos (2003) showed that the presence of food residues was higher among children with CP when compared with normal children, they explained this finding by the inability of the tongue, lips, and cheeks to perform normal deglutition. In relation to mouth breathing however, there was no significant difference found between the 2 groups which disagrees with findings of Rodrigues dos Santos et al. (2003).

Extra oral scratches and scars were more commonly seen in children with CP. This may be explained by the fact that most children with CP suffer from seizures and uncontrolled body movements, during which the child could easily scratch his face or worse, hit his head against a hard object like the edge of his chair or stroller. It is also documented that fractures are common in individuals with moderate to severe CP, and many of those who sustain a fracture will sustain repeated fractures. Low bone density, stiff joints, poor balance leading to falls, and violent seizures are factors that can contribute to fractures in this population (Henderson et al. 2012).

The oral examination indices that were used in the present study were chosen for their ease of conduction on children with disabilities in the most inconvenient conditions. The children had to be examined in their classrooms sometimes to avoid interruption of their daily routine. This was problematic because sometimes the class room setting didn’t help the examination at all; some children would be sitting in especially designed chairs that were very erect making it difficult to see the back teeth.

The examination had to be quick and completely painless because any irritation may cause the child to close his mouth and not open it again, sometimes a mouth prop had to be used in order to keep the mouth open for a while. Teachers and/ or nurses were helpful when examination of children with a higher cognitive level took place, children were responding better to their instructions.

When examining children with lower cognitive level, the teachers and/ nurses were very helpful in restraining the children so that the examination would be conducted safely and efficiently.

Caries level was determined using the DMFT and the dft. Missing primary teeth were excluded to avoid the confusion with normal shedding. The oral hygiene was measured using the OHI-S, which examines only 6 teeth. And the Visual Periodontal Index was used to determine the gingival health. This index was chosen because it doesn’t require the use of a probe which was an important prerequisite considering the difficult behavior of the children with CP.

The presence of dental caries did not differ between the two groups, although the mean of the total DMFT (DMFT + dft) in the CP group was higher, but this was not significant. These findings are in agreement with the findings of Rodrigues dos Santos et al. (2003) who also found no significant difference in the DMFS between children with CP and children in the control group aged 6-11 years. Pope and Curzon (1991) also didn’t find difference in caries experience between children with CP and controls. On the contrary, De Camargo and Antunes (2008) found that children and adolescents with CP suffer a higher burden of untreated dental caries than their non-CP counterparts. In

Nigeria, they found that the mean dmft and DMFT of children with CP were higher than that of the children in the control group (Oredugba, 2011).

The high total DMFT score in the CP group may be attributed to several factors, poor masticatory muscle control that may lead to food stagnation, poor manual dexterity makes it difficult for the child to brush, and the prescribed anticonvulsants that children with CP are taking are sweetened, highly viscous and used at night, which enhances the progression of dental caries. In addition, this group of children has a tendency toward reduced salivary function, and has a compromised ability to buffer the oral administration of exogenous acids. All this can result in an increased susceptibility to demineralization and caries of the teeth. (Siqueira et al. 2007).

By looking at the means of the decayed, missing and filled teeth in the primary and permanent teeth, it will be noticed that the main component of the total DMFT is the dft, meaning that the mean of the dft (3.6 ±3.64 in the CP group and 2.89 ±2.93 in the control group) was higher in the two groups than the mean DMFT (0.87 ±1.51 in the CP group and 1.32 ±1.7 in the control group). In both the dft and DMFT the main component was the decayed part. It had the highest mean between all the other categories. This is similar to what Oredugba (2011) found.

When calculating the means of the decayed, missing and filled teeth separately, the only significant difference found between the children in the CP group and the children in the control group was in the filled permanent teeth. Children in the control group had significantly higher mean of filled permanent teeth, this finding is similar to what Pope and Cruzon (1991) found in their study. De Camrgo and Antunes (2008) also found that more treatment had been performed in the permanent dentition than in the primary. This could suggest that the treatment needs of children with CP are not fulfilled in permanent teeth.

Regarding the oral hygiene of the two groups, there was no significant difference found. The results showed very similar mean OHI-S scores for the CP and control groups. The majority of the children in both groups were in the “fair” category. This was not in agreement with the findings of Pope and Curzon (1991), Rodrigues dos Santos et al. (2003), De Camargo and Antunes (2008), or Oredugba (2011) who found that the oral hygiene in children with CP was worse than that in the control group. This disagreement may be attributed to the fact that the children in the CP group didn’t exhibit poor oral hygiene as it would be expected. This may attributed to the good oral care they received in the rehabilitation centers as most of the centers that were visited encouraged tooth brushing after the breakfast meal. In addition, one of the centers provided tooth brushes and tooth paste regularly to the children. On the other hand, in the control group, only 26% of the children showed good oral hygiene, and as the results of this study show, almost 60% of them brushed their without supervision.

Concerning the gingival health, the Visual Periodontal Index was chosen specifically for this research because it would give estimation on the gingival health without having to use a probe or any instrument. Insertion of any intra oral instrument was really difficult in children with CP especially as the examinations were not conducted in the clinic and the proper assistance and restraints were unavailable. The results of this study showed no significant difference in the gingival health between the two groups and both of them showed signs of mild gingivitis. This disagrees with Pope and Curzon (1991) and Du et al. (2010) who found that the gingival health in children with CP was worse than the children in the control group. This disagreement may be attributed to the fact that children in the control group had poor gingival health.

The FHC-OHRQOL was chosen specifically because it was designed, and had been previously used on children with special needs, including children with CP (Beans-Ferrer et al. 2005). This questionnaire had to be translated to the Arabic language in order for it to be used, but the translation was not tested for validity or reliability due to time limitation. This was overcome by conducting a pre-test survey to assess the proper understanding of the Arabic-translated version, and by developing a standardized scenario that answers the unclear areas. In addition, interviewing the participants by telephone to fill the questionnaire ensured their accurate understanding.

In the first section of the questionnaire, spontaneous tooth ache and bad breath or taste were the most frequently reported symptoms in the two groups when combining the “all of the time’ and “some of the time” together. In the CP group bleeding with brushing and flossing was found to be equally frequent. These symptoms were found to be consistent with the examination findings in the two groups; high frequency of dental caries, mild to moderate gingivitis and fair oral hygiene. The findings of Beans-Ferrer (2005) showed that parents of CSHCN reported spontaneous tooth ache as one of the most frequent complains prior to oral rehabilitation which is in agreement with the present findings.

The most frequently reported daily life problem when combining the “all of the time’ and “some of the time” together was refusing food in both groups. Which was in agreement with the findings of Beans-Ferrer (2005) who mentioned that refusal of food was one of the most frequent complains prior to oral rehabilitation. In the CP group however, this frequency was found to be much higher. This is justifiable because it is common for children with CP to have feeding difficulties (Roger, 2004) additional tooth ache will defiantly make the process worse.

Based on the reports of the first and second sections, it comes as no surprise that the most frequent parental concern was about eating and nutrition in the CP group, this is in agreement with the findings of Beans-Ferrer (2005). Children with CP are at high risk for feeding and swallowing disorders that can have significant health implications, including limited caloric intake and acute and chronic malnutrition (Roger, 2004). Successful management of this problem should definitely include regular dental visits and preventive dental care.

A significant difference was found in the of number of positive findings as well as the of severity rating between the CP and control group in the “Daily Life Problems” section and the “Parental Concerns” section of the FHC-OHRQOL questionnaire. Parents of children with CP reported higher numbers and more sever daily life problems and also reported higher concern for their children’s oral health when compared to the parents in the control group. On the other hand, parents in the CP group reported similar findings in the oral symptoms section of the questionnaire as the parents in the control group. This suggests that although the children in the two groups suffer from almost the same oral health condition, parents in the CP group showed more distress and unease about their children’s oral health and its effect on their lives. This finding emphasizes the fact that non verbal children (as in children with CP), have difficulty expressing their complains, and their pain may stay unrecognized or underestimated in accordance to what Versloot et al. (2008) stated. Consequently, parents of this group of children may feel obliged to always be alert to any sign of distress or discomfort.

The higher concern of parents in the CP group may be also justified by their awareness regarding their children's oral health. In a study testing the oral health knowledge of parents of children with CP in Saudi Arabia, Wyne (2007) found that the overall oral health knowledge and attitude of parents of CP children is satisfactory.

According to the last section of the questionnaire (Section IV), the children in the CP group had lower QOL than the children in the control group. In all of the four questions, the mean percentage scores for the CP group always fell in the middle. The mean percentage scores for the control group were higher by around 10% in the first three questions regarding the oral health; however, when it came to the question about the overall QOL, the mean score was much higher in the control group.

Children in the CP group had lower OHRQOL and lower overall QOL, this is in agreement with the findings of Du et al. (2010), who found that the overall QOL and OHRQOL were significantly more compromised among children affected by CP than for preschool children without CP, highlighting the effects that CP has on general and oral health.

The small association found between the total DMFT and the severity of the oral symptoms reported may indicate that parents of children with CP have a good idea about the condition of their children's oral health, but the absence of association between the OHI-S and Visual Periodontal Index scores and the oral symptoms reported makes this possibility very weak. This may be explained by the fact that it may be difficult for parents of children with CP to identify poor gingival health and oral hygiene, while its always easier to identify cavitation or caries. It is also very difficult to know what a child with CP is suffering from in relation to their oral health (Versloot et al. 2008).

Parents of children with CP reported very few oral symptoms in the first section of the questionnaire compared to what is expected, and compared to the oral examination findings. This suggests that the parents of children with CP are not aware of the severity of their children’s oral health problems which contradicts what Wyne (2007) stated in his study on the oral health knowledge of parents of children with CP.

The fact that there was no association found between the all examination results and the severity of daily life problems supports the idea that parents of children with CP may not be exactly aware of the extent of the oral health problem their children have, but they assume it is bad and are suffering from it in their daily life. This is also found in the third section where a correlation was found only with OHI-S and parental concerns, while there was no correlation found with the total DMFT and Visual Periodontal Index, indicating that the parents are highly concerned about their children’s oral health based on assumption that it is not very well.

No significant association at all was found between the questions in section 4 and the total DMFT or the OHI-S in the CP group. This also supports the previous statement that parents are concerned about their children’s oral health and they know that their

OHRQOL is lower than normal developing children even if they don’t exactly know the extent of their children’s oral health problems.

A negative significant association was found between the first and third question in this section and the gingival health status indicating that the opinions of the parents’ on their child’s oral health and their feeling about it were better as the Visual Periodontal Index scores were lower indicating good gingival health.

The absence of association between the total DMFT, OHI-S and Visual Periodontal Index and the demographic variables indicates that these factors didn’t affect the type of care and amount of attention the child was is getting. This disagrees with what has been found in Brazil which was that the dental profile of children and adolescents with CP benefited from being cared by people that had completed at least the basic schooling level and worsened by the presence of more than one sibling in the family. They also found in that study that gender and whether the mother worked or not didn’t affect the dental health of the child which is similar to the present results (De Camargo and Antunes, 2008).

The children who were taking medication in the CP group were only 20 out of 63 children, this maybe the reason why the relationship between the medication and especially the total DMFT wasn’t shown in the results.

The association found between the pain being the main reason for visiting the dentist and the higher total DMFT is obviously because most of the children with CP are not enrolled in a regular dental check up program and are only going for treatment when needed.

The frequency of sugar intake and the frequency and supervision tooth brushing didn’t show a correlation with any of the intra-oral indices, which was in agreement with the findings of De Camargo and Antunes (2008).

The OHRQOL in children with CP is low, and improving it is a shared responsibility that involves not only the parents of those children, but also the team of physicians, dentists, nurses, physical therapists and teachers who are an essential part of those children’s lives. Raising the awareness towards oral health and its effect on the QOL is essential step to enhance their OHRQOL followed by prevention, screening and early detection of oral symptoms and problems. Every child should be a given a chance for the improvement of their QOL by all means irrespective of their disability, even a small improvement matters a lot to them.

Chapter VII

Conclusions

From this study, it was concluded that:

1. The oral health status of children with CP is not significantly different from that of normally developing children in the same age group.

2. The OHRQOL of children in children with CP was significantly lower than that of normally developing children in 3 sections of the FHC-OHRQOL questionnaire.

    I. The numbers and severity of the oral symptoms reported in Section I didn't show any significant difference between the 2 groups.
    II. The number and severity of the daily life problems reported in Section II were significantly higher in children with CP.
    III. The number and severity of the parental concerns reported in Section III were significantly higher in children with CP.

IV. In Section IV, the parents’ opinions about their children’s oral health status, how they rate it compared to other children with the same age, their feelings about their over all oral well being along with their rating of their over all QOL were significantly lower in children with CP.

3. A significant positive association was found between the oral symptoms reported in Section I and the total DMFT score in children with CP as well as normally developing children.

4. A significant positive association was found between the parental concerns reported in Section III and the oral hygiene level in children with CP.

5. Significant negative associations were found among items in section IV and the total DMFT score and the Visual Periodontal Index scores.

6. There was no association found between the demographic variables including gender, number of siblings, order of child, parent’s education level, and mother’s occupation and the oral health status of the children CP group.

7. There was no association found between the medical history and the oral health status in the CP group.

8. A significant association was found between the reason for dental visits and the total DMFT score in the CP group. Pain was the most frequently associated reason with the higher total DMFT score.

9. Parents of children with CP are not aware of their children’s exact oral health status, but they are concerned it is affecting their daily life and their overall QOL.

Chapter VIII

Recommendations

In light of the findings of the present study, and for the purpose of raising the OHRQOL levels in children with CP and to overcome the concerns associated with their oral health condition the following recommendations are suggested:

1. To conduct a similar study including children with CP who were not covered in the present sample. Children could be recruited from hospitals, clinics, or even from their homes.

2. To have a member from each of the centers for CSHCN and schools trained and educated to identify oral problems using simple examination methods such as the ones used in this research.

3. A manual aided with pictures could be provided in order to help in identifying oral conditions and problems in the beginning and refresh their memory when needed.

4. To increase the awareness of dental professionals toward this group of children in particular and to CSHCN in general, starting by dental students. This could be achieved by enrolling the students in programs that allows them to visit those children in their centers so they can be familiar with their environments and needs.

5. It is also beneficial to have dentists visit the centers for CSHCN on regular basis to provide educational lectures and to examine the children.

6. To test the Arabic-translated version of the FHC-OHRQOL for validity and reliability of the translation in order for it to be available for use.

Chapter IX

Summary

Oral health-related quality of life (OHRQOL) is as “a multidimensional construct that reflects (among other things) people’s comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health”. Cerebral palsy (CP) is the most common form of neuromuscular disability affecting children. Children with CP are at increased risk for developing dental disease. It is generally agreed that this population has higher rates of poor oral hygiene and gingivitis and that may further affect their quality of life. The aim of this study was to assess the oral health and the parents’ perception of the OHRQOL in children with CP and compare it with healthy children in Jeddah.

The study sample consisted of 63 children diagnosed with CP that were recruited from eight centers of disability one of which was public and the remaining seven were private centers. The control group consisted of 99 normally developing children recruited from five elementary schools for boys and girls two of which were public and the remaining three were private. The children in both groups were from 6-12 years old. A brief oral examination was conducted assessing the dental health using the DMFT/dft, the gingival health using the Visual Periodontal Index and the oral hygiene using the Simplified Oral Hygiene Index (OHI-S). The examinations were conducted in the schools/centers of the children by calibrated examiners after receiving parental consent. In the consent form, parents were asked to provide their phone number in order to conduct a telephone interview to fill out the questionnaire. The OHRQOL questionnaire that was used in the study was the Franciscan Hospital for Children Oral Health-Related Quality of Life (FHC-OHRQOL). This questionnaire consisted of four sections. Section I consists of 15 items in which parents were asked to rate their child's current oral problems/symptoms. Section II consists of 13 items in which parents were asked to rate the impact of their child's current oral health on their daily life. Section III consisted of 9 questions related to parents' concerns about their child's oral health. In these 3 sections, each item was rated on a 4-point scale: never (0); hardly ever (1); some of the time (2) or all of the time (3). In section IV, a 13-cm visual analog scale (VAS) was used for each of 4 questions to assess parent's perceptions of their child's oral well-being and overall QOL.

The results of the present study demonstrated no significant difference regarding the demographic characteristics between the CP group and control group except that the number of working mothers in the CP group was significantly lower than that in the control group (p= 0.029) and the fathers' level of education was significantly lower in the CP group (p=0.002). Regarding the medical history, more children in the CP group were taking medication on regular basis (p=0.000) and more have been previously hospitalized (p=0.000). There was a statistically significant difference between the two groups in the number of dental visits (p=0.000), frequency of sugar intake (p=0.021), frequency of daily brushing (p=0.026) and the supervision of brushing (p=0.000). No significant difference was found in the "reason for dental visit". Significantly more children in the CP group had bruxism (*p*=0.000) and food pouching (*p*=0.000) than in the control group. The examination showed a significant difference of number of extra-oral findings between the two groups (*p*=0.000). There was no statistically significant difference in the dental health represented by the DMFT/dft, the oral hygiene assessed by the OHI-S or the gingival health indicated by the Visual Periodontal Index between the CP group and control group. The OHRQOL showed no significant difference in the number and severity of the reported oral symptoms (section I). Regarding the daily life problems and the parental concerns (sections II and III), children in the CP group had significantly higher number (*p*=0.004 and *p*=0.005 respectively) and more severe findings (*p*=0.001 and *p*=0.010 respectively) indicating worse quality of life. In section IV, children in the CP group had significantly lower scores in the four questions indicating lower quality of life (*p*= 0.013, *p*=0.033, *p*=0.000 and *p*=0.000 respectively).

The oral health status of children with CP is not significantly different from that of normally developing children but the OHRQOL of children with CP is significantly lower then that of normally developing children.

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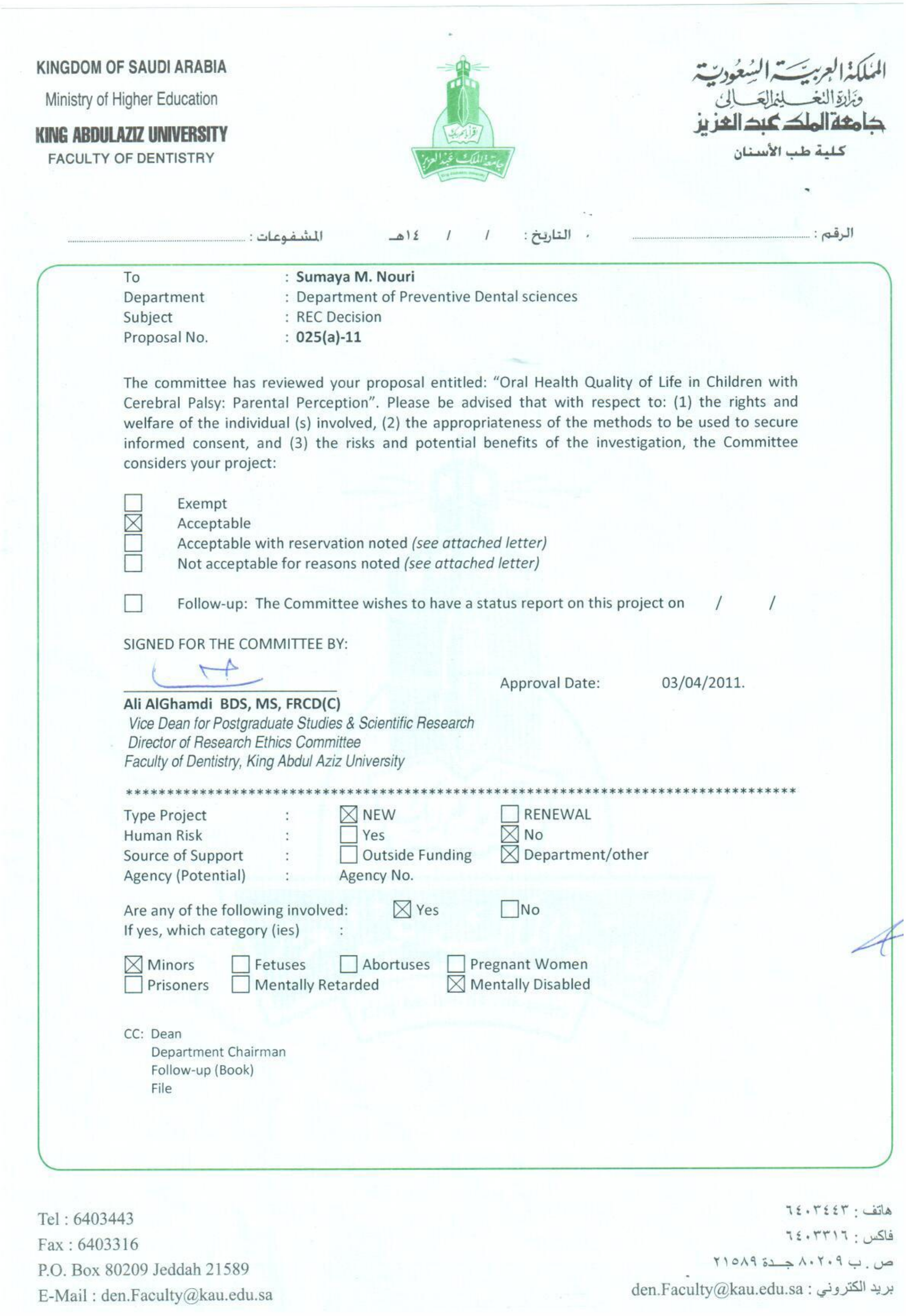
APPENDIX

Appendix I



KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
KING ABDULAZIZ UNIVERSITY
FACULTY OF DENTISTRY

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك عبد العزيز
كلية طب الأسنان

الرقم : .... التاريخ : / / ١٤هـ المشفوعات : ....

To : **Sumaya M. Nouri**
Department : Department of Preventive Dental sciences
Subject : REC Decision
Proposal No. : **025(a)-11**

The committee has reviewed your proposal entitled: “Oral Health Quality of Life in Children with Cerebral Palsy: Parental Perception”. Please be advised that with respect to: (1) the rights and welfare of the individual (s) involved, (2) the appropriateness of the methods to be used to secure informed consent, and (3) the risks and potential benefits of the investigation, the Committee considers your project:

☐ Exempt
☒ Acceptable
☐ Acceptable with reservation noted *(see attached letter)*
☐ Not acceptable for reasons noted *(see attached letter)*

☐ Follow-up: The Committee wishes to have a status report on this project on / /

SIGNED FOR THE COMMITTEE BY:

Approval Date: 03/04/2011.

Ali AlGhamdi BDS, MS, FRCD(C)
Vice Dean for Postgraduate Studies & Scientific Research
Director of Research Ethics Committee
Faculty of Dentistry, King Abdul Aziz University

****

Type Project : ☒ NEW ☐ RENEWAL
Human Risk : ☐ Yes ☒ No
Source of Support : ☐ Outside Funding ☒ Department/other
Agency (Potential) : Agency No.

Are any of the following involved: ☒ Yes ☐ No
If yes, which category (ies) :

☒ Minors ☐ Fetuses ☐ Abortuses ☐ Pregnant Women
☐ Prisoners ☐ Mentally Retarded ☒ Mentally Disabled

CC: Dean
Department Chairman
Follow-up (Book)
File

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هاتف : ٦٤٠٣٤٤٣
فاكس : ٦٤٠٣٣١٦
ص . ب ٨٠٢٠٩ جـدة ٢١٥٨٩
بريد الكتروني : den.Faculty@kau.edu.sa

Appendix-II

List of Centers for Children with CP in Jeddah

Status	Type	Center Name
Included in research	حكومي	1. جمعية الاطفال المعوقين
Changing location	حكومي	2. مركز التأهيل الشامل للإناث
Included in research	خاص	3. مركز العون
Included in research	خاص	4. مركز بادغيش للرعاية و التأهيل
Not enough CP cases	خاص	5. مركز السلام التخصصي لتحسين عيوب النطق
Not enough CP cases	خاص	6. مركز التدخل المبكر لرعاية الفئات الخاصة
Not enough CP cases	خاص	7. مركز تحسين النطق و الكلام لرعاية ذوي الاحتياجات الخاصة
Not enough CP cases & uncooperative parents	خاص	8. مركز الرعاية و الحنان للأطفال ذوي الاحتياجات الخاصة
Not enough CP cases	خاص	9. مركز الخطوة الاولى للرعاية و التأهيل
Not enough CP cases & uncooperative parents	خاص	10. مركز البسمة للرعاية الخاصة
Included in research	خاص	11. مركز ايثار للرعاية النهارية
Not enough CP cases	خاص	12. مركز أمل للرعاية النهارية (Hope) لذوي الاحتياجات الخاصة
Included in research	خاص	13. مركز نجود لتأهيل الأطفال المعوقين
Not enough CP cases	خاص	14. مركز أبجد للرعاية النهارية
Included in research	خاص	15. مركز سأكون لتأهيل ذوي الاحتياجات الخاصة ـ للرعاية النهارية
Included in research	خاص	16. مركز جدة لتأهيل ذوي الاحتياجات الخاصة
Not enough CP cases	خاص	17. مركز تواصل للتدخل المبكر
Not enough CP cases	خاص	18. مركز تنوير لذوي الاحتياجات الخاصة
Included in research	خاص	19. مركز الحنان المتميز
Only physical therapy	خاص	20. مركز جدة لرياض ذوي الاحتياجات الخاصة
No answer	خاص	21. مركز دار الأمان
No answer	خاص	22. الجمعية الفيصلية
No CP cases at that time	خاص	23. مركز رسالة أمل
Fax number only	خاص	24. مركز أمل جدة لتأهيل المعاقين
Not in same age group	خاص	25. مركز الطفولة السعيدة
No CP cases at that time	خاص	26. مركز المهارات لتنمية القدرات الوظيفية
Only physical therapy	خاص	27. مركز شروق الشمس الحديث

Fax number only	خاص	28. المركز العربي للعلاج الطبيعي
No answer	خاص	29. مركز القطان
Wrong number	خاص	30. مركز تحدي الطفولة
No answer	خاص	31. مركز نورة
No CP cases at that time	خاص	32. المركز العربي الارتقائي

*****Shaded cells indicate that the center was included in the research.

Appendix-III

List of Contacted CP Centers in Jeddah

Number of Children with CP	Type	Center Name
46	حكومي	1. جمعية الاطفال المعوقين
6 (changing Location)	حكومي	2. مركز التأهيل الشامل للإناث
30	خاص	3. مركز العون
12	خاص	4. مركز بادغيش للرعاية و التأهيل
1	خاص	5. مركز السلام التخصصي لتحسين عيوب النطق
2	خاص	6. مركز التدخل المبكر لرعاية الفئات الخاصة
1	خاص	7. مركز تحسين النطق و الكلام لرعاية ذوي الاحتياجات الخاصة
3 (uncooperative parents)	خاص	8. مركز الرعاية و الحنان للأطفال ذوي الاحتياجات الخاصة
1	خاص	9. مركز الخطوة الاولى للرعاية و التأهيل
2 (uncooperative parents)	خاص	10. مركز البسمة للرعاية الخاصة
10	خاص	11. مركز ايثار للرعاية النهارية
3	خاص	12. مركز أمل للرعاية النهارية (Hope) لذوي الاحتياجات الخاصة
9	خاص	13. مركز نجود لتأهيل الأطفال المعوقين
1	خاص	14. مركز أبجد للرعاية النهارية
10	خاص	15. مركز سأكون لتأهيل ذوي الاحتياجات الخاصة - للرعاية النهارية
5	خاص	16. مركز جدة لتأهيل ذوي الاحتياجات الخاصة
1	خاص	17. مركز تواصل للتدخل المبكر
4	خاص	18. مركز تنوير لذوي الاحتياجات الخاصة
5	خاص	19. مركز الحنان المتميز

***** Shaded cells indicate that the center was included in the research.

Appendix-IV

Introduction Letter and Consent Form for the CP Group

ولي أمر الطفل / الطفلة

السلام عليكم..

من منطلق حرص قسم طب أسنان الاطفال بجامعة الملك عبد العزيز على تقديم الأفضل في مجال العناية بصحة فم وأسنان أطفالنا، فإننا نقوم بإجراء بحث علمي بتنسيق د. سمية النوري بعنوان **" جودة الحياة المتعلقة بصحة الفم لدى مجموعة من الأطفال المصابين بالشلل الدماغي في مدينة جدة : منظور الأهل".**

لقد تم اختيارمركز طفلك للمشاركة في هذا البحث الذي يهدف لتقييم جودة نوعية الحياة المتعلقة بصحة الفم من منظور الأهل لدى هؤلاءالأطفال ومن ثم مقارنتها بتلك لدى الاطفال الأصحاء. يتكون هذا البحث من جزئين، الاول: عبارة عن إستبيان سوف تتم الإجابة عليه عبر مكالمة هاتفية من أحد الباحثين مع ولي أمر الطفل. الجزء الثاني: عبارة عن فحص سريع لفم وأسنان الطفل و سيتم إجراؤه في المركز خلال ساعات الدوام. علماً بأن كل المعلومات ستكون سرية.

النتائج التي سنحصل عليها من هذا البحث سوف يكون لها دور إيجابي في خدمة المجتمع و خصوصاً الأطفال المصابين بالشلل الدماغي ، حيث أنها ستساعد في تحديد حجم المشاكل التي يعاني منها هؤلاء الأطفال حتى نتمكن من توفير الخدمات و العلاج اللازم.

في حال موافقتكم على المشاركة في هذا البحث الرجاء توقيع هذه الخطاب و إرفاق رقم الهاتف أو الجوال و تحديد إذا امكن الوقت الأنسب للإتصال بكم.

شاكرين لكم تعاونكم معنا.

د.سمية النوري/ جامعة الملك عبد العزيز، كلية طب الأسنان، قسم طب أسنان الأطفال.

موافقة خطية (لدراسة إكلينكية)

Consent Form

عنوان البحث: جودة الحياة المتعلقة بصحة الفم لدى مجموعة من الأطفال المصابين بالشلل الدماغي في مدينة جدة: منظور الأهل

إن هذا البحث لا يستدعي اعطاء أي دواء خاص أو منع أي دواء عن الطفل أثناء أو بعد الكشف.

لإتمام هذا البحث نطلب موافقتكم على أخذ بيانات الطفل و طريقة علاجه.

بعد فهم طبيعة هذا البحث ومراجعة المعلومات المفصلة عن الدراسة المرفقة فأنني أوافق طوعا على المشاركة في هذه الدراسة.

- ✓ أنا أعلم بأنني سوف أشارك في هذه الدراسة ومن المحتمل أن تكون ذات فائدة بطريقة مباشرة أو غير مباشرة و لكنها سوف توفر معلومات يمكن أن تفيد مرضى آخرين بمثل حالة الطفل في المستقبل.
- ✓ أنا أعلم أن المعلومات سوف تكون ذات سرية تامة.
- ✓ بالإضافة إلى ذلك فأنني أعلم بأنه لي الحق في الانسحاب في أي وقت من هذه الدراسة و ذلك بإخطار الطبيب الباحث بأنني قررت الانسحاب أو قررت عدم المشاركة.
- ✓ أنني افوض الطبيب بتسجيل معلومتي الطبية ونشر أو تقديم نتائج الدراسة في المؤتمرات الطبية في المستقبل مع عدم ذكر إسم الطفل.

اسم الطفل: عمر الطفل:

اسم المركز: فصل الطفل:

هل يعاني الطفل من أي مشاكل صحية أخرى ؟

هل يتناول الطفل اي ادوية بصورة دائمة ؟

تاريخ الانضمام الى البحث:

اسم ولي الأمر: علاقته بالطفل:

توقيع ولي الأمر:

هاتف المنزل: الجوال:

الوقت الأنسب للاتصال:

Appendix-V

Introduction Letter and Consent Form for the Control Group

ولي أمر الطالب / الطالبة،
السلام عليكم...
إن صحة الفم جزء اساسي من الصحة العامة حيث أن المشاكل المتعلقة بصحة الفم و الاسنان لا تقتصر على الشعوربالألم فقط ، بل إن لها أبعاد أخرى يمكن أن تؤثرعلى نفسية الطفل ، تركيزه ، أداؤه الدراسي ، علاقته بالآخرين و بالتالي على جودة حياته بالكامل.

لقد تم اختيارمدرسة طفلك للمشاركة في بحث علمي تحت إشراف قسم طب أسنان الاطفال بجامعة الملك عبد العزيز بعنوان **" جودة الحياة المتعلقة بصحة الفم لدى مجموعة من الأطفال المصابين بالشلل الدماغي في مدينة جدة : منظور الأهل".** الهدف من هذا البحث هو تقييم منظور الأهل لجودة الحياة المتعلقة بصحة الفم لدى الأطفال (الاصحاء وبعض الفئات من ذوي الإحتياجات الخاصة) في جدة ، و من ثم مقارنة النتائج. يتكون هذا البحث من جزئين، الاول: عبارة عن إستبيان سوف تتم الإجابة عليه عبر مكالمة هاتفية من أحد الباحثين مع ولي أمر الطفل. الجزء الثاني: عبارة عن فحص سريع لفم وأسنان الطفل و سيتم إجراؤه في المدرسة خلال ساعات الدوام. علماً بأن كل المعلومات ستكون سرية.

النتائج التي سنحصل عليها من هذا البحث سوف يكون لها دور إيجابي في خدمة المجتمع ، حيث أنها ستساعد في تحديد حجم المشاكل التي يعاني منها هؤلاء الأطفال حتى نتمكن من توفير الخدمات و العلاج اللازم.

في حال موافقتكم على المشاركة في هذا البحث الرجاء توقيع هذه الخطاب و إرفاق رقم الهاتف أو الجوال و تحديد إذا امكن الوقت الأنسب للإتصال بكم.

شاكرين لكم تعاونكم.
د. سمية النوري/ جامعة الملك عبد العزيز، كلية طب الأسنان، قسم طب أسنان أطفال

موافقة خطية (لدراسة إكلينكية)

Consent Form

عنوان البحث: جودة الحياة المتعلقة بصحة الفم لدى مجموعة من الأطفال المصابين بالشلل الدماغي في مدينة جدة: منظور الأهل

إن هذا البحث لا يستدعي اعطاء أي دواء خاص أو منع أي دواء عن الطفل أثناء أو بعد الكشف.

لإتمام هذا البحث نطلب موافقتكم على أخذ بيانات الطفل و طريقة علاجه .

بعد فهم طبيعة هذا البحث ومراجعة المعلومات المفصلة عن الدراسة المرفقة فأنني أوافق طوعا على المشاركة في هذه الدراسة.

- ✓ أنا أعلم بأنني سوف أشارك في هذه الدراسة ومن المحتمل أن تكون ذات فائدة بطريقة مباشرة أو غير مباشرة و لكنها سوف توفر معلومات يمكن أن تفيد مرضى آخرين بمثل حالة الطفل في المستقبل.
- ✓ أنا أعلم أن المعلومات سوف تكون ذات سرية تامة.
- ✓ بالإضافة إلى ذلك فأنني أعلم بأنه لي الحق في الانسحاب في أي وقت من هذه الدراسة و ذلك بإخطار الطبيب الباحث بأنني قررت الانسحاب أو قررت عدم المشاركة.
- ✓ أنني افوض الطبيب بتسجيل معلوملتي الطبية ونشر أو تقديم نتائج الدراسة في المؤتمرات الطبية في المستقبل مع عدم ذكر إسم الطفل.

اسم الطفل:	عمر الطفل:
اسم المدرسة:	فصل الطفل:

هل يعاني الطفل من أي مشاكل صحية ؟

هل يتناول الطفل اي ادوية بصورة دائمة ؟

ئتاريخ الانضمام الى البحث:

اسم ولي الأمر:	علاقته بالطفل:

توقيع ولي الأمر:

هاتف المنزل:	الجوال:

الوقت الأنسب للاتصال:

Appendix-VI

استبيان معلومات المريض

الاسم:

المركز / المدرسة:

الفصل:

التاريخ: / /

الرقم التسلسلي:

رمز الطفل المشارك: Control Case

رمز الطبيب الباحث: 1 2

(Form A) أ/ البيانات الشخصية

تاريخ الميلاد				
الجنس	ذكر	أنثى		
رقم الهاتف	المنزل	الأب	الأم	
عدد الاخوة (باستثناء الطفل المشارك)				
ترتيب الطفل بين الإخوة	الأول	الثاني	الثالث أو أكثر	
مهنة الأم	تعمل	ربة منزل		
المؤهل الدراسي للأب	جامعي	دبلوم	مدرسة (ثانوي، إعدادي، إبتدائي)	لا يقرأ أو يكتب
المؤهل الدراسي للأم	جامعي	دبلوم	مدرسة (ثانوي، إعدادي، إبتدائي)	لا تقرأ أو تكتب

Appendix-VII

(Form B) ب/ البيانات الطبية

هل عانى طفلك أو يعاني حالياً من أي من المشاكل الصحية التالية:

	نعم	لا
أمراض القلب		
الحمى الروماتزمية		
الأمراض التنفسية		
الربو		
أمراض الكلى		
أمراض الكبد		
مشاكل في النمو		
السكر		
الحساسية		
التشنجات أو الصرع		
جلطات الدماغ		
فقر الدم		
أمراض سيولة الدم		
الأورام الخبيثة		
إعاقة سمعية / بصرية / نطقية / حركية		
أمراض أخرى:		

هل يتناول طفلك أي من الأدوية بصورة دائمة؟

- لا
- نعم

إذا كانت الإجابة "نعم" الرجاء التعداد:

هل سبق أن تم تنويم طفلك في المستشفى؟

- لا
- نعم

إذا كانت الإجابة "نعم" فما هو السبب؟

Appendix-VIII

(Form C) ج/المعلومات المرتبطة بصحة الفم و اللأسنان

كم مرة ذهب طفلك لزيارة طبيب الاسنان ؟

- مرة
- مرتين
- أكثر من مرة
- لم يذهب من قبل

ماهو سبب الزيارة؟

- الشعور بالألم
- لاستكمال خطة علاج
- للفحص الدوري

كم بالمتوسط يبلغ عدد الأغذية السكرية (عصيرات، حليب محلى أو صناعي، مشروبات غازية، حلويات... إلخ) التي يتناولها طفلك خلال اليوم؟

- لا يتناولها
- مرة واحدة في اليوم
- من مرتين إلى ثلاثة في اليوم
- أكثر من ثلاث مرات في اليوم

كم مرة في اليوم تنظف أسنان طفلك؟

- لا تنظف
- مرة واحدة في اليوم
- من مرتين إلى ثلاثة في اليوم
- أكثر من ثلاث مرات في اليوم

هل يشرف أحد على تنظيف أسنان طفلك؟

- أحد الوالدين ينظف أسنان الطفل
- أحد الوالدين يشرف على تنظيف أسنان الطفل
- الطفل ينظف أسنانه بدون إشراف
- أحد غير الوالدين يشرف أو ينظف أسنان الطفل

هل يميل طفلك للضغط أو الجز على أسنانه؟

- لا
- نعم

هل يميل طفلك للاحتفاظ بالطعام في فمه قبل البلع ؟

- لا
- نعم

هل يميل طفلك للتنفس من فمه ؟

- لا
- نعم

Appendix-IX

(Form D) FHC-OHRQOL

Section I: "Child's Oral Problems/Symptoms"

Does your child have any of the following oral problems/symptoms?	Never	Hardly ever	Some of the time	All of the time
1. Tooth ache				
2. Pain with hot/cold foods				
3. Pain with chewing				
4. Bad taste or bad breath				
5. Pain with sweets				
6. Bleeding with brushing/flossing				
7. Pain for no reason				
8. Broken teeth				
9. Dry mouth				
10. Painful/bleeding gums				
11. Mouth sores				
12. Mouth bubbles/blisters				
13. Swelling of the face				
14. Sore jaw				
15. Headaches				

Section II: **"Your Child's Daily Life"**

Does your child suffer from any of the following because of his/her current oral health condition?	Never	Hardly ever	Some of the time	All of the time
1. Difficulty eating				
2. Acts irritable				
3. Refuses certain foods				
4. Difficulty getting to sleep				
5. Wakes up from sleep				
6. Acts aggressive				
7. Difficulty paying attention				
8. Behavior trouble				
9. Avoids meeting people				
10. Miss school				
11. Experiences jokes about…				
12. Avoids smiling because of ugly teeth				
13. Avoids smiling because of missing teeth				

Section III: "Parental Concerns"

Are you concerned that your child's oral health condition:	Never	Hardly ever	Some of the time	All of the time
1. Affects your child's eating & nutrition?				
2. Causes anger about oral problems?				
3. Affects school work and attendance?				
4. Makes your child miss sleep?				
5. Makes you miss work?				
6. Changes family plans?				
7. Disrupts family life?				
8. Leads to unfinished chores?				
9. Interferes with friendships?				

Section IV: “Parent’s Perceptions of Their Child’s Oral Well-Being And QOL”

Please mark an (X) on line to indicate your estimation of your child’s oral well-being for each of the fallowing questions:

1. What is your opinion of the appearance of your child’s teeth and mouth?

Excellent	Good	Poor

2. How do you think your child’s oral health is compared to other individuals of the same age?

Better than others his/her age	About the same as others his/her age	Worse than others his/her age

3. How do you feel about your child’s overall oral well-being?

Excellent	Good	Poor

4. How would you rate your child’s overall QOL?

Excellent	Good	Poor

Appendix-X

Arabic-translated Version of the FHC-OHRQL

(Form D) د/ المعلومات المرتبطة بتاثير صحة الفم على حياة الطفل وعائلته

الجزء الأول: المشاكل /الأعراض المرتبطة بصحة فم الطفل.

هل يعاني طفلك من اي من المشاكل / الأعراض التالية؟	أبدا	نادراً	أحياناً	دائماً
1. ألم في الأسنان				
2. ألم مع شرب او تناول الأطعمة الساخنة او الباردة				
3. ألم عند المضغ				
4. رائحة نفس اوطعم غير مستحب (كريه)				
5. ألم عند تناول الحلويات				
6. نزيف باللثة عند تفريش الأسنان /استخدام خيط الأسنان				
7. الم من غير سبب				
8. أسنان مكسورة				
9. جفاف في الفم				
10. الم او نزيف من اللثة				
11. تقرحات في الفم				
12. حبوب في الفم				
13. انتفاخ في الوجه				
14. الم في الفك				
15. الصداع				

الجزء الثاني: حياة طفلك اليومية.

هل حالة فم وأسنان طفلك تسبب معاناته من:	أبداً	نادراً	أحياناً	دائماً
1. صعوبة في الأكل؟				
2. شعور بالانزعاج؟				
3. رفض أنواع معينة من الأطعمة؟				
4. مواجهة صعوبة في النوم؟				
5. الاستيقاظ من النوم؟				
6. التصرف بعدوانية؟				
7. اي صعوبة في التركيز؟				
8. اى مشاكل سلوكية؟				
9. تجنب لقاء الاخرين؟				
10. التغيب عن المدرسة؟				
11. سخرية زملائه ؟				
12. تجنب الابتسام او الضحك بسبب سوء مظهر اسنانه ؟				
13. تجنب الابتسام او الضحك بسبب فقدانه لبعض الأسنان؟				

<u>الجزء الثالث:</u> قلق الأهل المرتبط بحالة فم وأسنان الطفل

هل تشعربالقلق من أن حالة فم وأسنان طفلك:	أبداً	نادراً	أحياناً	دائماً
1. تؤثر على تناوله للطعام وعلى غذاءه؟				
2. تشعره بالغضب؟				
3. تؤثر على اداءه الدراسي وعلى مواظبته؟				
4. تحرمه من النوم؟				
5. تمنعك عن العمل؟				
6. تؤثر على خططكم العائلية؟				
7. تؤثر على حياتكم العائلية؟				
8. تؤدي الى صعوبة في اداء الواجبات المنزلية؟				
9. تؤدي الى التعارض مع الصداقات؟				

الجزء الرابع: تقدير الأهل لمدى صحة فم الطفل و لحياته العامة.

ضع علامة (×) في الموقع على الخط الذي يمثل جوابك لكل سؤال

1. ما رأيك في حالة فم و أسنان طفلك؟

سيئة	جيدة	ممتازة

2. ما تقديرك لحالة فم وأسنان طفلك مقارنة باطفال اخرين في مثل سنه؟

أسوأ من غيره في مثل سنه	مثل غيره ممن في سنه	أفضل من غيره في مثل سنه

3. ما هو شعورك تجاه صحة فم طفلك بشكل عام؟

سيئة	جيدة	ممتازة

4. ما هو تقييمك لحياة طفلك العامة؟

سيئة	جيدة	ممتازة

Appendix-XI

Examination Sheet

School/Center: Class:

Name: Examiner: 1 2 3

Extra-Oral Examination:

Extra-Oral appearance	Normal:	Abnormal:
Head		
Face		
Lips		
Hands		
Fingers, nails		

Intra-Oral Soft Tissue Examination:

Oral mucosa	Normal:	Abnormal:

<table>
<tr><th colspan="2">Tooth</th><th>D/d</th><th>M</th><th>F/f</th><th colspan="3">Plaque</th><th colspan="3">Calculus</th></tr>
<tr><td>17</td><td></td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>16</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>15</td><td>55</td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>14</td><td>54</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>13</td><td>53</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>12</td><td>52</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>11</td><td>51</td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>21</td><td>61</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>22</td><td>62</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>23</td><td>63</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>24</td><td>64</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
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<tr><td>26</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
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<tr><td>37</td><td></td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>36</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>35</td><td>75</td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>34</td><td>74</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>33</td><td>73</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>32</td><td>72</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>31</td><td>71</td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>41</td><td>81</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>42</td><td>82</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>43</td><td>83</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>44</td><td>84</td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td>45</td><td>85</td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>46</td><td></td><td></td><td></td><td></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td>47</td><td></td><td></td><td></td><td></td><td colspan="3">▨</td><td colspan="3">▨</td></tr>
<tr><td colspan="2">DMFT</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td colspan="2">dft</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td colspan="2">Total</td><td colspan="3"></td><td colspan="3"></td><td colspan="3"></td></tr>
<tr><td colspan="5">Visual Periodontal Index</td><td colspan="2">0</td><td colspan="2">1</td><td colspan="2">2</td></tr>
</table>

CURRICULUM VITAE

Name	Sumaya M. Nouri
Date of Birth	September, 6, 1982
Nationality	American
Education	(2010-2013) Masters of Pediatric Dentistry Student College of Dentistry King Abdul Aziz University
	(2000-2006) Bachelor of Dental Science Degree College of Dentistry King Abdul Aziz University
	(2006-2007) Internship in Armed Forces Hospital King Abdul Aziz Airbase Dhahran, Saudi Arabia
Employment History	(2009-2010) General Practitioner at Dr. Munir Hamid Harasani Dental Clinics.

بين المجموعتين فيما يختص بعلامات المرضى الخارجية غير الفموية (p= 0.000). بينما لم تظهر أي فروقات إحصائية في صحة الفم حسب مؤشر DMFT/dft، وكذلك في مؤشر نظافة الفم OHI-S أو في صحة اللثة حسب مؤشر Visual Periodontal Index بين المجموعتين. لم تظهر جودة الحياة المتعلقة بصحة الفم OHRQOL أي اختلاف جوهري بين عدد وحدّة الأعراض أو المشاكل المتعلقة بصحة الفم (القسم الأول). أما فيما يختص بمشاكل الحياة اليومية وقلق الأهل (القسم الثاني والثالث) فإن المؤشر لدى الأطفال المصابين بالشلل الدماغي كان أعلى من ذلك لدى المجموعة الأخرى مما يدل على انخفاض مستوى جودة الحياة ونوعيتها. وحسب القسم الرابع فإن نتائح الأسئلة الأربعة للأطفال المصابين بالشلل الدماغي كانت متدنية مما يدل أيضاً على إنخفاض جودة الحياة لدى هذه الفئة.

لم تكن حالة الصحة الفموية للأطفال المصابين بالشلل الدماغي مختلفة عن تلك لدى الأطفال الطبيعيين و لكن جودة الحياة المتعلقة بصحة الفم بالنسبة للأطفال المصابين بالشلل الدماغي أقل مما هي لدى الأطفال الطبيعيين.

الأهل إدراج أرقام هواتفهم في نموذج الموافقة من أجل إتمام المقابلة الهاتفية لتعبئة استبيان مستشفى فرانسيسكان لجودة الحياة المتعلقة بصحة الفم (FHC-OHRQOL). يُقسّم الاستبيان إلى أربعة أقسام. يتكون القسم الأول من ١٥ عنصر يُطلب فيه من الأهل تقييم مشاكل وأعراض أطفالهم المتعلقة يصحة الفم. و يتكون القسم الثاني من ١٣ عنصر يقيّم فيه الأهل تأثير صحة الفم على حياة أطفالهم اليومية. ويتكون القسم الثالث من ٩ أسئلة تختص بقلق الأهل تجاه صحة فم أطفالهم. وتم تقييم كل من هذه الأقسام الثلاثة على مقياس من أربعة نقاط: أبدا (٠), نادرا (١), أحيانا (٢), دائما (٣). أما في القسم الرابع فتم استخدام مقياس مرئي تناظري لأربعة لأسئلة تقيم مدى إدراك الأهل لأهمية صحة فم أطفالهم بشكل خاص ونوعية حياتهم بشكل عام.

أظهرت نتائج البحث أنه لا يوجد اختلاف في الصفات الديموغرافية بين مجموعة الأطفال المصابين بالشلل الدماغي وبين المجموعة التنظيمية إلا في أن عدد الأمهات العاملات في مجموعة الأطفال المصابين بالشلل الدماغي و مستوى الآباء التعليمي كانا أقل إحصائياً من عددهم و مستواهم في المجموعة التنظيمية (p= 0.029) و (p= 0.002). أما بالنسبة للحالة الطبية، وجد أن غالبية الأطفال اللذين يتعاطون عقاقير وأدوية بانتظام (p= 0.000) و اللذين تم تنويمهم في مستشفيات من قبل (p= 0.000) كانوا من مجموعة الأطفال المصابين بالشلل الدماغي .كما أظهرت النتائج أيضاً تباين إحصائي واضح بين المجموعتين في عدد الزيارات لعيادات الأسنان (p= 0.000)، تكرار تناول السكريات (p= 0.021)، تكرار استعمال فرشاة الأسنان اليومي (p= 0.026) ومراقبة عملية تفريش الأسنان (p=0.000). لم يوجد فرق ذو أهمية إحصائية في "سبب زيارة عيادة الأسنان". كما تبين أن غالبية الأطفال المصابين بالشلل الدماغي يمارسون عادة الجزّ على أسنانهم (p= 0.000) ويحتفظون بالطعام في فمهم قبل البلع (p= 0.000) أكثر من أولئك في المجموعة التنظيمية. كما أظهر الفحوصات فروقات معتبرة

الملخص

تعرف جودة الحياة المتعلقة بصحة الفم (OHRQOL) "بأنها بناء ذو أبعاد متعددة يعكس – ضمن أمور أخرى – راحة الإنسان أثناء تناول الطعام أو النوم أو أي تفاعل اجتماعي آخر، كما يعكس احترام الذات والرضا حيال صحة الفم". إن الشلل الدماغي هو أكثر أنواع الإعاقات العصبية العضلية التي تصيب الأطفال. و يوصف بأنه مجموعة من معوّقات تطوّر الأنشطة ووضعية الجسد التي تحِدّ من الحركة وتُنسب إلى اضطرابات غير تصاعدية وقعت أثناء تطوّر عقل الجنين أو الرضيع. كما أنه غالبا ما تصاحبه اضطرابات بالإحساس والتمييز والتواصل والإدراك و السلوكيات و نوبات الصرع. إن خطورة التعرض لأمراض الفم عند الأطفال المصابين بالشلل الدماغي مرتفعة، إذ من المتعارف عليه أن نسبة تدنّي صحة الفم واللثة لديهم عالية مما يؤثر على جودة نوعية حياتهم. تهدف هذه الدراسة إلى تقييم صحة الفم وإدراك الأهل لمفهوم جودة الحياة المتعلقة بصحة الفم لدى الأطفال المصابين بالشلل الدماغي ومقارنتها مع تلك لدى الأطفال الأصحاء قي مدينة جدة.

شملت الدراسة على ٦٣ طفل تم تشخيصهم بالشلل الدماغي، وهم من ثمانية مراكز لذوي الاحتياجات الخاصة منهم مركز واحد من القطاع الحكومي والسبعة الباقين من القطاع الخاص. وتتكون المجموعة التنظيمية من ٩٩ طفل طبيعي من خمسة مدارس ابتدائية للبنين والبنات، مدرستين منهما حكومية و الثلاثة الباقية مدارس خاصة، وتتراوح أعمار الأطفال في المجموعتين ما بين ٦ إلى ١٢ سنة. تم إجراء فحص للفم لتقييم صحة الأسنان وذلك باستخدام مؤشر DMFT/dft، وصحة اللثة باستخدام مؤشر Visual Periodontal Index ، ومؤشر Simplified Oral Hygiene Index (OHI-S) لتقيم نظافة الفم، وتم هذا الفحص في مدارس ومراكز هؤلاء الأطفال بعد أخذ موافقة الأهل وأجراها أطباء جرى معايرتهم. وقد طُلِب من

جودة الحياة المتعلقة بصحة الفم لدى الأطفال المصابين بالشلل الدماغي: منظور الأهل

سمية محمد عمار منيب النوري

المستخلص

إن الشلل الدماغي هو أكثر أنواع الإعاقات العصبية العضلية التي تصيب الأطفال، كما أن خطورة التعرض لأمراض الفم عند الأطفال المصابين بالشلل الدماغي مرتفعة، إذ من المتعارف عليه أن نسبة تدنّي صحة الفم واللثة لديهم عالية مما يؤثر على جودة نوعية حياتهم. تهدف هذه الدراسة إلى تقييم صحة الفم وإدراك الأهل لمفهوم جودة الحياة المتعلقة بصحة الفم لدى الأطفال المصابين بالشلل الدماغي ومقارتنها مع تلك لدى الأطفال الأصحاء قي مدينة جدة.

شملت الدراسة على ٦٣ طفل تم تشخيصهم بالشلل الدماغي، و على مجموعة تنظيمية تتكون من ٩٩ طفل طبيعي. تتراوح أعمار الأطفال في المجموعتين ما بين ٦ إلى ١٢ سنة. تم فحص فم الأطفال لتقييم صحة الأسنان و اللثة و لتقيم نظافة الفم في مدارس ومراكز هؤلاء الأطفال بعد أخذ موافقة الأهل. وقد طُلِب من الأهل إدراج أرقام هواتفهم في نموذج الموافقة من أجل إتمام المقابلة الهاتفية لتعبئة استبيان مستشفى فرانسيسكان لجودة الحياة المتعلقة بصحة الفم. يُقسّم الاستبيان إلى أربعة أقسام. يطلب من الأهل في القسم الأول تقييم مشاكل وأعراض أطفالهم المتعلقة يصحة الفم. القسم الثاني يقيّم فيه الأهل تأثير صحة الفم على حياة أطفالهم اليومية. و القسم الثالث يختص بقلق الأهل تجاه صحة فم أطفالهم. أما في القسم الرابع فتم استخدام مقياس مرئي تناظري لأربعة لأسئلة تقيم مدى إدراك الأهل لأهمية صحة فم أطفالهم بشكل خاص ونوعية حياتهم بشكل عام.

لم تظهر النتائج اختلاف ذو أهمية إحصائية في الصفات الديموغرافية بين مجموعة الأطفال المصابين بالشلل الدماغي وبين المجموعة التنظيمية إلا في أن عدد الأمهات العاملات في مجموعة الأطفال المصابين بالشلل الدماغي و مستوى الآباء التعليمي كانا أقل إحصائياً من عددهم و مستواهم في المجموعة التنظيمية. لم تظهر أي فروقات إحصائية في صحة الأسنان وكذلك في نظافة الفم أو في صحة اللثة بين المجموعتين. لم تظهر جودة الحياة المتعلقة بصحة الفم أي اختلاف جوهري بين عدد وحدّة الأعراض أو المشاكل المتعلقة بصحة الفم. أما فيما يختص بمشاكل الحياة اليومية وقلق الأهل فإن المؤشر لدى الأطفال المصابين بالشلل الدماغي كان أعلى من ذلك لدى المجموعة الأخرى مما يدل على انخفاض مستوى جودة الحياة ونوعيتها. وحسب القسم الرابع فإن نتائج الأسئلة الأربعة للأطفال المصابين بالشلل الدماغي كانت متدنية مما يدل أيضاً على إنخفاض جودة الحياة لدى هذه الفئة.

لم تكن حالة صحة الفم للأطفال المصابين بالشلل الدماغي مختلفة عن تلك لدى الأطفال الطبيعيين و لكن جودة الحياة المتعلقة بصحة الفم بالنسبة للأطفال المصابين بالشلل الدماغي أقل مما هي لدى الأطفال الطبيعيين.

جودة الحياة المتعلقة بصحة الفم لدى الأطفال المصابين بالشلل الدماغي: منظور الأهل

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بحث مقدم لنيل درجة الماجستير في طب أسنان الأطفال

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