ORAL HYGIENE PRACTICES, TREATMENT NEEDS AND BARRIERS TO DENTAL CARE AMONG ADOLESCENTS ATTENDING SPECIAL EDUCATION SCHOOLS IN SHAH ALAM, SELANGOR, MALAYSIA

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By

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LIST OF ABBREVIATIONS

SHCN	Special health care needs
PWD	People with Disabilities
DMFT	Decayed, Missing, Filled Teeth
PPKI	Program Pendidikan Khas Integrasi
WHO	World Health Organization
MBPK	Murid Berkeperluan Pendidikan Khas
OKU	Orang Kurang Upaya

LIST OF APPENDICES

KAJIAN TENTANG AMALAN KEBERSIHAN MULUT, KEPERLUAN RAWATAN PERGIGIAN DAN HALANGAN YANG DIHADAPI UNTUK MENDAPATKAN RAWATAN PERGIGIAN DALAM KALANGAN MURID REMAJA BERKEPERLUAN PENDIDIKAN KHAS DI SHAH ALAM, SELANGOR, MALAYSIA

ABSTRAK

Remaja dengan keperluan penjagaan kesihatan khas telah dilaporkan mempunyai kesihatan mulut yang lemah berbanding remaja normal disebabkan oleh pelbagai faktor, termasuk latar belakang sosiodemografi, amalan kebersihan mulut dan halangan yang dirasakan. Kajian ini bertujuan untuk menilai amalan kebersihan mulut, status kesihatan mulut, keperluan rawatan pergigian, dan halangan kepada penjagaan pergigian remaja berkeperluan penjagaan kesihatan khas yang menghadiri sekolah pendidikan khas di Shah Alam, Selangor, Malaysia, di samping menilai hubungan antara halangan ini dan keperluan rawatan pergigian mereka. Shah Alam, merupakan sebuah kawasan bandar di Selangor, Malaysia. Ianya dipilih untuk kajian ini kerana pendaftaran kemasukan sekolah remaja berkeperluan khas yang tinggi di sekolah khas di Selangor berbanding negeri-negeri lain di Malaysia. Menjalankan kajian di Selangor memastikan bahawa penemuan akan mewakili remaja berkeperluan penjagaan kesihatan khas yang menghadiri sekolah khas di seluruh Malaysia Seramai 131 remaja dengan pelbagai jenis keperluan penjagaan kesihatan khas berumur 13-18 tahun, yang memenuhi kriteria, mengambil bahagian dalam kajian ini. Semua maklumat mengenai sosiodografi, amalan kebersihan mulut dan kemungkinan halangan kepada penjagaan pergigian peserta dibekalkan oleh ibu bapa sebagai proksi melalui borang tinjauan dalam talian. Pemeriksaan oral ke atas Decayed Missing Filled Teeth (DMFT), Indeks

Kebersihan Mulut Ringkas (OHIS) dan keperluan rawatan telah dijalankan di sekolah dengan kehadiran guru. Statistik perkaitan dianalisa menggunakan ujian Chi-square. Nilai-p kurang daripada 0.05 dianggap signifikan secara statistik. Data telah dianalisis melalui Pakej Statistik untuk Sains Sosial versi 29.0.. Lebih 60% peserta menunjukkan kebersihan mulut yang baik dengan purata skor DMFT dan OHI-S masing-masing 0.79 ± 1.49 dan 0.73 ± 0.4. Kebanyakan peserta, (59.5%), memberus gigi lebih daripada sekali sehari, dan kira-kira 93.9% menggunakan ubat gigi berfluorida. Halangan terbesar yang dirasakan oleh ibu bapa atau penjaga di mana mereka menghadapi kekangan masa untuk membawa anak mereka ke klinik pergigian dan anak-anak mereka resah semasa rawatan pergigian. Kebanyakan mereka memerlukan rawatan penskaleran dan tampalan. Tiada perkaitan yang didapati antara halangan kepada penjagaan pergigian dan keperluan rawatan pergigian. Remaja dalam kajian ini mempunyai status kesihatan mulut yang memuaskan, namun masih terdapat keperluan memperbaiki tabiat kesihatan mulut dan masih terdapat rawatan pergigian yang tidak dipenuhi. Kajian ini juga memberikan gambaran yang jelas tentang halangan kepada penjagaan pergigian di kalangan remaja berkeperluan khas. Kajian ini dijalankan di kawasan bandar di Selangor, Malaysia dan memandangkan remaja ini mempunyai set gigi baru, oleh itu, tiada kaitan didapati antara halangan kepada penjagaan pergigian dan keperluan rawatan pergigian. Kawasan kajian berbilang pusat dengan saiz sampel yang lebih besar disyorkan untuk kajian masa depan.

ORAL HEALTH PRACTICES, TREATMENT NEEDS AND BARRIERS TO DENTAL CARE AMONG ADOLESCENTS ATTENDING SPECIAL EDUCATION SCHOOLS IN SHAH ALAM, SELANGOR, MALAYSIA

ABSTRACT

Adolescents with special healthcare needs have been reported to have poor oral health in compared to normal adolescents due to various factors, include sociodemographic backgrounds, oral hygiene practices and perceived barriers. This study aimed to evaluate the oral hygiene practices, oral health status, dental treatment needs, and barriers to dental care of adolescents with special healthcare needs attending special education schools in Shah Alam, Selangor, Malaysia, while also evaluating the association between these barriers and their dental treatment needs. Shah Alam, an urban area in Selangor, Malaysia, was chosen for this study due to the high enrollment of special needs adolescents in special schools in Selangor compared to other states in Malaysia. Conducting the study in Selangor ensures that the findings will be representative of adolescents with special healthcare needs attending special schools across Malaysia. A total of 131 adolescents with different types of special healthcare needs aged 13-18 years old, who fulfilled the criteria, participated in this study. All information on sociodemographic, oral hygiene practices and possible barriers to the dental care of the participant was supplied by the parents as a proxy through an online survey form. The oral examination on Decayed Missing Filled Teeth (DMFT), Simplified Oral Hygiene Index (OHIS) and treatment needs was carried out in the school with teachers in attendance. Statistical analysis was performed using Chi-square test. A p-value less than 0.05 was considered statistically significant. Data was analyzed via the Statistical Package for Social Sciences version 29.0. Over

60% of participants demonstrated good oral hygiene with a mean DMFT and OHIs scores of 0.79 ± 1.49 and 0.73 ± 0.4, respectively. Most participants, (59.5%), brushed their teeth more than once a day, and about 93.9% used fluoridated toothpaste. The barriers perceived by the parents or caregivers where time constrains to bring their child to dental clinic and child dental anxiety. Most of them required oral prophylaxis and restorative treatment. The present study shows no association between barriers to dental care and dental treatment needs. Adolescents with special healthcare needs in the present study generally have a satisfying oral health status. However, improvements in oral hygiene practices are needed and unmet treatment needs remain high. This study also provides a valid picture of barriers to dental care among adolescents with special needs. This study was conducted in an urban area in Selangor, Malaysia and considering that these adolescents had a new set of teeth, therefore, no association was observed between barriers to dental care and dental treatment needs. A multi-centre study area with a larger sample size is recommended for the future studies.

Keywords: Adolescent, Special education, Oral Hygiene, Barriers, Dental Treatment Needs

CHAPTER 1

INTRODUCTION

As of January 2023, there were 637,537 registered persons with disabilities (PWD) under the Department of Social Welfare (Malaysia), with 71,550 (11.2%) being adolescents aged 13-18 years. (Kementerian Pendidikan Malaysia, 2023) This study focused on adolescents with special healthcare needs who attend special schools in Shah Alam, Selangor, Malaysia. There are four categories of public special schools in Malaysia, and this study specifically targeted those in special integrated schools in Shah Alam, Selangor. In this chapter, we will explore the brief background, purpose, and significance of special education schools in Malaysia, and their relevance to the aim of our study. The next section will address special healthcare needs and related dental issues, which are also aligned with the purpose of this study.

The Ministry of Education Malaysia according to the Education Act 1996, Education Regulations (Special Education 1997 Part II 3(2) provides special education and facilities for students with visual and hearing impairments, while integrated special education is for those with learning, vision, and hearing impairments (Ministry of Education, 1998).One of the aims of special education schools is to enhance support services, including healthcare services such as dental care. The mission is to develop self-potential to the fullest (Kementerian Pendidikan Malaysia (KPM), 2024). From the perspective of oral health, it is essential to provide dental education for maintaining oral hygiene practices among children and adolescents, ensuring they sustain their oral health throughout life.

1.1 Public Special Education Schools in Malaysia

Special education aims to provide educational services to students with special needs who face challenges in vision, hearing, learning, and special rehabilitation. The Ministry of Education Malaysia sincerely provides equal opportunities to students with SHCN, ensuring that they enjoy quality education and a balanced life with peers who do not face special challenges. According to the Ministry of Education Malaysia, there are four types of Special Education Programs in Malaysia (Jenis Pendidikan Khas, 2024).

1.1.1 Special Education School for Hearing and Vision:

The school is specifically designed to offer education to students with special healthcare needs, especially those who fall into the Hearing and Vision category. By providing a curriculum that is tailored to the needs of students with special needs (hearing and vision), the school aims to provide an inclusive educational experience and support the holistic development of each student.

1.1.2 Integrated Special Education Program

The program is an initiative available in regular day schools, where there are modified special education classes. The programme is designed to provide specific support to students with special needs from the three categories of Vision, Hearing, and Learning. The main purpose of the program is to provide access to quality education for all students, including those who need additional support. In this way, regular day schools act as agents of inclusion, ensuring that every student gains an equal opportunity to develop their potential in a positive educational environment. There are 940 special integrated secondary school programs, known as Program Pendidikan Khas Integrasi (PPKI), in Malaysia. Out of these, 101 are in Selangor. Selangor has the highest enrolment of adolescent students in these programs, with

6,770 out of the total 39,002 students (17.35%). (Pejabat Pendidikan Daerah Negeri Selangor, 2023) Most adolescents with special healthcare needs in these programs fall under the learning disability (88.8%) category, and most of them are male (72%). (Pejabat Pendidikan Daerah Negeri Selangor, 2023)

1.1.3 Inclusive Programs

The programme is an initiative where qualified special healthcare needs or special education students will study together with mainstream program (fit and healthy) students in regular classes. The main objective of the programme is to create an inclusive learning environment where students with special healthcare needs can interact and learn with their peers from the main program. Programs like this are often known as inclusive education, where a holistic approach is taken to ensure that each students receives the support they need to reach their full potential. This approach encourages mutual understanding and assistance between mainstream program students and students with special needs in a cohesive learning environment.

1.1.4 Special Rehabilitation Programme

This program was specifically created to provide assistance to students who face difficulties in mastering writing, counting and reading. The main goal of the programme is to provide additional support to students who are experiencing challenges in these aspects, with the hope that they can improve their skills in this area. The program aims to provide a learning approach tailored to each student's needs. It may involve more focused teaching methods, additional resources, or special guidance to help students overcome learning difficulties in writing, counting, and reading. (Kementerian Pendidikan Malaysia, 2023)

Currently, these children attend special classes in schools, institutions, or

Community-based Rehabilitation Centres. They receive ad-hoc dental treatment when mobile dental teams visit these locations. Additionally, children and adolescents with special needs are referred by dental nurses and dental officers to Paediatric Dental Specialists based in hospitals. The School Dental Service (SDS) is a key part of public oral health services in Malaysia, providing oral healthcare to primary and secondary school children (including special education schools) through a systematic incremental dental care approach to achieve orally fit status. Care is mainly delivered at school and dental clinics, with mobile dental teams and clinics complementing the efforts.

1.2 Dental Issues Related to Special Healthcare Needs

Special healthcare needs (SHCN) are conditions that need extra health and related services compared to what most people need. In Malaysia, the term 'person with disabilities' (PWD) or '*orang kurang upaya*' (OKU) is commonly used. The Department of Social Welfare in Malaysia considers people with long-term physical, mental, intellectual, or sensory impairments as Persons with Disabilities (PWD). These impairments, along with different barriers, can limit their full participation in society. The seven subcategories of PWD or Special Healthcare Needs (SHCN) are hearing disabilities, visual disabilities, speech disabilities, learning disabilities, physical disabilities, mental disabilities, and multiple disabilities.

Adolescent patients with special healthcare needs are vulnerable to dental problems such as dental caries, periodontal issues, dental erosion, and malocclusions. Several factors contribute to these problems (Tefera et al., 2021). Patients with special

healthcare needs may have a higher risk of dental decay due to factors such as limited dexterity or difficulties in brushing teeth, especially when taking sweetened medication for an extended period. Poor oral hygiene, plaque, and calculus can lead to periodontal problems in these patients (Pini et al., 2016). Bruxism, or grinding and clenching of teeth, is common in children with cerebral palsy, leading to flat biting surfaces of the teeth. Certain habits like food pouching can also increase the risk of carious lesions (İlhanli, Ilhanli & Çelenk, 2022)..

The impact of dental diseases is more significant and prolonged among adolescents with special healthcare needs because their oral health and treatment decisions are primarily made by their parents (Cruz, Neff & Chi, 2015). Children including adolescents with special healthcare needs may face several barriers to getting dental care. These include financial difficulties, the location of dental clinics, other urgent health issues, lack of awareness, and limited knowledge about oral health. Language, education, cultural, and ethnic differences can also make it harder to access care. Often, these children face multiple challenges at the same time (Abdrabbo Alyafei et al., 2020; Da Rosa et al., 2020; Subramaniam & Muthukrishnan, 2021).

Various barriers exist within healthcare systems that affect access to dental care for children with special healthcare needs. These barriers include limited access to dental care, insufficient training for dental professionals in caring for these patients, challenges with cooperation during dental appointments, oral aversions, competing medical needs (Abdrabbo Alyafei et al., 2020). and the financial and emotional burden on the families of these children. A study conducted by Lee et. al

involved young adult with special needs and their parents agreed that they were overwhelmed by dealing with the adverse general health issues of their adolescents and so paid relatively less care to their dental needs (Lee & Chang, 2021). Additionally, children and adolescents with special healthcare needs have unique oral health requirements that require specialized knowledge and training from dental providers. Unfortunately, dental care for these individuals is not always prioritized in healthcare systems, despite the need for further research and optimized management strategies (Paschal et al., 2016).

1.3 Problem Statement

Oral health is fundamental to overall well-being and enables individuals to actively engage in society and reach their full potential. Despite this, oral diseases remain the most prevalent noncommunicable diseases, affecting nearly half of the global population (45% or 3.5 billion people) throughout their lives, from early childhood to old age (WHO's Global oral health status report (GOHSR), 2022). Individuals with SHCN may be at increased risk for oral diseases; these diseases further effect the patient's overall health. The involvement of parents/caregivers is critical for ensuring appropriate and regular supervision or assistance of oral hygiene practices daily routine (American Academy of Pediatric Dentistry, 2020a). There are several studies related to oral health behaviours, oral hyigiene practices and dietary habits among adults with SHCN which involved their next to kin/caregivers. A study conducted in Saudi Arabia to evaluate the impact of oral health practice and knowledge level of caregivers on periodontal status of adult's special needs (Al-Abdaly et al., 2019). The study concluded that the level of oral health practices among

parents/ caregivers were not effective in keeping periodontal health of special needs adults.

A local study conducted to evaluate the oral health behaviours and oral hygiene practices among special needs adult who were aged 16 years and above found that almost half of them (48%) required assistance from parents or caregivers during tooth brushing (Tay MJ et al., 2018). As oral health is integrated part for health and wellness, caregivers for special needs individuals, including children and adolescents are an important part of the oral health team and must become comprehend and competent in these vulnerable individuals daily oral hygiene practices.(Ferguson & Cinotti, 2009). People with disabilities experienced barriers during dental treatments, and many of their oral health issues remained untreated leading to unmet dental needs (S. H. Tan, 2015). Another local study was conducted to evaluate the unmet dental needs and barriers to care perceived by the guardians of children, 6-12 years old with learning difficulties (CWLD) attending the Special Education Integrated Programmes of a mainstream primary school. Unmet dental needs of 23.1% and multiple barriers to dental care of CWLD were found (Shoaib et al., 2023).

Another study conducted to evaluate parents's perceived barriers to dental care for special needs children with autism spectrum disorder (ASD). Caregivers of children with ASD reported encountering more barriers compared to other caregivers (Taneja & Litt, 2020).

While significant research mentioned before has been conducted on oral health behaviors and practices among children and adults with SHCN, the barriers that hinder them to access dental treatment and dental treatment requirements,

unfortunately there is a notable gap in the literature addressing the specific dental needs and barriers of adolescents. This research aims to evaluate the oral hygiene practices, oral health status, dental treatment requirements, and barriers from the perspective of parents/caregivers of specifically adolescents with SHCN. There were limited studies involved this specifically targeted vulnerable group.

1.4 Rationale of The Study

1.4.1 Sustainable Development Goal (SDG)

According to the Sustainable Development Goal (SDG) 3 for 2030, Malaysia emphasizes good health and well-being, ensuring the inclusion and development of persons with disabilities (PWD) (Urbanice Malaysia, 2030). The 2030 Agenda for Sustainable Development holds significant promise for people with disabilities, aiming to leave no one behind. Therefore, this study aims to align with SDG 3 by addressing current oral health status specifically among adolescents with special healthcare needs (SHCN).

1.4.2 Health Equity for Person with Disability (PWD)

An estimated 1.3 billion people globally experience significant disability, a figure that has grown over the last decade. The World Health Organization's Global Report on Health Equity for Persons with Disabilities (2022) highlighted that many people with disabilities (PWD) are still being left behind, experiencing persistent health inequities, dying earlier, and suffering poorer health and functioning due to unjust factors that are avoidable (World Health Organization, 2024). It encourages WHO member states to do more research on disabilities, gather useful and comparable data, remove barriers, and make health services and programs more accessible for people

with disabilities, adolescents with special healthcare needs are part of the vulnerable group that should be included. The WHO's Global Oral Health Status Report (GOHSR) offers the first comprehensive overview of the burden of oral diseases and identifies challenges and opportunities to advance progress toward universal oral health coverage (WHO's Global oral health status report (GOHSR), 2022). Hence, it emphasizes the global impact of oral disease on health and well-being, highlighting significant inequalities, with the most vulnerable and disadvantaged populations, including SHCN individuals bearing a higher disease burden.

1.4.3 Focus on Adolescents

Adolescents with special healthcare needs (SHCN) undergo biological and physical growth, and their oral health is affected by the physical and psychological changes of this developmental stage (Sbricoli et al., 2022). Adolescents generally experience rapid physical, cognitive, and psychosocial growth. This affects how they feel, think, make decisions, and interact with the world around them. Sustaining good oral hygiene depends on patient motivation. When they are motivated to have a good appearance, oral health behaviors will always be positive. Self-consciousness and a good appearance are important in making friends and meeting new people at school (Calderon & Mallory, 2019). Despite being typically considered a healthy stage of life, adolescence is marked by significant death, illness, and injury, much of which is preventable or treatable. During this phase, adolescents establish behavioral patterns related to diet, physical activity, substance use, and sexual activity—that can either protect their health, including dental health and the health of those around them or put their health at risk, both now and in the future (WHO & Child and Adolescent Health Unit, 2017). The National Adolescent Health Plan of Action comprises seven

strategies as stipulated in the National Adolescent Health Policy (National Plan Of Action For Adolescent Health Programme., 2020). One of these strategies includes research and development. Recognizing the potential and need for research in the field of adolescent health, relevant and appropriate research in identified priority areas shall be encouraged. Therefore, this study is aligned with one of the policy's goals.

The policy of National Adolescent Health is to encourage and ensure the development of adolescents in realising their resposibilities for health and empower them with approraite knowledge and assertive skills to enable them to practice healthy behaviours through active participation (*Dasar Kesihatan Remaja Negara*, 2001). Although this statement was for adolescents generally, it could also be implemented with SHCN. The present study aims to address the barriers to dental care perceived by the parents of adolescents attending special education schools in Shah Alam, Selangor, thereby filling the existing research gap by evaluating the oral hygiene practices of this specific group, the study aims to determine the dental treatment needs for adolescents with SHCN.

1.5 Conceptual framework

Sociodemographic factors, including household income, education level, and number of children, affect the perceived barriers to oral healthcare for adolescents with special healthcare needs and their parents or caregivers. These factors contribute to constraints such as financial and time limitations, as well as the child's disabilities.

The oral hygiene practices of adolescents, including their frequency of toothbrushing, use of fluoride toothpaste, and sugar intake, significantly impact their

dental treatment requirements, which may include scaling, restorations, extractions, and prosthesis. Determining their oral health status necessitates an oral examination, which comprises of the Simplified Oral Hygiene Index and DMFT, both of which serve as critical indicators for adolescents with special healthcare needs. All these variables are interconnected and play a role in determining the decision of met or unmet dental treatment needs of adolescents with special healthcare requirements.

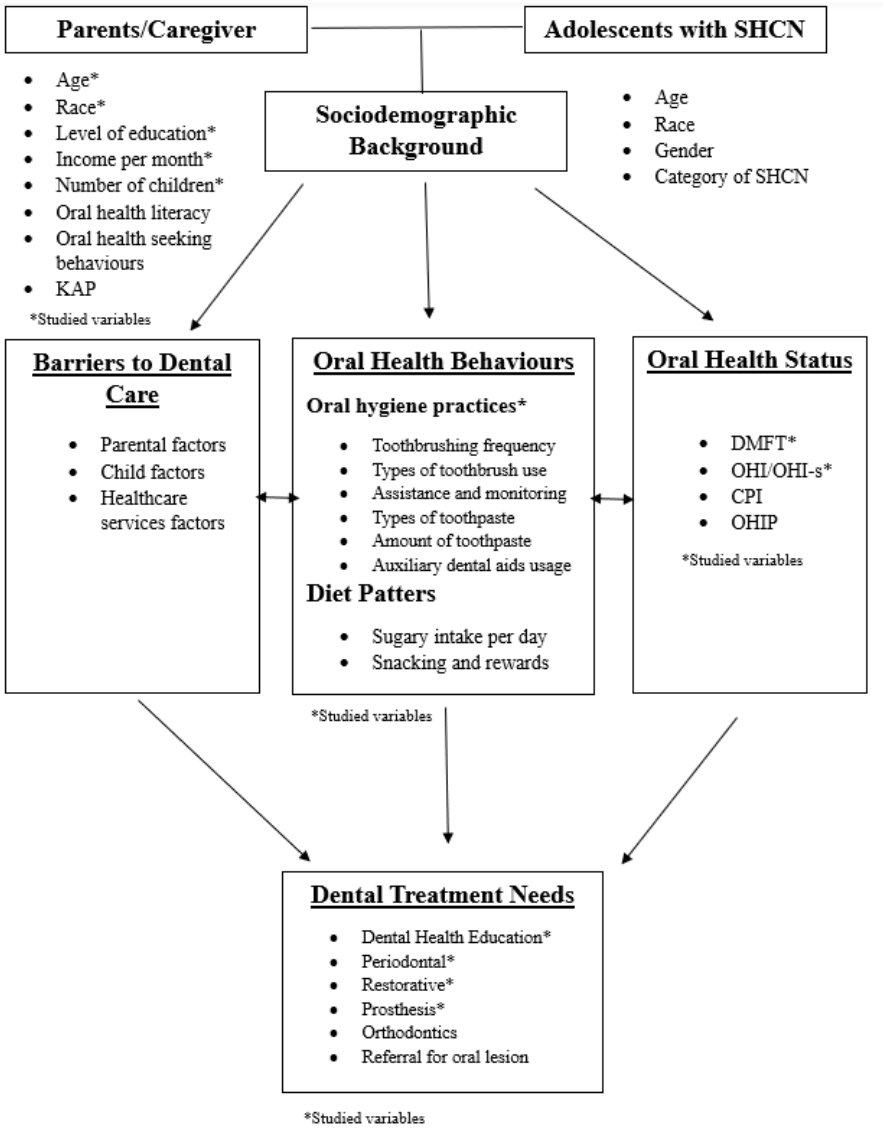

Figure 1.1 Conceptual Framework of the study

1.6 Objective

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1.6.1 General objective:

To evaluate oral health practices, oral health status, barriers to oral healthcare and dental treatment needs of adolescents with special healthcare needs (SHCN) attending special schools in Selangor

1.6.2 Specific objective

1. To determine the oral health practices, oral health status and dental treatment needs of adolescents with SHCN attending special schools in Shah Alam, Selangor.
2. To evaluate parent's perceived barriers in oral health care of adolescents with special healthcare needs attending special schools in Shah Alam, Selangor.
3. To identify the association between barriers to oral healthcare with dental treatment needs of adolescents with SHCN attending special schools in Shah Alam, Selangor.

1.7 Research question

1. What are oral hygiene practices, oral health status and treatment needs in adolescents with SHCN attending special schools in Shah Alam, Selangor?

2. What are the barriers perceived by their parents of adolescents with SHCN attending special schools in Shah Alam, Selangor?

3. What are the associations between barriers to oral healthcare with the treatment needs of adolescents with SHCN attending special schools in Shah Alam, Selangor.

1.8 Hypotheses

There are associations between barriers to oral health care with the treatment needs.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a review of the literature on the oral health status and behaviors of children and adolescents with SHCN. It also explores the barriers their parents perceive in providing dental care for them. The introduction will clarify the term 'adolescents' based on several definitions. Subsequent sections will cite several previous studies related to oral health status, oral health behaviors, and oral hygiene practices among children and adolescents with SHCN. The other sections will address barriers to dental care as perceived by the parents, as well as dental treatment needs and common dental issues within this group. The chapter ends with a summary of the literature review.

2.1.1 Adolescence

The term 'adolescence' refers to the period of rapid biological growth, changes, and social role transitions that bridge the gap between childhood and adulthood. The definition of adolescence has evolved due to factors such as earlier onset of puberty, delayed timing of important life milestones (e.g., education, marriage, parenthood), and the influence of social media. According to the American Academy of Pediatrics (AAPD), adolescence is divided into three age groups: early (ages 11-14), middle (ages 15-17), and late (ages 18-21) (American Academy of Pediatric Dentistry, 2023).

The World Health Organization has defined adolescence as being between the ages of 10 to 19 years and this can be further subdivided into 3 groups that is early (10-14 years), middle (15-17 years) and late adolescence (18-19 years). Adolescence

is the period of gradual transition from childhood to adulthood. This transition is accompanied by significant and challenging changes in the life of the adolescents biologically, physically, emotionally, socially and economically (Who & Child and Adolescent Health Unit, 2017; National Plan of Action for Adolescent Health Programme., 2020).

In Malaysia, adolescents comprise approximately 15.6% of the total Malaysian population. According to the National Adolescent Health Policy, adolescence is defined as individuals aged 10 to 19 (National Health and Morbidity Survey 2022: Adolescent Health Survey, 2022). Adolescent health encompasses the complete physical, social, mental, and spiritual well-being of young people, ensuring they can lead healthy, harmonious lives within supportive environments (*Dasar Kesihatan Remaja Negara*, 2001).

In defining adolescence, both the World Health Organization (WHO) and Malaysia align in recognizing it as the period between ages 10 to 19. This phase is marked by significant physical, cognitive, and psychosocial growth, laying the foundation for good health and well-being. However, the American Academy of Pediatric Dentistry (AAPD) offers a broader definition, categorizing adolescents as individuals between the ages of 11 to 21. Adolescents generally and those with SHCN need access to comprehensive, age-appropriate information, including dental education, as well as opportunities to develop life skills and access health services that are equitable, acceptable, and effective.

2.2 Oral Health Behavior and Literacy

The term “oral health behaviour” describes the complex effect on individual oral health of oral hygiene practices, nutritional preferences and the pattern of a person's utilization of dental services, determined principally by the social opportunity structure offered by a society, which underlies the distribution of access to oral health literacy, the availability and utilization of dental services (Kirch, 2008). Oral health literacy is essential for parents and caregivers, especially those who take care of individuals with SHCN. Oral Health Literacy (OHL), defined as an ability to obtain, understand, and apply information related to oral health, plays a crucial role in promoting effective oral health outcomes and behaviours (Shiqi Yu, 2024). It equips them with the knowledge and skills to ensure the oral health and overall well-being of their children. A local study concluded that there is a significant association between the oral health literacy of parents with the decayed, missing and filled teeth (dmft) score of their preschool children (Adil et al., 2020).

2.2.1 Socioeconomic Status and impact on oral health Status

Childhood circumstances, such as socio-economic status and family structure, play a crucial role in shaping children's psychological and psychosocial attributes, as well as their Oral Health-Related Quality of Life (OHRQoL). Literature reviews by Kumar et al., have shown that these factors significantly impact children's overall well-being and oral health outcomes (S., J. & R., 2014). A local study found that parents with stable income levels and small family size, are more likely to afford regular dental visits and preventive care, which can lead to better oral health outcomes for their children with SHCN (Tay MJ et al., 2018; Thyath MN et al., 2015). Another study conducted to focus on children with special needs, specifically learning disabilities, found that the main barriers to oral healthcare were their

behavior at dental clinics and dentists' refusal to provide necessary treatment. Low income, low education level, and long working hours among their guardians were identified as confounding factors (Shoaib et al., 2023). Socioeconomic status can affect dietary habits. Families with limited financial resources may have less access to nutritious foods and more exposure to sugary snacks and beverages, which can contribute to dental caries and other oral health issues(Thyath MN et al., 2015). Parents with higher educational backgrounds tend to have better knowledge of oral health practices and the importance of maintaining good oral hygiene. This knowledge can positively influence their children's oral health behaviors (Oredugba & Akindayomi, 2008). Another study where the aim was to assess the association between parents' education and socioeconomic status and their children's oral health, involving preschoolers and adolescents, supports this statement. The findings indicate that higher education levels and income among parents are correlated with a lower prevalence of decayed teeth in their children with better oral health behaviors (Ellakany et al., 2021). Individuals with SHCN living in urban areas often have better oral health status compared to those in rural areas. A previous study conducted emphasizes the need for improved oral health knowledge, better access to care, and the implementation of school-based dental care programs specifically for adolescents in rural area (Dodd et al., 2014). The oral health status of individuals in urban and rural areas can differ significantly due to various factors (Zollinger et al., 1993; Singh et al., 2020). In Asia, children are more likely to have poor oral health if their caregivers have low income, a low level of education, live in rural areas, and have limited access to quality oral healthcare (Ningrum et al., 2021). Hence, Parents and caregivers in urban areas are often more informed about the importance of maintaining good oral hygiene (Tan, Jawahir & Doss, 2023).

2.2.2 Toothbrushing assistance, frequency and the use fluoridated toothpaste

Parents and caregivers play a crucial role in assisting their children with special healthcare needs (SHCN) in maintaining good oral hygiene. Indeed, as children transition into adolescence, the role of parents and caregivers evolves significantly. This period is marked by substantial changes on multiple fronts physical, cognitive, and social (American Psychological Association (APA), 2023). Hence, promoting healthy oral health behaviors, such as proper nutrition and toothbrushing techniques for their daily oral health practices is important. Combining good oral hygiene practices at home with the use of a fluoride toothpaste can significantly enhance the topical effects of fluoride (Toumba et al., 2019). If a patient's sensory issues cause the taste or texture of fluoridated toothpaste to be intolerable, consider using a toothpaste without sodium lauryl sulfate (SLS) to eliminate the foaming nature. Alternatively, using auxiliary dental aids such as fluoridated mouthrinse or a product like casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) may be applied with the toothbrush (Peerbhay & Titinchi, 2014; American Academy of Pediatric Dentistry, 2020). Many children and adolescents with SHCN require assistance from parents and caregivers to manage their routine oral hygiene practices. This task can be challenging, particularly if the individual resists. Assistance from other health professionals, such as occupational therapists, can be especially beneficial for children and adolescents with low dexterity and weak motor handling capabilities. These professionals can provide customised or modified toothbrush to help them handle their toothbrush properly and maintain good oral hygiene practices (Global web icon Australasian Academy of Paediatric Dentistry (AAPD), 2013; Holt K, 2014). Maintaining good oral health practices includes brushing teeth at least twice daily. A study conducted evaluating the oral

hygiene routines of preschool-aged children with SHCN found that only half of the caregivers reported brushing their teeth twice a day (Campanaro, Huebner & Davis, 2014). While a local study found that most of the individual with SHCN reported brushing their teeth at least once a day (84%), using fluoridated toothpaste and employing oral hygiene auxiliary aids. However, nearly half of them required assistance from parents or caregivers during tooth brushing (Tay MJ et al., 2018). A study by Mustafa et al. on children and adults with special healthcare needs (SHCN) of speech and hearing revealed that 69% were unaware of the proper brushing technique, and the majority did not use dental floss (Alqassim et al., 2022).This study shows the need for improved oral hygiene practices among individuals with SHCN.

2.2.3 Sugary Intake, Supplements and Rewards

Adolescents generally tend to consume more added sugars, primarily through soft drinks, compared to other age groups. This high intake of added sugars can contribute to various health issues, such as dental problems and an increased risk of developing metabolic diseases (Della Corte et al., 2021). While the statement primarily applies to adolescents in general, it is equally relevant for those with SHCN. They, too, tend to consume more added sugars, mainly through soft drinks, which can contribute to various health issues. An article by DJ Johnston explained about how sugar and sweets impact people with attention deficit hyperactivity disorder. (DJ Johnston, 2024) In Malaysia, Attention Deficit Hyperactivity Disorder (ADHD) falls under the category of "Learning Disabilities" within the "Orang Kurang Upaya" (OKU) classification (Jabatan Kebajikan Masyarakat Malaysia, 2008). In this article, when individuals with ADHD consume something sweet, their brains receive a quick dopamine boost. Unfortunately, this also means they are more likely to turn to sugary snacks when feeling low, tired, or just demotivated (DJ

Johnston, 2024). Another subcategories of SHCN with learning disability is Autism Spectrum Disorder (ASD) (Statistik Pendaftaran Oku Mengikut Negeri Dan Kategori Sehingga 31 Januari 2023). Individuals with autism need to be trained in self-care skills independently. A study from Indonesia aimed to increase self-care autonomy in children with autism, specifically in bathing, dressing, and brushing their teeth. (Irawan, 2022). It concluded that positive reinforcement is the formation of a behavior pattern by providing rewards or actions immediately after the expected behavior appears and is a powerful way to change behavior (Irawan, 2022). However, sugary treats can be a quick and effective reward, they can also lead to sugar cravings and potential health issues. It's essential for parents to balance the use of sugary rewards with healthier alternatives to avoid creating an over-reliance on sugar. A previously mentioned study by Tay MJ et al was mostly involved those with intellectual disability. They found more than half of the participants consumed sugary snacks between meals, and 36% of the individuals with SHCN were given sweets as a response to their temper tantrums by their parents or caregivers (Tay MJ et al., 2018).

Many children and adolescents with special health care needs, particularly those on long-term syrup medications, whether regularly or as needed (prn). There is a strong link between sugar consumption and dental caries (Davies & Lindmeier, 2019). To improve the taste sugar, artificial sweeteners or flavouring may be added to liquid medicine to make them taste better (Medicines for Children, 2021). Poor oral hygiene habits during medication use and hospitalizations were observed mainly among children with SHCN concluded knowledge was poorly associated with the caregivers' practices (Pomarico, Souza & Rangel Tura, 2005). With the

advent of safer natural sugars and advances in understanding neurobiological mechanisms of taste perception, along with improved drug palatability and pediatric dosing, pediatric specialists and physicians should be able to provide tailor-made medicine for each child with minimal adverse effects in the near future (Jehan Al Humaid, 2018). Hence, a non-cariogenic diet and sugar-free liquid medications should be discussed with the caregiver and physician (Kowash et al., 2017). Some of the adolescents and children with SHCN would have to take nutritional supplement or food. especially for those with poor apetite or loss of smell (Coffey et al., 2022). Although nutritional supplements can be very helpful for children and adolescents with SHCN, unfortunately, the sugar content of frequently prescribed Oral Nutritional Supplements (ONS) can be high, increasing the risk of dental caries. For example, pre-formed ONS can contain between 6.6 and 27.2 grams of sugar per serving, while powdered ONS mixed with milk can have between 16.4 and 35 grams of sugar per serving (Coffey et al., 2022).

2.3 Barriers to Dental Care

Barriers to oral healthcare are common problems worldwide. (Marchan et al., 2022) These barriers can be due to several factors, including financial constraints, accessibility issues, and psychosocial challenges (Lai et al., 2012).For our literature review, we aim to explore previous studies both internationally and locally, focusing on barriers to dental care from three perspectives: parents, children and adolescents with SHCN and healthcare services.

2.3.1 Parental or Caregiver Factor

Parental and caregiver factors often include financial constraints, lack of time, and uncertainty about where to take children with special health care needs (SHCN) for dental care (Lai et al., 2012). A previous study conducted to evaluate significant observations in unmet needs could also be attributed to determine the unmet dental treatment needs and self-reported barriers to continued care self-reported barriers to accessing continued care. The cost of care (financial barrier) was reported as the main self-reported barrier (Rada, 2013). Another study conducted in India supported the same parental barrier mostly from financial constraints (68.6%) (Bhaskar et al., 2016). Another point of view of a study conducted in Qatar that thoroughly assesses the barriers to oral health care perceived by parents and caregivers of children with disabilities. This study was the first of its kind in Qatar and focused on significant barriers, including financial constraints, lack of time, and uncertainty about where to take children with SHCN for dental treatment (Abdrabbo Alyafei et al., 2020). The study reveals that 89% of parents and caregivers reported a significant barrier due to their lack of knowledge about where to take their child for treatment of oral health problems instead of financial barriers. A local study is in line with Alyafaei et al., most of the perceived barriers by the parents of SHCN children was “Do not know where to seek dental treatment” (92.3%) (Shoaib et al., 2023). Both of the studies mentioned involved special needs children. In the study by Abdrabbo Alyafei et al., 57% of the children were between 6 and 10 years old. In the study by Shoaib et al., the mean age of the children was 9.24 years (Abdrabbo Alyafei et al., 2020; Shoaib et al., 2023). For younger children, barriers to dental care are influenced by parental attitudes and anxieties. For pre-adolescents and adolescents generally, dental attendance and compliance with preventive advice are affected by their stage of

psychological development (Freeman, 1999). But for those with SHCN, due to parents and caregivers lack of knowledge may lead to delays in seeking dental care, resulting in unmet dental needs and worsening oral health conditions. The American Academy of Pediatric Dentistry's guideline on the management of dental patients with special health care needs highlights the significance of caregivers' perceptions in treatment planning. (American Academy of Pediatric Dentistry, 2020b) A local study on special needs dentistry in Malaysia discusses the impact of caregivers' attitudes and educational experiences on the treatment planning for individuals with SHCN, some of them perceived that most dentists do not have enough experience in treating their special needs or medically compromised children. (Ahmad et al., 2015) However, this study is more related and relevant to be discussed in the next section "healthcare services factors". Parental dental anxiety can directly effect the child's oral health and dental visit patterns. This statement is supported by a cross-sectional study done by Gudipaneni, R. K. et al., they found that several factors were identified as predictors of parental dental anxiety and oral health literacy. These factors include the age of parents, family income, the presence of one or more untreated decayed teeth in children, and the timing of the most recent child dental visit (Gudipaneni, 2024).

2.3.2 Child Factor

While practitioners should be mindful of the unique considerations required for special needs patients, it is crucial that all of them receive personalized care that considers their level of oral health literacy, medical and health issues, possible dental anxiety, and other factors (American Dental Association, 2024). A study conducted by Lai et al., on parents and caregiver of SHCN children and adolescents with age range of 1–18-year-old, they found that most of the barriers perceived was due to

uncooperativeness of their child during dental treatment (Lai et al., 2012). Same goes to another study conducted to evaluate barriers to dental care among autistic children and adolescents, this study by Barry et al., concluded more than half of the barriers perceived was uncooperativeness during dental treatment (63%). This is because some children and adolescents with SHCN have difficulty communicating their pain and how they are feeling during treatment sessions to their parents or the dental team (Junnarkar et al., 2023).

According to Krishnan K et al., the main barriers perceived by most of SHCN children was child dental anxiety (Krishnan, Iyer & Madan Kumar, 2020). Child dental anxiety is a prevalent issue in the field of pediatric dentistry. Effective communicative management and the appropriate use of commands are universally employed in pediatric dentistry for both cooperative and uncooperative children (American Academy of Pediatric Dentistry, 2021). A literature review was performed by the American Academy of Pediatric Dentistry (AAPD) focusing on behavior guidance for infants, children, and adolescents, including those with special healthcare needs (American Academy of Pediatric Dentistry, 2021). The guidelines were revised in 2020 and the latest update in 2024. The recent practice guideline aligns with multiple nonpharmacological behavior guidance for pediatric dental patients (Dhar et al., 2023). A study by Kong et al. aimed to assess the effectiveness of diverse non-pharmacological interventions in reducing anxiety. They concluded that music is recommended as a priority (Xiangrong Kong, 2024). Although the study mentioned pediatric patients generally, a study by Gowdham et al., agreed that musical distraction has a positive impact on reducing dental anxiety in intellectually disabled children (Gowdham et al., 2021). A review by Zuhair Motlak Alkahtani