ISSN-E: 2617-9563

“AWARENESS AND KNOWLEDGE OF HIGH SCHOOL STUDENTS ON THE PREVENTION, CAUSES, MANAGEMENT, AND TREATMENT OF MALOCCLUSION IN THE KINGDOM OF SAUDI ARABIA: BASIS FOR A PROPOSED PRIMER”

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ISSN-E: 2617-9563

ABSTRACT

This research determined the level of awareness and knowledge of malocclusion among high school students in Riyadh, Kingdom of Saudi Arabia. The respondents were 362 high school students. The data were gathered through a researcher-made questionnaire. The research tool underwent validation and reliability testing using Cronbach's Alpha. Percentage, weighted mean, chi-square, independent t-test, and analysis of variance were used as statistical treatments. The results of the study revealed that the level of awareness of high school students regarding malocclusion in terms of the 5 parameters had an average verbal interpretation of "Agree." While the level of knowledge of high school students regarding malocclusion in terms of the 5 parameters had an average verbal description ranging from "Somewhat Knowledgeable" to "Knowledgeable." Further, the results showed that previous or current orthodontic treatment was the only profile associated with the high school students' level of awareness and knowledge of malocclusion. The study concludes that the high school student-respondents were mostly male, in their middle adolescent stage, in their second level, and mostly had no previous or current orthodontic treatment. Their level of awareness regarding malocclusion in terms of the 5 parameters suggests that their familiarity with malocclusion was not that high yet and could still be improved to help them take good care of their oral cavity. Their level of knowledge revealed that they had background information about malocclusion but it was not yet enough. The study also showed that the high school students differed in their level of knowledge on malocclusion when grouped according to previous or current orthodontic treatment.

Keywords: Malocclusion, Awareness, Knowledge, Management, Saudi Arabia**.**

المستخلص:

حدد هذا البحث مستوى الوعي والمعرفة بسوء الإطباق لدى طلاب المرحلة الثانوية بمدينة الرياض بالمملكة العربية السعودية. وكان عدد المشاركين ٣٦٢ طالبا من طلاب المدارس الثانوية. وتم جمع البيانات من خلال استبيان أعده الباحث. خضعت أداة البحث لاختبار التحقق والموثوقية باستخدام ألفا كرونباخ. تم استخدام النسبة المئوية والمتوسط الموزون ومربع كاي واختبار t المستقل وتحليل التباين كعلاجات إحصائية. وأظهرت نتائج الدراسة أن مستوى وعي طلاب المرحلة الثانوية بسوء الإطباق من حيث المعلمات الخمس كان تفسيره اللفظي متوسطاً لـ "أوافق". في حين أن مستوى معرفة طلاب المدارس الثانوية فيما يتعلق بسوء الإطباق من حيث المعلمات الخمس كان متوسط الوصف اللفظي يتراوح بين "معرف إلى حد ما" إلى "معرف". علاوة على ذلك، أظهرت النتائج أن العلاج التقويمي السابق أو الحالي هو الملف الوحيد المرتبط بمستوى وعي ومعرفة طلاب المدارس الثانوية بسوء الإطباق. وخلصت الدراسة إلى أن المشاركين في الدراسة من طلاب المدارس الثانوية كانوا في الغالب من الذكور، في مرحلة المراهقة المتوسطة، في المستوى الثاني، ولم يكن لدى معظمهم أي علاج تقويمي سابق أو حالي. يشير مستوى وعيهم فيما يتعلق بسوء الإطباق من حيث المعلمات الخمسة إلى أن إلمامهم بسوء الإطباق لم يكن مرتفعًا بعد ولا يزال من الممكن تحسينه لمساعدتهم على العناية الجيدة بتجويف الفم. كشف مستوى معرفتهم أن لديهم معلومات أساسية حول سوء الإطباق ولكنها لم تكن كافية بعد. كما أظهرت الدراسة أن طلاب المدارس الثانوية اختلفوا في مستوى معرفتهم بسوء الإطباق عند تجميعهم وفقًا للعلاج التقويمي السابق أو الحالي.

الكلمات المفتاحية: سوء الإطباق، الوعي، المعرفة، الإدارة، المملكة العربية السعودية.

ISSN-E: 2617-9563

CHAPTER I
THE PROBLEM AND ITS BACKGROUND

Introduction

In our time, and considering the development that has taken place in spreading awareness and the spread of social communication, it has become easy to spread awareness and methods of prevention in orthodontics. Helping individuals to assume responsibility for preserving their orthodontics problems is an important goal which cannot be attained without public education and motivation. Orthodontic treatment is a composite of different target what's more, emotional elements. While target factors are gotten from analysis and are conclusive, abstract factors rely principally upon style, and mental considerations. Orthodontist's perspective on the abstract components may shift impressively from patient to parent. So, to come to an arrangement with respect to different methodology, there ought to be an open discourse between the orthodontist and the parent-patient party. Seeking and acquiring this point of view in a clinical setting is conceivable through educated assent.

There is no refusal of the way that oral wellbeing is currently thought of a significant and necessary piece of general wellbeing and together they oversee a singular's general well-being. Therefore, it is pivotal to expand mindfulness in regard to oral wellbeing. Oral wellbeing information is viewed as a fundamental essential for wellbeing related behaviour. It not just includes of rebuilding efforts and periodontal sicknesses, yet in addition the style assumes a fundamental part, and the branch essentially worried about feel is as a matter of fact orthodontics which was proclaimed as a forte.

Saudi Arabia's youth orthodontic treatment demand and workforce needs 670 individuals, consisting of 390 females and 280 men, were surveyed in a cross-sectional study from November 2016 to April 2017. The participants' ages varied from 12 to 19, and they were all secondary and high school students. After analysing the data from the IOTN-DHC, which takes into account both the oral health component (DHC) and the aesthetic component, we can see that 24.3% of the instances necessitated severe or extreme treatment needs, while 54.3% fell into the no or light need category. With 48.8% of cases, crowding was the most common kind of malocclusion, followed by increased overjet at 21.8% and spacing at 16.1%.

According to (Al-Hummayani, F. M., & Taibah, S. M. 2018), IOTN-DHC and IOTN-AC were shown to have a statistically significant link ($p<0.001$) when tested using Pearson's Chi-squared test. A substantial correlation was indicated by 51.2% of the sample agreeing with the modest requirement category.

After spacing, increased overjet, and increased overbite, crowding was the most common occlusal feature. Among the Saudi teenagers examined in Abha city, common results were normal overjet, overbite, and Class I molar and canine connections. This study used a multi-stage random sampling technique to pick 1998 Saudis from the city of Abha for a clinical examination. The participants had an average age of 14.13 ± 0.99 years. Gloves, a light source, a mouth mirror, and a ruler were used to record occlusal parameters such as canine and molar relationships, crowding, spacing, overbite, overjet, anterior open bite, anterior crossbite, posterior crossbite, and scissors bite. Class I molar connections were found in 1219 cases (61% of the entire sample), Class II in 326 cases (16.3%), and Class III in 154 cases (7.7%). A total of 1255 dogs (62.8%), 231 (11.6%), and 112 (5.6%) were found to have a Class I-III canine association. Out of all the instances, 1490 (74.6%) had a normal overbite and 1515 (75.6%) had a normal overjet. A crowding malocclusion affected 26.6% of patients, whereas spacing affected 20.6%, increased overjet affected 19.5%, increased overbite affected 19.4%, posterior crossbite affected 8.5%, and anterior open bite affected 6.1%(Asiry, M. A., & AlShahrani, I. 2019).

A study on 500 14-year-old male Saudi Arabian children revealed that 62.4% had one or more malocclusion features. About 40% required treatment with fixed appliances, 33% needed extraction of permanent teeth, and only 2.5% would benefit from treatment with simple removable appliances. The investigation used a modification of the registration method, and most children were in dental stage DS4. The study evaluated treatment needs according to Norwegian Health Service guidelines (Al-Emran, S.et al., 2017).

Orthodontics, a dental branch focusing on diagnosing and managing dental malocclusions, deals with irregularities in teeth or jaws. Malocclusions are deviations from standard dental estimates, presenting as irregularities between arches or anomalies in teeth positioning (Alharbi, M. A., & Al-Salamah, R. M. 2021).

Teasing about dental appearance in childhood has been associated with a desire for orthodontic treatment. Orthodontic usage has increased due to the rising prevalence and incidence of malocclusions, representing a global public health concern. Earlier studies note that tooth misalignment can lead to various difficulties, including social discrimination, oral function problems, temporomandibular joint disorders, and increased susceptibility to trauma or dental issues (Mohammad, Y. et al., 2019).

In addition to a host of additional benefits, orthodontic treatment aims to enhance quality of life, boost self-confidence, and prevent injuries to both hard and soft tissues.6 In order to encourage patients to adopt healthy lifestyles, it is important to determine the degree of awareness that dental practitioners have towards these patients. When a person's teeth or jaws are misaligned due to a developmental defect, the specialty of orthodontics can help.4 In order to improve the quality of life, enhance dental and jaw function, and correct dentofacial irregularities or malocclusion, orthodontic treatments are essential for every individual. In addition to its significance in societal and psychological shifts, it is a key component in self-esteem.6 Becker et al. found that parents' main motivation for getting orthodontic treatment for their children with SHCNs was to make them look more appealing.7 The purpose of this study was to assess the level of orthodontic treatment knowledge among Saudi Arabian dental experts, general practitioners, interns, and seniors in the field (Kazim AL Ayed, 2017).

According to the 26 studies included in the systematic review, there were 72% of the candidates with malocclusion in Saudi Arabia. Prevalence of Class I, Class II and Class III malocclusion were 66.51%, 17.70%, and 15.79% respectively. In both male and female participants, the prevalence of Class I was the highest followed by class II and III malocclusion (Devanna, R.et al., 2021).

Statement of the Problem

This study sought to determine the level of awareness and knowledge of high school students on the prevention, causes, management, and treatment of malocclusion in the Kingdom of Saudi Arabia.

Specifically, this study sought to answer the following research questions:

1. What is the demographic profile of the high school students according to:
   - 1.1 Sex;
   - 1.2 Age;
   - 1.3 Year level; and
   - 1.4 Previous or current of orthodontic treatment?
2. What is the level of awareness of the high school students regarding malocclusion in terms of:
   - 2.1 Prevention;
   - 2.2 Clinical manifestation;
   - 2.3 Predisposing Causes;
   - 2.4 Management and treatment; and
   - 2.5 Benefits of treatment?
3. What is the level of knowledge of the high school students regarding malocclusion in terms of:
   - 3.1 Prevention;
   - 3.2 Clinical manifestation;
   - 3.3 Predisposing Causes;
   - 3.4 Management and treatment; and
   - 3.5 Benefits of treatment?
4. Is there a significant relationship between the demographic profile and the level of awareness of high school students regarding malocclusion?
5. Is there a significant relationship between the demographic profile and the level of knowledge of high school students regarding malocclusion?
6. Is there a significant difference in the level of awareness of the high school students regarding malocclusion when grouped according to profile?
7. Is there a significant difference in the level of knowledge of the high school students regarding malocclusion when grouped according to profile?
8. Based on the results of the study, what primer can be proposed to increase the level of knowledge and awareness of the high school students regarding malocclusion?

Hypotheses

The following hypothesis were tested at 0.05 level of significance:

Ho1: There is no significant relationship between the demographic profile and the level of awareness of the high school students regarding malocclusion.

Ha1: There is a significant relationship between the demographic profile and the level of awareness of the high school students regarding malocclusion.

Ho2: There is no significant relationship between the demographic profile and the level of knowledge of the high school students regarding malocclusion.

Ha2: There is a significant relationship between the demographic profile and the level of knowledge of the high school students regarding malocclusion.

Ho3: There is no significant difference between the level of awareness and the level of knowledge of the high school students regarding malocclusion.

Ha3: There is a significant difference between the level of awareness and the level of knowledge of the high school students regarding malocclusion.

Significance of the Study

The following are expected to benefit from the results of this study:

Dental Education:

This study will update the present dental education system to fill the gap by adding information regarding the level of knowledge and awareness of the high school students.

Orthodontic and Dental Practitioners:

The result of this study will help the orthodontist and dental practitioners to guide the high school students in obtaining knowledge and awareness in the application of orthodontic health.

General Public:

This study will contribute to the general information related of orthodontics oral care in social media.

High School Students:

This study will provide the high school students to have proper knowledge and awareness regarding orthodontic health which may serve as their quire to prevent orthodontic problem.

Future Researchers:

This study will help future researchers to gather information about orthodontics health treatment in the Kingdom of Saudi Arabia.

Conceptual Framework

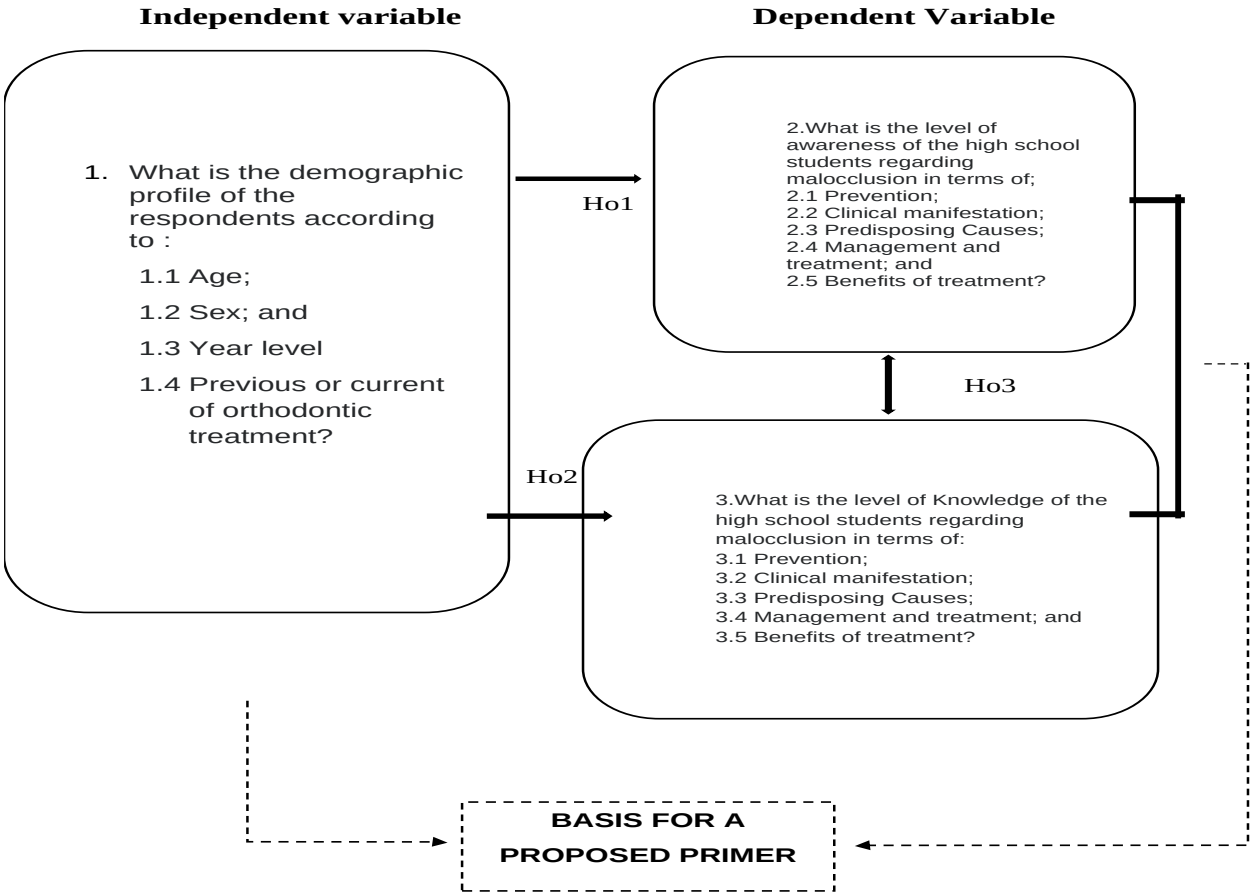

Fig.1: AWARENESS AND KNOWLEDGE OF HIGH SCHOOL STUDENTS ON THE PREVENTION, CAUSES, MANGEMENT, AND TREATMENT OF MALOCCLUSION IN THE KINGDOM OF SAUDIA ARABIA:

The study analyses the interaction of independent variables—demographic parameters like age, sex, year level, and orthodontic treatment history. Dependent variables include high school students' awareness and understanding of malocclusion's prevention, clinical manifestation, predisposing causes, management, treatment, and advantages. One-tailed arrows show strong correlations between pupils' malocclusion awareness and knowledge. Awareness and knowledge differ as seen by the two-tailed arrow. Additionally, a broken line provides health education programme instructions to raise high school pupils' malocclusion awareness.

Theoretical Framework

Orthodontics, traditionally grounded in the positivist model emphasizing direct cause-and-effect relationships in diseases, has witnessed a shift towards incorporating diverse factors influencing the health-disease process. Globally, there's increased awareness of orthodontics, particularly in children and adults, alongside a rise in orthodontic treatment. However, malocclusion still lacks recognition as a dental problem in developing countries, where priority is given to treating tooth decay and periodontal diseases. Untreated cases of malocclusion persist due to factors such as limited information, resource scarcity, low literacy rates, and socio-economic status. Studies demonstrate the interconnectedness of oral-dental health knowledge, positive dental health attitudes, and behavior, linked to education and income levels. Additionally, attitudes toward dental appearance vary among populations. This awareness is influenced by factors like age, gender, and the socio-economic and socio-cultural structure of a city (Turkan Sezen Erhamza, 2020).

The surge in orthodontic awareness extends to both children and adults globally, with notable increases reported in Nigeria. However, in developing countries like India, dental health knowledge, positive attitudes, and behavior are intricately linked to education and income levels. Previous studies highlight the association between attitudes toward dental appearance and diverse populations. Income status is identified as a factor influencing orthodontic awareness, with students' awareness influenced by age, gender, and socio-economic and socio-cultural factors in the city (Pradeep A. Bapana, 2020).

The Health Belief Model (HBM) was developed in the early 1950s by social scientists at the U.S. Public Health Service to understand the failure of people to adopt disease prevention strategies or screening tests for the early detection of disease. Later uses of HBM were for patients' responses to symptoms and compliance with medical treatments. The HBM suggests that a person's belief in a personal threat of an illness or disease together with a person's belief in the effectiveness of the recommended health behaviour or action will predict the likelihood the person will adopt the behaviour.

The HBM derives from psychological and behavioural theory with the foundation that the two components of health-related behaviour are 1) the desire to avoid illness, or conversely get well if already ill; and, 2) the belief that a specific health action will prevent, or cure, illness. Ultimately, an individual's course of action often depends on the person's perceptions of the benefits and barriers related to health behaviour. There are six constructs of the HBM. The first four constructs were developed as the original tenets of the HBM. The last two were added as research about the HBM evolved.

Cue to action - This is the stimulus needed to trigger the decision-making process to accept a recommended health action. These cues can be internal (e.g., chest pains, wheezing, etc.) or external (e.g., advice from others, illness of family member, newspaper article, etc.).

The Health Belief Model (HBM) has several limitations that curtail its applicability in public health. It fails to consider individual attitudes, beliefs, and other determinants that influence the acceptance of health behaviors. The model overlooks habitual behaviors, like smoking, which may not be easily influenced by recommended actions. Additionally, it neglects behaviors performed for non-health reasons, such as social acceptability, and does not account for environmental or economic factors impacting recommended actions. The assumption of equal access to information and the belief that cues to action are widely prevalent oversimplify the decision-making process. Moreover, the HBM is more descriptive than explanatory, lacking a clear strategy for changing health-related actions. While individual constructs can be useful depending on the health outcome, integrating the HBM with other models considering environmental context is recommended for more effective application and strategic change.

Scope and Limitations of the Study

The study assessed the awareness and knowledge of malocclusion among high school students in selected public schools in Riyadh, Kingdom of Saudi Arabia. Conducted during the Academic Year 2021-2022, the research involved 362 students from levels 1 to 3. Data collection included demographic information such as age, sex, and year level. The study focused on selected public schools under the Department of Education in Riyadh, limiting participants to students aged 14 to 19 who were currently enrolled. The study excluded students ages fourteen to nineteen who were not currently enrolled, Saudi nationals, and students who lived outside Riyadh, Kingdom of Saudi Arabia. Data were gathered using a researcher-made survey questionnaire, implemented from March to May 2022.

Definition of Terms

Dental caries refers to damage to a tooth that can happen when decay-causing bacteria in your mouth make acids that attack the tooth's surface, or enamel. This can lead to a small hole in a tooth called a cavity.

Management of Orthodontic is a way of straightening or moving teeth, to improve the appearance of the teeth and how they work. It can also help to look after the long-term health of your teeth, gums and jaw joints.

Malocclusion is defined as an appreciable deviation from the ideal that may be considered aesthetically or functionally unsatisfactory. Malocclusion has been described in numerous ways, ranging from specific classifications to indices of treatment need and outcome. Unlike a disease process, when the presence of specific features classifies the disease, a wide range of occlusal traits can constitute a malocclusion. However, within this spectrum, certain features can be identified for the purpose of classification, which allows communication and a basis for diagnosis. For any classification to be of use it needs to be simple, objective and reliable (Mosby's, 2009).

CHAPTER II
REVIEW OF RELEATED LITERATURE AND STUDIES

Level of Awareness

Based on the study conducted by (Alshammari MH, et al. 2021), which aimed to assess guardian awareness of children's dental health, the main findings were as follows: approximately 51% of the participants were fathers and 49% were mothers. The majority of the participants (90%) were above the age of 26, and the majority of the participants (38%) had a secondary certificate or university degree. On the other hand, only 64% of the parents had checked their children's teeth. The average overall knowledge of parents regarding dental health was medium, scoring 7.97 out of a possible 16.0%. Lastly, a statistically significant relationship was found between the type of parents, their educational level, and overall knowledge related to oral health.

A cross-sectional study was carried out in Chennai, India, among one thousand young adults (aged 18–22) at Sathyabama University. Each participant was asked to rate their level of knowledge on malocclusion and orthodontic treatment using a 24-item multiple-choice questionnaire. The SPSS software, version 20, was used for descriptive statistics and chi-square testing. We used a 0.05 level of significance.

Of the whole sample, 39.9% were dissatisfied with their tooth alignment, and over 70% showed interest in and care for their self-image. There was a noticeable lack of knowledge on the causes and effects of malocclusion among the members. Sixty-two percent of the population has not seen a dentist for more than three years. Many people have misconceptions about orthodontics.

Pratap Mane (2022), reported about Evaluation of the awareness and knowledge of orthodontics and orthodontic treatment in patients visiting School of Dental Sciences, Karad, a pr-structured questionnaire consisting of twenty questions was given to random 500 patients visiting the School of Dental Sciences, Karad, Maharashtra, India, in the age group of 18–25 years, who may or may not have taken orthodontic treatment. Exclusion criteria used were systemically compromised patients. The responses of the patients to the questions were recorded on a 3-point Likert scale. Simple descriptive statistics were applied to describe the study variables. Within limits of this study, it may be concluded that people in rural areas comparatively lack awareness regarding advances and various techniques in orthodontic treatment. Although people are concerned regarding their facial appearance, lack of awareness regarding this field makes them unapproachable to an orthodontist.

Level of Knowledge

Jyoti Mishra (2021), studied about Determining Orthodontic Knowledge and Awareness in Young Adults. To assess the level of awareness among local adult population (orthodontically untreated) regarding orthodontic treatment and procedures. A cross-sectional study was planned by accessing 100 subjects comprising of 2 groups (50 males and 50 female). After due ethical clearance, a self-structured questionnaire consisting of 17 questions was given to a group of randomly selected 100 individuals with an age range of 20 to 30 years. The overall awareness of orthodontics as a speciality among both the groups was only 52% to 56%. Statistically insignificant difference was found in the knowledge and awareness of orthodontic treatment among both male and female subjects, that is, Group I and II. Also, those who knew about the orthodontic treatment did not opt for it because of high cost and longer duration involved. More than half of the population is unaware of the scope of orthodontic treatment, and thus, they do not seek any assistance. Hence, more efforts are needed to create awareness about orthodontics and the associated benefits.

A thorough evaluation of orthodontic treatment knowledge among dental specialties was published by (Alharbi, M. A., & Al-Salamah, R. M. 2021). The early patient referral to appropriate therapy could be facilitated by the knowledge of non-orthodontic dental specialists regarding this topic. Eligible publications included eight in all, encompassing 1,397 non-orthodontic specialists from various nations. The research questionnaires used in all eight studies were cross-sectional. There was a wide range of expertise represented, from dental experts to students. Six studies included general dentists, two studies included undergraduate dental students, one research included dental surgeons, and another study included paediatric dentists. Research on the level of knowledge and awareness among specialists who are not orthodontics has shown mixed results. Educational programmes, however, must go farther in order to achieve these goals.

Malocclusion

According to Mani (2021), in recent times, youngsters are developing an unusual kind of malocclusions which are intended to be treated during their formative stage in its place of treating more invasive in their later stage. Myofunctional appliances are intended to set up muscular balance and eradicate oral dysfunction and thus direct in proper growth of the maxilla and mandible, esthetic impairment, discomfort, functional impairment, and ill are the prime purposes behind helpless collaboration and treatment suspension in beginning phase of treatment. Myofunctional treatment support more prominent mandibular skeletal impacts than treatment at a prepubertal stage. (Cohen 1987) suggested that treatment should start before the patient accomplishes top development rate to take the improvement of times of quick development, which both lead and follow the peak growth rate itself.

The average number of months that subjects wore their upper and lower fixed orthodontic appliances was 12.55 ± 10.86 months, with 231 subjects spending less than 18 months and 66 subjects spending more than 18 months in the appliances. When it came to dental plaque, orthodontic patients lacked enough periodontal understanding. Of the participants tested, just 24 (8%) got the knowledge questions right. Regarding periodontal health, adult orthodontic patients expressed an unfavourable view towards fixed orthodontic treatment. The subjects' opinion towards fixed orthodontic treatment was negatively impacted by the duration of treatment. Nearly two-thirds of the people surveyed fell into the "high awareness" category. Orthodontia patients lacked awareness about periodontal health. Patients' awareness of periodontal health throughout orthodontic treatment was moderate, and it varied by age, attitude, and the length of treatment.

Suma Shekar (2021), reported about Knowledge, Attitude, and Practices Related to Orthodontic Treatment among College Students in Rural and Urban Areas of Mysore, India. Four hundred and forty-one college students participated in the present study. 89.3% of the participants were aware about malalignment of teeth. The awareness was significantly higher among females and those in urban areas. 39.2% of the study participants expressed willingness to undergo orthodontic treatment even if treatment

duration extends up to 1–2 years with no significant difference in relation to gender and area of residence. 14.1% of the study participants have undergone treatment for malalignment of teeth with no significant difference between males and females. However, a significantly higher percentage of participants from urban areas have undergone treatment.

Oral Health Program

According to (Mishra, J., et al., 2022), people's oral health depends on their knowledge and experience. As people, educators have an effect on students in all areas, including their access to dental health care. The purpose of this research was to assess the level of oral health awareness, education, and practice among Nepalese educators working in the Chitwan District. To assess the oral health condition, knowledge, attitude, and habits of 550 teachers from both public and private schools in Chitwan District, a cross-sectional review was conducted. We used chi-square for descriptive analysis and other statistical tests. The teachers' attitude, practices, knowledge, and knowledge were measured using a five-point Likert Scale. When asked about periodontal infections, most educators were more knowledgeable than they were about dental caries. When comparing public school teachers (9.8%:27) to private school teachers (20.7%:57), the former group had better data on students' oral health. Educators in the public and private sectors had nearly the same percentage of students with adequate knowledge of dental health (73.5 percent for the former and 74.2 percent for the latter). When comparing sexes, men scored higher on measures of excellent dental health.

(Devanna, R., et al.,2021). A meta-analysis and systematic review of the prevalence of malocclusion among children in the Kingdom of Saudi Arabia An genuine and worldwide scale database search was conducted utilising relevant MeSH (Medical Subject Headings) terms. The search was registered with PROSPERO as CRD42020198427. We followed the PRISMA standards for searching for literature and screening papers. For the purpose of statistical analysis, 95% confidence intervals (CIs) were established for the dichotomous variables. Testing for overall effect was done as Z, and indices Tau2, Chi2, df, and I2 were used to determine the heterogeneity index between the trials. It was found that 7,930 candidates had one of the three types of malocclusions. Class I malocclusions were found to be 66.51% prevalent, Class II malocclusions 17.70%, and Class III malocclusions 15.79%. Out of the tiny subset of these candidates, 42.07 percent of boys, 12.27 percent of girls, and 3.4 percent of boys had Class I, Class II, or Class III malocclusion, respectively. In Saudi Arabia, 72 percent of applicants had malocclusion, according to 26 studies that were part of the meta-analysis. Class II malocclusion was seen in 17.70% of cases, Class III in 66.51% of cases, and Class III in 15.79% of cases. Class I malocclusion was the most common type among both sexes, with classes II and III following closely after.

CHAPTER III
METHODOLOGY

Research Design

A descriptive correlational design was employed to explore the relationship between high school students' demographic profiles and their awareness and knowledge of malocclusion. This design facilitated the investigation of potential differences in awareness and knowledge levels based on distinct student profiles. Correlational research, utilized in this study, aims to understand the natural relationships between variables, focusing on the connection between students' profiles and their awareness and knowledge regarding malocclusion. Additionally, a comparative study design was applied, assessing unmanipulated variables and establishing a formal procedure to determine significant differences in awareness and knowledge levels among high school students concerning malocclusion (Cheprasov, 2021; Villanueva, 2013).

Sample and Sampling Technique

This cross-sectional study conducted in Riyadh, Saudi Arabia, involved 362 respondents from public high schools in the 2021-2022 academic year. The self-made questionnaire, divided into two parts, focused on awareness and knowledge of malocclusion prevention, causes, management, and treatment. Prior to the main study, pilot testing involved 30 high school students in levels 1 to 3 in Saudi Arabia, ensuring the reliability of the questionnaire with a Cronbach alpha of 0.937. Respondents, male and female students in levels 1 to 3, residing in Riyadh, completed the researcher-made questionnaire during school hours.

Research Instruments

A researcher-made questionnaire was formulated to survey in the high school level The part of the questionnaire is the following: (a) Part 1, refers to respondent’s demographic data; (b) Part 2, refers to questions related to level of awareness of high school students; (c) Part 3 refers to questions related level of knowledge of high school level students. The research instrument was in Arabic language, which was translated from English language by an expert in the two languages.

Data Gathering Procedures

A letter of permission, endorsed by the researcher, dissertation adviser, and MCU Dean of the School of Graduate Studies, was sent to Riyadh's public high schools for the study involving 362 respondents from the 2022-2023 school year. The Ethics Review Board reviewed and approved the questionnaires. Following school approval, a pilot study was conducted off-site. Upon obtaining permission, study questionnaires were distributed to high school students for completion. The questionnaire comprises three parts: Part I focuses on demographic details, including age, sex, year level, and orthodontic treatment history. Part II assesses awareness of malocclusion, covering prevention, clinical manifestation, predisposing causes, management, treatment, and benefits. Part III evaluates the level of knowledge on malocclusion. The questionnaire underwent reliability and validity testing, achieving a .95 reliability score. Data were gathered and analyzed using the Statistical Package for Social Sciences Version 8 (SPSS) (for interpretation and analysis).

Statistical Treatment of Data

After the data and tabulation were finished, statistical treatments were used. The researcher employed descriptive and inferential statistics to examine and understand the study's findings. Mean scores and frequency distributions were utilised in descriptive statistics. We calculated the percentage of people who rated something the same and the percentage of people who belonged to a given profile category.

1. **Percentage**: is the distribution and display of data that specifies the percentage of observation that exist for each data point or grouping of data points (Lavrakas, 2017). It was used to show the relative proportion of the respondents in terms of their socio-demographic profile using the formula:

Formula: P = f/n x 100Where:
P is percentage
f is frequency of response or case
n is the total number of respondents or cases

2. **Weighted Mean (WM)** – was used to determine the level of knowledge and awareness of school-aged children and their parents. Weighted Mean is the average of a set of values wherein each measurement has a different weight or degree of importance (Investopedia, 2017). The sum of all items or terms divided by the total number of items or terms using the formula below:

Formula: WM = fw/n
Where:
WM = weighted mean
fw = sum of the frequency multiplied by unit of weight n = total number of respondents

To determine the level of knowledge and awareness of the respondents as stated in Statement of the Problem 2 and 3 the following Likert scale was used:

Scale	Verbal Interpretation	Symbol
4	Fully knowledgable.	FK
3	Knowledgeable	K
2	Somewhat Knowledgeable	SK
1	Not knowledgeable	NK

Scale	Verbal Interpretation	Symbol
4	Strongly Agree (very much aware)	SA
3	Agree (aware)	A
2	Disagree (somewhat aware)	D
1	Strongly Disagree(not aware)	SD

Untrustworthy items were removed from the scale using this method. Instead of only "Agree" or "Disagree," the Likert method codes responses as "Strongly Agree" or "Strongly Disagree," expanding the range of potential values. Every respondent had their scale score calculated. One way to find out if two people with drastically different scores will answer the same question is to compare their responses to all of the questions. For example, if responder A gets a really high score and person B gets a really low score.

3. Chi-square was used to test the hypotheses. This test was used in order to find the significant relationship between the socio-demographic profile and level of knowledge and awareness of the respondents. The formula for Chi–square is:

Formula:

$$X^2 = \sum \frac{(\text{Observed value} - \text{Expected value})^2}{\text{Expected value}}$$

where:

X2 = stands for the value of chi-square
Oi = stands for observed frequency
Ei = stands for expected frequency, asserted by the null hypothesis
N = stands for the number of cells in the table

4. **Pearson Product Moment Correlation** (r) is a statistical tool that is being used to measure the relationship between two variables. It also quantifies the strength of linear association between two variables that are measured on interval or ratio scales. Pearson r was adapted to gauge if there is a significant relationship between the level of awareness and knowledge in high school's students.

The formula is as follows:

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

Where:

n = number of pairs of scores
$\sum y^2$= sum of squared y scores
$\sum x$ = sum of x scores
$\sum y$ = sum of y scores
$\sum x^2$ = sum of squared x scores
$\sum xy$ = sum of the product of the paired scores

5. **Independent t-test** is also called the two-sample t-test, is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups. The independent t–test was employed in this study to validate if there is a significant difference in the respondents' level of knowledge when grouped according to their profile; ; and difference in the level of awareness of the respondents when grouped according to their socio-demographic profile.

The formula for independent t-test is as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

S2 is an estimator of the common variance of the two samples. It can be calculated as follows:

$$S^2 = \frac{\sum(x - \bar{x}_1)^2 + \sum(x - \bar{x}_2)^2}{N_1 + N_2 - 2}$$

Where:

$\bar{x}_1$ = mean of group 1
$\bar{x}_2$ = mean of group 2

N1 = sample size of group 1 N2 = sample size of group 2 S12 = variance of group 1 S22 = variance of group

Once t-test statistic value is determined, it was compared with the critical value of t-test table corresponding to the confidence level alpha (5%). The degrees of freedom (df) used in the test are:

$$df = N_1 + N_2 - 2$$

6. **One Factor Analysis of Variance (One-Way ANOVA)** is a statistical technique that can be used to show difference between two (2) or more computed means of the tested variables. It is also being used to make multiple comparisons of several population means. The ANOVA test is being performed by comparing two types of variation, the variation between the sample means, as well as the variation within each of the samples.

ISSN-E: 2617-9563

7. It is also being used to general rather than specific differences among means (Lane, 2017). In this study, this statistical tool was used to determine the difference. Below is the formula that represents One-way ANOVA test statistics:

Source of Variation	Sum of Squares	Df
Between	SSB	dfB
Within	SSW	dfW
Total	SST	dfT

Sum of Squares "total" (SST) = $\sum A^2+\sum B^2+\sum C^2+\sum D\ldots-\frac{\sum A F \sum \square F \sum C F \sum D}{N}$

Sum of Squares "between" (SSB) = $\frac{\sum A\ 5F\ \sum \square\ 5F\ \sum C\ 5F\ \sum D\ 5 - (\sum A F \sum B\ldots)^2}{\#\ oA\ roLs \qquad N}$

Sum of Squares "within" (SSW) = TSS-SSB

Where: ∑ = sum of the following scores

A = group 1

B = group 2

C = group 3

D = group 4

N = number of observations

CHAPTER IV
PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

In this section, the researcher displays, analyses, and interprets the data obtained from the study instrument. After the data and tabulation were finished, statistical treatments were used. The researcher employed descriptive and inferential statistics to examine and understand the study's findings. Mean scores and frequency distributions were utilized in descriptive statistics. We calculated the percentage of people who rated something the same and the percentage of people who belonged to a given profile category.

1. **What is the demographic profile of the high school students according to:**

1.1 Sex;

1.2 Age;

1.3 year level; and

1.4 Previous or current orthodontic treatment?

Table 1.1. Frequency and Percentage Distribution of High School Students' Profile according to Sex

SEX	HIGH SCHOOL STUDENTS	
	Frequency	Percentage (%)
Male	326	90.06
Female	36	9.94
TOTAL	362	100.00

Table 1.1 shows the frequency and percentage distribution of the sex of the high school student-respondents, wherein majority or 90.06% of the respondents are male.; while 9.94% of the respondents are female.

Table 1.2. Frequency and Percentage Distribution of High School Students' Profile according to Age

AGE	HIGH SCHOOL STUDENTS	
	Frequency	Percentage
14-15 years old	118	32.60
16-17 years old	131	36.18
18-19 years old	113	31.22
TOTAL	362	100.00

Table 1.2 presents the frequency and percentage distribution of the age of the high school student-respondents, wherein 131 or 36.18% of the respondents are in the 16-17 years old age group. While 118 or 32.60% of the respondents belong to the 14-15 age group; lastly 113 or 31.22% are part of the 18-19 years old age bracket.

Table 1.3. Frequency and Percentage Distribution of Respondents' Profile according to Year Level

Year Level	HIGH SCHOOL STUDENTS	
	Frequency	Percentage
1st Year	118	32.60
2nd Year	131	36.18
3rd Year	113	31.22
TOTAL	362	100.00

In terms of the year level of the high school student-respondents, 36.18% are in the second year level; followed by 118 respondents or 32.60% belonging in the first year level; and lastly 113 respondents are part of the third year level.

Table 1.4. Frequency and Percentage Distribution of High School Students' Profile according to Previous or Current Orthodontic Treatment

Orthodontic Treatment	HIGH SCHOOL STUDENTS	
	Frequency	Percentage (%)
No	276	76.24
Yes	86	23.76
TOTAL	362	100.00

According to Jyoti Mishra (2021), A cross-sectional study was planned by accessing 100 subjects comprising of 2 groups (50 male and 50 female). . The overall awareness of orthodontics as a speciality among both the groups was only 52% to 56%. Statistically insignificant difference was found in the knowledge and awareness of orthodontic treatment among both male and female subjects, that is, Group I and II. Also, those who knew about the orthodontic treatment did not opt for it because of high cost and longer duration involved.

2. What is the level of awareness of the high school students regarding malocclusion in terms of:

2.1 Prevention;
2.2 Clinical manifestation;
2.3 Predisposing Causes;
2.4 Management and treatment; and
2.5 Benefits of treatment?

Table 2.1. Level of Awareness of High School Students regarding Malocclusion in terms of Prevention

Prevention	Numerical Interpretation	Verbal Interpretation
1. At the age of 7 years, a child should visit an orthodontist for check-up	2.78	A
2. Losing a baby tooth too early or too late should be avoided	2.74	A
3. Under orthodontic treatment with bad oral health will increase caries and may result in gum problems.	3.06	A
4. Using a space mentioner when I lose teeth early to avoid any future problems.	2.68	A
5. Using an appliance to help stop bad oral habit and avoid malocclusion	2.73	A
6. Maintaining good alignment of teeth as it will protect them from caries and gingivitis.	2.97	A
7. Using an appliance to modify the problem of the growth in maxilla and mandible that will avoid any skeletal problem in the future	3.03	A
Average	2.86	A

**Strongly Agree (SA) 3.26-4.00; Agree (A) 2.51-3.25; Disagree (D) 1.76-2.50; Strongly Disagree (SD) 1.00-1.75

Table 2.1 presents the level of awareness of the high school students regarding malocclusion in terms of prevention, wherein the average score was 2.86 or Agree. Item Number 3, "Under orthodontic treatment with bad oral health will increase caries and may result in gum problems" got the highest numerical interpretation of 3.06 or Agree. While Item Number 4, "Using a space mentioner when I lose teeth early to avoid any future problems" got the lowest numerical interpretation of 2.68 or Agree. The results show that among the high school student-respondents their level of awareness in malocclusion in terms of prevention is not that high since they just gave a verbal interpretation of Agree, which may imply that concerned stakeholders may develop programs on orthodontics or oral health in general.

Table 2.2. Level of Awareness of High School Students regarding Malocclusion in terms of Clinical Manifestation

Clinical Manifestation	Numerical Interpretation	Verbal Interpretation
1. Presence of space between teeth	3.31	SA
2. Crowding of teeth	3.62	SA
3. The upper jaw is protruding	3.02	A
4. The lower jaw is protruding	3.01	A
Average	3.24	A

**Strongly Agree (SA) 3.26-4.00; Agree (A) 2.51-3.25; Disagree (D) 1.76-2.50; Strongly Disagree (SD) 1.00-1.75

Table 2.2 shows the level of awareness of high school student-respondents regarding malocclusion in terms of clinical manifestation, wherein the average score was 3.24 or Agree. Item Number 2, "Crowding of teeth" got the highest numerical interpretation of 3.62 or Strongly Agree.

This may mean that the respondents are indeed familiar with the said clinical manifestation. While Item Number 4, "The lower jaw is protruding" got the lowest numerical interpretation of 3.01 or Agree. The results show that among the student-respondents their level of awareness regarding malocclusion in terms of clinical manifestation ranges from Agree to Strongly Agree, which may imply that not all of the clinical manifestation related to malocclusion are familiar with the respondents.

Table 2.3. Level of Awareness of High School Students regarding Malocclusion in terms of Predisposing Causes

Predisposing Causes	Numerical Interpretation	Verbal Interpretation
1. Permanently breathing from the mouth	2.01	D
2. Late or early loss of baby teeth	2.40	D
3. Tongue thrust	2.23	D
4. Biting on the lips permanently	1.77	D
5. Thumb sucking habit	3.00	A
6. Nail biting habit	2.95	A
7. Hereditary factor	3.48	SA
8. Growth problem of upper or lower jaw	2.89	A
Average	2.59	A

**Strongly Agree (SA) 3.26-4.00; Agree (A) 2.51-3.25; Disagree (D) 1.76-2.50; Strongly Disagree (SD) 1.00-1.75

In terms of the predisposing causes of malocclusion as seen in Table 2.3, the respondent's responses from the 8 items ranges from Disagree to Strongly Agree. Which may mean that the level of awareness of the respondents on the predisposing factors vary, that is they are familiar with some items but not all. Item 7, "Hereditary factor" got the highest score of 3.48 (Strongly Agree); while Item 4, "Biting on the lips permanently" received the lowest score of 1.77 or Disagree.

Table 2.4. Level of Awareness of High School Students regarding Malocclusion in terms of Management and Treatment

Management and Treatment	Numerical Interpretation	Verbal Interpretation
1. Ordinary metallic brackets use elastic	2.93	A
2. Aligner, which is a clear, plastic orthodontic appliance, is molded to fit over the teeth and is usedto correct their alignment	2.38	D
3. Functional appliance is used to correct the problem of the growth	3.56	SA
4. Self-ligating does not require use elastic	3.04	A
Average	2.98	A

**Strongly Agree (SA) 3.26-4.00; Agree (A) 2.51-3.25; Disagree (D) 1.76-2.50; Strongly Disagree (SD) 1.00-1.75

Table 2.4 shows the level of awareness of high school student-respondents regarding malocclusion in terms of management and treatment, wherein the average score was 2.98 or Agree. Item Number 3, "Functional appliance is used to correct the problem of the growth" got the highest numerical interpretation of 3.56 or Strongly Agree. While Item Number 4, "Self-ligating does not require use elastic" got the lowest numerical interpretation of 3.04 or Agree. The results show that among the student-respondents their level of awareness regarding malocclusion in terms of management and treatment ranges from Disagree to Strongly Agree.

Table 2.5. Level of Awareness of High School Students regarding Malocclusion in terms of Benefits of Treatment

Benefits of Treatment	Numerical Interpretation	Verbal Interpretation
1. Orthodontic treatment can give a beautiful smile	2.89	A
2. Orthodontic treatment can improve biting or chewing	2.86	A
3. Orthodontic treatment can improve speaking	2.83	A
4. Orthodontic treatment has good long-term effect on the health of teeth and gums	3.01	A
Average	2.90	A

**Strongly Agree (SA) 3.26-4.00; Agree (A) 2.51-3.25; Disagree (D) 1.76-2.50; Strongly Disagree (SD) 1.00-1.75

Table 2.5 presents the level of awareness of high school student-respondents regarding malocclusion in terms of benefits of treatment, wherein the average score was 2.90 or Agree. Item Number 4, "Orthodontic treatment has good long-term effect on the health of teeth and gums" got the highest numerical interpretation of 3.01 or Agree, While Item Number 3, "Orthodontic treatment can improve speaking" got the lowest numerical interpretation of 2.83 or Agree. The results show that among the student-respondents their level of awareness regarding malocclusion in terms of benefits of treatment, were all rated with a verbal interpretation of Agree.

Participants ranked their favourite orthodontic appliance and payment method alternatives and their level of awareness of nine orthodontic modalities was measured using a Likert scale. The degrees of awareness were moderate to high, and the aligners were transparent, with stainless steel and ceramic brackets. It was clear, however, that early treatment tools—including expanders, headgear, and functional appliances—were significantly less recognised. Ceramic brackets were deemed the most desirable orthodontic device by the study's participants, whereas lingual brackets were deemed the least favoured. The results of the study suggest that dental professionals and community awareness programmes should work together to increase the general public's understanding of dentofacial orthopaedic procedures.

3. What is the level of knowledge of the high school students regarding malocclusion in terms of:
3.1 Prevention;
3.2 Clinical manifestation;
3.3 Predisposing Causes;
3.4 Management and treatment; and
3.5 Benefits of treatment?

Table 3.1. Level of Knowledge of High School Students regarding Malocclusion in terms of Prevention

Prevention	Numerical Interpretation	Verbal Interpretation
1. At the age of 7 years, a child should visit an orthodontist for check-up	1.72	NK
2. Losing a baby tooth too early or too late should be avoided	2.17	SK
3. Under orthodontic treatment with bad oral health will increase caries and may result in gum problems.	2.67	K
4. Using a space mentioner when I lose teeth early to avoid any future problems.	2.20	SK
5. Using an appliance to help stop bad oral habit and avoid malocclusion	1.93	SK
6. Maintaining good alignment of teeth as it will protect them from caries and gingivitis.	2.34	SK
7. Using an appliance to modify the problem of the growth in maxilla and mandible that will avoid any skeletal problem in the future	1.88	SK
Average	2.13	SK

**Very Knowledgeable (VK) 3.26-4.00; Knowledgeable (K) 2.51-3.25; Somewhat Knowledgeable (SK) 1.76-2.50; Not Knowledgeable (NK) 1.00-1.75

Table 3.1 shows the level of knowledge of the high school students regarding malocclusion in terms of prevention, wherein the average score was 2.13 or Somewhat Knowledgeable. Item Number 3, "Under orthodontic treatment with bad oral health will increase caries and may result in gum problems." got the highest numerical interpretation of 2.67 or Knowledgeable. While Item Number 1, "At the age of 7 years, a child should visit an orthodontist for check-up" got the lowest numerical interpretation of 1.72 or Not Knowledgeable. The findings show that among the high school student-respondents their level of knowledge in malocclusion in terms of prevention is not that much, thus specific programs may be develop even in the school level in increasing the knowledge of the high school students.

Table 3.2. Level of Knowledge of High School Students regarding Malocclusion in terms of Clinical Manifestation

Clinical Manifestation	Numerical Interpretation	Verbal Interpretation
1. Presence of space between teeth	3.52	VK
2. Crowding of teeth	3.54	VK
3. The upper jaw is protruding	2.47	SK
4. The lower jaw is protruding	2.49	SK
Average	3.01	K

**Very Knowledgeable (VK) 3.26-4.00; Knowledgeable (K) 2.51-3.25; Somewhat Knowledgeable (SK) 1.76-2.50; Not Knowledgeable (NK) 1.00-1.75

Table 3.2 presents the level of awareness of high school student-respondents regarding malocclusion in terms of clinical manifestation, wherein the average score was 3.01 or Knowledgeable. Item Number 2, "Crowding of teeth" got the highest numerical interpretation of 3.54 or Very Knowledgeable, this mean that the respondents are very knowledgeable on crowding of teeth. While Item Number 3, "The upper jaw is protruding" got the lowest numerical interpretation of 2.47 or Somewhat Knowledgeable.

The results show that among the student-respondents their level of knowledge regarding malocclusion in terms of clinical manifestation ranges from Somewhat Knowledgeable to Very Knowledgeable, which imply that the respondents have enough knowledge on the clinical manifestations of malocclusion.

Table 3.3. Level of Knowledge of High School Students regarding Malocclusion in terms of Predisposing Causes

Predisposing Causes	Numerical Interpretation	Verbal Interpretation
1. Permanently breathing from the mouth	1.53	NK
2. Late or early loss of baby teeth	2.86	K
3. Tongue thrust	1.55	NK
4. Biting on the lips permanently	1.56	NK
5. Thumb sucking habit	2.70	K
6. Nail biting habit	2.23	SK
7. Hereditary factor	3.48	VK
8. Growth problem of upper or lower jaw	1.99	SK
Average	2.24	SK

**Very Knowledgeable (VK) 3.26-4.00; Knowledgeable (K) 2.51-3.25; Somewhat Knowledgeable (SK) 1.76-2.50; Not Knowledgeable (NK) 1.00-1.75

In terms of the knowledge on predisposing causes of malocclusion as seen in Table 3.3, the respondents gave extreme responses on the 8 items ranging from Not Knowledgeable to Very Knowledgeable. This mean that the level of knowledge of the respondents on the predisposing factors vary, that is they are knowledgeable with some items but not all. Item 7, "Hereditary factor" got the highest score of 3.48 (Very Knowledgeable); while Item 3, "Tongue thrust" received the lowest score of 1.55 or Not Knowledgeable.

Table 3.4. Level of Knowledge of High School Students regarding Malocclusion in terms of Management and Treatment

Management and Treatment	Numerical Interpretation	Verbal Interpretation
1. Ordinary metallic brackets use elastic	1.90	SK
2. Aligner, which is a clear, plastic orthodontic appliance, is molded to fit over the teeth and is used to correct their alignment	1.65	NK
3. Functional appliance is used to correct the problem of the growth	3.44	VK
4. Self-ligating does not require use elastic	2.61	K
Average	2.40	SK

**Very Knowledgeable (VK) 3.26-4.00; Knowledgeable (K) 2.51-3.25; Somewhat Knowledgeable (SK) 1.76-2.50; Not Knowledgeable (NK) 1.00-1.75

Table 3.4 shows the level of knowledge of high school student-respondents regarding malocclusion in terms of management and treatment, wherein the average score was 2.40 or Somewhat Knowledgeable. Item Number 3, "Functional appliance is used to correct the problem of the growth" got the highest numerical interpretation of 3.44 or Very Knowledgeable. While Item Number 2, "Aligner, which is a clear, plastic orthodontic appliance, is molded to fit over the teeth and is used to correct their alignment" got the lowest numerical interpretation of 1.65 or Not Knowledgeable. The results show that among the student-respondents their level of knowledge regarding malocclusion in terms of management and treatment ranges from Not Knowledgeable to Very Knowledgeable.

Table 3.5. Level of Knowledge of High School Students regarding Malocclusion in terms of Benefits of Treatment

Benefits of Treatment	Numerical Interpretation	Verbal Interpretation
1. Orthodontic treatment can give a beautiful smile	2.48	SK
2. Orthodontic treatment can improve biting or chewing	2.64	K
3. Orthodontic treatment can improve speaking	2.63	K
4. Orthodontic treatment has good long-term effect on the health of teeth and gums	2.56	K
Average	2.58	K

**Very Knowledgeable (VK) 3.26-4.00; Knowledgeable (K) 2.51-3.25; Somewhat Knowledgeable (SK) 1.76-2.50; Not Knowledgeable (NK) 1.00-1.75

Table 3.5 presents the level of knowledge of high school student-respondents regarding malocclusion in terms of benefits of treatment, wherein the average score was 2.58 or Knowledgeable. Item Number 2, "Orthodontic treatment can improve biting or chewing" got the highest numerical interpretation of 2.64 or Knowledgeable, While Item Number 1, "Orthodontic treatment can give a beautiful smile" got the lowest numerical interpretation of 2.48 or Somewhat Knowledgeable. The results show that among the student-respondents their level of knowledge regarding malocclusion in terms of benefits of treatment things can still be improved on so as to increase their knowledge in terms of benefits of treatment.

According to Pratap Mane (2022), in the age group of 18–25 years, who may or may not have taken orthodontic treatment. Exclusion criteria used were systemically compromised patients. The responses of the patients to the questions were recorded on a 3-point Likert scale. Simple descriptive statistics were applied to describe the study variables. Within limits of this study, it may be concluded that people in rural areas comparatively lack awareness regarding advances and various techniques in orthodontic treatment. Although people are concerned regarding their facial appearance, lack of awareness regarding this field makes them unapproachable to an orthodontist.

4. Is there a significant relationship between the demographic profile and the level of awareness of high school students regarding malocclusion?

Table 4. Relationship Between Demographic Profile and Level of Awareness of High School Students regarding Malocclusion

Profile and Awareness on Malocclusion	Computed Chi-square Value	Degree of Freedom	Tabular Chi-square Value	Decision	Interpretation
Sex	1.07	3	7.815	$H_{o:}$ Accepted	Non Significant
Age	3.88	6	12.592	$H_{o:}$ Accepted	Non Significant
Grade Level	3.88	6	12.592	$H_{o:}$ Accepted	Non Significant
Previous or Current Orthodontic Treatment	10.34	3	7.815	$H_{o:}$ Rejected $H_{A:}$ Accepted	Significant Relationship

*0.05 level of significance

Table 4 presents the relationship between the demographic profile of high school student-respondents and their level of awareness in malocclusion wherein only previous or current orthodontic treatment had a significant relationship. This means that previous or current orthodontic treatment influences the high school students' level of awareness on malocclusion, since if one has experience coming to an orthodontist he or she will be gaining awareness and information regarding malocclusion.

5. Is there a significant relationship between the demographic profile and the level of knowledge of high school students regarding malocclusion?

Table 5. Relationship Between Demographic Profile and Level of Knowledge of High School Students regarding Malocclusion

Profile and Knowledge on Malocclusion	Computed Chi-square Value	Degree of Freedom	Tabular Chi-square Value	Decision	Interpretation
Sex	4.05	3	7.815	H_o: Accepted	Non Significant
Age	8.29	6	12.592	H_o: Accepted	Non Significant
Grade Level	8.29	6	12.592	H_o: Accepted	Non Significant
Previous or Current Orthodontic Treatment	9.83	3	7.815	H_o: Rejected H_A: Accepted	Significant Relationship

*0.05 level of significance

Table 5 shows the relationship between the demographic profile of high school student-respondents and their level of knowledge in malocclusion wherein only previous or current orthodontic treatment had a significant relationship. This suggests that a history of orthodontic treatment it may affect the high school students' level of knowledge on malocclusion, since this student are exposed to an orthodontist, thus they will gain information on orthodontics, including that of malocclusion.

6. Is there a significant difference in the level of awareness of the high school students regarding malocclusion when grouped according to profile?

Table 6. Difference in the Level of Awareness of High School Students Regarding Malocclusion when grouped according to Profile

Difference Level of Awareness	Computed t-Test /F test Value	Degree of Freedom	Tabular t-Test/F test Value	Decision	Interpretation
Sex**	0.78	360	1.980	H_o: Accepted	Non Significant
Age***	2.23	2, 259	3.06	H_o: Accepted	Non Significant
Year Level***	2.23	2, 259	3.06	H_o: Accepted	Non Significant
Previous or Current Orthodontic Treatment**	2.54	360	1.980	H_o: Rejected H_A: Accepted	Significant Difference

*0.05 level of significance; **t-Test; ***F test

Table 6 presents the difference in the level of awareness of the high school students regarding malocclusion when grouped according to profile, wherein only previous or current orthodontic treatment yielded a significant difference. This implies that a previous or current orthodontic treatment may create awareness to the student about malocclusion, wherein they can even ask their orthodontist to clarify concepts on orthodontics.

7. Is there a significant difference in the level of knowledge of the high school students regarding malocclusion when grouped according to profile?

Table 7. Difference in the Level of Knowledge of High School Students Regarding Malocclusion when grouped according to Profile

Difference Level of Awareness	Computed t-Test /F test Value	Degree of Freedom	Tabular t-Test/F test Value	Decision	Interpretation
Sex**	1.12	360	1.980	H_o: Accepted	Non Significant
Age***	1.78	2, 259	3.06	H_o: Accepted	Non Significant
Year Level***	1.78	2, 259	3.06	H_o: Accepted	Non Significant
Previous or Current Orthodontic Treatment**	3.07	360	1.980	H_o: Rejected H_A: Accepted	Significant Difference

*0.05 level of significance

Table 7 shows the difference in the level of knowledge of the high school students regarding malocclusion when grouped according to profile, wherein only previous or current orthodontic treatment tested a significant difference. This means that a history of orthodontic treatment may provide added information among the high school students on malocclusion.

8. Based on the results of the study, what primer can be proposed to increase the level of knowledge and awareness of the high school students regarding malocclusion?

Based on the results of the study, specifically on the level of awareness and knowledge on malocclusion of high school students, an appropriate enhancement via a primer in oral health school programs will be proposed. An oral program incorporated in a primer that will enhance the awareness of high school students on malocclusion in terms of prevention, clinical manifestation, predisposing causes, management and treatment, and benefits of treatment may be initiated by doing a wide scope of dental health education in the school, and by also maximizing the social media platform so as to really attract high school students.

Similarly, school dental stakeholders may develop an oral primer that will further improve the knowledge of high school students on malocclusion in terms of prevention, clinical manifestation, predisposing causes, management and treatment, and benefits of treatment.

CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

1. In terms of sex, the majority of the respondents are male (90.06%); in terms of age the most number belong to the 16-17 years old age group (36.18%); in terms of year level 36.18% belong to the second year level; and 76.24% of the respondents have no previous or current orthodontic treatment.
2. The level of awareness of the high school students regarding malocclusion in terms of prevention was 2.86 or Agree; in terms of clinical manifestation, the average score was 3.24 or Agree; in terms of predisposing causes, the average score was 2.59 or Agree; in terms of management and treatment, the average score was 2.98 or Agree; and in terms of benefits of treatment, the average score was 2.90 or Agree.
3. The relationship between the demographic profile of high school student-respondents and their level of awareness in malocclusion was only found in previous or current orthodontic treatment.
4. The relationship between the demographic profile of high school student-respondents and their level of knowledge in malocclusion was only significant in previous or current orthodontic treatment.

Conclusions

1. The high school student-respondents were mostly male, in their middle adolescent stage, in their second level, and mostly had no previous or current orthodontic treatment.
2. Previous or current orthodontic treatment is the only profile variable associated with the high school students' level of awareness on malocclusion.
3. Previous or current orthodontic treatment is also associated with the high school students' level of knowledge on malocclusion.
4. High school students' level of awareness on malocclusion varies in terms of previous or current orthodontic treatment.
5. High school students' level of knowledge on malocclusion differed in terms of previous or current orthodontic treatment.

Recommendations

1. School dentists may develop an oral health program that will enhance the awareness of high school students on malocclusion in terms of prevention, clinical manifestation, predisposing causes, management and treatment, and benefits of treatment.
2. Future researchers may use the results of this study as baseline data in doing research in other parts of Saudi Arabia and other levels of the educational system.
3. Future researchers may do a qualitative study focusing on the lived experiences of both orthodontists and dental patients.
4. Further studies may be done with a bigger sample size to make the results more conclusive.
5. Further studies may be done to determine if awareness and knowledge about malocclusion is a motivating factor for students to seek consultation with an orthodontist.

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