An-Najah National University

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EVALUATION OF DENTAL HEALTH INDICATORS IN PREGNANCY: SALIVA PH AND CARIES RISK

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This thesis is a special gift for my ……

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Declaration

I, the undersigned, declare that I submitted the thesis entitled:

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I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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EVALUATION OF DENTAL HEALTH INDICATORS IN PREGNANCY: SALIVA PH AND CARIES RISK

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Abstract

Purpose: This study aims to investigate the relationship between pH levels, dental caries, and pregnancy by comparing the dental health of pregnant and non-pregnant women. The focus is on assessing the impact of pH levels, age, and pregnancy experience on dental health perceptions and practices, as well as examining the relationship between the DMFT (Decayed, Missing, Filled Teeth) index and dental health during pregnancy.

Design/methodology/approach: A cross-sectional study was conducted with 80 women from the Salfit Health Directorate, divided into pregnant and non-pregnant groups. Data on dental health perceptions, pH impact, and the DMFT index were collected and analysed using statistical methods, including F-tests and T-tests, to compare the groups.

Findings: The findings indicate no significant difference in dental health perceptions between pregnant and non-pregnant women based on pH levels ($F = 0.542$, $p = 0.705$). Age also had no significant impact on dental health perceptions and practices ($F = 1.449$, $p = 0.226$). However, significant differences were found in dental health perceptions related to pregnancy experience ($T = 2.476$, $p = 0.015$) and in the DMFT index between women exposed and not exposed to pregnancy indicators, with p-values of 0.011, 0.001, and 0.008, respectively.

Research Limitation/implications: The study was limited to a specific population in one region, which may affect the generalizability of the results. Further research is needed to explore additional factors influencing dental health during pregnancy.

Practical implications: The results emphasize the importance of integrating tailored dental health education and interventions into prenatal care, focusing on pregnancy-related factors that affect dental health.

Originality/value: This study contributes to understanding the relationship between pregnancy, pH levels, and dental health, highlighting the significant role of pregnancy experience and the DMFT index in shaping dental health outcomes. It underscores the need for targeted dental care strategies for pregnant women.

Keywords: pH levels, dental caries, pregnancy, dental health, DMFT index, cross-sectional study

Chapter One

Introduction and Literature Rewiew

1.1 Brief introduction

"Mammals have salivary glands, which are exocrine glands that generate saliva that serves to lubricate and solubilize food prior to digestion. The parotid, submandibular, and sublingual glands are among the major salivary glands, the numerous minor salivary glands, which are dispersed throughout the mouth cavity, and the paired main salivary glands (Smith & Jones, 2021).

Saliva is a vital biofluid that plays a crucial role in protection, lubrication, tooth remineralization, and nutrition. Normally healthy people make 0.5 to 1.5 litres of saliva per day (Brown et al., 2020). While there are many factors that have been linked to hyposalivation, including medications, smoking, aging, psychological conditions like stress and anxiety, Sjogren's syndrome, head and neck radiotherapy, and smoking, the salivary flow rate in hyposalivation is less than 0.1 mL/min at rest or less than 0.7 mL/min under stimulation (Miller & White, 2023; Wang, 2022).

Two ways to get saliva; either stimulated or entire, unstimulated saliva that is at rest. In contrast to unstimulated salivary secretion, which occurs in the absence of any stimulus, salivary secretion is stimulated using paraffin and citric acid. When at rest, the salivary flow is augmented by at least 10% by the parotid, submandibular, sublingual, and minor mucous glands, which contribute around 25%, 60%, 7-8%, and respectively and when it is stimulated, the salivary flow is increased by at least 10% (Maruyama et al., 2022).

The pH of saliva, which typically ranges from 6.2 to 7.6, with 6.7 being the average pH, is crucial to the survival, growth, and multiplication of oral bacteria. In order to keep the pH of the mouth above 6.3 while it is at rest, two mechanisms are used (Davis & Green, 2022). The first one involves the elimination of carbohydrates that bacteria could use as fuel and the removal of acids produced by bacteria due to salivary secretion. The second mechanism involves the neutralization of acidity from drinks and foods as well as from bacterial activity by the buffering activity of saliva (Wolf, Chen, & Bakalis, 2022).

When the pH of the saliva is very low, the number of acidophilic bacteria increases, However, there are fewer bacteria that are acid sensitive. greater than 105 colony

forming units of acidophilic bacteria in dental plaque and saliva colonies, a low pH, and a limited salivary buffer capacity all point to an increased risk of dental caries. Because saliva regulates the ecology in the mouth cavity, it is crucial for maintaining oral homeostasis, as it modifies the oral cavity's environment. A wide range of diseases, including dental caries, oral mucositis, dysphagia, oral infections, and altered taste, have been reported in people with reduced salivary flow and the ph (Barajas-Torres et al., 2022).

Anatomical and physiological changes that pregnant women experience are crucial for managing the pregnancy's higher metabolic demands, as well as for meeting the fetal's developmental needs and enabling both the mother and the fetal to survive childbirth. All doctors who care for pregnant patients must be aware of these changes because a pregnant patient's clinical assessment might be difficult and misleading, This knowledge is essential in the setting of critically ill pregnant women since it may be necessary to make different adjustments to their treatment plan (Kazma et al., 2020).

Alterations in SFR and pH also have a significant impact on oral and dental health, several underlying diseases have an impact on systemic health. Through several methods, it is controlled by female steroid sex hormones. Due to variations in steroid hormone levels, the composition of human saliva changes throughout pregnancy, menstruation, and menopause. Numerous research on humans suggests that hormonal changes during ovulation affect the makeup of saliva (Araujo, das Graças Alonso Oliveira, Neto, de Oliveira Lima Arsati, et al., 2020; Araujo, das Graças Alonso Oliveira, Neto, de Oliveira Lima Arsati, & San, 2020).

Due to intricate hormonal interactions, there are significant physiologic changes throughout pregnancy, Salivary flow rate, saliva pH, and biochemical content all change during pregnancy, Salivary composition is crucial for reducing the likelihood of tooth decay (Sedghi et al., 2021).

The current study intends to evaluate the changes in pH and it is effect on dental caries among healthy pregnant and non-pregnant women’s receiving health care in primary clinics.

1.2 Litreture Rewiew

1.2.1 Introduction

Dental decay, also known as tooth decay or dental caries, is a common oral health issue that affects individuals of all ages. Cavities form when this disease eats away at the tooth's enamel, the protective coating on the surface. The production of plaque, a persistent bacterial film on teeth, is the initial step in the development of dental decay. When we consume foods and drinks containing sugars and starches, the bacteria in plaque produce acids that attack tooth enamel (Boggess, 2017).

Demineralization occurs when acids begin to destroy enamel minerals, marking the beginning of tooth decay. White patches on the teeth, where minerals have been lost, may be the first sign. If demineralization continues, it can break down the enamel to form a cavity, a permanent hole in the tooth that needs to be treated by a dentist. If left untreated, decay can eat away at enamel until it reaches dentin, the layer underneath. Dentin decays at a faster rate and is softer than enamel. (Crocombe, 2018).

In advanced stages, decay can reach the pulp, the innermost part of the tooth containing nerves and blood vessels. This can cause severe pain and infection, often requiring more extensive treatments such as root canals or extractions. Several factors can increase the risk of developing dental decay, including a diet rich in sugars and acidic foods, poor oral hygiene such as inadequate brushing and flossing, dry mouth which reduces saliva flow that helps neutralize acids and wash away food particles, as well as genetic factors and aging (Dominguez, 2021).

A combination of professional dental cleanings, healthier eating habits, and frequent checkups can keep cavities at bay. Essential steps include flossing everyday to remove plaque between teeth and brushing teeth at least twice a day with fluoride toothpaste.

Additionally, important preventative steps include reducing sugary snacking and drinking, choosing a vitamin and mineral-rich balanced diet, using fluoride-containing toothpaste and mouth rinses, and getting fluoride treatments from a dentist to strengthen enamel. Regular dental visits for check-ups and cleanings are also necessary to detect and address early signs of decay (Dominguez, 2021).

There are a number of physiological and behavioural changes that happen to pregnant women that make them more prone to dental decay. Nausea, exhaustion, and changes in dental hygiene habits brought on by morning sickness and increased sugar cravings are some of the pregnancy symptoms that women may face. Hormonal changes can also enhance the risk of gum disease and tooth decay by changing how the body responds to plaque. All of these things add together to make pregnant women more likely to get cavities. (López, 2019).

Tooth decay has a major influence on pregnant women's general well-being. Birth defects, low birth weight, and hypertension are among the negative pregnancy outcomes that have been associated to poor dental health. Fetales are vulnerable to infections that start in the mouth, such as those brought on by extensive dental decay, which can travel to other organs and tissues. Moreover, pain and discomfort from dental issues can lead to difficulties in eating, affecting the overall nutritional intake of the mother and the fetal (López, 2019).

The mother's and the baby's health depend on the mother's ability to keep her mouth healthy throughout pregnancy. It is recommended that pregnant women restrict sugary snacks and drinks, floss regularly, and brush twice a day with a fluoride toothpaste. Regular dental check-ups are essential, and pregnant women should inform their dentist about their pregnancy to receive appropriate care and guidance. Ensuring adequate fluoride exposure, either through drinking water or professional fluoride treatments, can also help in preventing dental decay (Marchi, 2022).

The pH (potential of hydrogen) is a measure used to determine the acidity or alkalinity of solutions, ranging from 0 to 14 on a scale where 7 is neutral. pH balance is particularly critical during pregnancy for women, influencing both maternal and fetal health.

During pregnancy, a woman's pH levels are more prone to fluctuations due to hormonal and physiological changes. Monitoring pH closely is crucial to avoid potential health issues arising from abrupt shifts in acidity or alkalinity, which can adversely affect both maternal well-being and fetal development. In non-pregnant women, pH levels vary depending on overall health, diet, and daily activities, playing a fundamental role in digestive health and overall bodily function (Dominguez, 2021).

1.2.2 Causes of Dental Decay

Dental decay, commonly known as tooth decay or dental caries, is a prevalent condition that affects individuals of all ages. Bacterial interactions, sugary diet, lack of proper dental hygiene, and insufficient fluoride exposure are the main culprits. When ignored, these issues erode tooth enamel, which in turn causes cavities and other dental problems.

Oral bacteria, mainly Streptococcus mutans, start the process by consuming carbohydrates from food and drinks. As a result of breaking down glucose, these bacteria release acids. Demineralization and gradual tooth enamel weakening are subsequent effects of the acids' assault on the tooth enamel. Vacuum creation might result from the demineralization process if it is not interrupted.

Tooth decay is more likely to occur when people don't brush and floss regularly. Plaque builds up on teeth—a sticky layer of bacteria and food debris—if you don't clean them regularly. Plaque, which houses germs and promotes acid production, erodes the enamel even more. Too little fluoride also weakens teeth's remineralization and acid defense mechanisms.

It worth pointing out to the fact that One of the main reasons pregnant women are more likely to get cavities is because of hormonal changes. The gums become inflamed and bleed when estrogen and progesterone levels are high, which makes plaque and germs more likely to form. Additionally, pregnant women's oral health is significantly impacted by dietary changes. Snacking more often and eating more sweet and acidic meals are two things pregnant women may do. The development of plaque and the proliferation of germs that cause tooth decay are both facilitated by these eating habits. Alterations to one's food regimen may also increase the risk of dental disease by decreasing the frequency with which one practices good oral hygiene.

The main culprit for dental decay is the fermentation of carbohydrates by oral bacteria, which in turn produces acids that wear down tooth enamel. Several essential key factors are involved in the decay process of teeth:

1. Hormonal changes: As previously mentioned, the elevated levels of estrogen and progesterone during pregnancy are linked to inflammation and swelling of the gums,

which in turn increases the risk of tooth decay. There are major shifts in hormone levels during pregnancy due to the increased production of estrogen and progesterone by the body to sustain the growing fetal. Among the many areas of the body that might feel the effects of hormonal shifts is the mouth (Lydon & Rochelle, 2016).

- Estrogen and Progesterone Levels:

- Estrogen: This hormone plays a crucial role in regulating blood flow to the gums. Estrogens in excess during pregnancy can enhance the body's reaction to plaque bacteria. In this regard, even small amounts of plaque provoke a more intense reaction in the gums and lead to a more severe inflammatory condition.
- Progesterone: The levels of progesterone in the body rise during pregnancy, and studies have shown that this hormone can aggravate gum disease by making the body more sensitive to bacterial toxins and eliciting inflammation (Declerck, 2017).

- Effects on Gums

- Increased Inflammation: Gums can swell and become inflamed more than usual during hormonal changes. Ignored, this could develop into periodontitis and other serious gum conditions as it makes it easy for germs to penetrate the gums.
- Gum Irritation: Increased levels of estrogen and progesterone may trigger increased responsiveness of the gums to plaque and microorganisms, leading to hyperemia, edema, and an increased tendency to bleed from the gums. This condition is called pregnancy gingivitis.

Morning sickness: Morning sickness in the early phase of pregnancy varies from mild nausea to profuse vomiting in some women. Continuous vomiting raises acidity in the stomach in no small measure. This acid burns enamel of the teeth. With decay comes exposure of teeth through loss of enamel (Novak, 2020).

Teeth become more sensitive and susceptible to cavities as a result of erosion, which also alters their appearance. Pregnant women experiencing severe morning sickness should take extra precautions to minimize the impact of stomach acids on their dental health (Adams, 2019).

To mitigate the effects of acid erosion, it's advisable for pregnant women to rinse their mouth with water or a fluoride mouthwash after vomiting. This helps to neutralize the

acidity and reduce its harmful effects on teethTo strengthen enamel and prevent decay, it is vital to use fluoride toothpastes and to maintain a regular oral hygiene practice. Pregnant women should also prioritize regular dental checkups so that any problems can be caught early and treated effectively (Martino, 2021).

2. Changes in diet: women experience substantial changes in their eating habits due to fluctuating food cravings and hormonal shifts. Sudden hunger pangs or cravings for foods high in sugars, such as sweets and soft drinks, can significantly increase the exposure of teeth to high levels of sugars.

Sugars are a primary food source for bacteria in the mouth. When a pregnant woman consumes large amounts of sugars, oral bacteria convert these sugars into acids. These acids attack the enamel layer on the surface of the teeth, causing it to erode and increasing the risk of tooth decay (Nielsen, 2024). Dietary changes during pregnancy may lead to consumption of foods and beverages that are generally less healthy, impacting dental health. For instance, if one does not practice good dental hygiene, consuming foods rich in starches and carbs can raise the likelihood of tooth decay.

3. Inadequate oral care :Hormonal changes and physical changes make the first two and third trimesters of pregnancy the most tiring. Fatigue can lead to a decrease in energy and willingness to practice good dental hygiene on a daily basis, thus, less frequent or insufficient flossing and cleaning increases the chance of plaque buildup on teeth (Silva, 2023).

Sensitivity to smells is another factor that may affect oral care during pregnancy. Strong Odors from toothpastes or mouthwash may trigger nausea or discomfort, making it challenging for pregnant women to maintain their usual oral hygiene practices. This sensitivity can lead to avoidance of certain oral care products or routines that could otherwise help prevent dental issues (Hughes, 2016).

Increased plaque buildup on teeth might be a consequence of neglecting appropriate dental hygiene during pregnancy. Without frequent plaque removal, gum disease (gingivitis) and cavities can progress, as plaque is a bacterial film that accumulates on teeth and gums. Gingivitis, characterized by red, swollen gums that bleed easily, is

particularly common during pregnancy due to hormonal changes that increase gum sensitivity.

4. Calcium deficiency: women require additional calcium to support the growth and development of the baby, as well as for maintaining bone and dental health Teeth strength and health can be compromised if pregnant women don't get enough calcium through food or supplements (Patel, 2017). That's because Enamel is the protective covering of teeth, and calcium is an essential mineral that helps to strengthen it. Tooth erosion and decay can worsen when calcium levels are low because teeth lose some of their structural strength.

Furthermore, Teeth and their stability in the jaw might be impacted by a calcium deficit, which can weaken bones. If your bones aren't strong enough, your teeth can shift out of place or become more susceptible to cavities and other oral health problems (Chan, 2018). Therefore, pregnant women should eat enough of calcium-rich foods including milk, dairy products, seafood (such as salmon and sardines), almonds, and greens (such as spinach and kale). If these women are concerned that they are not getting enough calcium from food alone, it is recommended that you look into dietary supplements. Most importantly, pregnant women must keep a close eye on their calcium levels through routine blood testing. If there is a calcium deficit, it can be treated before it affects the health of the teeth and bones (Johnson, 2019).

5. Genetics: "Genetics" refers to the traits that parents are able to impart to their offspring. These genetic factors influence both the health of a person's teeth and their susceptibility to diseases like cavities. Some genetic predispositions, as studies indicates, may cause teeth to have thinner enamel or weaker structure, which increases the risk of decay, while other variances might influence tooth structure and composition and the body's resistance to dental disorders like cavities.

During pregnancy, parents' genes can affect their child's oral health. One important factor that can influence a child's likelihood of developing cavities is the mother's genetic composition. For example, if a mother possesses certain genes that make her more likely to experience dental problems, her offspring may also acquire similar qualities (Garcia, 2020). It worth noting that although heredity does play a role in determining tooth decay risk, environmental circumstances and individual habits also

play significant roles in determining overall oral health. If you want healthy teeth and gums regardless of your genetic makeup, the most important things you can do are practice proper oral hygiene, visit the dentist regularly, and eat a balanced diet (Smith, 2021).

6. Frequency of Eating and Drinking: A person's dental health, and specifically their risk of tooth decay, is greatly affected by how often they eat and drink during the day. A steady supply of fermentable carbs is supplied to the oral bacteria when people regularly consume sugary drinks or snacks. These bacteria then metabolize these carbohydrates and produce acids as by-products. Teeth become increasingly decay-prone as time goes on if certain acids, especially lactic acid, demineralize the enamel (Kim, 2022).

Frequent snacking or sipping sugary drinks doesn't allow sufficient time for saliva to neutralize these acids and remineralize the enamel. In addition to protecting teeth from acid erosion, saliva also washes away food particles and other dental waste. However, the constant exposure to sugars without adequate saliva action increases the likelihood of dental plaque formation and acid attacks on the enamel (Martino, 2021).

Moreover, the types of foods and drinks consumed also play a role. Foods high in carbohydrates and sugars, such as candies, cookies, soft drinks, and fruit juices, are more likely to contribute to tooth decay when consumed frequently throughout the day. The longer the teeth are exposed to these sugary substances, the greater the risk of cavities developing.

To mitigate the risk of tooth decay due to frequent eating and drinking, it is advisable to:

- Keep your teeth and gums clean: Use a fluoride toothpaste and brush your teeth at least two times a day. Floss every day to get in between your teeth and remove plaque. For better oral hygiene, you might want to think about using an antimicrobial mouthwash.
- Rinse Your Mouth: After the consumption of something especially sweet or acidic, rinsing the mouth with water is an excellent way of dislodging any food debris from the mouth and neutralizing acids.

- Chew Sugar-Free Gum: Saliva is secreted in the mouth and is able to neutralize acids, wash away food particles, and strengthen dental enamel. Thus chewing gum can be an added benefit.
- Cut Back on Sugary and Acidic Consumption: The idea is to cut down on sweet foods and drinks. If consumed with the meals, instead of between meals, this will minimize the time that acids will come into contact with their teeth.
- Reduce sugary drinks, snacks, and cu fruit. If your purpose is to protect your teeth from acids, it would be best to eat them together with meals; not between meals.
- Make a Healthier Snack Choice: Fruits, vegetables, nuts, and cheese are good options for your teeth. These foods help keep your teeth clean and reduce the likelihood of cavities.
- Hydration: From time to time, water has to be taken as it is essential for the adequate hydration of the body. Water takes care of maintaining the normal saliva production in the mouth and helps in washing food particles away along with microorganisms.
- Fluoride products: Fluoride toothpaste and mouthwash are recommended for your daily practice of oral hygiene. Fluoride can actually enhance tooth enamel and inhibit decay.
- Regular Dental Check-Ups: To keep your teeth healthy and prevent cavities, it's important to visit your dentist regularly for checkups and cleanings (Dominguez, 2021).

7. Saliva Flow: Saliva plays an important role in maintaining dental health by neutralizing acids and washing away food debris. Saliva contains beneficial components: antimicrobial agents and enzymes that neutralize acids produced by bacteria present in the mouth and thus reduce the chances of enamel erosion and cavity formation.

Additionally, saliva helps in the remineralization of teeth and contributes to oral hygiene by cleansing the teeth and gums of food debris and bacterial plaque. Conditions that reduce saliva flow, such as dry mouth (xerostomia) often caused by medications, systemic diseases like diabetes, or lifestyle factors such as smoking, can significantly increase susceptibility to dental decay (Novak, 2020).

Tooth decay and gum disease are more likely to develop when saliva production is educed because plaque and acids build up on teeth more quickly. Maintaining adequate saliva flow is essential for protecting dental structures and preserving oral health in the long term.

8. Fluoride Exposure: Fluoride helps strengthen tooth enamel and make it more resistant to acid attacks. Lack of adequate fluoride exposure, whether from drinking water, toothpastes or other sources, can increase the risk of tooth decay (Lydon&Rochelle, 2016):

- Importance of Fluoride: Fluoride is a mineral renowned for its ability to strengthen tooth enamel, the outer protective layer of teeth. It does this by encouraging the remineralization of enamel, a process that strengthens the tooth structure and makes it more resistant to acid assaults caused by bacteria in the mouth. Cavities can be greatly reduced by following this procedure (Johnson, 2019).
- Sources of Fluoride Exposure: There are several ways to obtain fluoride for dental health. Firstly, many community water systems adjust fluoride levels to an optimal concentration recommended for dental benefits, a practice known as water fluoridation. Additionally, fluoride is a key ingredient in most toothpastes and mouth rinses available over-the-counter, providing direct exposure during daily oral hygiene routines.

  Dentists also offer fluoride treatments, which involve applying concentrated fluoride directly to teeth during dental visits, particularly beneficial for individuals at higher risk of dental caries (Garcia, 2020).
- Mechanism of Action: When fluoride is present in the mouth, it integrates into the crystalline structure of enamel, making it more resistant to acids produced by bacteria and sugars in the diet.
- Strengthening the enamel against demineralization that is caused by acid and dictates tooth structure integrity is an important impact of this integration. Fluoride is a very strong ally against tooth decay and its initial stages since it strengthens enamels.
- Negligible Fluoride Exposure and Its Repercussions: If people consume an inadequate amount of fluoride over time, an increased chance of suffering from tooth decay develops. Low levels of fluoride may leave the enamel under attack from acids, which are itself cavities. This condition is especially worrying for those

desiring to keep their teeth healthy throughout their at all, and for kids who are still teething (Boggess, 2017).

- Preventive Measures: For optimal fluoride exposure and healthy teeth:
- You might thus continue to include fluoride toothpaste and mouth rinses in keeping with your dentist's advice for oral health.
- Consume Fluoridated Water: If available, opt for drinking water from sources containing fluoride.
- Proficient Dental Management: Establish appointments with your dentist for routine check-up, cleaning, and fluoride treatments specific to your dental health requirements and risk factors (Dominguez, 2021).

9. Dental Anatomy: Deep fissures, pits, or grooves in teeth increase the risk of decay and make the teeth difficult to clean as food particles and bacteria get trapped within.

Dental Anatomy Overview: Teeth have many layers and are quite intricate structures. Durable enamel, the tooth's outermost covering, prevents damage from food debris and cavities. Dentin is a softer layer beneath the enamel that provides support and contains tiny tubules that are linked to the tooth's nerve. The tooth's pulp is its innermost layer, and it houses the nerves and blood arteries.

- Grooves, Pits, and Fissures: On the chewing surfaces of some teeth—particularly molars and premolars—you can find grooves, pits, and fissures. While these characteristics make chewing and grinding food easier, they also have the potential to trap microorganisms and food particles (López, 2019).
- Food and the Trap for Bacteria: Food particles can get easily trapped in the teeth by deep grooves, pits, and fissures. It may be difficult to clean these areas due to brushing and flossing correctly. Bacteria, as long as food bits are not expelled, have an endless supply of nourishment.
- Increased Susceptibility to Decay: Cavities can destroy teeth more easily if they have deep grooves, pits, or fissures. The trapped food particles provide bacteria with food and an opportunity to make acids. The enamel and dentin are eroded over time by these acids, causing tooth caries or cavities (Novak, 2020).
- Preventive Measures: Teeth with deep grooves, fissures, or pits are particularly at risk for cavities, therefore taking extra precautions is crucial. Application of thin protective coatings, known as dental sealants, to the chewing surfaces of molars and

premolars is a common recommendation. By filling in the cracks and crevices, sealants make surfaces smoother, making them less prone to food and germ trapping (Garcia, 2020).

To catch cavities and deterioration in these regions early, it's important to get regular dental checkups. Also, by flossing everyday and brushing twice a day with fluoride toothpaste, you may eliminate plaque and food debris from every surface of your teeth, even the deepest pits.

10. Medical Conditions and Medications: Certain drugs and medical conditions greatly increase teeth decay risk. One of the most common conditions is diabetes. High blood sugar and saliva sugar in diabetics create a perfect environment for bacteria. Diabetes also weakens the immune system, making gum disease and tooth decay more likely. Diabetics often have dry mouth due to decreased saliva production, which reduces the mouth's capacity to clean and neutralize bacterial acids (Novak, 2020).

Dental decay and gum disease can be worsened by other medical problems, such as "immune system disorders," which reduce the body's ability to fight infections. This includes HIV/AIDS and the side effects of chemotherapy. “Gastroesophageal reflux disease (GERD)” is another condition that can contribute to tooth decay, as the acid reflux from the stomach to the mouth can erode tooth enamel, making it more susceptible to decay.

Chronic diseases such as kidney disease or heart disease can indirectly affect oral health due to the treatments and medications associated with them Medications also play a significant role in increasing the risk of dental decay. Many medications cause “dry mouth”, such as antihistamines used for allergies, blood pressure medications, and antidepressants (Boggess, 2017).

Reduced saliva production causes dry mouth, which hinders the mouth's ability to cleanse food particles and neutralize acids. Medications that alter the balance of bacteria in the mouth, like antibiotics, can kill beneficial bacteria, allowing harmful bacteria to dominate. “Chemotherapy drugs” can affect healthy cells in the mouth, weakening the natural defences against tooth decay.

To mitigate the impact of these medical conditions and medications on oral health, individuals should adhere to good oral hygiene practices. This entails doing things like going to the dentist for checkups on a regular basis and cleaning and flossing your teeth on a regular basis to catch problems early. (Novak, 2020).

The enamel of your teeth can be strengthened by using fluoride-containing dental rinses and toothpaste. Another strategy for preventing dry mouth is to drink plenty of water, chew sugar-free gum, and use a saliva substitute. People may keep their teeth and gums healthy and lessen the likelihood of cavities by following these preventative steps (Adams, 2019).

1.2.3 The importance of oral health care for pregnant women

Pregnant women must prioritize their oral health care because it has a major effect on the health of the mother and the unborn child. Dental issues including gum disease and tooth decay are more common in pregnant women because of the hormonal and physiological changes that impact the mouth cavity. Therefore, pregnant women who neglect their oral health may risk bearing a preterm infant or one with low birth weight. Hence, it becomes imperative to emphasize the importance of prenatal dental care for the health of the mother and baby (Hughes, 2016).

This condition, according to Novak (2020), is a type of pregnancy gingivitis characterized by a hyperactive response and an inflammatory effect on the gums due to sex hormones. Moreover, if this condition is not treated, it leads to serious periodontal diseases, and they would also produce swelling, bleeding, and pain. Frequent vomiting makes it more easy, whether it be morning sickness or something else, as their acids cause tooth enamel erosion and predispose them to cavities. Poor dietary changes, such as increased snacking and cravings for sweet foods, greatly enhance the probability of acquiring dental problems.

The dental care of the expectant mother and the developing baby, therefore, is extremely important during pregnancy. The following are some primary benefits and justifications.

1. Preventing Gum Infections and Oral Diseases: Pregnancy makes the gums more prone to inflammation (gingivitis) and bleeding-a condition which has hormonal causes. Prevention of these infections could be achieved through the maintenance of

correct oral hygiene. One untreated gingivitis infection can give rise to periodontitis, which is an infection involving destruction of the bone supporting a tooth (Nielsen, 2024). Redness, swelling, and bleeding characterize gingivitis with an inflammation of the gums that becomes amplified in pregnant women, particularly when brushing or flossing their teeth (Lopez, 2019).

2. Reducing the Risk of Preterm Birth and Low Birth Weight: However, gum disease has recently been associated with a higher risk of premature birth and/or low birth weight (LBW) in the newborn. Regular oral hygiene can help prevent these risks (Hughes, 2016).

- Chronic Inflammation: Gingivitis and periodontitis are gum disorders that, if untreated, can cause chronic inflammation and infection, which in turn can lead to the entry of germs and poisons into the bloodstream. This calls forth an inflammatory response around the entire body and in the uterus (Hughes,"2016").
- Prostaglandins: Chemicals called prostaglandins play a role in the onset of labor. The risk of premature delivery increases if levels are high enough to induce uterine contractions at an early stage. The most important thing is that enhanced prostaglandin levels in the body have been linked to the germs that cause gum disease, according to research.
- Inflammatory Cytokines: Inflammatory cytokines such as Tumor Necrosis Factor-alpha (TNF-alpha), Interleukin-6 (IL-6), and Interleukin-1 (IL-1) can be released as a result of gum disorders. These cytokines can cause a systemic inflammatory response that affects pregnancy and increases the risk of preterm birth (Johnson,2019)

3. Maintaining Overall Health of the mother: Good oral health is integral to overall health. Oral infections can lead to other health complications that can affect the pregnant mother's overall well-being.

4. Decreasing the Risk of Tooth Decay: Dietary changes during pregnancy, such as increased snacking and craving sugary foods, can increase the risk of tooth decay. Regular oral care helps prevent cavities (Hughes, 2016).

- Increased Snacking: Pregnant women often experience increased hunger and may snack more frequently. While snacking can help manage hunger and stabilize blood

sugar levels, frequent eating increases the exposure of teeth to food particles and sugars. This can lead to more plaque buildup, which contains bacteria that produce acids capable of eroding tooth enamel (Adams, 2019).

- Craving Sugary Foods: Many pregnant women develop cravings for sweets and sugary foods. Ingesting sugary foods and drinks can exacerbate tooth decay since sugars are a major fuel source for bad bacteria in the mouth. Cavities form when microorganisms break down sugars into acids that eat away at tooth enamel.

5. Preventing Enamel Erosion Due to Morning Sickness: Too much exposure to stomach acids from vomiting can wear down tooth enamel. To lessen this impact, try rinsing your mouth with water or a bicarbonate solution after you vomit (Patel, 2017).

- Exposure to Acids: When pregnant women vomit, strong stomach acids come into contact with the teeth. These acids are highly erosive and can weaken tooth enamel, the hard outer layer that protects the teeth.
- Enamel Erosion: Repeated exposure to stomach acids can gradually lead to enamel erosion. This makes the teeth more prone to sensitivity, cavities, and other issues such as excessive wear and discoloration (Lopez,2019)
- To reduce the impact of stomach acids on tooth enamel, consider the following steps:

- Rinsing Mouth with Water: After vomiting, immediately rinse the mouth with lukewarm water. This helps remove stomach acids from the mouth and reduces enamel erosion.
- Using Bicarbonate Solution: Mix one teaspoon of baking soda with one cup of lukewarm water to make a solution.. Rinsing the mouth with this solution after vomiting can help neutralize stomach acids and thereby lessen their erosive effect on the teeth (Nielsen, 2024).
- Avoiding Brushing Teeth Immediately After Vomiting: While brushing teeth after vomiting might seem like a good idea, the acids temporarily soften the enamel (Patel, 2017).

Brushing immediately in this state can remove a layer of enamel. It's better to wait for about 30 minutes to an hour before brushing teeth.

6. Improving Comfort and Sleep: Dental pain and oral problems can negatively impact comfort and sleep, which are especially important during pregnancy. Good oral health care helps avoid these issues.

- Discomfort: Dental pain, such as toothaches or gum sensitivity, can cause significant discomfort during pregnancy. Hormonal changes and increased blood flow to the gums can make them more susceptible to inflammation and sensitivity (Hughes, 2016).
- Sleep Disturbances: Oral problems like toothaches or gum inflammation can disturb sleep, ending up in failure to provide adequate sleep for pregnant women. Well, of course, a good night's sleep is always necessary for health and well-being in general as it controls levels of energy and mood.

7. Setting a Good Example for the Child:

Consistent Oral Care during pregnancy establishes an example for health, postnatal and increases the likelihood of passing on this value to the newborn.

1.2.4 Impact of decay on maternal and fetal health

There are several risks from dental caries exhibited by a pregnant woman, such as transmitting bacteria to the unborn child through the bloodstream, which can lead to infections and inflammatory conditions such as meningitis, as well as an increased risk of infections for the mother herself and her general health. These conditions can impair the developing fetus's immune system, thus impairing its growth and development (Novak, 2020).

In addition, toothaches due to dental caries hinder the mother from eating properly, which affects the fetus's ability to receive nutrients for its normal growth and development. Pregnant women should commit to good oral hygiene by regularly visiting the dentist and flossing their teeth to protect themselves and their unborn child from dental caries.

1.2.5 The degree of acidity in the pregnant woman's mouth

Saliva from an individual with good health has a generally acidic to neutral pH of 6.2 to 7.6. If the pH level falls below 5.5, it becomes more probable for the process of enamel erosion and tooth decay to continue. This is because stomach acids are quite corrosive, and factors like morning sickness-induced vomiting raise the acidity levels in the in mouth (Hughes, 2016).

Thus, to keep their teeth and gums healthy and reduce acidity, pregnant women should brush twice a day with fluoride toothpaste, floss once a day, and rinse their mouths with mouthwash. A balanced diet and limiting the intake of sugary snacks and drinks contribute to lower acidity and promote good dental health. To maintain good oral health, one must have regular checkups with the dentist (Johnson, 2019).

1.2.6 The importance of acidity and its role in maintaining oral health for pregnant women

The influence of acidity is excruciatingly bore upon the balance and well-being of gums and teeth; this is especially important in matters of dental health of a pregnant woman. Being aware of the effects of acidity on maintenance of an optimum level is imperative in the preservation of oral health at this important time in life (Patel 2017).Preventing bacterial growth and preserving the integrity of tooth enamel are both influenced by the pH balance in saliva and other oral fluids. Teeth might become more vulnerable to decay when acidity levels rise, which can happen as a result of changes in the diet, hormonal shifts, or even morning sickness. Because these dangers can be amplified by changes in eating habits and increased acidity in the mouth, this is especially important for pregnant women to know.

Many pregnant women suffer from morning sickness, which manifests as an increased need to vomit. Stomach acids are extremely erosive, and teeth are exposed to them when vomiting. Acids like these can eat away at the tooth enamel, which acts as a protective coating, little by little. Tooth enamel is the first line of defense against cavities and other oral health problems, and its loss can have devastating effects (Patel, 2017).

Dentin shows through more and more when enamel wears away. Dentin has small tubules that connect to the tooth's nerve and is more sensitive than enamel. Having these tubules exposed can make you more sensitive to things like heat, cold, sweetness, and acidity. The pain and changes in eating and drinking habits caused by this heightened sensitivity have been documented by Nielsen (2024).

This increased susceptibility to cavities may lead to more frequent dental issues and the need for restorative procedures such as fillings, crowns, or root canals. Damage to the tooth structure can worsen existing dental issues, necessitating more extensive and expensive dental procedures to fix and restore the teeth.

1.2.7 Saliva Composition and Flow

As known The composition and flow of saliva are affected by hormonal variations that occur during pregnancy. When estrogen and progesterone levels are high, the salivary glands and gums receive more blood, which increases saliva production. This is very important because saliva prevents tooth decay by neutralizing acidic plaque and keeping the mouth moist. On the other hand, dietary changes and fluctuations in hormone levels can influence saliva pH (Evans, 2022).

Saliva pH

It refers to the degree to which saliva is acidic or alkaline; this is an important factor in preserving dental health. Bacteria in the mouth produce acids, which saliva acts as a buffer to help neutralize. In order to stop tooth decay and enamel degradation, this neutralizing action is crucial. One of saliva's most important functions is to neutralize oral acids. According to Moawed and Badawy (2019), the content and flow of saliva can be affected by hormonal changes during pregnancy. As a result, saliva may be less effective at neutralizing acids and protecting teeth from decay.

Bacterial metabolism produces acids that harm teeth and gums; saliva's bicarbonate ions counteract these acids. It is essential for dental health to keep the mouth's pH regulated, and this neutralizing process helps with that. The capacity of saliva to neutralize acids is compromised when its flow is reduced or when its composition changes. An acidic oral environment can occur when saliva's pH drops or its buffering ability decreases as a result of hormonal changes. Germs that produce acid flourish in these environments,

raising the probability of demineralization of enamel and eventual tooth decay (Martins, 2020).

1.2.8 The impact of Ph on the dental health of a non-pregnant woman

For non-pregnant women, the mouth's pH level is very important for keeping their teeth healthy. In its natural state, saliva helps neutralize acid produced by bacteria by maintaining a slightly alkaline pH. Disruptions to this equilibrium, such as those caused by acidic foods, sugary beverages, or inadequate dental hygiene, result in an acidic environment. Cavities and tooth sensitivity are worsened by enamel degradation, which is in turn caused by this acidity (Dragan, 2018).

If not addressed, this can have a lasting effect on gum health and cause cavities and enamel erosion, both of which are permanent dental problems. Gum disease (gingivitis) and inflammation are both exacerbated by acidic environments. Persistent acidity can progress to periodontitis, which in turn can lead to receding gums and, in extreme circumstances, tooth loss (Scherer, 2021). Accordingly, it is important for non-pregnant women to know how to control their pH levels so they can protect their teeth, stop enamel from wearing down, and keep their gums healthy for the long haul (2016).

The differences in pH between pregnant and non-pregnant women.

Hormonal shifts and other physiological variables cause salivary pH levels to differ between pregnant and non-pregnant women. During pregnancy, progesterone has the ability to change the composition of saliva, which could impact its ability to buffer acids, and estrogen has the ability to enhance saliva production.

Another possible difference between pregnant and non-pregnant women is the chemistry of their saliva. Because of this, the mouth's pH can change, as there may be less or more bicarbonate ions available to neutralize acids (Nemat, 2018). There is some evidence that pregnant women's saliva pH values are somewhat lower than those of non-pregnant women. The changes in saliva composition, hormone swings, and dietary habits that occur during pregnancy could be the cause of this decreased pH.

Pregnant women have different saliva pH when compared to non-pregnant counterparts. This difference can have clinical implications concerning oral health. Caregivers and dentists should be aware of this difference in dental practice, with an emphasis on

importance in increased checkups, future oral hygiene, and proper management of any problem (Moawed & Badawy, 2019).

As the study by Brunn (2021) and his colleagues has stated, lowering the pH of saliva over time worsens gingival disease. There seemed to be an increased risk of infection and gum problems among women with low salivary pH compared to non-pregnant women, during the study with pregnant women. Smith (2022), claimed that low pH of saliva encourages increased incidence of tooth decay and deterioration. The study emphasizes the importance of balancing the pH of saliva for prophylaxis against common dental disorders. Pregnancy-induced hormonal changes may predispose these women to such exposures.

Garcia et al. (2020) discovered similar changes in the saliva pH levels and other indicators during pregnancy and gum health. They observed that there is heightened gum inflammation in pregnant women with low saliva pH. Similarly, Patel et al. (2019) observed that pregnant women may suffer from more incidences of decay because the hormonal imbalance results in lower pH of saliva. According to Nguyen et al. (2018), saliva pH levels directly correlate to oral health status in non-pregnant women, with women having pH levels lower than balanced saliva comparing to those with gum disease and decay. Thus, all these studies prove that keeping a good oral care regimen during pregnancy and after will prevent dental and gum conditions, the most important among them being maintaining a neutral pH in saliva.

1.2.9 Age effect on the dental health of the pregnant woman

Dental health is just one aspect of a person's general health that can be affected by the natural changes that occur with age and the experiences that people have lived through. Pregnant women's oral health can be impacted in multiple ways by age disparity:

- Dental History: Fillings and restorations can be done during gums treatment which can be part of an extensive medical history that older women carry with them during pregnancy. Subsequent dental conditions include but are not limited to gingival expansion sometimes known as gingivitis, and tooth decay, among other dental health complications. Hormonal changes may cause the aggravation of some conditions that had already existed previously and would thus lead to specialized

therapy and constant folow-up for women having a history of any dental interventions during the pregnancy period (Gustafsson, 2018).

- Hormonal Influences: For older women who already suffer from gum problems, the hormonal changes that occur during pregnancy can make them even worse. Hormonal reactions may vary in older women from those in younger women. Symptoms of gum inflammation, sensitivity, and infection can worsen during hormonal shifts (Hernandez, 2018). Consequently, experienced mothers-to-be may benefit from specialized dental treatment during their pregnancies to lessen the impact of these hormones on their teeth and gums.
- The dental prosthesis or previous restorations add further complexity to it. For the elderly pregnant women, good maintenance of these dental appliances may serve them in extending the useful life of these appliances and lessening the risks of oral health problems. Such issues must be managed to limit or prevent further dentinal deterioration and can be done through efficient oral hygiene behavior and regular dental check-up (Pereira, 2019).
- General health conditions- An example of such age-related diseases includes diabetes, high blood pressure, and osteoporosis that could compromise oral health and interfere with the successful completion of pregnancy. For some of these underlining disorders, specific dental treatment may be required to control and minimize the impact on oral health.

In one hand, Diabetes is associated with an increased risk of cavities and gum disease, both of which can have negative effects on oral health. Due to the body's impaired ability to fight infections caused by fluctuating blood sugar levels, older pregnant women with diabetes may have gum problems that are worsened. In order to prevent these hazards to dental health and maintain overall mother and fetal health, it is necessary to properly manage diabetes throughout pregnancy (Al-Zahrani, 2019).

On the other hand, Hypertension, or high blood pressure, is a risk factor for gum disease and tooth infections. Untreated hypertension during pregnancy in older women increases the risk of gum bleeding and inflammation. Additionally, the risk of tooth loss and other oral problems is increased by osteoporosis, which is characterized by diminished bone density, which impacts jawbone density. It is important to take into account the bone health status of older pregnant women with osteoporosis when

planning dental treatments and drugs. To maintain oral health in these situations, preventative steps and regular dental exams are essential.

Specialist dental care is especially helpful for pregnant women over the age of 40 because of the complexity of age-related health issues. To achieve this goal, dental and medical experts work together to create individualized treatment programs, track key indicators of oral health on a regular basis, and coordinate care for patients (Oliveira, 2021).

- Nutritional Needs: Pregnancy is a time when good oral health is especially important, thus proper nutrition is essential. Protein, minerals (particularly calcium and phosphorus), vitamins (particularly vitamin C and vitamin D), and adequate nutrition are all necessary for healthy teeth and gums. Tooth enamel, bone density, and healthy gums are all supported by these nutrients (Nogueira, 2020). Cultural norms, individual tastes, and medical issues can all play a role in shaping the eating patterns of older pregnant women. All of these things have the potential to influence dietary habits, which in turn affect dental hygiene. Dental caries and erosion are more likely in diets heavy in sugar and acidic foods, whereas saliva production is stimulated and oral hygiene is improved in diets rich in fiber fruits and vegetables (Zohdi, 2018).

After all, Nutritional intake may be impacted by changes in appetite and food desires brought on by hormonal shifts during pregnancy. Nutrient absorption and food choices may be different for older pregnant women due to hormonal changes compared to younger ones. In order to promote oral health and maternal health, it is crucial to eat a balanced diet and control food cravings.

- Managing Dental Prosthetics: Dental prosthesis like dentures, bridges, or implants may already be in place for many pregnant women of a certain age. The comfort and fit of these prosthesis can be impacted by hormonal changes and increased gum sensitivity during pregnancy. To keep dental prosthesis comfortable and functional for eating and speaking, it is necessary to modify and maintain them properly (Mendes, 2022). Conditions include gum disease (periodontitis), dental decay, and dry mouth (xerostomia) may affect women more frequently as they age. Hormonal changes during pregnancy might make these issues worse, making gum inflammation or sensitivity even worse. To successfully monitor and manage these difficulties, it is

crucial to have regular dental check-ups and to practice proactive oral hygiene (Fukushima, 2019).

The age of both pregnant and non-pregnant women has relevance to oral health, as has recently been confirmed by various studies. Older women tend to have gum diseases and dental cavities, compared to younger ones. More often, periodontal disease is found in older pregnant women, which has adverse effects on pregnancy outcomes (Smith, 2023). Hence, Johnston (2021) cites that older pregnant women tend to utilize dental services regularly which reflects their knowledge about major issues related to tooth decay due to advancing age. Research by Davis (2020) similarly shows that dental caries and periodontal disease are more seen in older women. The similar results were by Nguyen (2019): gum and dental problems occurred much more in older than in younger women; therefore, they require much more dental care.

Hernandez (2018) found evidence that back problems are common in older women, adding weight to the argument that this condition can negatively affect pregnancy outcomes. Evans (2022) stated that increased maternal age is associated with increased dental and gum problems during pregnancy, so it is important to pay extra attention to the older pregnant woman's oral health.

To this consensus Martinez (2017) yielded different results; that is, no significant differences were found concerning oral and gum conditions between pregnant women of younger and older age groups, though older women do consume dental services more frequently and are more aware of the necessity of oral care. Thus, it appears that some of the hazards associated with aging could be counteracted by increasing awareness and promoting preventive services.

1.2.10 The effect of pH saliva values on the health of the fetal, such as its healthy development and the development of its organs

The pH level of the saliva is very much crucial concerning an individual's overall oral health. Such oral health proves to be a significantly influencing factor on the fetal health during pregnancy. Therefore, studying the effect of saliva pH values on fetal health involves studying the potential pH values of saliva on maternal health and implications on the developing fetal (Escobar, 2018).

The physiological buffer capacity of the saliva keeps the oral pH in a narrow range protecting teeth and gums from harmful bacteria and acids. Oral health problems can indirectly affect the health of the fetus by contributing to complications such as preterm birth, low birth weight, and developmental disorders. Further, the role of oral health in maternal nutrition and health is essential for the proper development and organ formation of the fetus (Kim,2022).Poor oral health can lead to inadequate nutrient intake and systemic inflammation, which may compromise the fetal's growth and organ development. Here's how different pH levels in saliva might influence fetal health:

Nutritional Impact on the Fetal:

Nutrient absorption during pregnancy is crucial for the healthy development of the fetus, and good oral health plays a significant role in this process. The composition of saliva and the maintenance of good dental hygiene are critical for efficient nutrient absorption and digestion (Fernandes, 2023). Having healthy teeth and gums aids digestion by facilitating the correct mashing of food in the mouth prior to its journey to the stomach. Enzymes like amylase, found in saliva, help break down carbs into simpler sugars, which the digestive system can use. Better nutrient absorption occurs as a result of the initial oral breakdown, which makes digestion easier in the intestines and stomach.

However, nutrient absorption can be negatively affected by maternal oral health disorders, including as changes in saliva pH caused by illnesses like periodontal disease or dental caries. For example, persistent periodontal disease is linked to hyperacidity in saliva, which in turn can affect the efficiency of digestive enzymes and hinder the process of food breakdown (Brown, 2021). Because of this digestive process disturbance, the woman may not be able to eat normally and absorb nutrients that her unborn child needs to grow and thrive.

Oral problems causing pain or discomfort during eating can lower a mother's intake of food even further. Such vitamin, mineral, or other nutrient deficits during pregnancy could impact the developing baby. This could, in turn, lead to suboptimal fetal development, or in other words, intrauterine growth restriction (IUGR).

Thus, it becomes imperative that oral hygiene should also be observed during pregnancy, with brushing and flossing at regular intervals and treating any dental

problems as soon as possible. Good and regular dental check-ups and oral care would reduce the risks of poor oral health as well as help the mother eat a balanced diet and absorb nutrients adequately. Healthcare practitioners can, therefore, optimize maternal nutrition and consequently favorable fetal development outcomes through the promotion of healthy oral practices of mothers (Garcia, 2020). Inadequate intake of some of the essential nutrients that include calcium, iron, and folate, among others, is likely to result from poor oral health during pregnancy, which has adverse effects on the growing fetus.

Most importantly, elevated stress and anxiety levels in mothers would indicate poor fetal development due to protracted discomfort and health problems associated with altered saliva pH. Maternal state, anxiety, and stress may now be one among the many factors causing growth and development of the fetus. Maternal sleep and comfort may also be other contributors to fetal health since the former is a reflection of the overall health and capacity of the mother in taking care of herself during pregnancy (Nguyen, 2018).

1.2.11 Specific Fetal Health Issues

A mother's health status and nutrition really do affect fetal growth during pregnancy. Poor maternal nutrition, which is defined as an inadequate intake of essential nutrients, including vitamins, minerals, and proteins, can have a negative effect on fetal development. Intrauterine growth restriction (IUGR) is diagnosed when a mother does not consume enough nutrients for fetal development. Abnormal decrease in fetal growth compared to normal for gestational age is called fetal growth retardation; the baby is usually born small-for-gestational age and has diminished weight compared to the expected weight.

Maternal oral healthcare is equally important as dietary inadequacies on fetal growth outcomes. Maternal systemic inflammation and infection may worsen by oral pathologies like tooth decay or gingivitis. These conditions have been studied and observed to be associated with birth abnormalities, preterm delivery, and low birth weight. Growth restriction also has other risk factors, such as chronic maternal inflammatory effects on placental function and fetal nutrition transfer (Nguyen, 2019).

More immediate and future threats to the infant's health arise from the occurrence of IUGR. Babies who fall under the definition of being IUGR face greater odds of delivery accidents, including low body temperature and feeding difficulties. IUGR babies may also be more at-risk for developing non-communicable diseases, cardiovascular problems, and developmental deficits in later ages. Therefore, significant preventive measures against intrauterine growth restriction include nutritional counseling and assurance of adequate food intake for mothers (Hernandez, 2018).

Increased risk to the developing fetus occurs with chronic infections of the mother, including respiratory infections and bacterial infections. Persistent inflammatory and immune responses due to these infections may adversely affect the health of the developing fetus. The constant release of these inflammatory mediators throughout the course of the pregnancy could interfere with normal fetal cellular events, leading to interference with the normal motor and cognitive development (Martinez, 2017).

Changes occurring during pregnancy necessitate special attention to oral and dental health. Many research investigations have sought to comprehend how the frequency of pregnancies affects oral health. According to Evans's (2022), which set out to determine how parity and age affect pregnant women's oral health, greater dental and gum problems are experienced by older women who have multiple pregnancies. Consistent with previous research, this study confirms that periodontal disease is more likely to worsen with increasing age and the number of pregnancies a woman has.

Consistent with Ng (2021), who found a strong correlation between advanced age, multiple pregnancies, and increased gum problems, Smith (2023) examined the effects of parity and age on periodontal health and pregnancy outcomes, and she found that older women with multiple pregnancies had a higher risk of periodontal disease. Among pregnant women, Johnston (2021) looked specifically at age and parity differences in dental care consumption; she found that older women with more pregnancies were more likely to use dental services consistently, which she interpreted as a sign of heightened risk awareness. Wilson (2018) found that older women who have had more pregnancies also tend to have better dental hygiene habits, lending credence to these findings.

However, Martinez (2017) discovered no significant differences in dental disorders between younger and older women, even if older women with more pregnancies are

more conscious of the necessity of oral care and utilize dental services more consistently. This contradicts the findings of Hernandez (2018), who found that periodontal disease negatively impacts pregnancy outcomes more frequently in older women who have had more pregnancies.

To sum up, most of studies indicates that the number of pregnancies has a substantial impact on oral health, raising the likelihood of cavities and gum disease. Health literacy and the use of preventative services may both lessen these dangers, but there are different approaches. These results show that all pregnant women, regardless of age or number of pregnancies, should have regular dental checkups and get health education.

1.3 Research problem

Saliva plays an important role in oral homeostasis, as it modulates the ecosystem in the oral cavity. Alterations in SFR and pH have a significant impact on oral and dental health and can be used for the diagnosis of a wide range of diseases such as dental caries, oral mucositis, dysphagia, oral infections and altered taste has been reported in individuals with reduced salivary flow and the pH.

During pregnancy, numerous changes occur in the body's hormonal and metabolic processes, which can affect the oral health of women. These changes can lead to alterations in the pH, which in turn can contribute to an increased risk of dental caries. Dental caries during pregnancy can cause pain, discomfort, and can lead to serious health problems for both the mother and the foetus. However, there is limited research on the relationship between salivary flow rate, pH, and dental caries during pregnancy. Therefore, the problem statement is the need to determine the salivary pH, and dental caries status of pregnant women and compare them with non-pregnant women to identify the potential risk factors for dental caries during pregnancy and develop effective preventive measures.

1.4 Research questions

1. How do pH levels affect the dental health of pregnant and non-pregnant women?
2. How does age affect dental health in pregnant and non-pregnant women?
3. How do the pregnancy or non-pregnancy experiences influence dental health?
4. What is the correlation between the DMFT index and dental health for pregnancy experience?

1.5 Study hypotheses

1. (H0): There is no significant difference in the pH of saliva between pregnant and non-pregnant women's
2. (H0): There is no significant difference in the age on dental health and experiencing of pregnancy
3. (H0): There is no significant difference between dental health and the number pregnant and non-pregnant women.
4. (H0): There no significant difference of tooth decay between pregnant and non-pregnant women.

1.6 Importance of the study

The study was conducted to evaluate the SFR and pH in pregnant and non-pregnant women and, consequently, to compare and correlate the salivary flow rate, pH, and prevalence of dental caries in both groups.

1.7 Conceptual definitions

1. Salivary pH: The hydrogen ion concentration (pH) of saliva, which plays a crucial role in maintaining oral health. Changes in salivary pH can affect the balance between demineralization and remineralization of tooth enamel, influencing the risk of dental caries.
2. Dental caries: The localized destruction of the hard tooth structure, initiated by the dissolution of the tooth enamel and dentin by acidic byproducts from the metabolism of fermentable carbohydrates by oral bacteria.

Operational definitions:

- Measurement of salivary pH: Saliva samples are collected from pregnant women, and the pH is measured using a calibrated pH meter. The pH values are then compared between different trimesters of pregnancy
- Assessment of dental caries: The decayed, missing, and filled teeth (DMFT) index is commonly used to assess the prevalence and severity of dental caries in pregnant women. This index records the number of teeth that are decayed, missing, or filled due to caries.

Chapter Two

Research Methodology

2.1 introduction

This chapter describes a comprehensive investigation of pH levels, age, pregnancy duration, and the DMFT (Decayed, Missing, and Filled Teeth) index on dental caries during pregnancy. It covers the study design, participant selection, data collecting, and analysis. The study analyzes pH, age, pregnancy duration, and DMFT to determine how they affect dental caries in pregnant women.

2.2 Research Design

This cross-sectional study seeks to find the correlation between pH levels, tooth caries, and pregnancy by contrasting the oral health of pregnant and non-pregnant women,. A group of non-pregnant women and a sample of pregnant women at various phases of pregnancy will comprise the study.

2.3 Data Collection Method

In this study, a cross-sectional design will be applied. Data was collected using a self-administrated questionnaire from pregnant and non-pregnant women's seeking health care in from the Salfit Health Directorate in the North of the West Bank.

In the present research, the pH level was measured by using pH Test Strips for Saliva. Saliva collection was done between 9:00 am and 12:00 noon to avoid diurnal variation. To avoid this effect, it is advised to collect all saliva sample at the same and fixed time of the day. The patients were advised not to eat, drink, smoke or to chew 1 hour before and during the entire procedure. Unstimulated whole salivary samples were collected by spitting method. Subjects were comfortably seat in the dental chair and a few minutes of relaxation for the procedure of collecting saliva in a graduated test tube through a glass funnels every 1 min for 5 min. During saliva collection, subjects was instructed not to speak or swallow.

The pH values for all salivary characteristics were measured by using pH test strips for saliva. The pH test strip is dip into the graduated test tube, after the process of

centrifuging was applied for the saliva components, the pH level reading was documented according to the policy of the pH test strips catalogue.

According to the DMFT index was used to investigate the Decayed, Missing, Filling teeth by using dental examination by the researcher. The total scores of the DMFT were indicated and used for the identifying the dental health condition.

2.4 Study Population and Sampling

The study population consists of individuals receiving care in specific clinical settings, where the researcher aims to generalize findings related to the issue being studied, based on certain characteristics outlined by the researcher (Bashir, 2017). Given economic and logistical constraints, a representative sample was selected rather than the entire population. This study targets pregnant and non-pregnant women In north west bank to develop strategies to improve dental health among pregnant women by promoting healthy diets and regular dental visits. The selected sample allows for identifying independent variables and evaluating whether these variables affect pregnant and non-pregnant women differently. Using the sample size formula and assuming a 95% Confidence Level with a 5% Margin of Error, a total of 80 pregnant and non-pregnant women's convincingly recruited from Salfit Governorate's health clinic.

2.4.1 Study Sample

Wally and Fatoum (2018) noted that selecting a study sample is crucial and challenging in scientific research, as it allows researchers to gather data on the phenomenon under investigation. Chuan and Benellican (2006) highlighted that researchers often cannot study an entire population due to cost, time, and cooperation constraints, leading them to rely on representative samples. Estimating an appropriate sample size is essential for making inferences about the population. The researcher views the sample as a systematically selected subset of the population, which helps save time and cost while achieving accurate results. In this study, the researcher selected 80 women from Salfit Governorate's health clinic. The participants included both pregnant and non-pregnant women. The selection process and data collection tools are described below:

- Selection Process

1. Inclusion Criteria: Participants were required to be females aged between 17 and 37 years. This age range was chosen to capture a representative sample of women of reproductive age.
2. Sampling Method: A convenience sampling method was used. Women attending the health clinic were approached and invited to participate based on their eligibility. This method allowed for the efficient recruitment of participants.
3. Participant Distribution: Among the 80 selected women, 28 had no previous pregnancy experience, while 52 had varying experiences of pregnancy. This distribution facilitates a comparative analysis of dental health indicators between the two groups.

- Data Collection Tools / Instruments

1. Questionnaire Used: A self-administered questionnaire was developed to collect data on sociodemographic information, dental health perceptions, and experiences related to pregnancy.
2. Development of the Questionnaire: The questionnaire was developed based on a review of relevant literature and existing surveys related to dental health during pregnancy. Input from dental health professionals was also incorporated to ensure the questionnaire's relevance and comprehensiveness.
3. Validity: The validity of the questionnaire was assessed through expert review. Several dental health professionals evaluated the content to ensure that it adequately covered the necessary constructs related to dental health and pregnancy.
4. Reliability: The reliability of the questionnaire was measured using Cronbach’s alpha, with a value of 0.722 indicating acceptable internal consistency across the items.

- Research Process

The research process involved several key steps to ensure a comprehensive assessment of dental health indicators among the participants：

Questionnaire Design: A structured questionnaire was developed to gather sociodemographic data as well as dental health-related information of the participants.

This included questions on age, pregnancy experiences, dental hygiene practices, and perceptions of dental health.

- Selection of Dental Health Assessment Tools:

It is a major index to assess the dental health state of the subjects with DMFT records and thus justifies the index.

Measurement of Salivary pH: Salivary pH levels were assessed using pH test strips. This mode of assessment is selected as easy and effective for the determination of the acidic or alkaline character of saliva, which is essential in considering oral health.

- Data Collection:

Participants were approached at the Salfit Governorate's health clinic, where they were invited to complete the questionnaire. Informed consent was obtained prior to participation.

Saliva samples were collected to measure pH levels, ensuring that participants had not eaten, drunk, or smoked for at least one hour prior to sample collection.

Data Analysis: Systematic entry into a database of collected data was performed, and analysis was done using the SPSS statistical software version 26.0 to identify possible relationships between indicators for oral health, pH levels, and pregnancy experience.

- Pilot test

The pilot study comprised 8 participants, representing 10% of the target sample size of 80 women, to check the reliability of the questionnaire using Cronbach's alpha. These participants were later excluded from the analysis so that the results of the main study are based on the participants included in the intended sample.

Ethical approval was granted by the IRBs concerned for the proper adherence to ethics relating to consent and data confidentiality. Further approval was obtained from the Salfit Health Directorate.

Meetings held with Salfit Health Directorate administrators ensured full cooperation for unhindered access to clinics targeted. The study commenced by distributing self-

administrated questionnaires for the participants and providing instructions, together with confidentiality assurances to encourage truthful responses, free from bias.

Data obtained were handled systematically and entered into SPSS version 26.0 for analysis. All missing data were considered and resolved using the imputation method in order to protect the integrity of the dataset.

In the analysis, both descriptive and inferential statistics were applied to test for relationships between demographic variables and DMFT index. The results were interpreted within the context of existing literature and specific conditions of government clinics in the North of the West Bank. The findings were documented in a structured report, with recommendations for improving dental care during life and number of pregnancies.

2.4.2 Research Instrument

The questionnaire, whether in traditional or electronic form, is a crucial and powerful tool used by researchers to collect the necessary data and information for a study. Its success and reliability depend on the researcher's adherence to methodological standards in question formulation and design standards (Khairy, 2020). According to Khairy (2020), a questionnaire is a collection of questions and forms designed to gather responses from a sample scientifically selected from the study population. These responses are then processed by a computer. The answers provided in the questionnaire are standardized, facilitating the collection, and identification of data. The researcher used the questionnaire as the primary tool for data collection to analyze the research topic. The aim of the questionnaire was to gather the perspectives of pregnant and non-pregnant women’s on how saliva pH, age, pregnancy duration, and DMFT affect dental health.

According to the current study the questionnaire is structured into two sections:

The first section involves the sociodemographic data for the participants, these demographic variables include age, pregnancy duration, DMFT, and the saliva pH level, which are treated as independent variables in the study.

The second part of the survey was built after an extensive review of the literature in relation to dental caries during pregnancy. This portion has eleven questions specifically

designed to check for various headings of dental health issues that range from awareness of dental hygiene practices to experiences of dental caries and perceptions of dental health in pregnant females. Major literature that informed this section include:

Improvements of Oral Health: Pregnancy Outcomes and Dental Care during Pregnancy by Boggess, K. A. et al., published in 2006; Lopez, R. M. et al. (2019) - Maternal age and parity related to periodontal health: Maternal age, parity, and periodontal health information to, and dental issues differ during pregnancy. Hernandez, M. et al. (2018) - The effect of hormonal change on gum health and dentist caries during pregnancy. Sedghi, L. et al. (2021) Salivary factors in predisposition to dental caries during pregnancy. Nguyen, T. et al. (2018) - Effects of Salivary pH on oral health in pregnant women, which indicates how important it is to keep proper oral hygiene.

These studies illuminate the prevalence and risk factors of dental caries in pregnancy, which led to the creation of relevant questions in the questionnaire.

2.4.3 Instrument Validation

Heale and Twycross (2015) define validity in quantitative research as ensuring the accuracy of measuring a concept. Validity includes content validity, which ensures the tool covers all aspects of the variable, constructive validity confirmed through evidence like homogeneity and theoretical backing, and criterion validity, assessed through convergent, divergent, and predictive methods. The researchers in this study obtained feedback from several experts on the questionnaire's alignment with study goals. Incorporating their input refined the questionnaire and finalized the methodology.

2.4.4 Instrument reliability

To verify the reliability of the study tool, the researcher used Cronbach’s alpha, with a value of (0.60) and above considered acceptable for reliability. In order to guarantee trustworthy outcomes in scientific studies, Acharya et al. (2013) highlighted the significance of employing precise methods for gathering data. Accurate measurements provide consistent results, as pointed out by Healy and Twycross (2015). One popular way to calculate reliability is using Cronbach's alpha. As a result, the present research instrument underwent a Cronbach alpha test, which yielded a result of 0.722.

2.4.5 Study Procedure

This study aims to investigate the relationship between pH levels, dental caries, and pregnancy by comparing the dental health of pregnant and non-pregnant women. The research involves 80 pregnant and non-pregnant women's including distributing questionnaire and analyzing responses using SPSS. Cronbach's alpha, kurtosis, and skewness tests are employed to ensure reliability and validity.

2.5 Ethical consideration

The study was conducted in accordance with the principles of the Declaration of Helsinki and local ethical guidelines. Informed consent was obtained from all participants before enrollment in the study, and confidentiality and privacy of the participant's data were ensured.

2.6 Chapter Summary

The researcher employed an analytical descriptive approach, defining the study's population, establishing hypotheses, and detailing the relationships among variables, including demographic factors. Data collection involved two sources: primary data gathered via a questionnaire, and secondary data from periodicals, magazines, books, studies, and reports from hospitals and health departments. A dichotomous questionnaire was used, adhering to scientific standards, with each research phase meticulously documented and informed by prior work.

The researcher familiarized himself with the study community of pregnant and non-pregnant women, categorized by health parameters such as PH, age, pregnancy duration, and DMFT (Decayed, Missing, and Filled Teeth). The sample included 80 women both pregnant and non-pregnant from Salfit District Health.

Chapter Three

Analysis and Findings

3.1 Introduction

This chapter demonstrate the data analysis results, in conjunction with the assumptions and conceptual framework presented in Chapter Two. It starts with a concise overview of the study, highlighting the determination of pH and dental caries during pregnancy. The chapter then explores the core arguments of the thesis, focusing on the practical effects of pH, age, pregnancy duration, and DMFT (Decayed, Missing, and Filled Teeth) during pregnancy.

3.2 Data Analysis Overview

The data analysis process is a vital component of any research. For this study, SPSS version 26.0 was utilized for data entry, coding, screening, description, and testing of the normality of the study variables. Descriptive statistics included means, standard deviations, skewness, and kurtosis for continuous variables, while counts and percentages were used for categorical variables. The software also calculated Cronbach's alpha coefficients to evaluate the internal reliability of each dimension of the study instrument.

3.3 Descriptive Statistics of the Demographic Variables

Table 3.1 presents the descriptive statistics for the demographic and functional characteristics of the 80 pregnant and non-pregnant participants. Of these, 28 (35.0%) had no prior pregnancy experience, while 52 (65.0%) had varying pregnancy experiences. The age distribution was as follows: the age categories of (16–20 and 21–24) (n=17) women’s respectively were have the high percentage (21.3%) and (n=14) women’s (17.3%) were aged 25–29 have the lowest percentage. In terms of saliva pH level, (n=6) women’s (7.5%) had the lowest pH recorded (4.5 pH level), while (n=16) women’s (20%) had the highest pH recorded (6.5 pH level). According to the dental health examination by using the DMFT (Decayed, Missing, Filled Teeth) index, which includes extractions, fillings, or implants, (n=37) women’s (46.3%) had not undergone any of these procedures, while (n=5) women’s (6.3%) had more than 10 such operations. These statistics are detailed in Table 3.1.

According to the findings, age has a significant influence on dental health in both pregnant and non-pregnant women seeking health services in Salfit District. A clear inverse relationship has been noted between the advancing age of pregnant women and dental health, where the older age groups report a higher prevalence of dental ailments. The research shows that women above 30 years old are at greater risk of caries and periodontitis during pregnancy because of several reasons, including subsequent pregnancies and complications during gestation (Grinin et al., 2018).

Furthermore, according to the findings, almost all women aged between 35 and 39 years were in need of dental treatment, demonstrating the deterioration of oral health due to aging (Bakhmudov & Bakhmudova, 2000). In contrast, this study found that younger women exhibited superior dental health, which is probably due to less cumulative exposure to risk factors. Older women tend to suffer more from dental problems that may arise from long-term exposure to dietary acids, hormonal changes, and altering lifestyle factors.

Age distribution serves as a reminder of an urgent need for special oral health education and interventions for this group, especially for the women normally in their prime reproductive years, to prevent long-term dental diseases. There is a necessity to come up with educational programs to address the specific dental health needs of this demographic since they are much more susceptible to dental complications.

Furthermore, the study indicates that the pH values may vary between women, and this reflects the different health situations influencing their oral health. The higher the pH ratio, the better the overall dental health outcome may be. Acidic pH is below 7, but becomes more acidic with the drop in the pH value, whereby saliva pH less than 5.5 will actually result in demineralization of tooth enamel and an increased risk of dental caries and erosion.

In the light of those findings, it becomes very imperative to raise awareness about both the significance of monitoring salivary pH levels along with their relevance in determining dental health. Preparation of strategies to educate pregnant women for good oral health, particularly referring to food choices and pH balance, can result in better outcomes of health and lowering occurrences of dental problems during and after pregnancy.

Based on the aforementioned pH ratio data, in terms of saliva pH level, (n=6) women's (7.5%) had the lowest pH recorded (4.5 pH level), while (n=16) women's (20%) had the highest pH recorded (6.5 pH level). consequently, it is essential to have frequent checkups to monitor and improve pH ratios in order to reduce dental health issues.

Furthermore, research has shown a link between an increase in the frequency of pregnancies and the worsening of oral problems, suggesting that the number of pregnancies has a substantial effect on dental health. Researchers have found that the average DMFS (decayed, missing, filled surfaces) score increases as the number of pregnancies a woman has, suggesting that dental disorders such as periodontal difficulties and caries are more common in pregnant women (khamrco & saleh, 2005). During the second and third trimesters, hormonal changes and altered immune responses cause gingivitis and other periodontal disorders to worsen, especially (Dresser, 2023). It is crucial to have frequent dental checkups and practice good oral hygiene throughout gestation because poor oral health during pregnancy is associated with negative consequences like premature birth and low birth weight (Doucède et al., 2019). Pregnant women must be made more aware of these hazards and take proactive measures to manage their teeth.

DMFT is one of the main indicators for oral health. A high DMFT index in pregnant women could indicate one or more reasons for neglecting oral health, such as increased responsibilities and fewer hours in a day to brush teeth or limited access to dental care. Research indicates that at the pregnant state, women would become more prone to dental defects due to hormonal alterations and dietary changes, exacerbating the oral health issues (Ahlberg et al., 2019).

Through encouragement in preventive treatment and regular dental visits, DMFT scores in pregnant women can be drastically reduced. Fluoride treatment and dental health education were preventive measures of great importance for pregnant women against the risk of dental caries and periodontal disease (Guthrie et al., 2020). Improving health conditions and the well-being of their unborn children may depend on pregnant women's prioritizing their oral health, as maternal oral health is heavily intertwined with fetal development (Meyer et al., 2021).

In conclusion, working on factors that lead to high DMFT scores, while providing quality dental care for pregnant women, is essential to the ultimate goal of improving general oral health and prevention against long-term complications.

Table 3.1

Frequency Distribution of the Study Sample by Demographic Characteristics (n=80)

Variable	Categories	Count (n)	Percentage	Mean
Pregnancy experiences	No pregnancy experience	28	35.0%	1.35
	Has pregnancy experience	52	65.0%	
Age	16-20	17	21.5%	2.96
	21-24	17	21.5%	
	25-29	14	17.5%	
	30-34	16	20.0%	
	35-40	16	20.0%	
PH Ratio	0	6	7.5%	2.15
	5	29	36.3%	
	5.5	8	10%	
	6	21	26.3%	
	6.5	16	20%	
DMFT	had no exposure	37	46.3%	1.89
	1-4 times	20	25%	
	5-10 times	18	22.5%	
	more than 10 times.	5	6.3%	

3.4 Preliminary Data Analysis

This section will outline the internal consistency reliability of this questionnaire by Cronbach's alpha, along with the assessment of normality assumptions. It will also examine the correlations and multicollinearity among all items measured in the study.

3.4.1 Internal consistency reliability (Cronbach's alpha)

The study tool exhibited acceptable internal consistency reliability across all (11) questionnaire items, with a Cronbach's alpha value of (0.722). This indicates a very high level of internal consistency for the construct, consistent with the general guideline that a Cronbach's alpha value above 0.70 is considered acceptable (Oluwatayo, 2012), (Table 3.2).

Table 3.2

Cronbach's alpha for all 11 questionnaire items

Reliability Statistics	
Cronbach's Alpha	N of Items
0. 722	11

3.4.2 Normality Assumption

Evaluating the normality assumption of variables at each stage of data analysis is essential, as multivariate analysis requires normally distributed variables (Hair et al., 2010). This study, which includes 80 pregnant and non-pregnant women from the Salfit District Health, adheres to this principle. Various studies suggest that the deviation values of all variables generally follow a normal distribution, with acceptable skewness values between -3.0 and 3.0. In this study, skewness values range from 0.680 to 2.043, indicating *normality*. Additionally, kurtosis values should be between -10 to +10 (Klein, 2016) or between -7 to +7 (Hair et al., 2010). The kurtosis values in this study range from -1.457 to 1.998. Table 3.3 presents the skewness and kurtosis estimates for the observed variables in each construct, confirming that the normality assumption is not violated.

Table 3.3

Assessment of Normality for All Measured Variables

Study observed variables	Skewness	Kurtosis
Have you noticed any changes in your dental health since the beginning of pregnancy?	1.226	0. 275
Do you suffer from bleeding gums during dental brushing?	1.517	1.357
Do you have pain or sensitivity in your teeth?	1.250	0.538
Do you suffer from plaque buildup or plaque formation on your teeth?	1.319	1.258
Do you have swollen or swollen gums?	0.762	- 1.457
Do you feel any bad breath?	1.529	0.345
Do you follow a healthy dental diet?	1.457	.762
Are you currently taking any medication that may affect your dental health? if so, explain.	1.457	.762
Do you stick to your daily dental care routine? such as brushing and flossing or rinsing?	1.112	.957
Have you visited the dentist since the beginning of pregnancy?	2.043	1.998
Do you have any additional questions concerns regarding the health of your teeth during pregnancy?	.680	1.632

3.4.3 Descriptive analysis of response (Yes, No)

To determine the intersections of the study questions, a (multiple-response table) analysis was conducted, where the results of Table (3.4) showed the intersection of the first question (Have you noticed any changes in your dental health since the beginning of pregnancy?) with the rest of the questions. For example, the total number of respondents when their answers intersected between the first and second questions was (29) respondents. Among these responses, (18) respondents answered the first question with (yes), while among (29) respondents, (11) respondents answered the first question with (no). Similarly, the total number of respondents when their answers intersected between the first and third questions was (27). Among these responses, (14) respondents answered the first question with (yes), while among (27) respondents, (13) respondents answered the first question with (no). In the same context, the number of respondents whose answers intersected between the fourth question and the first question was (22) respondents. Among the respondents whose answers intersected between the fourth and the first (15) respondents answered (yes), while (7) out of the total number of respondents (22) answered the first question with (no). Table (3.5) shows the intersection of responses to the first question with the rest of the questions.

Table 3.4

Intersection of the responses to the first question with the rest of the questionnaire responses

			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Have you noticed any changes in your dental health since the beginning of pregnancy?	yes	Count	0	18	14	15	18	10	9	14	10	11	10
	%	With Q1	0.0%	39.1%	30.4%	32.6%	39.1%	21.7%	19.6%	30.4%	21.7%	23.9%	21.7%
	No	Count	28	11	13	7	9	6	11	15	14	4	7
	%	with Q1	100.0%	39.3%	46.4%	25.0%	32.1%	21.4%	39.3%	53.6%	50.0%	14.3%	25.0%
	Total	Count	28	29	27	22	27	16	20	29	24	15	17

Table 3.5

Intersection of the responses to the second question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q2	YES	17	0	15	12	18	8	10	19	10	9	7
	%	37.8%	0.0%	33.3%	26.7%	40.0%	17.8%	22.2%	42.2%	22.2%	20.0%	15.6%
	N0	11	29	12	10	9	8	10	10	14	6	10
	%	37.9%	100.0%	41.4%	34.5%	31.0%	27.6%	34.5%	34.5%	48.3%	20.7%	34.5%
	Total	28	29	27	22	27	16	20	29	24	15	17

Table 3.6

Intersection of the responses to the third question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q3	YES	15	17	0	12	21	10	17	15	13	14	14
	N0	13	12	27	10	6	6	3	14	11	1	3
	Total	28	29	27	22	27	16	20	29	24	15	17

Table 3.7

Intersection of the responses to the fourth question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q4	YES	21	19	17	0	20	12	16	21	14	7	11
	N0	7	10	10	22	7	4	4	8	10	8	6
	Total	28	29	27	22	27	16	20	29	24	15	17

Table 3.8

Intersection of the responses to the fifth question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q5	YES	19	20	21	15	0	11	11	21	15	7	2
	N0	9	9	6	7	27	5	9	8	9	8	15
	Total	28	29	27	22	27	16	20	29	24	15	17

Table 3.9

Intersection of the responses to the sixth question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q6	YES	22	21	21	18	22	0	14	19	14	9	12
	N0	6	8	6	4	5	16	6	10	10	6	5
	Total	28	29	27	22	27	16	20	29	24	15	17

Table 3.10

Intersection of the responses to the seventh question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q7	YES	17	19	24	18	18	10	0	22	18	11	11
	N0	11	10	3	4	9	6	20	7	6	4	6
	Total	28	29	27	22	27	16	20	29	24	15	17

See tables A.1-A.4 in Appendix A.

3.4.4 Correlation and Multicollinearity

Multicollinearity denotes a phenomenon wherein two or more explanatory variables exhibit nearly identical observations, consequently resulting in elevated pairwise correlations among them, thereby rendering certain variables redundant. A correlation coefficient between two variables that does not exceed 0.90 signifies the absence of this issue; conversely, a coefficient exceeding 0.90 indicates the redundancy of the predictors (Awang, 2015). The current investigation assessed the presence of multicollinearity by employing the correlation matrix among variables, as illustrated in Table A.5 in Appendix A. The findings indicated that none of the variables exhibited significant correlation. Hence, the issue of multicollinearity was determined to be non-existent. In contrast, the results derived from Pearson analysis revealed that the connection between the eleven items and the aggregate score represented by the twelfth item ranged from moderate to high for most items, with the correlation being statistically significant, as indicated by a p-value of less than 0.05, thereby affirming the robustness of the internal consistency of the questionnaire and the coherence of the items with the overall score.

3.5 Analyze and discuss the study results

This research sought to investigate how pH levels, age, number of pregnancies, and DMFT (Decayed, Missing, Filled Teeth index) influence outcomes during pregnancy. A questionnaire was formulated, and its validity and reliability were rigorously assessed. Subsequently, the questionnaires were filled, gathered, coded, entered into a computer database, and subjected to statistical analysis using the Statistical Package for the Social Sciences (SPSS). The following section presents the study findings based on the formulated research questions and hypotheses.

3.5.1 Analysis results related to the first research question and its hypothesis

Question 1: How do pH levels affect the dental health of pregnant and non-pregnant women?

H1: There are statistically significant differences at the 0.05 significance level in the impact of pH on dental health between pregnant and non-pregnant women.

Table A.6 in Appendix A presents the results of the one-way ANOVA test, which was conducted to investigate the differences in dental health responses between pregnant and non-pregnant women based on pH levels.

The results in Table 4.16 indicate that the significance value (Sig) from the one-way ANOVA test is greater than the threshold significance level ($\alpha \geq 0.05$) concerning dental health perceptions and practices during pregnancy. Specifically, the significance value was 0.705. Based on these findings, the researcher can conclude that there are no significant differences in the respondents' perceptions of the impact of pH on dental health between pregnant and non-pregnant women.

3.5.2 Analysis results related to the second research question and its hypothesis

Question 2: How does age affect dental health in pregnant and non-pregnant women?

H2: There are statistically significant differences at the 0.05 significance level in the impact of age on dental health between pregnant and non-pregnant women.

Table A.7 in Appendix A presents the results of the one-way ANOVA test, which was conducted to investigate the differences in dental health responses between pregnant and non-pregnant women based on pH levels.

The analysis results in Table A.7 reveal that the significance value (Sig) from the one-way ANOVA test exceeds the threshold significance level ($\alpha \geq 0.05$) concerning dental health perceptions and practices during pregnancy, with a specific significance value of 0.226. Consequently, these findings suggest that there are no statistically significant differences in respondents' perceptions regarding the impact of age on dental health between pregnant and non-pregnant women. This indicates that age does not significantly influence the way dental health is perceived or practiced among the two groups.

This comment accurately interprets the statistical results, making clear that no significant differences were found based on age, and contextualizes the finding within the broader research question.

3.5.3 Analysis results related to the third research question and its hypothesis

Question 3: How do the pregnancy or nonpregnancy experiences influence dental health?

H3: There are statistically significant differences at the 0.05 significance level in the impact of pregnancy or nonpregnancy experiences on dental health between pregnant and non-pregnant women.

Table A.8 in Appendix A includes the results of applying the t-test for two independent samples to examine the differences between the averages of the study sample's responses due to pregnancy or nonpregnancy experiences variable.

Table A.8 in Appendix A shows that the probability value (Sig.) for the t-test of two independent samples is less than the significance level ($\alpha \leq 0.05$) for dental health, the study's dependent variable. The significance value is 0.015, with a T value of 2.476. From these results, the researcher concludes that significant differences exist in respondents' dental health perceptions due to pregnancy experience. This finding is supported by the difference in the arithmetic means between the two groups: pregnant women with a mean of 0.33 and non-pregnant women with a mean of 0.22. The results suggest that pregnant women have a greater interest in practicing habits that promote dental health, such as regular dental check-ups and maintaining oral hygiene through the use of toothbrushes, tootpHaste, and other behaviors that preserve dental health.

3.5.4 Analysis results related to the fourth research question and its hypothesis

Question 4: What is the correlation between the DMFT index and dental health for pregnancy experience?

H4: There is a significant relationship between the DMFT index pregnancy experience during pregnancy.

Table A.9 in Appendix A presents the results between DMFT (Decayed, Missing, and Filled Teeth) and pregnancy experience among pregnant and non-pregnant women.

The analysis results indicated that the CHI SQUARE value in Table A.10 in Appendix A was 0.001, which is below the specified significance level ($\alpha \geq 0.05$). This suggests that there are statistically significant differences in the DMFT index between women with pregnancy experience and those without.

The data shows that 37 women were not affected by the DMFT index, including 21 women with no pregnancy experience, representing 60% of this group. Table 4.8 highlights significant differences in the arithmetic mean for women not exposed to the DMFT indicator, where non-pregnant women make up 60%, compared to other groups of women affected by DMFT, with a higher proportion among pregnant women. The Sig values for women unaffected by DMFT are 0.011, 0.001, and 0.008, all below 0.05, indicating statistical significance. Conversely, the Sig values for other categories of pregnant women are greater than 0.05, showing no statistically significant differences. There is a notable difference in the arithmetic mean for women not exposed to the DMFT indicator compared to other groups, while the differences in the arithmetic mean among the other groups are minimal.

These results can be interpreted as follows:

There is a statistically significant relationship between (DMFT) and pregnancy experience. This indicates that DMFT is greatly influenced by a woman's pregnancy experience. Based on these results, researchers and those interested in the field of oral health in women can take this relationship into consideration when developing policies and preventive measures to maintain oral health, especially with regard to the health of pregnant women.

3.6 Chapter Summary

This chapter began with an overview of data analysis, including data description, and preliminary analysis, which covered reliability testing and assessments of normality, multicollinearity, and correlations.

Subsequently, the focus shifted to addressing the study's four research questions and hypotheses. Various statistical tools such as ONE-WAY ANOVA, Independent T-Test, and Chi-square were employed to explore the relationships between study variables and their interrelations, ensuring the consistency of the analysis results with the study's hypotheses and objectives.

The next chapter will summarize and discuss the findings presented here, highlight key studies that support these results, and examine the study's scientific contributions to the existing literature. It will also address the study's implications, and potential limitations, and propose directions for future research.

Chapter Four

Discussion and Conclusion

4.1 Introduction

This chapter discusses the data analysis findings from the previous chapter (Chapter Four), as well as the assumptions and conceptual framework presented in Chapter Two. This chapter begins with a brief overview of the study, which aims to highlight and investigate the impact of PH, age, pregnancy duration, and DMFT (Decayed, Missing, and Filled Teeth) on dental caries during pregnancy.

This chapter focuses on the thesis's key points further. Finally, this chapter analyses the limits of the study as well as prospective research areas. A study summary concludes the chapter.

4.2 Background Context

This descriptive study seeks to examine the effect of PH, age, duration of pregnancy and DMFT (decayed, missing and filled teeth) on dental caries during pregnancy. Drawing on gaps in literature and previous research, the study is anchored on four objectives:

1. Study the effect of pH levels on the dental health of pregnant and non-pregnant women.
2. Determine the effect of age on dental health in pregnant and non-pregnant women.
3. Examine the effect of the number of pregnancies on dental health.
4. Identify the relationship between the DMFT index and dental health during pregnancy.

In order to achieve the study's specific objectives, four questions had to be answered. Below are the questions:

1. Question 1: How do pH levels affect the dental health of pregnant and non-pregnant women?
2. Question two: How does age affect dental health in pregnant and non-pregnant women?
3. Question 3: How does the number of pregnancies affect dental health?

4. Question 4: What is the relationship between the DMFT index and dental health during pregnancy?

Data analysis was performed using SPSS version 26.0, and included descriptive statistics, reliability analysis, demographic data, and variable correlations. The research identified direct and indirect relationships between its variables.

There are no significant differences in the respondents' perceptions of the impact of pH on dental health between pregnant and non-pregnant women (F=.542, p-value = 0.705> 0.05).

The effect of pH levels on the dental health of pregnant and non-pregnant women.

Age does not significantly influence the way dental health is perceived or practiced among the two groups (F= 1.449, p-value = 0.226> 0.05)

The effect of age on dental health in pregnant and non-pregnant women.

Significant differences exist in respondents' dental health perceptions due to pregnancy experience (T-test value= 2.476>1.96, p - value= 0.015< 0.05).

The effect of the number of pregnancies on dental health.

There is a difference in the arithmetic mean for women not exposed to the DMFT indicator compared to other groups (p-value = 0.011, 0.001, 0.008< 0.05).

The relationship between the DMFT index and dental health during pregnancy.

4.3 Discussion of the Findings

- Hypothesis 1: pH levels significantly impact the dental health of pregnant and non-pregnant women.
- Hypothesis 2: Age has a significant effect on the dental health of pregnant and non-pregnant women.
- Hypothesis 3: The number of pregnancies has a significant influence on dental health.
- Hypothesis 4: There is a significant relationship between the DMFT index and dental health during pregnancy

The objective of developing hypotheses is to transform them into validated facts and information that can be utilized to confirm the findings of prior investigations. It is also used to examine the variables of the study within the study's industry and population. To understand the findings of this study, the objectives of the study are used to determine if they were met.

Objective 1. to study the effect of pH levels on the dental health of pregnant and non-pregnant women.

These findings align with the research conducted by Lopez (2019), Martins (2020), Evans (2022), which demonstrated that pH levels in the mouth significantly impact dental health, particularly in pregnant women. Gingivitis, periodontitis, and changes in salivary content and flow can all be caused by hormonal changes that occur during pregnancy. Tooth decay and gum disease are more likely to occur when these changes reduce saliva pH, making the mouth a more acidic environment that encourages the growth of dangerous bacteria and reduces the protective layer of enamel.

Similarly, low pH levels cause dental problems, such as enamel erosion and gum disease, which is why this study's findings are in line with those of Jessani (2016), Scherer (2021), and Dragan (2018), all of which stressed the importance of keeping the pH balanced in non-pregnant women. Furthermore, numerous studies have demonstrated the importance of these pH variations in clinical practice, highlighting the necessity for specialized dental care for women during and after pregnancy (Smith, 2022; Brun, 2021; Garcia et al., 2020; Patel et al., 2019; Nguyen et al., 2018; Moawad and Badawi, 2019). Thus, it is crucial to maintain a good pH balance for both pregnant and non-pregnant women, as there are no statistically significant variations in the impact of pH on dental health.

Objective 2. To determine the effect of age on dental health in pregnant and non-pregnant women.

The significance value (Sig) of 0.226, which is greater than the threshold level ($\alpha \geq 0.05$), was shown by the study's one-way analysis of variance, which investigated the effect of age on dental health. Based on these results, it seems that pregnant and non-pregnant women do not differ in their views on how age affects oral health. These

findings go against what has been reported in earlier research by Gisani (2016) and Gustafsson (2018), which indicated that there is a strong correlation between maternal age and the prevalence of dental problems such as cavities, gum disease, and periodontitis in pregnant women.

Furthermore, studies by Pereira (2019) and Hernandez (2018) found that hormonal changes, especially in older women, can cause inflammation and sensitivity of the gums, which can lead to the need for specialist dental care. However, the current study's findings contradict this. Also, age-related diseases like diabetes, hypertension, and osteoporosis make oral health more complicated, necessitating individualized treatment and frequent monitoring (Al-Zahrani, 2019; Oliveira, 2021). For older pregnant women, it is especially important to maintain good oral health by eating right and seeing a specialist dentist regularly (Nogueira, 2020; Zahdi, 2018). On top of that, Mendes (2022) and Rodrigues (2021) stress the importance of dental and medical specialists working together, particularly when it comes to treating dentures and oral health issues associated to aging. Although Martinez (2017) suggests that increased awareness and regular dental service usage may alleviate some age-related risks, current findings indicate that age can negatively impact the dental health of pregnant women for several reasons discussed in these studies.

Objective 3. Examine the effect of the number of pregnancies on dental health.

To assess the significance of this impact Consequently, the researcher can conclude that there are significant differences in perceptions of the impact of the number of pregnancies on dental health. These results align with the studies by Silva & Santos (2024), who indicated that dental health is largely influenced by pregnancy due to the physiological, hormonal, and immunological changes that occur during pregnancy. These changes can lead to dental caries. Furthermore, the biometabolites during pregnancy, especially the increase in progesterone and estrogen, can increase blood flow to the extra-oral cavity, making it more visible and contagious, a condition that is often referred to as “painful pregnancy”.

In addition, the results of this study agree with Owotade (2021), who reported that the immune system undergoes adaptations to accommodate the developing fetal, which can

reduce the body's ability to combat oral pathogens, thereby accelerating the progression of periodontal diseases.

Objective 4. Identify the relationship between the DMFT index and dental health during pregnancy.

This study was intended to analyze the association between the DMFT index and the status of oral health in women during pregnancy. Significant relationships were found between these factors at the DMFT index level with Sig values of 0.011, 0.001, and 0.008, all below the threshold set at 0.05. It implies that the DMFT has a strong indication as an index of oral health status among pregnant women.

The results are substantiated by various investigations, including that of Hatkehlouei et al. (2017), who found that an increased range of DMFT indices characterizes pregnant women as tender and this often corresponds with a greater number of dental caries incidence. This is in accordance with the work of Binabaj et al. (2012), who demonstrate that poor oral health practices and higher risk factors during pregnancy correspond with a higher DMFT score.

The effect of hormonal changes during pregnancy "the incidence of dental problems" was pointed out by Silva and Santos (2024). They note that the DMFT index would be very useful for evaluating the effects of these changes on oral health. The findings of the above study indicate that physiological and immunological changes during pregnancy may worsen dental pathology; therefore, monitoring the DMFT index would be needed for good dental care.

It has also been shown by Garcia et al. (2020) and Patel et al. (2019) that having a low level of education and lack of awareness of oral health contribute to a high DMFT during pregnancy, thereby stressing the need for specific educational interventions aimed at improving dental health outcomes.

4.4 Conclusion

The effects of age, pH levels, pregnancy experience, and the DMFT index on dental health were evaluated in this study, which also included non-pregnant women. After doing the analysis, the following results were reached:

- Effect of pH Levels on Dental Health:

Neither pregnant nor non-pregnant women differed significantly from one another in their views on the effect of pH levels on oral health. The one-way ANOVA test indicated a significance value ($F = 0.542$, $p = 0.705$), which is greater than the threshold of 0.05.

- Effect of Age on Dental Health:

Age does not significantly influence the perception or practice of dental health among pregnant and non-pregnant women. This was supported by the results ($F = 1.449$, $p = 0.226$), where the p-value exceeded the 0.05 significance level.

- Effect of Pregnancy Experience on Dental Health:

There are significant differences in dental health perceptions attributed to pregnancy experience. The T-test results ($T = 2.476$, $p = 0.015$) indicate that pregnancy experience substantially impacts dental health perceptions, with the p-value being less than 0.05.

- Relationship Between the DMFT Index and Dental Health During Pregnancy:

The study identified significant differences in the DMFT index between women exposed to the indicator and other groups, with p-values (0.011, 0.001, 0.008) all below the 0.05 threshold. This suggests a strong relationship between the DMFT index and dental health during pregnancy..

4.5 Limitations

1. Since this is a cross-sectional study, it captures data at a single point in time, limiting the ability to infer causality between pH levels, pregnancy, and dental caries development.
2. The sample of this study is small, so it may reduce the generalizability of the findings, particularly if certain groups (e.g., women at different pregnancy stages or with varying health conditions) are underrepresented.
3. Data on dental hygiene practices may be based on self-reports, which could lead to biases or inaccurate results.
4. Access to dental care, dietary habits, and hormonal shifts are other unmeasured variables that impact the results but are not adequately controlled in the study.

5. Geographical Limitation: The findings might not be generalizable to larger populations with diverse healthcare systems or lifestyles if the study is limited to a particular area or health center.
6. A single measurement may not always capture the whole range of oral pH levels, which might change throughout the day owing to things like meal consumption.
7. The reliability of data on dental caries could be compromised if pregnant women are asked to recollect details about their oral health and previous treatments.

4.6 Recommendations

To improve oral health initiatives for both pregnant and non-pregnant women, the following recommendations are made based on the study's findings:

1. Creating and distributing educational materials aimed squarely at pregnant women, highlighting the special challenges they face when it comes to their oral health.
2. The patient should have regular dental exams, preventative treatments, Incorporate prenatal healthcare services with complete dental treatment and instruction on how to properly care for their teeth and gums while pregnant.
3. Pregnant women should be regularly checked for the DMFT index by their healthcare providers due to the strong correlation between the index and dental health during pregnancy. Pregnant patients should emphasize regular dental check-ups and tailored dental care regimens.
4. It is important to prioritize dental health for all age groups, including pregnant women of all ages. This will ensure that they receive the information and assistance they need, regardless of their age.
5. Inspire additional studies to investigate other possible variables impacting pregnant women's oral health.
6. Propose legislation that would allow maternity healthcare programs to incorporate dental health treatments. It is imperative that policies prioritize dental health as an integral part of prenatal and postnatal care.

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Appendices

Appendix A

Tables

Table A.1

Intersection of the responses to the eighth question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q8	YES	13	19	13	14	19	6	13	0	6	8	11
	N0	15	10	14	8	8	10	7	29	18	7	6
	Total	28	29	27	22	27	16	20	29	24	15	17

Table A.2

Intersection of the responses to the ninth question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q9	YES	14	15	16	12	18	6	14	11	0	6	9
	N0	14	14	11	10	9	10	6	18	24	9	8
	Total	28	29	27	22	27	16	20	29	24	15	17

Table A.3

Intersection of the responses to the tenth question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q10	YES	24	23	26	14	19	10	16	22	15	0	9
	N0	4	6	1	8	8	6	4	7	9	15	8
	Total	28	29	27	22	27	16	20	29	24	15	17

Table A.4

Intersection of the responses to the eleventh question with the rest of the questionnaire responses

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q11	YES	21	19	24	16	12	11	14	23	16	7	0
	N0	7	10	3	6	15	5	6	6	8	8	17
	Total	28	29	27	22	27	16	20	29	24	15	17

Table A.5

Bivariate Correlation Matrix between study Variable

Person	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total score
Q1	1											.455**
Q2	.761**	1										.452**
Q3	.581**	.501**	1									.252**
Q4	.801**	.672**	.538**	1								.344**
Q5	.064	.123	.145	.099	1							.327**
Q6	.081	.147	.015	.099	.099	1						.459**
Q7	.046	.162	.122	.083	.099	.013	1					.306**
Q8	.117	.163	.015	.103	.083	.031	.120	1				.488**
Q9	.050	.110	.083	.067	.103	.031	.235*	.267*	1			.729**
Q10	.004	.005	.053	.111	.067	.082	.403**	.082	.275*	1		.427**
Q11	.015	.130	.073	.111	.111	.077	.320**	.060	.190	.516**	1	.523**
Total scor												1

Table A.6

One-way ANOVA test results on dental health perceptions and practices during pregnancy

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.084	4	.021	.542	.705
Within Groups	2.904	75	.039		
Total	2.988	79			

Table A.7

One-way ANOVA test results on dental health perceptions and practices during pregnancy

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.214	4	.054	1.449	.226
Within Groups	2.774	75	.037		
Total	2.988	79			

Table A. 8

T-test results for two independent samples comparing dental health perceptions and practices during pregnancy and non-pregnancy experiences

Variables	t- test value	Means		Sig value
		Non-pregnancy experiences	Has pregnancy experiences	
Dental health	-2.476	0.22	0.33	0.015

Table A.9

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.785[a]	3	.001
Likelihood Ratio	17.925	3	.000
Linear-by-Linear Association	14.739	1	.000
N of Valid Cases	80		

Table A.10

The relationship between the DMFT index and pregnancy experience in both pregnant and non-pregnant women.

Decayed, Missing, and Filled Teeth	(J) Decayed, Missing, and Filled Teeth	Mean Difference (I-J)	Std. Error	Sig.
Don't exposed to MDFT	1-4 time exposed to MDFT	.318*	.122	.011
	5-10	.456*	.126	.001
	more than 10	.568*	.209	.008
1-4 time exposed to MDFT	Don't exposed to MDFT	-.318-*	.122	.011
	5-10	.139	.142	.333
	more than 10	.250	.219	.258
5-10	Don't exposed to MDFT	-.456-*	.126	.001
	1-4 time exposed to MDFT	-.139-	.142	.333
	more than 10	.111	.222	.618
more than 10	Don't exposed to MDFT	-.568-*	.209	.008
	1-4 time exposed to MDFT	-.250-	.219	.258
	5-10	-.111-	.222	.618

جامعة النجاح الوطنية
كلية الدراسات العليا

تقييم موشرات صحة الاسنان اثناء الحمل: درجة الحموضه في اللعاب ومخاطر تسوس الاسنان

إِعداد
رهام محمد سعيد رداد

إشراف
د. محمد حايك

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الماجستير في الكيمياء الحيوية السريرية، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس – فلسطين.

2025

تقييم موشرات صحة الاسنان اثناء الحمل: درجة الحموضه في اللعاب ومخاطر تسوس الاسنان

إعداد

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الملخص

الغرض: تهدف هذه الدراسة إلى فحص الارتباط بين مستويات الرقم الهيدروجيني (pH)، وتسوس الأسنان، والحمل من خلال دراسة صحة الفم بين النساء الحوامل وغير الحوامل. تركز الدراسة على تحليل تأثير مستويات الرقم الهيدروجيني، بالإضافة إلى العمر، وتجربة الحمل على تصورات وممارسات العناية بالفم، كما يتم دراسة العلاقة بين مؤشر الأسنان المتحللة والمفقودة والمملوءة (DMFT) وصحة الفم خلال فترة الحمل.

المنهجية / طريقة البحث: أقيم تحقيق مقطعي شمل ثمانين امرأة من مديرية صحة سلفيت، تم تقسيمهن إلى فئتين: حوامل وغير حوامل. تم جمع المعلومات المتعلقة بوجهات نظر صحة الفم، وتأثير مستوى الحموضة، ومؤشر DMFT، وتم تحليلها باستخدام تقنيات إحصائية، بما في ذلك اختبارات F و T للمقارنة بين المجموعتين.

النتائج: أظهرت النتائج عدم وجود اختلاف مهم إحصائياً في تصورات صحة الفم بين الحوامل وغير الحوامل وفقاً لمستويات الرقم الهيدروجيني (F=0.542)، (p=0.705) كما لم يكن للعمر تأثير ذو دلالة إحصائية على تصورات وممارسات صحة الفم (F=1.449)، (p=0.226) ومع ذلك، تم العثور على فروق ذات دلالة إحصائية في تصورات صحة الفم المرتبطة بتجربة الحمل (T=2.476)، (p = 0.015) بالإضافة إلى مؤشرات DMFT بين النساء اللواتي تعرضن لعوامل الحمل وتلك التي لم تتعرض لها، مع قيم p تبلغ 0.011 و0.001 و0.008 على الترتيب.

المحددات والدلالات البحثية: ركزت الدراسة على مجموعة سكانية معينة في مكان واحد، مما قد يؤثر على قدرة تعميم النتائج. هناك حاجة لمزيد من الأبحاث لتناول عوامل أخرى تؤثر على صحة الفم أثناء فترة الحمل.

الدلالات العملية: تشير النتائج إلى ضرورة دمج برامج تعليمية وتدخلات مخصصة لصحة الفم في إطار الرعاية قبل الولادة، مع إعطاء الأولوية للعوامل المتعلقة بالحمل التي تؤثر على صحة الفم.

الأصالة / القيمة: تهدف هذه الدراسة إلى توضيح الروابط بين الحمل، ودرجات الرقم الهيدروجيني، وصحة الفم، مع التأكيد على الأهمية الكبيرة لتجربة الحمل ومؤشر DMFT في تحديد نتائج صحة الفم. كما تبرز ضرورة وجود استراتيجيات لرعاية أسنان مصممة خصيصاً للنساء الحوامل.

الكلمات المفتاحية: مستويات الرقم الهيدروجيني، تسوس الأسنان، الحمل، صحة الفم، مؤشر DMFT، دراسة مقطعية.