

A Phenomenologic Study About the Dietary Habits and Digestive Complications for People Living with Temporomandibular Joint Disorders

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Aims: To better understand the experiences of individuals who must alter the types of food they eat because of having a chronic temporomandibular joint disorders (TMD) and the digestive issues that these alterations produce. **Methods:** Six participants answered open-ended questions during semi-structured interviews about their experiences with TMD-related changes in diet and digestion. These interviews, held face-to-face with the participants in a nonclinical environment, were recorded and transcribed. Interpretive phenomenology was used to arrange and analyze the narrative data collected. **Results:** The authors identified three common themes among the participants: (1) constipation and bloating; (2) loss of chewing function; and (3) weight change. For each of these themes, participants expressed physiologic and psychologic complications, which were largely unaddressed by their health care providers. **Conclusion:** These findings highlight the need for health care providers to establish nutritional guidelines for TMD individuals at risk of physiologic and psychologic comorbidities. Health care intervention programs to treat people living with chronic TMD pain and that provide nutritional guidance will help decrease medical crises and the need for expensive interventions and will better assist these patients. *J Oral Facial Pain Headache* 2019;33:377–388. doi: 10.11607/ofph.2302

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One of the primary concerns facing people living with temporomandibular disorders (TMD) is a change in the quality and quantity of food intake to minimize pain, which is one of the main symptoms characterizing TMD.^{1–3} Many patients take medication to reduce their TMD symptoms and choose softer foods that require less chewing to reduce pain intensity.^{2,4–7} Regrettably, health care providers devote little time to understanding the totality of the suffering of these patients and instead focus on the medical aspects of treatment.^{6,8} Clinicians need to establish guidelines to help TMD patients improve the quality of their diets and minimize or avoid eating-related pain, but promulgated dietary guidelines for patients with neurovascular or neuropathic disorders are lacking, except for excluding specific trigger foods.³

TMD are one common type of orofacial pain (OFP). OFP is defined as pain localized to the region in front of the ears, above the neck, below the orbitomeatal line, or in the oral cavity, most commonly resulting from toothache or TMD.⁹ TMD constitute a cluster of clinical conditions that affect the masticatory muscles, temporomandibular joint (TMJ), and associated structures such as the capsule, articular disc, and retrodiscal tissue.^{10–12} The two most common types of painful musculoskeletal TMD are arthralgia and myofascial pain (MP).^{3,13,14} Arthralgia, localized to the TMJ, includes conditions that originate from and cause pain in that area.^{13,15} Typical jaw movements associated with chewing food may exacerbate TMD pain.^{16,17} MP is considered as a source of discomfort in individuals with regional pain symptomatology.^{18,19} The prevalence of MP is around 30% in patients having local pain complaints seen in primary care clinics and up to 85% in patients seen at specialized

pain management centers.^{20,21} Patients with a severe intensity of myofascial pain syndrome (MFP) are likely to reduce their consumption of dietary fiber.^{7,18}

TMD accounts for 25% of the population, with up to 11% in chronic pain.⁹ TMDs rank second among common chronic pain conditions, with a prevalence of 5% to 12% in the general population; only musculoskeletal lower back pain has a greater prevalence.^{1,22-24} However, the etiology of TMD is still not well understood, even though the annual cost for its treatment has doubled, amounting to four billion dollars in the last decade.¹ The poorly understood causes of TMD add complexity to its treatment, which includes physical, pharmacologic, cognitive-behavioral, and dietary therapies.³ Approximately 50% of patients who suffer from TMD look for professional dental or psychotherapeutic care, and nearly 33% of them will continue to suffer from moderate to severe levels of pain, disability, and psychological distress regardless of the treatment received.^{25,26}

TMD are characterized by chronic pain, dysfunction of the masticatory system, and limited movement of the mandible.^{10,22} As a direct consequence, patients with TMD are forced to choose softer foods that require less chewing to minimize their pain.^{2,3} TMD pain is the main concern in more than 97% of TMD patients. The focus on food texture rather than on nutritional benefits leads to health problems such as digestive issues, weight gain or loss, loss of energy, and mental health issues.^{2,6,7,27-29} Multifactorial TMD conditions affect appetite and motor functions of the oral cavity such as mouth opening, biting, and chewing, which are associated with pain and discomfort.² Painful TMD conditions may also negatively affect the sensory factors involved in drinking, eating, and swallowing, resulting in changed dietary intake and subsequent nutritional status.^{2,4,5} These physical implications may lead to a possible avoidance of the healthy fruits, vegetables, nuts, and whole grains rich in vitamins, antioxidants, and minerals that contribute to a healthy diet.^{2,4,5} Additionally, 14% of TMD patients may also exhibit symptoms of psychiatric illness, sleep disturbance, energy loss, weight loss, concentration changes, and depression.^{2,6,7,27-31} All of these factors, individually or collectively, may have a profound effect on the person living with TMD that, over time, may affect their overall health and quality of life. The present authors intended to explore and understand the experiences expressed by people living with TMD who change their food choices to accommodate their pain. The research approach chosen was interpretive phenomenology because its foundational underpinnings are rooted in lived experience. Understanding the feelings, values, and perceptions of patients that underlie and influence their behavior helps to improve treatment plans and out-

comes.³² The data from other pain conditions suggest that an increased understanding of the role of nutrition in chronic OFP might help in an adjunctive capacity to improve the general outcomes of therapy.^{2,15} Additionally, improving the patient-doctor relationship could help enhance treatment.⁸

Mastication, which is important not only for food consumption but also for mental and physical functioning, has an effect on other systemic actions, including blood circulation, locomotion, excretion, endocrine function, and reproduction.³³ According to previous physiology studies, the masticatory process appears to be fundamental for gastrointestinal (GI) absorption of certain foods like meat, vegetables, and fruit.³⁴ The cornerstone of the masticatory process is the TMJ and surrounding structures, such as muscles of mastication, blood vessels, and nerves that occur in the oral phase.³⁵ In the oral phase, food is cut mechanically into smaller particles by chewing, mixed with saliva (which aids in taste), and then transferred to the bolus for swallowing. In this phase, digestion of starch and lipids in the food is also initiated.³⁶ Saliva has several properties that serve to protect the nutritional canal mucosa against acidity.³⁷ Food mastication induces saliva production, which consequently increases its buffer capacity.³⁸ Any defect in salivary function or in the ability to mix food properly with saliva could lead to many systemic disorders and conditions, including malnutrition, eating disturbances, anorexia, and anemia.³⁶ The integrity of the GI system, therefore, is dependent on adequate chewing.

Along this line of thinking, patients who limit their food intake because of reduced masticatory function usually fall into the first two classes of protein-energy malnutrition.³⁹ Nutrition is defined as the process by which a living organism takes in food and uses it for growth, metabolism, and tissue repair, while diet is more narrowly defined as a regimen of food intake planned to meet specific requirements of the person, including or excluding certain foods.⁴⁰ Both nutrition and diet significantly influence general health and contribute to improved health status. Consequently, oral health impacts nutrition and diet by affecting a person's ability to eat.² Food quality and nutritional status are crucial for conserving and promoting health throughout the life span.² In terms of excluding hard foods, older studies point out that apples, meat, and bread might frequently be banned from the OFP patient's diet.^{15,41} In addition, recent studies have recommended that meat and vegetables be prepared differently by using softer cooking methods.^{15,42} Poor nutrition combined with other risk factors, such as physical inactivity or tobacco use, may amplify the prevalence of chronic diseases, including diabetes, obesity, cancers, osteoporosis, cardiovascular disease (CVD), and oral disease.^{2,3}

Conversely, oral health may influence dietary intake and nutritional status.⁴³ TMD patients often modify their eating habits due to pain, which compromises their diet.^{2,44} The development of both adaptive and maladaptive behaviors are common as patients with TMD attempt to minimize the factors that initiate or increase pain.⁴⁴

Medications used to treat chronic OFP may also influence nutrient absorption and diet.² These influences can affect patients' overall food intake, digestion, and absorption of macronutrients such as carbohydrates, proteins, and fats; and other prescribed medications can cause micronutrient depletion of minerals, vitamins, and organic acids either by preventing nutrient absorption (primary malabsorption), enhancing nutrient elimination, or both. OFP symptoms can last for more than 6 months in some patients, with consequences that impact various aspects of daily life, including loss of employment, sleep disturbance, fatigue, social withdrawal, difficulty chewing/eating, and anxiety about oral and dental health.^{45,46} For instance, the medications prescribed for MP combined with low dietary fiber lead to an increased risk of constipation and may also worsen comorbid medical conditions.⁷ Also, long-term use of nonsteroidal anti-inflammatory drugs (NSAIDs) to treat chronic diseases such as TMD and MP requires laboratory monitoring for adverse renal effects, GI bleeding, and a possible hepatic impact,⁴⁷ threatening GI hemorrhage and perforation.⁴⁸ Patients do not usually require hospitalization for minor side effects, but they may still require health care resources for continued treatment.

Alleviating personal suffering is essential in all aspects of medicine, but chronic pain offers a unique challenge to the afflicted of learning how to manage pain in the context of life-altering circumstances.⁴⁹ Many OFP patients feel dissatisfied with the health care system that they journey through.⁵⁰ In an acute care medical model, providers are predominantly focused on identifying the biomedical needs to rid the person of their pain, often ignoring the functional, emotional, and social issues that add to personal suffering.^{8,51} Therefore, understanding these aspects might help health care providers become more aware or empathetic about their patients' experiences.

In a discussion about whole person care, understanding the implications of having to choose softer foods that require less chewing can result in unintended consequences of weight loss or gain, loss of energy, digestive problems, and/or fatigue that follow from their food choices.² The literature is lacking regarding established guidelines for neuropathic or neurovascular disorders (except for avoidance of specific trigger foods) and validated standards to evaluate and manage diet and nutritional wellbeing in

patients with TMD. Therefore, specialists may not be able to assess diet and nutritional status related to quality of life in these patients.²

To date, no qualitative studies have investigated the experiences of TMD patients in terms of the effect of diet change on physical and social health. Few studies have attempted to research in detail the extent to which changing diet affects patients' general health through insufficient oral functioning and a compromised quality of life.^{2,3,15,16,52–54} Because knowledge on this topic is still limited, a broader understanding of the perspective of TMD patients and the barriers they face regarding diet change is needed. Accordingly, the aim of this study was to further the understanding of the experience of TMD patients who undergo physiologic and psychologic complications related to diet and digestion. The findings will inform medical practitioners about these issues and provide support for further work aimed to mitigate these TMD-related challenges.

Materials and Methods

Research Approach

An interpretive phenomenology study approach (IPA) was used to explore TMD patients who have altered dietary habits and digestion.^{55,56} The importance and character of a phenomenologic research approach (IPA) is its ability to explore, examine, and interpret the lived experiences of the study participants.⁵⁷ Creswell asserts that qualitative research has the exploratory capacity to examine, interpret, and understand problematic issues, stating that “we conduct qualitative research because a problem or issue needs to be explored,” and that the phenomenologic approach is the most suitable tradition to use in getting to the root cause of the phenomenon.⁵⁸ So, in an IPA research study, the core of the purpose statement is that the research endeavor has a phenomenon that it wants to explore.⁵⁷ Three of the most acknowledged modern-day minds (theorists) on the IPA approach—Smith, Flowers, and Larkin—state that “IPA is a qualitative research approach committed to the examination of how people make sense of their major life experiences.”⁵⁹ IPA lets the research participants express themselves and their lived experience stories the way they feel is appropriate without any alteration and/or prosecution. Thus, adopting the IPA approach in a qualitative research study re-emphasizes the point that its main objective and essence are to investigate the lived experiences of the research participants and to let them tell the research findings through their lived experiences.⁵⁷ Smith et al assert that IPA aimed to “stake a claim for a qualitative approach central of psychology, rather

than importing one from a different discipline."⁵⁹ As a qualitative approach, IPA began as a psychologically oriented approach:

*So IPA started in psychology and much of the early work was in health psychology. Since then it has been picked up particularly strongly in clinical and counselling psychology as well as in social and educational psychology. It is not surprising that the key constituency for IPA is what can broadly be described as applied psychology, or 'psychology in the real world.'*⁵⁹

In 1990, van Manen wrote extensively about hermeneutical phenomenology. According to him, hermeneutical phenomenology is the lived experiences of research participants (phenomenology) and the interpretation (text) of the life they have lived and experienced (hermeneutics).⁶⁰ Additionally, Moustakas writes about psychologic phenomenology, in which he was less focused on the interpretation of the researcher's personal experience and more concerned with describing the lived experiences of the participants in the research.⁶¹

Participant Selection

A sample size of approximately 6 to 8 participants was sought.⁶² The interpretive phenomenologic approach in human science does not base its sample size on the number of participants, but rather on the availability of suitable participants.^{62,63} Although Creswell states that it is important to determine the size of the sample you will need when selecting participants for a study,⁶⁴ in a phenomenologic research tradition, the sample size can be anywhere between 2 and 25.⁵⁷ The selection of these participants should represent the homogeneity that exists among the participants' sample pool. The fundamentals of conducting an IPA research study with homogenous participants are to capture a better gauge and a better understanding of the overall viewpoints among the participants' lived experiences. Additionally, Creswell states that it is essential that all participants have similar lived experiences of the phenomenon being studied.⁵⁸ Also, Smith et al highlight that "IPA studies are conducted on relatively small sample sizes, and the aim is to find a reasonably homogeneous sample, so that, within the sample, we can examine convergence and divergence in some detail."⁵⁹

The researchers intended to explore a phenomenon of interest that is not dependent on the number of people recruited into the study.⁶² Participants were English-speaking, ≥ 18 years old, had chronic TMD confirmed by a TMD specialist, and self-reported changes in their dietary habits.

Participant Recruitment

The participants were recruited through referrals from specialists at the McGill University Student Dental Clinic, the Jewish General Hospital, and the Montreal General Hospital in Montreal, Canada, between September and November 2017. Informed consent was obtained for each participant.^{62,63} Based on availability, six participants were recruited, which is a number sufficient for this type of study.^{62,63} The interpretive phenomenologic approach in human science does not base its sample size on the number of participants but rather on the availability of suitable participants.^{62,63} The researchers' intention was to explore a phenomenon of interest, and this goal is not dependent on the number of people recruited into the study⁶²; additionally, the authors were not concerned with generalizability, but rather with the transferability of findings to health care systems in similar political, social, and cultural contexts.⁶²

Data Collection

Two techniques for data collection were adopted. Face-to-face individual interviews with the participants were audio recorded.^{62,65} Participants were encouraged to express their experiences of living with TMD in a relaxed conversation rather than a formal interview, which provided rich and detailed information.⁶⁶ The open-ended questions for each semi-structured interview let participants explore their perspectives and explain their experiences in depth and detail, enabling them to express additional issues that might not be covered specifically by the interview guide questions (Table 1).⁶⁷

The interviews were conducted in English at the McGill University's Faculty of Dentistry. A quiet, private office was chosen to allow the participants to feel comfortable talking freely while expressing their experiences. At the beginning of each interview, the interviewer thanked the patients for participating in the study and introduced herself. This prelude was intended to provide a relaxed atmosphere. The interviewer then explained the aim of the research study, the interview process, and reviewed the participant consent form.

The interviews ranged from 15 to 90 minutes in duration. Each interview began with less sensitive topics, asking participants to speak a little bit about themselves, followed by questions about their general experience with TMD. The next questions were much more specifically focused on the research topic.⁶⁷ Questions during the interview were flexible and changed to include the variety of issues presented by patients regarding their experience with TMD and nutrition. As in a qualitative research study, the research questions should encapsulate the core of what the research study is trying to expose (the

Table 1 Interview Guide

1. Tell me about your experience living with TMD (jaw pain), and what it means for you? 1a. How long ago did your jaw pain begin? 1b. How has your pain affected your life?
2. Have you had to change your diet because of this condition? 2a. Have you had to change the kinds of food you now eat to accommodate your pain? 2b. If yes, please explain in more detail.
3. Could you explain how you have had to change your eating and drinking habits due to your pain and the duration of these changes? 3a. Has the duration of your meals in both preparation and consumption changed? 3b. Does it take more or less time to eat than before you had jaw pain? 3c. Has the texture of the foods you choose changed?
4. Have you stopped eating any foods because of your pain? 4a. If yes, which foods? And how do you feel regarding this change? 4b. If you could, would you want to add these foods back into your diet?
5. How has your pain affected your general health? 5a. Please explain, what is/are the effect(s)? 5b. What was/were the effect(s)?
6. Have you noticed a change in your body weight? Please explain. 6a. For example, have you changed the size of your clothes? (Asked if the participant was unsure whether there had been a change in body weight.) 6b. How does the change in weight make you feel?
7. Are there any digestive problems? Please explain. 7a. Do these influence your day-to-day activities? 7b. How have you learned to manage these issues?
8. How does living with TMD make you feel about your quality of life?
9. Have you received any treatment for digestive problems?
10. Were your doctors understanding about your suffering? 10a. Did the doctors listen to your concerns regarding the impact of TMD on your life? 10b. Did they offer any new or helpful advice?
11. Is there anything else you would like to add on this topic?
12. Demographic questions: Where were you born? Where do you live? What is your age? What is your sex? What is the highest level of education that you have completed? What is your occupation?

ontologic, epistemologic, and methodologic stances of the research study). According to Trede and Higgs, “Research questions embed the values, world view and direction of an inquiry. They also are influential in determining what type of knowledge is going to be generated.”⁶⁸ Additionally, Creswell and Creswell advised that qualitative researchers only ask “one or two central questions followed by no more than five to seven subquestions . . . several subquestions follow each general central question, and the subquestions narrow the focus of the study but leave open the questioning.”⁶⁹ When asking these questions, as a rule, it is important that qualitative researchers apply the open-ended question formula. Creswell and Creswell encourage researchers to “use open-ended questions without reference to the literature or theory unless otherwise indicated by a qualitative strategy of inquiry.”⁶⁹ In summary, the research questions should be formulated in a way that is probing and open-ended.

In qualitative research, the use of an audio recorder is important for collecting interview data for transcription and analysis at a later stage in the study.⁷⁰ Recording the interview allows the interviewer to

focus on the conversation rather than taking notes. Recordings also capture changes in speech, emotion, pauses, etc, which are vital components of the original conversation.^{71,72}

Data Analysis

The phenomenologic research approach does not follow a prescribed or controlled process, but is based on and rooted in philosophy.^{62,63,73–75} Coherent application of the philosophy—using data collection methods and procedures consistent with phenomenologic theory—is a crucial part of phenomenologic data analysis.^{62,73,76} Instead of strict procedures and rules, phenomenologic data analysis flexibly responds to the research question.⁷⁷ Van Manen invites us to see phenomenology as a “way toward human understanding.”⁷⁸ As such, there are multiple ways to approach data analysis in phenomenologic research.⁷⁵

In a qualitative research analysis, the interview transcripts should be transcribed verbatim into a hard copy and then analyzed using color-coding (or any other practical methods) for categorization for analyses of common themes. Miles, Huberman, and

Table 2 Participant Demographics

Participant no.	Age (y)	Sex	Residence	Level of education	Occupation
1	51	Male	Montreal	PhD	Student
2	22	Female	Montreal	Undergraduate student	Student
3	29	Male	Montreal	Master	IT advisor
4	64	Female	Montreal	Master	Retired
5	39	Female	Montreal	Bachelor	Massage therapist
6	25	Female	Montreal	Bachelor	Music teacher

Saldana state that “credible and trustworthy analysis requires, and is driven by, displays that are focused enough to permit a viewing of a full data set in the same location and are arranged systematically to answer the research questions at hand.”⁷⁹ More significantly, Smith et al argue that the IPA research approach can investigate deeply the lived experiences of research participants and provide a way to understand the phenomenologic significance of the experience and how it impacts the participant.⁵⁹ The last step of the traditional phenomenologic method of analysis is the long paragraph; the researcher must write a mini-statement that tells the audience (readers) “what” the research participants have experienced and “how” they experienced the phenomenon in a contextual form.⁵⁷

Numerous steps in the analysis process (interviewing, data transcription for analysis, writing nonverbal clues [eg, sighing, smiling, and physical expression] noted in the interviews in each transcript, listening to audio recordings, reading and re-reading the narrative data, color-coding, comparing the transcript data to the audio recordings of the interviews, and then grouping similar interview excerpts) enabled the researcher to be familiar with the data and facilitated the development and interpretation of the “findings”; ie, the descriptions of the phenomenon in question.^{55,76,80} To ensure that the findings were relevant and to gain credibility, data analysis was carried out by both researchers.

Ethical Considerations

Ethical approval was obtained from McGill University's Research Ethics Board Office, Montreal, Canada. All participants consented to a confidentiality agreement.

Results

Six participants, four women and two men, with a mean age of 45 years (range: 25 to 64 years), participated in this study (Table 2).

All participants had undergone physiotherapy to reduce tension in their facial muscles to reduce pain. Some participants were on medication, including antidepressants, painkillers, and anti-inflammatory

drugs. Through a series of interviews with these participants, three key themes were constructed that captured the lived experiences of TMD patients who have altered their eating habits: (1) constipation and bloating; (2) loss of chewing activity; and (3) weight change.

Constipation and Bloating

Constipation describes bowel movements that are infrequent and hard to pass. Constipation is a private problem that many participants confronted during hospitalization but rarely discussed with health care professionals.⁸¹ Participant 1 said:

*Constipation is a big problem for me;
I don't go into the toilet.*

In this quote, Participant 1 expresses concerns regarding his digestive problems. It was easy for him to engage in the interview while explaining his experience in detail. His somewhat angry mood dominated the general atmosphere during the interview, especially when asked how TMD pain affected his general health. He described that his situation was characterized by an inability to perform the simple physiologic function of defecation. Constipation impaired this basic bodily function, and he was also at risk for hemorrhage due to hemorrhoids. He attributed the root cause of this issue to changes in food patterns. Due to his TMJ pain, he chose to eat soft food:

I suffer from constipation; it's because soft food has no fiber. That's what they (doctors) actually told me. And now I'm on the list for having a hemorrhoid operation. It's a big problem for me that I don't go to the toilet. Yes, my digestive system is affected, definitely. I went, and I did the colonoscopy, and doctors found just small polyps. But the hemorrhoid, it is something. I don't like it, I hate it.

Participant 2 also suffered from constipation. She did not know the cause of the digestive system defects and the mechanism behind it. She attributed her troubles with constipation to be from only eating

certain kinds of food because of the pain. She expressed concerns about this issue, which affected her daily life:

Yeah maybe . . . but also because I haven't been drinking coffee so, that is too complex . . . I don't really know the precise cause of the constipation. . .

Participant 3 was also frustrated by constipation and bloating. These issues made him go to a specialist for diagnostic tests, but he still does not know the exact cause of his symptoms:

Yes, I've started experiencing digestive problems. Starting this year, I have bloating and constipation. And I've never had this before, so I'm not sure if this is in relation to TMDs . . . It's frustrating. Yes, you know I've been seeing a doctor, and they've given me basically fiber supplements and FODMAP diets to see why I'm getting bloated, why I get these kinds of symptoms. So, all I can say, you know, that treating this problem, I am not sure that is related.

Participant 4 also had bloating symptoms, which she thought was because her diet contained gluten:

It is really like when I start to feel bloated, then bloated, so I cut the gluten, and it was a big difference. And they said to me, that it is regarding gluten.

Participant 5 was confused by her multiple health problems. As a result, she was angry and felt like losing her temper frequently because of her condition:

I don't know. I'm constantly in pain very frankly. It's not only the TMJ, it's my back, it's my knees, it's my digestive issues. There are a lot of things that come in line with that. Probably studies have shown that if you have TMJ, then you probably have this. This problem is like everything is interconnected and the body kind of responds accordingly.

Loss of Chewing Activity

Participants explicitly expressed loss of chewing function due to TMD pain. Participant 1 shared his displeasure from losing chewing activity because he was forced to eat soft food instead of hard food. Hard foods were his preference, and he would like to be able to add them back into his menu. Because of this, Participant 1 has lost the joy of eating:

I don't get the satisfaction of chewing because I eat softer things. I eat more bread, you know, and I have to put it in the sauce because it gets softer. There is a satisfaction when you chew things, it's satisfying. And I do not do that. I cannot eat apples unless I cut them. Like I remember my grandmother was cutting them because she had dentures, so she couldn't bite. I mean the same thing, the same problem which is ironic because I didn't understand her at the time and I was mocking her. But now I totally understand what's happening. Chewing is limited to just the premolars, and I cannot chew for long because then the pain starts to be worse. So, yes, I would like to get this crunchy food. Vegetables, like biting into an apple would be something that I would like to do.

A similar feeling of frustration was expressed by Participant 5 as a consequence of loss of enjoyment eating crunchy food, which requires more chewing. This loss of enjoyment during chewing is one of the experiences shared by the participants as a consequence of their TMD pain:

I love dry bread, like rye bread, that is a little harder with the rye or nuts. I don't eat as many nuts because it's a lot of crunching, which causes pain . . . Now I can't open my mouth wide, so I take small bites. I don't take food that is chewy or very hard. So that I can macerate them instead of biting down.

As far as Participant 3 was concerned, his chewing difficulties caused him to take more time to eat meals:

When I eat, I have to cut the food into small pieces, and I consume more time to chew.

Participant 2 was emotionally and negatively affected by her chronic pain. She was concerned regarding her struggles, especially because she was "still young." She was annoyed because of her inability to chew food. Her chewing function also made her so exhausted that she often needed to nap after her meal:

Well, in general, it takes a lot longer to eat and drink just because it does require a lot more effort to chew. I find it really exhausting to eat and sometimes by the time I get to the end I'm ready for a nap because it's just so tiring . . . I've kind of stopped eating a lot of them [chewy food].

Weight Change

Most of the participants experienced changes in their body weight, either gain or loss, without knowing why. Participant 1, however, attributed his unexpected weight gain to the soft food. Moreover, he experienced other complications such as fatigue and knee pain, which required him to use a crutch to walk:

I gained weight, which is something that I didn't expect. I expected I will lose weight because I have pain, but I gained weight . . . I feel tired or fatigued maybe because I'm overweight. Also, I have pain in my knee because of the weight.

Participant 3 experienced weight loss when his pain was at its most intense. He attributed the cause to bloating:

It was last year when it was really bad. There was a change. I was losing weight. You know because of digestive, a problem. The bloating you know was just constant.

Participant 5 also experienced weight loss due to dietary changes and a decrease in the amount of food she ate because of jaw pain:

Because of the fact that I don't eat the same as much, I've lost weight. Because of the digestive issues that I had probably, because of a lack of proper biting down on my food, and because of my teeth. And because of the pain, there are certain foods I don't eat. There are certain foods that I don't chew properly. Hence, the digestive issues that affect me, eventually my digestive system going down.

The case of Participant 6 was more complex in comparison to the other participants. She attributed her weight increase to several factors related to dietary changes, TMD medications, and stress. She felt sad regarding her weight gain. The pain caused stress, which led her to eat more. She also mentioned that because of her TMD medications she had less energy for moving around:

I'm not as active as before, so I don't move as much. And yeah, I think I've gained more weight because of this . . . I definitely feel sad because I'm getting bigger and bigger.

Participant 4 also experienced changes in her weight:

I have lost no weight but inches. I don't lose much weight but was due to the gluten they said to me.

Summary

The findings in the study suggest that persons living with TMD who must make changes in their diet generally experience a decline in the efficiency of their digestive system, beginning with less ability to chew food, bloating, and finally constipation, with the added problem of changes in body weight. Consequently, they struggle even in their daily life from the complications of these health problems.

Discussion

The findings of this study provide insight into the lived experiences of six TMD patients who changed their eating habits due to TMD-related pain. Three key themes were identified that are common among these individuals: (1) constipation and bloating; (2) loss of chewing function; and (3) weight change. For each of these themes, participants described various physiologic and psychologic complications that arose, providing the authors with insight into how the quality of living is impacted for these patients. Many of these complications could possibly be mitigated by appropriate education about alternative diets accessible to the patients; however, in many cases, health care providers give insufficient information to ensure their patients are informed and capable of actualizing these changes.

The important nutrients provided by dietary fiber in vegetables, fruits, and grains are considered to be a significant component of healthy food.⁸² Eating high-fiber foods has important health benefits, such as lowering the risk of heart disease and diabetes, maintaining body weight, and maintaining stable and strong bowel function.⁸² Irritable bowel syndrome (IBS) symptoms, such as constipation and bloating, chewing difficulty, and weight change, are the most common digestive system problems the participants faced because of dietary changes. The change in diet disturbed the GI system, as well as many other systems in the human body. The change from hard food, with more fiber from vegetables and fruits, to soft food, with less fiber, significantly affected the digestive system's ability to perform vital functions such as defecating. This is a real concern since constipation is a private issue rarely discussed by patients with their health care providers.⁸³ Another function affected is mastication or the chewing of food, which leads to bloating and weight gain and its subsequent complications. Indeed, participants suffered from digestive system defects due to not consuming food containing sufficient levels of fiber.

Diet and food choice are fundamental issues that concern IBS patients.⁸⁴ According to the literature, type of food has a substantial effect on digestive system dysfunction. Also, the struggles faced by GI patients are correlated with the quality of their diets. Conclusions from Raphael et al that clinicians should recommend optional dietary fiber sources for MFP patients indicate that TMD patients are at risk of reduced fiber intake in their food, which leads to the possibility of being affected by IBS.^{7,84} Furthermore, patients who had a high degree of food-related IBS symptoms were susceptible to increased anxiety and depression.^{85–88} The participants in this study say that they did not receive useful food recommendations to help them cope with their complex conditions and optimal digestive system health.

Simrén et al showed there were connections between the development of IBS symptoms and food ingestion.⁸⁵ Also, the majority of IBS patients recognized that their symptoms were related to meals that were rich in carbohydrates and fats. Nevertheless, most of them were of normal weight or overweight.^{84–86} Bohn found that GI symptoms in IBS are triggered by type of food intake.^{84,85,89} Additional studies also reported that people with IBS often avoid various food items as a way of managing the disease, which can potentially lead to a lower intake of necessary nutrients.^{84,85,90–93} Dietary fiber is most helpful for persons with constipation⁹⁴; an increase in eating high-fiber food improves incomplete spontaneous bowel motion.⁹⁵ Constipated patients exhibit a higher prevalence of mood and anxiety disorders than in the general population.⁹⁶ However, few studies show a relationship between dietary fiber and bloating and diarrhea in IBS patients.⁹⁴ Studies by Chang et al, Dapoigny et al, and Park et al showed that 73% to 76% of IBS patients reported bloating as a troublesome symptom.^{97–99} Consequently, IBS patients often rank bloating as the most troublesome symptom.^{98–101} The present findings support these results in terms of the relationship between softer foods with less fiber and IBS. It was found that participants in this study suffered from constipation and bloating, and some of them gained or lost weight as a result of needing to ingest soft food.

Participants in a qualitative study about women diagnosed with GI disorder by Fletcher and Schneider described their relationship with food as a dynamic learning process they thought would be a lifelong struggle.⁸⁹ Another qualitative study by Jamieson et al concluded that women lacked information and assistance from health care providers related to the mismanagement of IBS conditions regarding the right choice of food and beverages.⁹¹ Even though few studies have thoroughly investigated dietary intake in IBS patients, patients were often found to request nutritional recommendations about what they should

eat.^{84,94} Munch et al, who studied the lived experiences of constipation in older people before and during hospitalization, found a lack of information on how to manage constipation, including patients' struggles at the physical, psychologic, and social levels, and that health care providers need to initiate conversations with patients regarding advising them on the management of constipation.⁸¹

Mastication is necessary for systemic and physical functioning,³³ as well as for psychologic and cognitive functioning, as mastication is considered to reduce stress.^{103–105} Frustration caused by the loss of masticatory function—fatigue in the muscles of mastication and indigestion caused by inadequate chewing when mixing food with saliva—caused issues suffered by the present participants that led to loss of enjoyment of food, increased time needed to eat meals, and fear and uncertainty about the future progression of their symptoms. Consequently, their quality of life was affected. These findings are supported and corroborated by the available literature regarding the physiology and psychology of mastication.

The present findings regarding loss of the enjoyment of food, more time needed to eat, and fear of showing signs of aging confirm Italia's earlier finding that pain and discomfort when chewing specific foods leads to a decline in engagement in socializing, social activities, and a change in identity.¹⁰⁶ In addition to mastication's purpose grinding food for swallowing and digestion, chewing also helps relieve stress and regulate cognitive function, especially by increasing attention.⁸³ A link between chewing and maintaining concentration has been suggested—for example, chewing gum while driving, for sleep prevention during work, and while learning tasks. Several studies have demonstrated the positive attributes of eating on attention, especially on sustained attention. These results also underscore findings that improvement in stress relief and mood are influenced by the time of on-task performance.^{83,107,108}

A dietary approach consisting of low-fat dairy products, vegetables, and fruits is correlated with weight loss.¹⁰⁹ Eating soft food resulted in weight gain for some of these participants and weight loss for others, but they lacked insight and knowledge about the cause of these changes. One participant who reported suffering a weight increase as a result of soft food (less fiber) developed knee pain due to his increased weight and now can only walk with the assistance of a crutch.

In addition to the pain itself, chronic TMD patients live discontentedly with the deterioration of their digestive system function as a result of adjusting their diet. By this reasoning, the effect of TMD pain on food intake seems to result in GI dysfunction, salivary gland dysfunction, and weight changes. While the

participants in this study were aware that their GI problems were a result of dietary changes, they did not have specific knowledge about the exact causes of this deterioration. Health care providers should be aware of these issues and address them with affected patients.

Conclusions

Based on the concepts of qualitative research, the present study has clarified answers about the experience, meaning, and perspective of altered diet due to TMD from the standpoint of the participants.³² These findings highlight the struggle of the participants in their daily life from the complications of TMD health problems. Therefore, the need for health care providers to establish nutritional guidelines for individuals at risk of physiologic and psychologic comorbidities that arise throughout the course of TMD disorders and treatments is crucial. In particular, health care providers should focus on effective communication and awareness of TMD-related complications to support their patients. Also, these findings can be used to inform health care providers about the need for intervention programs to treat comorbid conditions of TMD, especially those affecting the GI system, like constipation. Additionally, the findings emphasize the importance of managing TMD with a multidisciplinary approach, which means that dentists, psychiatrists/psychologists, physiotherapists, and nutritionists cooperate to design and apply a successful therapeutic strategy for these conditions.¹¹⁰ Future directions include examining the prevalence of digestive issues among the TMD population, informing health care professionals about the association between orofacial pain and digestive problems, and developing novel strategies to mitigate digestive complications arising from orofacial pain. The implications will be to decrease medical crises and expensive interventions, provide better assistance to patients, and refer them to other necessary health care professionals, which is an approach that leads to lower care costs, better satisfaction, and higher quality of life.^{8,111,112}

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