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https://doi.org/10.17159/sadj.v79i06.17942

Perceived knowledge, treatment approaches and predictors of referral practices in myofascial pain syndrome of the temporomandibular joint

SADJ JULY 2024, Vol. 79 No.6 P312-318

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ABSTRACT

Introduction

Myofascial Pain Syndrome (MFPS) of the head and neck is a frequently misdiagnosed cause of Temporomandibular Disorders (TMDs). In South Africa, literature regarding general dental practitioners' (GDPs) knowledge/management of TMDs associated with MFPS is limited.

Aim

To determine perceived knowledge and treatment practices of GDPs on TMDs associated with MFPS.

Design/Methods

A researcher-developed questionnaire consisting of sections on demographics, education/training, perceived knowledge and treatment/management, including referral practices, was conducted on GDPs registered with the Health Professions Council of South Africa, sampled through this database.

Results

More than three-quarters (n=40; 76.9%) of GDPs received MFPS training at the undergraduate level with 78.8% (n=41) dissatisfied with their knowledge and 57.7% (n=30) having attended postgraduate training. More than two-thirds (69.2%; n=36) referred patients to other healthcare professionals – mostly dental specialists (83.3%; n=30). Adjusted logistic regression revealed that those with adequate knowledge of MFPS were 6.52 times more likely to refer patients to other health practitioners than those with inadequate knowledge (OR=6.5, p=0.28, B=1.88); 73.1% (n=38) would consider such co-management strategies.

Conclusion

This study highlights the gap in GDPs' perceived knowledge in MFPS and TMDs. Supplementary training and mutual referral between allopathic and alternative medical professions is recommended for a more integrated treatment approach.

Keywords

Dentist, myofascial pain syndrome, trigger points, temporomandibular joint disorders, surveys and questionnaires, referral and consultation.

INTRODUCTION

Disorders arising from the temporomandibular joint (TMJ), a joint between the jawbone and the skull[1-3] – collectively referred to as Temporomandibular Joint Disorders (TMDs) – rank among the top three most common chronic pain conditions alongside headaches and back pain.[4] The prevalence of TMDs, following a recent systemic review, is estimated to be more than 30% in the adult/elderly group.[5] There is no documented literature on the prevalence of TMDs in South Africa; however, Graff-Radford in 1984 alluded to the importance of recognising and correctly diagnosing myofascial pain syndrome (MFPS) – a categorisation of chronic pain within muscles – as a key indicator of TMDs.[6] Despite this recommendation, anecdotal information suggests gaps in the effective diagnosis of MFPS and the consequent treatment of TMDs primarily due to limited education and training within this ambit of dental practice in South Africa.

The clinical examination and diagnosis of MFPS involves careful examination of the muscles in reference to specific criteria.[7] However, these criteria are often not considered in the clinical examination and are frequently overlooked.[7-9] Numerous studies conducted internationally on the management of TMDs by dental practitioners confirm that there is a significant gap in dentists' education and training regarding the correct diagnosis and management of MFPS.[10-14] In South Africa, there is a paucity of literature on studies that assess the knowledge of GDPs in MFPS and TMDs, as well as the perceived knowledge and the practices of GDPs in such management. It is therefore important to

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Author's contribution

1. H Van Der Colff, A Docrat, D Singh and JD Pillay – conceptualisation and design, analysis and interpretation of data (25% each).
2. H Van Der Colff, A Docrat, D Singh and JD Pillay – preparation and final submission of manuscript (25% each).
3. H Van Der Colff – acquisition and recording of data (100%).

https://doi.org/10.17159/sadj.v79i06.17942

understand how GDPs recognise, treat and manage MFPS so that gaps in current knowledge/practice can form the substrate for developing and expanding appropriate training towards improved health care in this domain.[13-18]

The purpose of this study was, therefore, to determine the perceived knowledge of South African GDPs regarding MFPS. The specific aims of the study were to identify the clinical practices applied, including diagnosis, treatment and management of MFPS of the TMJ, and to determine the predictors of referrals by dentists to other healthcare practitioners as part of an integrated healthcare approach.

METHODOLOGY

This study was designed as a questionnaire-based cross-sectional study. It was conducted within a predefined timeframe to obtain selected information from eligible participants and therefore a cross-sectional study was most appropriate. The STROBE guidelines were followed in terms of reporting the methodology of this study.

Dentists practicing privately within the greater eThekwini region of KwaZulu-Natal, South Africa, registered with the Health Professions Council of South Africa (HPCSA) and who signed the informed consent form, were eligible to participate in the study. Dentists who failed to return the questionnaire within the data collection period or those who participated in the expert group and pilot study were not eligible to be included in the main study.

All practitioners identified as practicing in the greater eThekwini region, as per the HPSCA database, were contacted to participate in the study. Of the 76 practitioners identified on the database, three moved away from the sampling area and three participated in the pilot study and were thus excluded from the main study. Therefore, 70 practitioners were eligible for participation in the main study. Eight dentists indicated that they did not wish to participate in the study, while 10 respondents did not complete the questionnaire within the data collection period and were therefore excluded. Consequently, 52 completed questionnaires were returned, which yielded a 74.3% response rate on eligible participants. There is a 10% loss of power using the sample size in the experiment (n=52) compared to the original sample size of 70 (power=85%). This was computed using GPower (version 3.1.9.2) [Effect size: medium (ρ=0.3) at an α of 0.05].[19]

A questionnaire was utilised as a tool to obtain data regarding the management strategies with regard to MFPS of the TMJ. The researcher developed a questionnaire validated by both an expert panel and a pilot study group. The questionnaire was then used as the research tool in this cross-sectional study. The questionnaire consisted of five sections (A-E) – these included: the biographical profile of respondents; topic background; perception; knowledge; utilisation and management (including referral patterns) of MFPS. There was a total of 58 questions between these five sections.

The researcher developed a questionnaire validated by an expert panel. To ensure that the questionnaire used in the study would yield the required data, a focus group (N=6) comprising dentists, questionnaire design experts, the research supervisors/promotors and a statistician was arranged to critically appraise it.

Based on the HPCSA database, each prospective respondent was contacted telephonically or by electronic mail with an invitation to participate in the study. All respondents who agreed to participate subsequently received a letter of information and an informed consent form via e-mail. To enhance the probability of an adequate return rate, the research included two methods of delivery and return of the questionnaire – hand-delivery and pick-up or via electronic mail.

This research study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was granted by the Durban University of Technology Institutional Research and Ethics Committee (reference number: IREC 019/16). This study was strictly carried out only in accordance with the methodology approved by IREC. Informed consent was obtained from all participants prior to participation in the study.

The data were captured on an Excel spreadsheet and imported into SPSS Statistics 23.0 (SPSS 2014). All categorical variables were presented by using frequency tables, cross tabulations and bar charts, using counts and percentages. Differences in the distributions per variable were identified using the chi-square goodness of fit test to determine if a set of observed data fits a particular theoretical distribution (ie the test compares the observed frequencies to the expected frequencies under the theoretical distribution and calculates a chi-square statistic). Inferential statistics were planned with the purpose of generalising the outcomes from a sample of the entire population of interest. It assisted in determining whether differences between groups (for instance, South African-trained dentists and overseas-trained dentists) are unique to his/her sample or are a result of real differences between the population represented.[20] Inferential statistics included the use of chi-square or Fisher's exact tests and the development of a logistic regression model. A confidence interval of 95% was set at $p<0.05$ for statistical significance.

RESULTS

Of a total of 70 eligible study participants, 52 completed questionnaires were returned, yielding a 74.3% response rate.

The ratio of males to females was 3:1 (n=39, n=13 respectively). The sample predominantly comprised Indians (n=38, 73.1%), with whites forming the next largest grouping (n=10, 19.2%). African and Coloured (mixed raced) respondents formed a similar but smaller grouping (n=4, 7.6%). Most respondents were between the ages of 30-39 years (n=16, 30.8%) and 50-59 years (n=14, 26.9%). The median age was 45 years (IQR: 34.0-57.0 years). In addition, the median number of years of respondents practicing was 20.5 years (IQR: 10.5-29.5 years). This reflects a more experienced group of respondents which is a useful consideration around the level of reliability of the responses. All respondents had a dental degree, with 5 dentists specialising in the field of orthodontics, aesthetics and/or surgery.

The demographic profiles of the respondents are shown in Table I.

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Table I: Demographic profile of respondents (N=52)

	Frequency	Percent	p-value
Gender			
Female	13	25.0	< 0.001*
Male	39	75.0	
Ethnicity			
African	2	3.8	< 0.001*
Coloured (mixed raced)	2	3.8	
Indian	38	73.1	
White	10	19.2	
Age (years)			
20 – 29	7	13.5	0.04*
30 – 39	16	30.8	
40 – 49	7	13.5	
50 – 59	14	26.9	
60 – 69	7	13.5	
70 – 79	1	1.9	
Qualification			
Bachelor of Dental Science/Surgery	29	55.8	< 0.001*
Bachelor of Dentistry	18	34.6	
Bachelor of Dental Science/Surgery & PDD in Aesthetic dentistry	1	1.9	
Bachelor of Dentistry & Community Health	1	1.9	
Bachelor of Dental Science/Surgery & Diploma in Orthodontics and Periodontics	1	1.9	
Bachelor of Dental Science/Surgery & Diploma in Orthodontics	1	1.9	
Bachelor of Dental Science/Surgery & Bachelor of Dentistry	1	1.9	

* Indicates statistical significance (chi-square goodness of fit test)

Perceived knowledge and competence of GDPs in the diagnosis and treatment of TMDs

While a little more than three-quarters (76.9%, p<0.001) of respondents indicated that they received education/training on MFPS, more than 40% had not attended any subsequent training by way of refresher courses, short courses or similar (collectively referred to as postgraduate courses in this study). Of the 30 respondents who had attended such courses, 90.0% (n=27) indicated that the courses were beneficial. All 22 respondents who had not attended courses indicated that they would find it beneficial to attend such courses. Figure 1 provides a graphical illustration of indicators that relate to education and training.

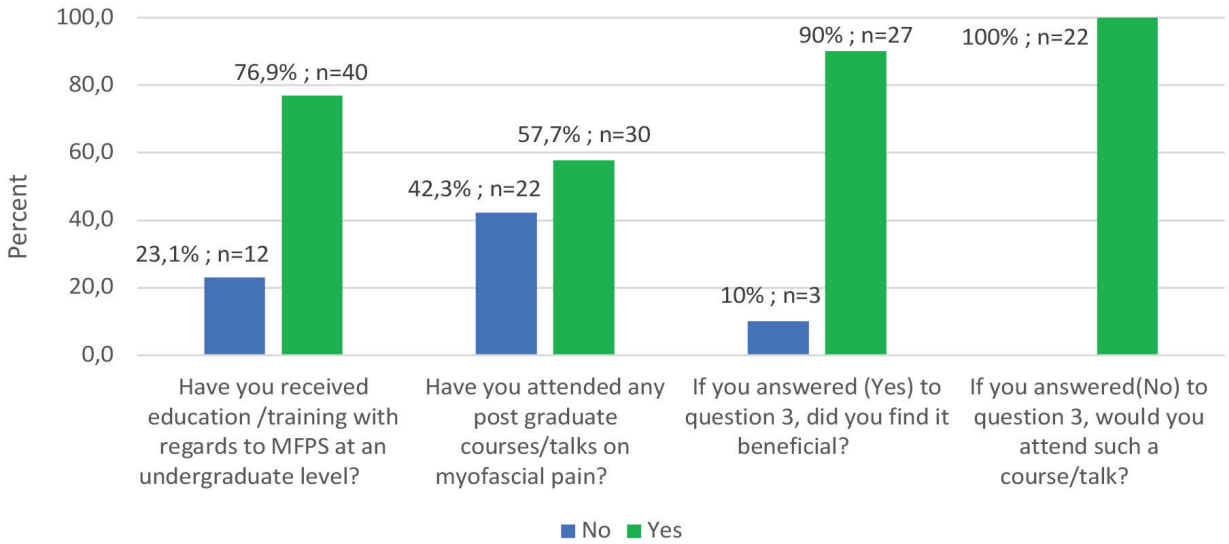

Figure 1: Level of education and training of dental practitioners (N=52)

https://doi.org/10.17159/sadj.v79i06.17942

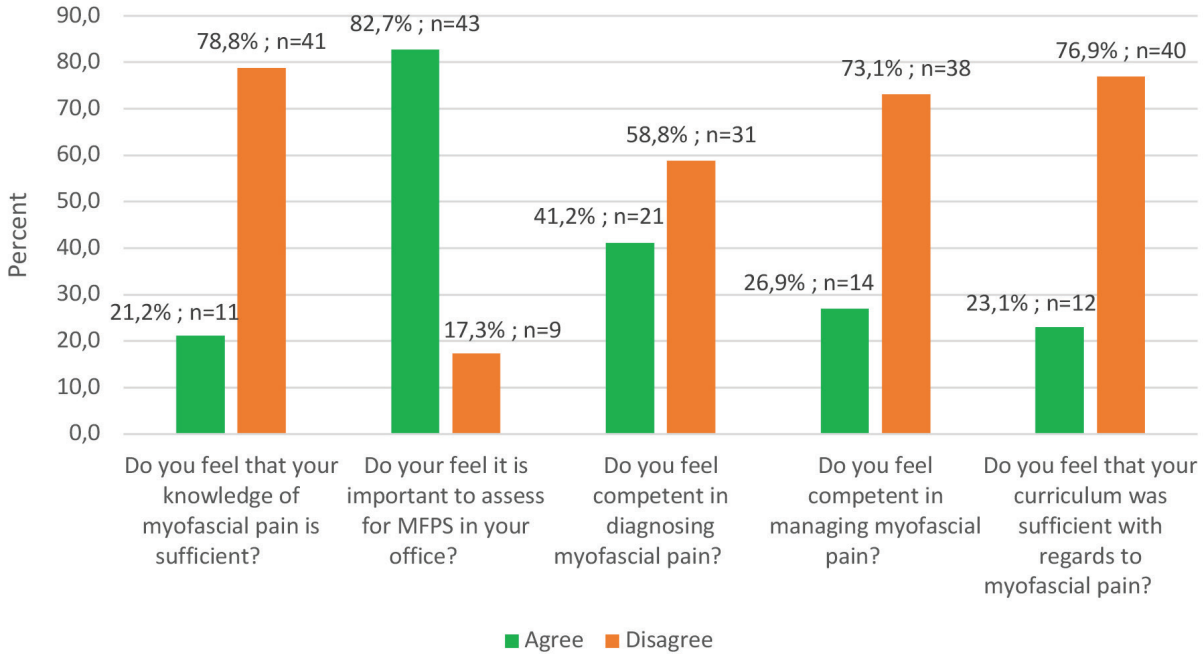

Figure 2: Competence relating to Temporomandibular Joint Disorders (N=52)

Perceived competence of dentists in Myofascial Pain Syndrome and TMDs

Knowledge-based statements were applied to self-rated competence levels (Figure 2).

As illustrated in Figure 2, a large number of respondents (n=41, 78.8%) indicated that they were not satisfied with the level of knowledge relating to MFPS (p<0.001). Similarly, a high number (n=43, 82.7%) of respondents believed that MFPS should be assessed on consultation (p<0.001). Nearly three-quarters of respondents (n=38, 73.1%) believed that they were not competent in diagnosing MFPS (p<0.001). A slightly higher number (n=40, 76.9%) did not believe that the undergraduate curriculum at universities was comprehensive in teaching about MFPS (p<0.001).

Nearly three-quarters of respondents (n=36, 69.2%) indicated that they did assess or diagnose MFPS (p=0.006), while a similar number of respondents (73.1%; n=38) had also indicated that they were not adequately equipped to do so. The discrepancy between knowledge and practice may be an indication for the higher referral.

Treatment approaches used by dentists in the treatment of Myofascial Pain Syndrome in TMDs.

The treatment approaches used by those dentists who indicated that they have assessed/diagnosed MFPS are presented in Table II.

Table II: Treatment and diagnostic modalities used by dentists in the treatment and diagnosis of Myofascial Pain Syndrome and Temporomandibular Joint Disorders (N=52)

	No n (%)	Yes n (%)	Other n (%)	p-value
Relaxation techniques	4 (11.10%)	32 (88.90%)		<0.001*
Flat/pincher palpitation	9 (25.00%)	27 (75.00%)		0.003*
Pharmaceutical drugs	1 (2.80%)	27 (75.00%)	8 (22.20%)	<0.001*
Heat therapy	10 (27.80%)	26 (72.20%)		0.008*
Mouth guard	6 (16.70%)	22 (61.10%)	8 (22.20%)	0.002*
Stretching	15 (41.70%)	21 (58.30%)		0.317
Signs and symptoms only	16 (44.40%)	20 (55.60%)		0.505
Night splint	8 (22.20%)	20 (55.60%)	8 (22.20%)	0.018*
X-ray imaging	23 (63.90%)	13 (36.10%)		0.096
Ice therapy	26 (72.20%)	10 (27.80%)		0.008*
Myofascial release	22 (61.10%)	6 (16.70%)	8 (22.20%)	0.002*
Trigger point injection	22 (61.10%)	6 (16.70%)	8 (22.20%)	0.002*
Ischaemic compression	30 (83.30%)	6 (16.70%)		<0.001*
Ultrasound imaging	35 (97.20%)	1 (2.80%)		<0.001*
Transcutaneous electrical nerve stimulation	27 (75.00%)	1 (2.80%)	8 (22.20%)	<0.001*

* indicates statistical significance (chi-square goodness of fit test)

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https://doi.org/10.17159/sadj.v79i06.17942

Relaxation techniques were used by 88.9% of dentists, followed by pharmaceutical drugs (75%), flat/pincher palpitation (75%) and ice therapy (72.2%). The use of other treatment approaches such as mouth guard, night splint, myofascial release and trigger point injection ranged from 16.7% to 61.1%. The least used treatment approach was ultrasound imaging (2.8%).

Patient referral by dentists to other health care professionals

Nearly 70% (69.2%; n=36) of respondents referred patients to other healthcare professionals. Of these (n=36), the most trusted referral was to another dental specialist (83.3%; n=30), with 25% (n=9) referring patients to physiotherapists, 13.9% (n=5) to chiropractors and 11.1% (n=4) to general practitioners. There was limited access to alternative medical disciplines; however, 73.1% (n=38) indicated they would consider alternative co-management of patients with MFPS and TMDs.

A logistic regression model was developed to test the relationship of perceived knowledge (independent variable) in referring patients with MPFS to other practitioners for treatment (dependent variable), using SmartPLS4. The unadjusted model indicated that the odds of a practitioner with adequate perceived knowledge of MPFS was 1.62 times more likely to refer a patient for treatment than a practitioner with no knowledge (p=0.74, Nagelkerke's R-Square=0.004, Wald=0.11, B co-efficient=0.48). After adjusting for gender, age and number of years of practice, the odds increased to 6.52 (p=0.28, Nagelkerke's R-Square=0.43, Wald=1.15, B co-efficient=1.88).

The Nagelkerke's R-Square value showed a marked improvement, with the Akaike Information Criterion (AIC) being met after adjustment (decreasing from the null to the estimated value). The p-values were relatively high, which suggests that there is no strong statistical evidence to support the idea that perceived knowledge of MFPS significantly influences the likelihood to refer a patient. Additionally, the differences between the "before adjustment" and "after adjustment" models suggest that some other variables or factors may be at play in the model, potentially influencing the relationship between perceived knowledge of MFPS and patient referrals. Nonetheless, the odds of a practitioner with adequate perceived knowledge of MPFS who will refer patients to others, are four times higher after adjustment.

DISCUSSION

The purpose of this study was to determine the perceived knowledge of South African GDPs regarding MFPS. The specific aims of the study were to identify the clinical practices applied, including diagnosis, treatment and management of MFPS of the TMJ, and to determine the predictors of referrals by dentists to other healthcare practitioners as part of an integrated healthcare approach. The findings of our research are within the range of those findings in other countries with regard to the evident gap in perceived knowledge for the treatment of MFPS and TMDs among GDPs.

Perceived knowledge and competence of GDPs in diagnosis and treatment

Our findings demonstrate that even though a large number of participants indicated that they had received MFPS training at the undergraduate level, a similar number indicated that they were not satisfied with their knowledge levels regarding MFPS as practicing professionals. In addition, a high number of participants believed that they are not competent in diagnosing MFPS and that their undergraduate curriculum at universities was not comprehensive in teaching about MFPS for the diagnosis thereof. Similar findings were observed in other studies globally. Taqi and Mirza,[21] in a study on third and fourth-year dental students (n=280) in Pakistan, Asia found that 96% and 93% indicated a self-perceived need for more knowledge in TMDs in their training, respectively. Rahmeier and Irineu,[22] in a pilot observational cross-sectional study on 20 dental students in their seventh to tenth semesters at a university in Brazil, South America, documented that all evaluated students reported hearing about TMD during the dentistry course, but 70% felt that they had little or no knowledge on the subject.

A study by Ziegeler and Wasiljeff[23] assessed the experience of dentists (general dentists and dental specialists, n=533) and the knowledge level of dental students (n=130) on the diagnosis and treatment of non-dental orofacial pain. Ninety-two percent of dental students stated that they felt either "not at all" (56%) or only "somewhat" (36%) prepared for the diagnosis or treatment of non-dental orofacial pain and only 23% of the dentists reported "good" or "very good" confidence for the diagnosis of non-dental orofacial pain. Our findings are therefore not unique to South Africa or Africa as the limited perceived knowledge of dentists and/or dental students appears to be a spread among many continents.

Postgraduate training

Approximately half of the dentists surveyed reported not having attended postgraduate courses/talks on MFPS beyond their formal qualification, with almost all of those respondents who attended training indicating its benefit. More importantly, all respondents indicated their willingness to attend postgraduate courses/talks on MFPS to supplement their knowledge and ability to treat such disorders. Few studies have investigated the benefits of postgraduate training and short courses/refresher courses on MFPS and TMD; however, these studies corroborate closely with our findings. In a Polish study by Osiewicz et al.[14] about half of the respondents (50.2%, n=201) had participated in postgraduate training in diagnosing or treating TMD. In Germany, a slightly lower number (41%) of dentists participating in postgraduate courses was documented by Ziegeler et al.[23] in 533 general dentists and dental specialists. Similarly, Gadotti et al.[3] in a study of 256 dentists in Florida, US found that 37% (n=95) of dentists had never taken a continuum education course on TMD. While these studies are significantly larger than ours, the similar results yielded indicate the same view on the benefits and interest by dentists of postgraduate training and/or short courses/refresher courses in this area of training. Consequently, efforts need to be placed on expanding postgraduate training programmes, refresher courses and short courses that can ensure continued

https://doi.org/10.17159/sadj.v79i06.17942

training in this specialised area of care. Such programmes can be facilitated and supported by relevant professional bodies/associations towards continued professional development.

Treatment approaches

Our findings show a diverse range of treatment approaches used by dentists in the treatment of TMD. The more widely used approaches included relaxation techniques, pharmaceutical drugs, flat/pincher palpitation and ice therapy, while other treatment approaches such as mouth guard, night splint, myofascial release and trigger point injection ranged from 16.7% to 61.1%. Similarly, diverse treatment approaches were found to be sought in other studies globally. Postgraduate dental students in India[24] used treatment modalities that included physical therapy (63.5%), pharmacological therapy (63.5%), heat application (54.1%), laser therapy (18.9%), trigger point therapy (21.6%) and surgical management (52.7%). Gadotti et al.[3] reported bite splints (90%), prescription medication (62%) and occlusion correction (58%) as the most frequent forms of treatment in a study on 256 Floridian (US) dentists. However, nearly one-third (30%; n=69) of the dentists in this group utilised other treatment methods, including ice/heat, arthrocentesis, diet alteration, jaw and neck exercises, botox, trigger point injection, thermotherapy and cryotherapy, and soft tissue massage. We recognise that while it may be beneficial to apply a wide range of treatment options, it would be useful to establish key modalities that are best suited through evidence-based research. This can further guide the development of a standardised treatment protocol that considers an integrated healthcare approach.

Patient referral

More than half of the respondents indicated that they referred patients to other healthcare practitioners. However, referrals were mainly done with professionals in the dental field, with small numbers referring to other types of health professionals. Ziegeler et al.[23] found that the majority of dentists referred patients to ENT (ear, nose and throat) physicians (59%) and to oral and maxillofacial surgeons (54%) and 51% referred patients to TMD specialists. Osiewicz et al.[14] indicates in a study on Polish dentists that the majority of the dentists were reluctant to undertake diagnosis and implement some treatment for patients being suspected of TMD and therefore referred these patients to prosthetics specialists (56.7%), physiotherapists (32.8%), maxillofacial surgeons (2%), dental surgeons (2.5%) and orthodontists (1.5%). Gadotti et al.[3] reported referrals most often to oral surgeons (62%), orthodontists (32%) and physiotherapists (31%). The findings of our study evidently display a similar, less integrated treatment approach to TMDs and referrals primarily to professionals in the dental domain. Be that as it may, some study findings,[3, 15, 23, 25] including that of our study, are receptive to an integrated approach to the treatment of TMD and strategies need to be developed to support and enhance this integration.

Strengths and limitations of the study

The study was, to our knowledge, the first study in South Africa establishing GDPs' knowledge, perceptions and treatment approaches on MFPS and TMDs. The study further evaluated GDPs' awareness and receptiveness of a multidisciplinary approach in care management.

The small sample size relative to similar international studies is identified as a notable limitation. However, the results presented in this study may serve as a starting point to raise awareness for further development of teaching methods and guidelines relevant to the topic and to highlight the need for referral and interprofessional education towards enhanced patient care.

CONCLUSION

The findings of our study provide new knowledge in the South African context on knowledge perception and practice of dentists in the treatment of TMDs and further supplement the findings to similar studies conducted globally with regard to the evident gap in perceived knowledge for the treatment of MFPS and TMDs among GDPs. Enhancing the knowledge of GDPs on MFPS and TMDs would support more confidence in the diagnosis, treatment and/or referrals of patients appropriately. It is therefore important to design suitable study programmes that would provide undergraduate dentists with the necessary practice and knowledge on TMDs and to supplement this with regular post-curricular training opportunities to keep practitioners updated on current trends in treatment through evidence-based practice. Furthermore, strategies towards enhancing an integrated approach to treatment that encompasses complementary and alternative medicine (CAM) must be explored, as welcomed by GDPs.

Conflict of interest

The authors declare that they have no conflicts of interest.

Funding

The research was funded by the Durban University of Technology.

Acknowledgements

The authors would like to thank Mr Marcel Lee Kistan, Mr Siyabonga Alpheos Cele and Ms Samukelisiwe Busiswa Nkosi for assisting in editing and formatting this manuscript.

List of abbreviations

Myofascial Pain Syndrome (MFPS)
General Dental Practitioners (GDPs)
Temporomandibular Disorders (TMDs)
South Africa (SA)
Myofascial trigger points (MFTPs)
Craniofacial pain (CFP)
Temporomandibular Joint (TMJ)
Trigger points (TPs)
Temporomandibular Joint Disorders (TMJDs).
KwaZulu-Natal (KZN)
Confidence interval (CI)

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Online CPD in 6 Easy Steps

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.