

ORIGINAL ARTICLE

Conceptualizing the clinical decision-making process in managing temporomandibular disorders: A qualitative study

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Abstract

Management of patients with temporomandibular disorders (TMD) appears to be more challenging than for other dental conditions. This study aimed to explore the decision-making process in TMD management, and thereby to conceptualize the decision-making process in dentistry. Individual semi-structured interviews were conducted during 2018 and 2019 with a purposive sample of 22 general dental practitioners from the Public Dental Healthcare Services and private practices in the Region of Västerbotten, Northern Sweden. The interviews were analysed using the Grounded Theory approach of Charmaz. Data analysis resulted in the core category 'Combining own competence and others' expectations in the desire to do the right thing'. The dentists showed interest in and a desire to apply professional knowledge, but also reflected on challenges and complexity in the decision-making process for TMD. The challenges were primarily related to organisational factors and lack of self-confidence. This identifies a need for re-organisation of daily clinical management in dentistry, and a need for more postgraduate training to improve self-confidence. The complexity of the decision-making process for TMD makes the study findings applicable in other dental situations.

KEY WORDS

decision-making, dental health services, evidence-based dentistry, qualitative research, temporomandibular joint disorders

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INTRODUCTION

In all healthcare, including dentistry, the decision-making process should ideally be evidence-based. 'Evidence-Based Medicine' (EBM) thus incorporates scientific evidence, clinical experience and patients' values in daily clinical management [1]. Thus, EBM not only embraces treatments with verified efficacy, but also emphasizes patient-centred care [2]. However, clinical decisions can be biased by non-clinical factors such as sociodemographic characteristics, clinicians' uncertainties, and previous experiences [3,4] that can lead to suboptimal use of EBM. The use of decision tools and guidelines can improve evidence-based decision-making, [5] and thereby also improve the quality of care.

Dental care in Sweden is subsidized by the government and provided both by the Public Dental Healthcare Services and by private practitioners. A majority of the Swedish population visit their dentist for regular check-ups, rather than only seeking emergency care [6]. Dental care is an example of continuous clinical decision-making using decision tools and guidelines [7] but where difficulties in implementation of EBM have been observed [8].

Despite the existence of guidelines, EBM can be difficult to implement in the clinical dental setting because of the nature of the healthcare system, patients' expectations, and healthcare personnel themselves [9–11]. Currently, evidence-based methods for management of dental conditions (including temporomandibular disorders, or TMD) are available [12,13]. TMD is the umbrella term embracing pain and dysfunction of the masticatory muscles and temporomandibular joint [14]. While TMD comprises one of the three most prevalent chronic pain conditions [15] that is managed on a daily basis, [16,17] adequate care and management of patients with TMD seem to be challenging [18].

However, the reasons for the lack of incorporation of EBM in managing TMD in dentistry are not fully understood. For example, it is not known what elements affect the individual dentist's decision-making process. What are the facilitators and impeters of this process? There is also a lack of knowledge about how dentists perceive their day-to-day TMD-related clinical work with regard to personal and clinical skills, individual interests, workload, and demands.

Taken altogether, there is a need for a deeper understanding of the clinical decision-making process in dentistry. Since care delivery in TMD is a challenging area, factors identified in the decision-making process for these patients could serve as a model for dentistry in general. Thus, the aim of the present study was to explore the decision-making process in the management of patients with TMD by general dental practitioners, and in doing so to conceptualize the clinical decision-making process in dentistry.

MATERIAL AND METHODS

Study design and setting

This study is part of a multidisciplinary and translational project aiming to explain the nature of both recognition and clinical management of patients with TMD. The study was reviewed and approved by the Regional Ethical Review Board at Umeå University (Ref no: 2012-331-31M) and was carried out in accordance with the ethical principles for medical research involving human participants (the Helsinki Declaration). This qualitative, inductive study was performed during 2018–2019 in the Region of Västerbotten in Northern Sweden. The Region of Västerbotten consists of nearly 270,000 inhabitants, 70% of whom (aged 23 years and older) reported to have visited their dentist at least once during 2016–2018 with the majority attending the Public Dental Healthcare Services [6]. Thematic, semi-structured interviews were conducted and analysed using the social constructivist Grounded Theory approach of Charmaz [19]. Grounded Theory in general focuses on experiences, actions and processes over time, in a specific context. In contrast to traditional Grounded Theory, the Charmaz approach assumes that data and theories are constructed by the researchers through the interaction with the participants [19]. Thus, this approach acknowledges not only reflexivity but also subjectivity in both participants and researchers. The use of Grounded Theory enables development of a theoretical model, or interpretative theory in relation to previous theories, by conceptualizing phenomena to an understanding in more abstract terms. Grounded Theory is also suitable when studying complex factors that influence health and illness [20].

Study participants

The study was conducted among dentists who fulfilled the inclusion criterion of being a clinically active general dental practitioner in the Region of Västerbotten, Sweden. There are approximately 8000 general dental practitioners in Sweden (57% female) and roughly one-third are in the age group of 55–64 years. There are approximately 70 specialists in TMD in the country. In Västerbotten, there are approximately 250 general dental practitioners (56% female), and fewer than 10 specialists in TMD [21]. A purposive maximum variation sample was used to ensure variation in employment (Public Dental Healthcare Services and private practice), sex, age and level of experience among the dentists [22]. In addition, there was a focus to cover the different geographical aspects of Västerbotten, which has urban areas situated by the coastline and rural area inland. Dentists were initially invited by a standardized e-mail, followed by telephone contact, and were scheduled for an interview. Thirty-one dentists were invited, and of these six did not reply and three declined

TABLE 1 Characteristics of the study sample (n = 22) by geographical location, employment, sex, age, and years as a dentist

Geographical area of Västerbotten	Employment (PDHS/PP)	Sex (men/women)	Median age (range) (years)	Median years as a dentist (range) (years)
Coast	14/1	4/11	44.5 (25–64)	13.5 (1–40)
Inland	5 [*] /2	3/4	43 (35–61)	8 (6–31)
Total	22	7/15	44.5 (25–64)	14.5 (1–40)

Abbreviations: PDHS, Public Dental Healthcare Service; PP, private practice.

*One dentist was employed at both PDHS and PP.

participation. Thus, 22 dentists (15 women and 7 men, aged 25–64 years) accepted the invitation and were interviewed (Table 1). All participants provided informed written consent and participated on voluntary basis without remuneration. They were informed about their right to withdraw without providing a reason until the time of publication of the study, and that the findings would be published as a scientific paper without revealing individual details that could identify study participants.

Data collection

Individual semi-structured interviews [23] were conducted at locations preferred by the dentists. One interview was performed by telephone because it was more convenient for this dentist, whereas the remaining interviews were done in person [24,25]. The interviews were performed by two of the authors (AI, AL) who were experienced in interview techniques. A thematic, semi-structured interview guide and a mind map allowing structured and open-ended questions were developed and used for the interviews (Figure 1). The mind map covered two major themes: ‘Decision-making’ and ‘Role of dentistry’. The interview guide covered the same themes as the mind map, with the addition of probing questions such as: ‘What are your thoughts about your own decision-making?’, ‘Which factors influence what type of treatment you offer for patients with TMD?’, and ‘How would you describe the role of the dental care organisation for patients with TMD?’. An emergent study design was used and constant comparisons by analysis during data collection allowed modifications of the interview guide throughout the process. Each interview lasted approximately 45 min; all interviews were audio-recorded and transcribed verbatim by a professional transcriber. After each interview, field notes and memos were written. Field notes included the context, dentist's presentation, atmosphere, and reactions during the interview. Memos were spontaneous abstractions of the field, for example, organisation, knowledge, and curiosity, and were the origin to categorization and conceptualization of the discovered phenomena. Transcripts were checked against the recordings and adjusted if needed, and the quotes were translated by a professional translator and cross-checked for accuracy.

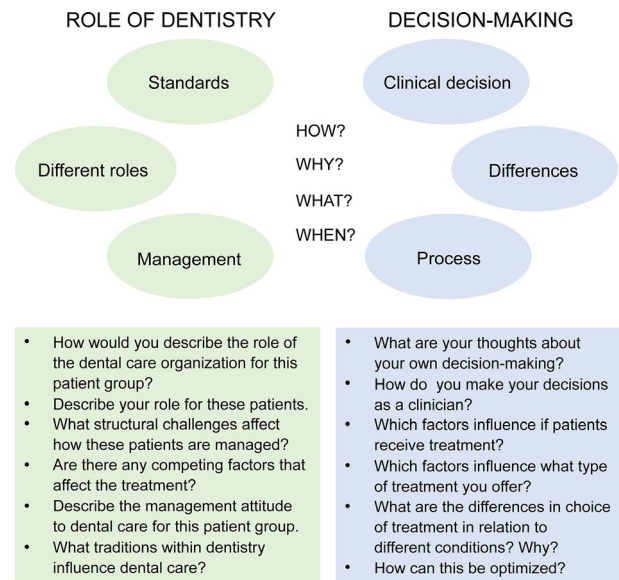


FIGURE 1 The mind map and interview guide used during the thematic interviews

Data analysis

Data were collected and analysed simultaneously in accordance with Grounded Theory as suggested by Charmaz [19]. This process followed a stepwise set-up (Table S1) and continued until inductive thematic saturation was reached. Inductive thematic saturation was defined as the event when neither additional data collection nor analysis provided generation of new codes or additional categories [26]. Firstly, transcripts were checked by one of the authors (AI) by reading and listening to all the interviews during the ongoing data collection period. Secondly, three authors (AI, AFW, AL) read and coded the same transcript and compared the codes to calibrate the interpretation of the transcript. Thereafter, the transcripts were independently coded by the same three authors. The analysis started with an open coding meaning that all codes aimed to characterize the main information from the interviews reading them line by line. Open codes stayed closely aligned with

the text. During the ongoing process, all new generated codes were compared to the already existing codes from the previous interviews, and all codes that provided new information were added to the final code-list. Open codes with similar content were grouped into selective codes on a more abstract level, while still focusing on the research question. Newly developed codes, hypothetical categories, and interviewer's memos were used to evolve the next interview [27]. Selective codes were clustered to develop sub-categories. The sub-categories were then merged into the categories. In the process of axial coding, the sub-categories and categories were compared on how they interacted during the process of decision-making. Finally, the core category was constructed and discussed in the context of already existing theories in clinical decision-making. The research group met regularly and discussed the codes and categories to ensure that the analysis represented the data. The process of arranging and re-arranging the categories continued until the consensus was reached and the core emerged. The checklist COREQ-32 (Consolidating Criteria for Reporting Qualitative Research) [28] was followed (Table S2) and the SRQR (Standards for Reporting Qualitative Research) [29] was consulted.

RESULTS

The analysis resulted in one core category, two categories and five sub-categories. The core category - *Combining own competence and others' expectations in the desire to do the right thing* - was based on the two categories: *Living up to the expectations from others on the professional role* and *Being comfortable with using own expertise* (Table 2). Each category includes converging sub-categories, illustrated by quotes from the interviews. In general, decision-making for TMD patients was perceived as a challenging process with both facilitating and impeding aspects. The importance of having sufficient knowledge and clinical experience together with working conditions that enable professional development was described as essential for adequate delivery of care. However, negative experiences, knowledge gaps, and structural obstacles in dental organisation were the elements that impeded the process of decision-making for TMD management.

Living up to the expectations from others on the professional role

This category comprises two sub-categories - *Structural mechanisms within dental care as an organisation* and *Correctly interpreting the patient's needs and expectations*. Dentists expressed that both external and internal factors impacted them directly by creating conflicting expectations.

External factors included different demands from authorities such as the management of the clinics and the dental health services structure, together with demands from the patients. These factors placed the dentists in a position where they felt a need to compromise between their internal professional expectations and others' expectations of their professional role.

Structural mechanisms within dental care as an organisation

Both private dental practitioners and dentists at the Public Dental Healthcare Services were well aware of their legal responsibilities related to the license to practice and the common ultimate goal to provide the best possible care for the patient. However, structural mechanisms of the dental organisation influenced and sometimes challenged the clinical decisions made by the individual dentist.

Firstly, the location of the dental clinic affected the decision-making, according to the interviewed dentists. Being situated near the coast where the specialist clinics are located made dentists feel more comfortable to refer the patients.

You have to be good at everything in the rural areas.

(Female dentist 10, age 39)

Secondly, demands from the management due to staff shortages, impacted the dentists' decision-making to prioritize certain treatments, such as emergency treatment and delivery of care for children. The interviewed dentists emphasized the importance of prioritizing, especially for emergency dental treatment, but at the same time apprehended this as a risk of causing inequities in the range of provision of care.

You prioritize fillings, perio, prosthetics, and oral hygiene a bit more, so you [TMD] do not end up so high on the list.

(Female dentist 6, age 43)

... then it may happen that you [takes a deep breath] may under-prioritize treatments like splints and so on, since these simply COST money.

(Male dentist 8, age 64)

Hourly revenue, time restrictions, and quantity of provided care were identified as common obstacles for providing adequate dental care. Treatments that required more interaction between the dentist and the patient, such as motivational interviewing, were classified as more time-consuming and were therefore difficult

TABLE 2 Illustration of the core category, two categories, and five sub-categories

Core category	Combining own competence and others' expectations in the desire to do the right thing				
Categories	Living up to the expectations from others on the professional role		Being comfortable with using own expertise		
Sub-categories	Structural mechanisms within dental care as an organisation	Correctly interpreting the patient's needs and expectations	Mixed perceptions about patients with TMD	Generalizations about TMD and its non-dental nature	Optimal conditions for providing care

to carry out. The appointment book was described as being full with no space for anything in addition to the scheduled appointments. The negative experience of time restrictions and economic pressures were more obvious in the public dental sector, whereas the private practitioners expressed appreciation of being able to allocate their time in their own preferred way.

I might spend more time in the beginning [pause] to get to know the person [pause], we talk, they can share [pause], later I benefit from this [pause], when they come back [pause] because they do come back.

(Male dentist 17, age 51)

The different levels of clinical experience were a factor that was often mentioned by those interviewed when discussing TMD management. Guidance from more clinically experienced colleagues was appreciated, but also more experienced colleagues appreciated advice from the younger dentists:

who probably know more about TMD than my gut feeling.

(Male dentist 8, age 64)

In addition to the support from colleagues within the clinic, the dentists valued the support by specialists in orofacial pain/TMD, as well as by specialists in other dental areas.

Correctly interpreting the patient's needs and expectations

The dentists expressed the importance of a correct interpretation of the symptoms and clinical signs as well as an adequate consideration of the patient's psychosocial status. By the correct understanding of the patient, communication on the same level could be established.

To meet each other on the same level.

(Female dentist 4, age 55)

In addition, the patient's socioeconomic status, communication skills, expression of demands, and expectations were all

aspects that affected dentists in their decision-making. By including these factors in decision-making, the dentists pushed their professional knowledge aside in favour of perceived expectations from the patients.

Those who can afford it [paying for the dental treatment] are more demanding [pause], sometimes they want to get a splint, they've heard that a neighbour had one and that it helped.

(Female dentist 22, age 28)

Being comfortable with using own expertise

This category comprises three sub-categories: *Mixed perceptions about patients with TMD*, *Generalizations about TMD and its non-dental nature*, and *Optimal conditions for providing care*. The category covers the aspect of professional competence and confidence in the clinical decision-making process. Those interviewed explained the importance of having sufficient usable knowledge as well as overcoming the personal challenges they faced in management of TMD.

Mixed perceptions about patients with temporomandibular disorders

Management of TMD was regarded as very complex and not having exact guidelines that suit every patient. This perceived complexity included the variety of TMD symptoms, difficulties in diagnostics, and comorbidities. It was a common insight that 'one size fits all' was not applicable in the management of TMD, and this evoked doubts about their own competence:

You are afraid of TMD because you don't have the competence to deal with it.

(Female dentist 3, age 62)

Uncertainty in the decision-making, combined with a feeling of lack of competence, resulted in avoidance of management of patients with TMD. This uncertainty regarding management of TMD was not described in the management of other dental conditions.

I can become a bit uncertain here [TMD]. When you have caries, you see it.

(Male dentist 8, age 64)

The dentists' individual areas of interest were also elements that affected the decision-making:

the treatment that patients receive is dependent on the dentist they meet.

(Female dentist 7, age 26)

This illustrates the relation between the dentist's interests and the treatment decisions. Some dentists expressed a genuine interest whereas others showed little interest in the area of TMD. Regardless of their individual interest in the TMD area, dentists reported that experience improved their clinical competence, and previous successful treatments increased their self-esteem when facing the next TMD patient.

Generalizations about temporomandibular disorders and its non-dental nature

The dentists expressed generalizations regarding TMD complaints and management. The impression of TMD was reported and related to co-morbidities, chronicity, and psychosocial conditions. This perceived relationship steered the perception of TMD as a condition on the periphery of the scope of dentistry. Accordingly, referrals to specialist were chosen ahead of providing care within general practice.

There is always something more with these patients [pause], if not one thing then the other [pause], difficult to understand.

(Female dentist 20, age 39)

Regardless of the type of TMD condition, TMD management was generally perceived as complicated. This perception reportedly influenced dentists to choose management strategies that:

had worked last time.

(Male dentist 8, age 64)

Generalizations over treatment choices were apparent during the interviews and were sometimes identified as existing behavioural patterns at the clinics. Advice such as

'Try to do as usual' or 'splint for every TMD patient'

(Female dentist 11, age 32)

often surprised the newly qualified dentists when they started working. Such behavioural patterns created a culture of generalizations where the dentist chooses whether to follow it or to apply own expertise.

Optimal conditions for providing care

Possessing sufficient and usable knowledge was identified as a foundation for adequate decision-making. Here, the continuous development of professional competence was essential for providing adequate care for TMD, and the dentists shared a vision of continuous postgraduate education. However, the opportunities for updating knowledge after graduation from dental school were far less common than they expected.

I follow old rules from school.

(Female dentist 12, age 61)

As a part of continuing professional development, support tool - national guidelines for dental care - was mentioned. However, due to the daily work conditions, the use of such support tools was not practical.

I have saved the link [to the guidelines], but how often do you use your [own personal] computer when you're in the clinic?

(Female dentist 6, age 43)

The theoretical model (Figure 2) was created as a summary of the study findings. It illustrates the process of daily clinical decision-making, and intra- and extrapersonal elements affecting this process. This key process, the core category, highlights the main intention – to do the right thing by combining one's professional competence together with others' expectations on one's professional role. The importance of being professional was identified as a key trait when the study participants reflected on the phenomena. The ambition of doing the right thing was grounded on the perceptions of being comfortable with using one's expertise as well as living up to the expectations of others in the professional role in the daily clinical work. In a context of clinical decision-making, these two aspects were both important as an internal juggling of facilitating and impeding factors.

DISCUSSION

The findings from the present study show that both the structure of the dental care organisation and the dentist's ability to assess the condition of the patient were important elements in their clinical decision-making. The organisational obstacles in professional development (with a lack of continuous

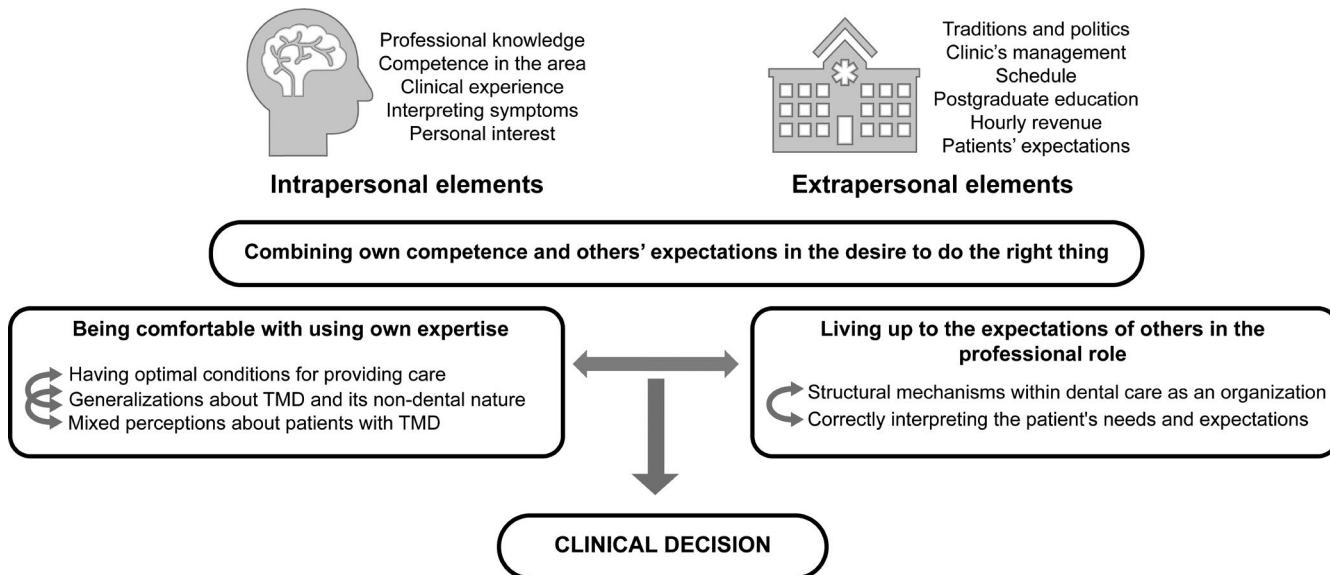


FIGURE 2 The decision-making model for TMD management in dentistry. Decision-making is illustrated as a continuous process of combining professional competence together with others' expectations of one's professional role. The process is always impacted by facilitators and impeters that arise from different intra- and extrapersonal elements

postgraduate education and time constraints) negatively affected the dentists' ability to apply their professional expertise. Taken together, decision-making for TMD was perceived as being an especially complex area of care provision in dentistry.

Grounded Theory is useful when conceptualizing a process [20] such as decision-making in general. Considering that it is difficult to reflect on one's own decision-making, [19] the dentists' description of their decision-making could therefore be imprecise. The major strength of our study was the rich and varied interviews. The purposive sampling [22] provided us with variations in sociodemographic characteristics and clinical experience among the participating dentists. This allowed a presentation of diversity, depth and breadth of experiences, and perspectives to be heard and to be examined for disconfirming evidence. The non-equal gender distribution among the dentists was expected since the frequency of female dentists is higher in this region [30]. This could be seen as a limitation; however, since this is a qualitative study generalization per se is not warranted.

Trustworthiness was reached through fulfilling aspects of credibility, confirmability, dependability, and transferability [27]. Triangulation between researchers was used to ensure credibility, [22] and several interpretations were discussed and negotiated before reaching a mutual agreement on findings. Diverse backgrounds and expertise of the authors influenced the data analysis and enriched the triangulation. The different fields were general dentistry, specialist dental care, temporomandibular disorders, orofacial pain, physiotherapy, epidemiology, and qualitative methods. Furthermore, the researchers had experiences from different roles in healthcare

organisations (that is, general dental practice, specialist practice, clinical and healthcare management, dental education) as well as in different European contexts. The interviewers' clinical involvement and competence in dentistry enabled a natural clinical setting for the interviews, which made it comfortable for dentists in the interview situation. On the other hand, it is possible that dentists censored the information they were willing to share with a colleague. Therefore, strategies used to counteract such censoring were: (1) the recognition of these dual roles ahead of the interviews; and (2) ensuring participants' privacy and confidentiality in presentation of data [31]. Dependability was created through an emergent study design with data collection, analysis and coding in parallel, which enabled the researchers to be reflective in the analysis process. In addition, quotations, notes, and memos were used to improve the confirmability of the findings. Our findings should be considered in other contexts to assure transferability, but we regard the findings representative for general practice dentistry in Sweden and in comparable countries.

Evidence-based medicine is partly based on various support tools that can help the clinician and prevent bias in daily clinical decision-making [32]. However, previous research has shown that the implementation of EBM in dentistry is often not adequate. The lack of clarity and agreement on evidence have been identified as major obstacles in the implementation of support tools [10]. In the Swedish dental organisation, there are evidence-based national guidelines for managing different dental conditions, including TMD [7]. Despite this, difficulties have been observed in the implementation of EBM in the management of TMD. In particular, a TMD screening tool, 3Q/TMD, [33] introduced to the Public

Dental Healthcare Services in Sweden more than 10 years ago, did not improve the provision of decision-making for TMD [8]; almost half of the patients with TMD symptoms received no clinical decision by their dentists [34]. Challenges in the implementation of evidence-based TMD management were also described in other populations suggesting a lack of utilization of scientific evidence for a standardized clinical practice [18]. The time constraints described by dentists in our study, and especially in the Public Dental Healthcare Services, could affect the ability to carry out a TMD examination in accordance with the current guidelines.

For successful implementation of EBM, available evidence, knowledge, and facilitators of clinical management are often stated as crucial components [35]. However, obstacles arising from the organisational management may also affect the implementation of EBM [36,37]. Thus, both local regulations and the previous experience of individual managers may influence the management's decisions [38]. The managers' behaviours can improve the organisational conditions for successful EBM implementation, thereby leading to increased uptake of EBM by clinicians [39]. In the context of dentistry, manager traits such as proactiveness, supportiveness, and motivation were also elements that the interviewed dentists requested for optimal work-related conditions.

In daily practice, the care provided is dependent on the clinician's continuous decision-making, with both clinical and non-clinical factors affecting the process [3,40]. Dentistry is recognized as a stressful profession, [41] with time pressure being one stressor that negatively affects decision-making, and thereby creating a risk for errors to occur [42]. Among non-clinical factors, organisational aspects such as management policies, size, geographical location and type of clinical practice play important roles [3]. This is consistent with the current study's identification of several clinical and non-clinical elements, and their convergence in the decision-making process. These factors included the location of the clinic in relation to referral possibilities, and inadequate postgraduate education linked to low self-confidence and avoidance of TMD management. This complexity accords with a Canadian study that analysed organisational factors related to collaboration between primary care and public health. Collaboration was deemed to be complex, requiring interaction between organisational leaders, optimal use of resources, and collaborative approaches [43]. The challenge to maintain the balance between consumerism and professionalism in dentistry was identified as a direct threat to traditional professional values [44,45]. In our study, dentists also described organisational factors framing the daily clinical routines. Requirements of a full appointment book, high hourly revenue, and prioritizing certain treatments limited the possibilities for adequate decision-making. These suboptimal work conditions resulted in uncertainty and doubts as examples of perceived stressors in clinical decision-making.

In the clinician's decision-making, organisational factors can facilitate the identification of rules and regulations but also impede the use of his/her own professional authority [46]. The latter varies in extent depending on the clinician's scope of duties and responsibilities. The complexity of the clinical decision-making also differs among the various conditions. Among general dental practitioners, high uncertainty in decision-making for TMD exists [47]; this is in contrast to easily identified conditions such as caries or the need for prosthodontic treatment. This was also expressed by the participants in our study. The lack of self-confidence among dentists (along with inadequate professional development) has been suggested to influence clinical decision-making and thereby contribute to uncertainties in TMD management [18]. Regardless of the complexity of the decision, an evidence-based provision of care should be adequate and appropriate for the clinical condition, the patient's preferences and the expertise of the care-giver [48]. Thus, sufficient professional competence and confidence are needed for adequate final decisions. Professional confidence is related to acting autonomously in the clinical setting [49,50]; for occupational therapy, this was proposed to be as important as professional competence, thus requiring continuous development during a career [51]. The findings from previous studies are in line with ours, thereby signifying the importance of both competence and confidence for professional development and appropriate clinical decision-making. With respect to this, ongoing and consistent support from management may facilitate adherence to existing regulations and guidelines. In the clinical setting, this could enable evidence-based clinical decisions, and at the same time meet the patient's expectations. Among patients with TMD, confidence and trust in the dentist are described as important factors in interaction [52,53]. From the analysis of our data emerged the concept of using Shared Decision Making in dentistry. Shared Decision Making is based on continuous interaction between the patient and the caregiver, resulting in a mutual decision [54]. The concept may warrant further research to improve our understanding of the daily management of patients with TMD.

Our findings highlighted the perceived complex nature of the clinical decision-making process in managing TMD patients. Organisational factors and a lack of self-confidence were the main factors affecting the clinical decision process for patients with TMD. This may contribute to the current under-treatment, thereby disadvantaging TMD patients. This also identifies a need for re-organising daily clinical management in dentistry and for more postgraduate training to improve self-confidence. The complexity of decision-making for TMD makes the study findings applicable to other dental situations, regardless of complexity. The findings should be considered in the revision of current clinical guidelines and dental educational programmes in the management of TMD patients.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.


AUTHOR CONTRIBUTIONS

Conceptualization: Anna Lövgren, Frank Lobbezoo, Corine Visscher, Annchristine Fjellman-Wiklund, Justin Durham; **Methodology:** Aurelia Ilgunas, Anna Lövgren, Annchristine Fjellman-Wiklund, Linnea Karlsson-Wirebring, Justin Durham; **Formal analysis:** Aurelia Ilgunas, Anna Lövgren, Annchristine Fjellman-Wiklund; **Investigation:** Aurelia Ilgunas, Anna Lövgren; **Resources:** Aurelia Ilgunas, Anna Lövgren; **Data curation:** Aurelia Ilgunas, Anna Lövgren, Annchristine Fjellman-Wiklund; **Writing – original draft preparation:** Aurelia Ilgunas, Anna Lövgren, Birgitta Häggman-Henrikson; **Writing – review and editing:** Aurelia Ilgunas, Anna Lövgren, Birgitta Häggman-Henrikson, Annchristine Fjellman-Wiklund, Linnea Karlsson-Wirebring, Frank Lobbezoo, Corine Visscher, Justin Durham; **Visualization:** Aurelia Ilgunas, Anna Lövgren, Birgitta Häggman-Henrikson; **Supervision:** Anna Lövgren, Birgitta Häggman-Henrikson, Justin Durham, Annchristine Fjellman-Wiklund, Frank Lobbezoo, Corine Visscher; **Project administration:** Aurelia Ilgunas, Anna Lövgren.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.

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