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Integration of Mental Health Screening in the Management of Temporomandibular Disorders (TMD)

ABSTRACT

Introduction

 Common mental health disorders (CMD) such as anxiety and/or depression are reported ≥16-40% patients who suffer from Temporomandibular Disorders (TMD) against 16.3% in the general population. Failure to recognise CMD may be detrimental to the management of TMD. Paper-based screening tools have been reported in TMD, but require clinician assessment and subsequent collation of data.

We present our findings of a new system – IMPARTS (Integrating Mental and Physical: Research Training and Services) – allowing the use of validated tools with treatment protocols to identify patients who may benefit from psychological intervention. IMPARTS also monitors disease and treatment progress.

Method

Patients attending outpatient clinics with symptoms of TMD completed a questionnaire of validated screening tools on an electronic tablet: Generalised Anxiety Disorder questionnaire (GAD-7), Patient Health Questionnaire (PHQ-9). Inclusion of Oral Health Impact Profile (OHIP-14) and Brief Pain Inventory (BPI) allowed treatment monitoring.

Data collection and analysis linked directly into the electronic patient record. Results could be reviewed immediately during consultation with treatment suggestion – e.g. referral to liaison psychiatry.

Results

162 patients were included. 17.3% (n=28) screened positively for probable Major Depressive Disorder and 19.8% (n=32) for Generalised Anxiety Disorder requiring referral. 1.2% (n=2) were identified high risk of suicide/self-harm and recommended immediate psychological assessment.

Discussion

Patient-completed electronic screening tools with clearly defined protocols can aid holistic treatment of TMD through identification, risk stratification and appropriate referral of patients with CMD.

Conclusion

The early identification and concurrent management of CMD in TMD patients (≤2 years of symptoms) has the greatest benefit and is therefore essential.

Introduction

Temporomandibular disorders (TMD) are characterised by pain and dysfunction in the joint (TMJ) and/or the masticatory musculature.

Psychological factors have been found to be an important aetiological component in producing and perpetuating TMJ disorders[1-3]. Clinical symptoms of common mental health disorders (CMD), such as depression and/or anxiety are reported in 16-40% of TMD patients[4-6] against 16.3% in the general population[7]. There is evidence that treatment of CMD is beneficial in the management of chronic health conditions and can reduce healthcare costs[8]. CMD is often under-diagnosed and under-treated[9]. NICE (National Institute for Health and Care Excellence) recommends screening for CMD for patients with chronic health conditions alongside a management strategy[10].

In the current climate it is difficult for Oral and Maxillofacial Surgery (OMFS) departments to make provision for the inclusion of a clinical psychologist or psychiatrist in the team, but non-mental health specialist clinicians often feel underqualified to make diagnoses or are unsure how to proceed with treatment[9]. Screening tools are available for CMD but these are often in paper form, time consuming to complete and analyse, and do not give guidance in management of a patient in the event of a positive screening result. We aim to show how this novel electronic screening tool can provide invaluable support to the non-mental health clinician to address CMD in TMD patients.

Integrating Mental & Physical healthcare: Research, Training & Services (IMPARTS)[11] is an initiative funded by King's Health Partners (KHP) to integrate mental and physical healthcare in research, training and clinical services at Guy's, St Thomas' and King's

College hospitals, and the South London and Maudsley NHS Foundation Trust. It aims to improve mental healthcare provision within physical healthcare settings. The project supports non-mental health clinicians by providing an informatics system that facilitates routine collection of patient-reported outcomes, with real-time feedback to guide clinical care. The development of mental health care pathways for patients identified via the informatics system, allows timely and tailored, evidence-based care. The IMPARTS system creates a database that can be used for audit and research process and has ethical approval for this purpose. IMPARTS has been successfully implemented in a number of chronic conditions such as rheumatoid arthritis and inflammatory bowel disease, and found to be a feasible and acceptable way to integrate treatment for CMD [12].

Materials and Methods

Study population and design

All patients referred to our OMFS specialist TMD clinics from both primary and secondary care between April 2015 and April 2016 were prospectively enrolled in the study. For the patient to be ultimately included in the analysis, electronic patient records were retrospectively checked to ensure the diagnosis of TMD was supported by the OMFS clinician at consultation as per the 2014 Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) of the International Association for Dental Research [13]. Those with symptoms attributable to other active pathology such as referred pain from a carious tooth were excluded. Patients had to be able to complete the questions themselves, although it was permitted to have an assistant read out questions and enter the answers given into the electronic tablet. The IMPARTS informatics system was used to develop a customised questionnaire for TMD patients

that were delivered on an electronic tablet and completed by patients on arrival prior to their consultation, **Figure 1**. Responses linked directly and immediately into the electronic patient record. The results were reviewed and discussed with the patients by the clinician and pre-determined protocols used to guide treatment for patients who screened positive.

IMPARTS questionnaires

The custom designed IMPARTS questionnaire comprised a series of existing tools that have been widely validated for screening of CMD including depression, anxiety and suicidal ideation alongside disease specific tools. The screening tools used were the Patient Health Questionnaire-9 (PHQ-9), the Generalised Anxiety Disorder Questionnaire-7 (GAD-7), the Brief Pain Inventory (BPI) and the Oral Heath Impact Profile (OHIP-14). Suicidal ideation was assessed by item 9 of the PHQ-9.

Referral pathways were determined and agreed with existing psychiatric services for patients who screened positive for one or more mental health disorder (Figure 2). With mild to moderate levels of depression and/or anxiety, the General Practitioner was notified of the result and referral to Improving Access to Psychological Therapies (IAPT)[23] services recommended. IAPT is an NHS programme providing services across England offering interventions approved by NICE for treating people with depression and anxiety disorders. Severe depression and/or anxiety advised referral to liaison psychiatry, with an urgent referral in the cases of suicidal ideation. A series of template letters was created to facilitate the referral process for clinicians. Information sheets on

the study given to participating OMFS clinicians supplied the details of named local contacts.

The IMPARTS system created a database that allowed data analysis for research purposes.

Statistical analysis

Descriptive statistics using the Independent t-test to compare normally distributed variables and Mann-Whitney and Wilcoxon signed-rank tests for non-parametric variables. Chi-square and Fisher's exact tests were also used to compare subgroups. Spearman's correlation coefficient, ρ, was used to measure association between different variables. The statistical analysis was performed with the Statistical Package for Social Sciences (SPSS, IBM Corp., Armonk, NY) version 23.0, with statistical significance set at 0.05.

Results

The study included 162 patients with a total of 236 clinical encounters, over the 12month period of the study. 19 patients were excluded from the study as their diagnosis was attributed to an alternative pathology at consultation. The patients were predominantly female (79.6%, F: M = 3.9:1), with a median age of 35 years (SD= 14.8, IQR 27-47]. 59 patients completed the IMPARTS questionnaire more than once during the study period, while the remaining 103 cases completed the questionnaire only once during the study period.

TMD symptoms were present for more than 3 months prior to completion of the IMPARTS questionnaire in 145 patients, while only 8 had their symptoms for less than 3 months. The median duration of symptoms for the whole cohort on first completion of IMPARTS was 24 months (SD =72.6, IQR 12 - 60.5).

The results of this study are summarised in **Table 1**. The median depression score was 6 (SD=6.3). Severe depression and the probable MDD were higher in males than females but with no statistical significance (Table 1). No symptoms of depression were found in 11.7% of patients (n=19), while the majority of patients had either mild or moderate depressive symptoms (27.8% and 27.2% respectively).

The median anxiety score was 4 (SD=5.2) with GAD suspected in 19.8% of patients (n=32). The majority of patients (n=87, 53.7%) did not have any symptoms suggestive of anxiety disorder, while moderate or severe symptoms were found in 11.7% and 8% of patients respectively.

Co-morbidity and psychological distress is common; 11.1% of patients screened positive for MDD and GAD (n=18). 25.9% screened positive for MDD or GAD (n=42).

Median OHIP-14 summary score was 29 (SD=11.7) with no significant difference between males and females. However, females had significantly higher scores in the OHIP-14 components of functional limitation, physical pain and physical disability (Table 1). Median BPI score was 42 (SD=26.7), with females reporting slightly higher but not statistically significantly different scores to males (Table 1). A strong positive

correlation was found between the initial BPI score and Depression, Anxiety and OHIP scores (ρ(160)=0.598, 0.499, 0.649 respectively, P<0.001).

Referrals

Sixty-two patients (38.3%) screened positive for CMD and were referred for further management according to predetermined care pathways. Referral for mixed anxiety and depressive disorder occurred in 31 cases, while anxiety or depression alone was the reason for referral in 19 and 12 cases respectively. Forty patients screened positively for mild to moderate depression and/or anxiety that led to a template letter from the OMFS clinician to their General Practitioner recommending referral to IAPT services. Twentytwo cases had severe symptoms and triggered referral to liaison psychiatry, initiated by the OMFS clinician using a template referral letter.

Suicidal ideation screened positive in 1.2% patients (n=2) and one case also screened positive for severe MDD. These cases were explored further by the OMFS clinician. The 0.6% (n=1) patient who screened positively for suicidal ideation and severe MDD had an urgent referral made to liaison psychiatry. Following discussion with the patient, the other case was judged not to be an immediate risk, and a standard referral to liaison psychiatry was made.

A total of 59 patients had a subsequent IMPARTS questionnaire completion at a followup during the study period. The median duration between the first and last IMPARTS questionnaire completion was 203 days (SD=118.1, IQR 109-308). Comparison between the initial and final scores shows some improvement in all four tools (PHQ-9, GAD-7, BPI

and OHIP-14 scores) indicating a tendency for CMD to be less likely and for pain and OHRQoL to improve, as demonstrated in Figure 3. Improvement was mostly significant in patients who had TMD symptoms for ≤2years with a mean difference for PHQ-9, GAD7, OHIP-14 and BPI scores of 3.6 (p=0.033), 2.1 (p=0.013), 6.9 (p=0.007) and 18.7 (p=0.007) respectively. This improvement was also limited to this category (≤ 2 years of symptoms) compared to the rest of the cohort in PHQ-9, OHIP-14 and BPI scores, 3.7(p=0.023), 6 (p=0.02), 16.3 (p=0.012) respectively, Figure 4.) There was no significant difference in mean scores for those who had TMD symptoms for >5years prior to first IMPARTS questionnaire completion (Figure 3, 4).

Patients satisfaction with IMPARTS

The usefulness of completing IMPARTS questionnaires just before seeing the clinician was subjectively assessed in a representative sample of 71 patients. Forty-two patients (60%) answered "yes" when they were independently asked "Did you find it useful to complete the questionnaire before seeing the team?" There was no statistically significant clinical difference in anxiety, depression, OHRQOL or pain scores between the patients who found IMPARTS useful and the ones who did not.

Discussion

As expected, CMD are present in our patients at higher levels than the general population. Due to their recognised impact on TMD, CMD warrant specific attention. The use of the IMPARTS system allowed identification and further management of CMD to be easily integrated into the treatment plan for TMD by the non-mental health clinician.

The PHQ-9[14-16] was chosen to screen for depression. Probable Major Depressive Disorder (MDD) was indicated if the patient reported low mood or loss of interest, in addition to a minimum of five of nine symptoms, on more than half the days in the last two weeks corresponding to a PHQ-9 score ≥10. Symptoms included items such as "trouble falling asleep, staying asleep or sleeping too much" and "feeling tired or having little energy". Symptoms scored higher the more frequently they were experienced e.g. 0 if the answer was "never" to a maximum of 3 for "nearly every day". Suicidal ideation was assessed by item 9 of the PHQ-9 and defined as having "thoughts that you would be better off dead or of hurting yourself in some way" on more than half the days in the past two weeks. Anxiety was assessed using the GAD-7[17]. Generalised Anxiety Disorder (GAD) was indicated if the patient scored ≥10. This was calculated using frequency (0 "never" and a maximum of 3 for "nearly every day") and symptoms such as "feeling nervous, anxious or on edge". The BPI-short form[18] has been used extensively for research in pain, and evaluates both severity of pain and impact on function. It was originally developed for use with cancer patients but has since evolved for use with noncancer pain also. It scores a scale of 0 (no pain or no interference) to 10 (worst pain imaginable or interferes completely). Example questions are "please choose the number that best describes your pain at its worst in the last week (0-10)" and "please choose the number that describes how, during the past week pain has interfered with your relations with others (0-10)". The OHIP-14[19-20] was chosen for its focus on oral healthrelated quality of life (OHRQoL) and has been used at national and international level for population based OHRQoL surveys, and more specifically in TMD[21-22]. It evaluates a number of domains including pain, function and psychological impact. Each question is scored for frequency from 0 "never", to a maximum 4 "very often". Example questions include "have you had painful aching in your mouth?" and "have you found it

uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?".

All questionnaires were chosen for their proven sensitivity, specificity and test-retest reliability in a wide variety of populations and across a number of different languages. The shortened versions were chosen as more user-friendly for patients screened, reducing time required and the number of questions asked, while still maintaining validity[15, 16]. The ubiquitous nature of these tools allows direct comparison with other national and international populations, and serial screenings can be used to review an individual patient's progress and response to treatment modalities.

CMD of any subcategory are more common in females than males with a prevalence of 19.7% vs. 12.5% in the general population[7]. This is important in the management of TMD due to female bias (F: M=3.9:1 in our population) and the prevalence of CMD remained higher in TMD patients even corrected for gender bias. Probable MDD was suspected in 17.9% of patients (n=29), against 2.3% prevalence in the general population or 8.8% females only[6] and GAD suspected in 19.8% of patients (n=32), against 4.4% prevalence in the general population or 12.8% females only[7].

It would be idyllic to include a clinical psychologist in every team treating patients with TMD; however budget constraints make this unlikely. The IMPARTS system delivers a patient-completed electronically delivered screening tool that greatly facilitates the signposting of patients who may suffer from anxiety and/or depression and efficiently integrates mental healthcare into treatment for TMD.

Clear guidance recommendations and pre-determined referral pathways with template referral letters reduces the burden on the OMFS clinician and General Practitioner in delivering holistic care. By integrating screening for CMDs we facilitate multidisciplinary care for patients with TMD to optimise outcomes and bring us in line with NICE guidelines.

The data collected by the IMPARTS created database will be useful when service planning and provides powerful argument for added psychiatry and psychological support for OMFS units. The database is invaluable for data collection for assessment of patient symptoms and response to new treatment modalities.

Conclusions

IMPARTS is a useful screening tool to identify CMD in TMD patients and ensures easy integration into the management plan.

Early identification and management of CMD in patients with TMD is essential. Our study shows improvements in CMD (≤2 years of TMD symptoms) has the greatest benefit in patient reported pain and OHRQoL.

Serial screenings can be used to monitor response in patient-reported pain and OHRQoL to different treatment modalities.

The IMPARTS system can be used as a powerful Audit and Research tool.

Conflict of Interest

No

Ethics statement/confirmation of patient permission

Ethics approval was included in the IMPARTS project system. A Research Application Form was approved by the IMPARTS Research Database Oversight Committee. The committee is chaired by a patient and includes senior KHP clinicians, researchers and representatives of the KHP Caldicott Guardian Committee.

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