Integration of mental health screening in the management of patients with temporomandibular disorders

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Abstract

Mental health disorders such as depression or anxiety, or both, are more common in patients with temporomandibular disorders (TMD) (16\%-40\%) than in the general population (16\%), and failure to recognise them may be detrimental to the management of TMD. Paper-based screening tools previously reported in this group require assessment by clinicians and subsequent collation of data. We describe our experience of a new system — IMPARTS (Integrating mental and physical: research training and services), which uses validated tools to identify and to monitor the progress of patients who may benefit from psychological intervention. At outpatient clinics, patients used an electronic tablet to complete the General Anxiety Disorder Questionnaire (GAD-7), the Patient Health Questionnaire (PHQ-9), the Inclusion of Oral Health Impact Profile (OHIP-14), and the Brief Pain Inventory (BPI). Data were linked directly to their electronic record to allow the results, with suggestions for treatment, to be reviewed immediately during the consultation. A total of 162 patients were included. Screening showed that referral was required in 28 (17\%) with a probable major depressive disorder and 32 (20\%) with a general anxiety disorder. Two (1\%), who were identified as being at high risk of suicide or self-harm, were referred for immediate psychological assessment. Use of the system can aid the holistic treatment of patients with TMD through appropriate referral. Early identification of mental health problems and concurrent management are most beneficial in those who have had symptoms of TMD for up to two years, and are therefore essential.

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Introduction

Temporomandibular disorders (TMD) are characterised by pain in the joint (TMJ) or the masticatory musculature, or both, and dysfunction, and psychological factors have an important role in producing and perpetuating them.\textsuperscript{1–3} The treatment of common mental health disorders such as depression or anxiety, or both, which are more common in patients with TMD (16\%-40\%)\textsuperscript{4–6} than in the general population (16\%),\textsuperscript{7} can benefit chronic conditions and reduce healthcare costs.\textsuperscript{8} As mental health disorders are often under-diagnosed and under-treated,\textsuperscript{9} the National Institute for Health and Care Excellence (NICE) recommends that patients with chronic health conditions are screened, and that management strategies are put in place when necessary.\textsuperscript{10}

Current budget constraints mean that departments of oral and maxillofacial surgery (OMFS) find it difficult to fund a clinical psychologist or psychiatrist, and OMFS clinicians often feel unable to diagnose mental health disorders or unsure about how to proceed with treatment.\textsuperscript{10} Most tools used to screen for common mental health disorders are in

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paper form, are time consuming to complete and analyse, and do not guide management. In this study we show how a new electronic screening tool, IMPARTS (Integrating mental and physical: research training and services)\textsuperscript{11} can help non-specialists address common mental health problems in patients with TMD.

IMPARTS is an initiative funded by King’s Health Partners 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 the provision of mental healthcare in physical healthcare settings, and supports clinicians who are not trained in mental health, by providing an informatics system that enables routine collection of patient-reported outcomes with real-time feedback to guide clinical care. The development of mental healthcare pathways allows timely and tailored evidence-based care. The system creates a database that can be used for audit and research, and has ethics approval for this purpose. It has been successfully implemented in patients with chronic conditions such as rheumatoid arthritis and inflammatory bowel disease, and is a feasible and acceptable way to integrate the treatment of mental health disorders.\textsuperscript{12}

**Material and methods**

**Study population and design**

We prospectively enrolled all patients referred to our OMFS specialist TMD clinics from both primary and secondary care between April 2015 and April 2016. Electronic records were retrospectively checked to ensure that a diagnosis of TMD by the OMFS clinician at consultation accorded with the 2014 diagnostic criteria for temporomandibular disorders of the International Association for Dental Research.\textsuperscript{13} Those whose symptoms were attributed to other active disease, such as referred pain from a carious tooth, were excluded. Patients had to be able to complete the questions themselves, although an assistant could act as an amanuensis. We used the IMPARTS informatics system to develop a customised questionnaire that patients could complete on an electronic tablet while they waited for their consultation (Fig. 1). Their responses were linked directly and immediately into their electronic record, and were reviewed by the clinician and discussed during the consultation. Predetermined protocols were then used to guide the treatment of those with problems.

**IMPARTS questionnaire**

The customised IMPARTS questionnaire comprised a series of widely validated tools for the screening of mental health disorders (depression, anxiety, and suicidal ideation), together with disease-specific questionnaires. We used the Patient Health Questionnaire-9 (PHQ-9), the General Anxiety Disorder Questionnaire-7 (GAD-7), the Brief Pain Inventory (BPI), and the Oral Health Impact Profile (OHIP-14). Suicidal ideation was assessed by item 9 on the PHQ-9.

Referral pathways for patients whose results showed one or more mental health disorder(s) were agreed with existing psychiatric services (Fig. 2). We notified the general practitioner about patients with mild to moderate symptoms and recommended referral to the IAPT (Improving access to psychological therapies) service.\textsuperscript{14} IAPT is an NHS programme that provides interventions approved by NICE in England to treat people with depression and anxiety. Those with severe depression or anxiety were referred to liaison psychiatry, and an urgent referral was made for those with suicidal ideation. We created a series of template letters to make referral easier and included details of named local contacts in the information sheets about the study.
The IMPARTS system created a database that enabled us to analyse the data.

Statistical analysis

Descriptive statistics were compared using the Independent t-test for normally distributed variables and the 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 was used to measure the association between different variables. Statistical analysis was done with the help of IBM SPSS Statistics for Windows version 23.0 (IBM Corp, Armonk, USA), and probabilities of less than 0.05 were accepted as significant.

Results

We recruited 181 patients. Nineteen of them were excluded, as they were not diagnosed with TMD. The study therefore included 162 patients and 236 clinical encounters. Most of the patients were female (female: male ratio 3.9:1) (Table 1). The questionnaire was completed more than once during the study period by 59 patients and only once by 103. A total of 145 patients had had symptoms of TMD for more than 3 months before they completed the questionnaire, and only eight had had them for less than three months. The median (IQR) duration of symptoms for the whole group on first completion was 24 (12 - 60.5) months.

Our results are summarised in Table 1. The median (IQR) depression score was 6 (2-11). A higher percentage of men had severe depression and a probable major depressive disorder than women, although this was not significant. Nineteen patients (12%) had no symptoms of depression, while in most they were minimal (n = 45, 28%) or mild (n = 44, 27%).

The median (IQR) anxiety score was 4 (1-8) and a general anxiety disorder was suspected in 32 patients (20%). Most (n = 87, 54%) had no symptoms of anxiety, while symptoms were moderate in 19 (12%), and severe in 13 (8%). Coexisting conditions and psychological distress were common; 18 patients (11%) had major depressive and general anxiety disorders, and 42 (26%) had depression or anxiety.

The median (IQR) OHIP-14 summary score was 29 (21-40) and the difference between that of men and women was not significant. Women, however, had significantly higher scores for functional limitation, physical pain, and physical disability (Table 1). The median (IQR) BPI score was 42 (26-63). Scores for women were slightly higher than those for men, but not significantly so (Table 1). There was a strong positive correlation between the initial BPI score and
Fig. 3. Improvement in scores between the first and last completion of the IMPARTS questionnaire by duration of symptoms. Black markers indicate a significant difference (p < 0.05) (PHQ-9 = Patient Health Questionnaire-9; GAD-7 = General Anxiety Disorder Questionnaire-7; BPI = Brief Pain Inventory; OHIP-14 = Oral Health Impact Profile).

depression, anxiety, and OHIP scores (ρ(160) = 0.6, 0.5, 0.7, respectively; p < 0.001).

Referrals

Sixty-two patients (38%) had symptoms of common mental health disorders, and their referrals for further treatment followed predetermined care pathways. Thirty-one patients with anxiety and depression, 19 with anxiety, and 12 with depression, were also referred on. OMFS clinicians sent letters that recommended referral to IAPT services to the general practitioners of 40 patients with mild to moderate symptoms of depression or anxiety, or both, and referred 22 patients with severe symptoms to liaison psychiatry.

Two patients showed signs of suicidal ideation. One of them, who also had symptoms of a major depressive disorder, was referred urgently to liaison psychiatry, and a standard referral was made to the service for the other who was judged not to be at immediate risk.

A total of 59 patients completed the questionnaire more than once, and the median (IQR) duration between the first and the last was 203 days (109-308). Scores for all four components (PHQ-9, GAD-7, BPI and OHIP-14) improved (Fig. 3), but these were mostly significant only in patients who had had symptoms of TMD for up to two years (mean difference: PHQ–9 = 3.6 (p = 0.033), GAD–7 = 2.1 (p = 0.013), OHIP–14 = 6.9 (p = 0.007), and BPI = 18.7 (p = 0.007), compared with the rest of the group: PHQ–9 = 3.7 (p = 0.023), OHIP–14 = 6 (p = 0.02), and BPI = 16.3 (p = 0.012) (Fig. 4). The difference in the mean scores of those who had had symp-
asleep or sleeping too much” and “feeling tired or having little energy”. Item 9 (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) is used to indicate suicidal ideation.

A general anxiety disorder is indicated if a patient scores 10 or more on the GAD-7. Symptons such as “feeling nervous, anxious or on edge” are scored from 0 (never) to 3 (nearly every day). The BPI-short form was originally developed for use in patients with cancer and has been used extensively for research into pain. It evaluates severity and impact on function, and is scored from 0 (no pain or no interference with activity) to 10 (worst pain imaginable or pain that interferes completely). Patients are asked - for example, to choose the number that best describes their pain at its worst in the last week (0-10), and to choose the number that describes how, during the past week, it has interfered with their relations with others (0-10). The OHIP-14 focuses on oral health-related quality of life and has been used nationally and internationally in population-based surveys, and more specifically in patients with TMD. It evaluates domains such as pain, function, and psychological impact, and questions are scored from 0 (never) to 4 (very often). Examples 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?”.

We chose these questionnaires because their sensitivity, specificity, and test-retest reliability have been proved in various populations and across different languages. We chose the shortened versions as they take less time to complete but retain validity. Their universal use allows for direct comparison with other national and international populations, and successive screenings can be done to review progress.

Mental health disorders are more common among women than men, the reported prevalence being 19.7% compared with 12.5%, respectively, in the general population. This female bias has an important bearing on the management of TMD (female: male ratio = 3.9:1 in our patients). The prevalence of depression is reported to be 2.3% among the general population and 8.8% among women, but 29 (18%) of our group were affected. The prevalence of general anxiety disorders is reported to be 4.4% among the general population, and 12.8% among women, but in our group, 32 (20%) were affected.

Ideally, a clinical psychologist would be part of each team that treats patients with TMD, but as budget constraints make this unlikely, the IMPARTS system can help clinicians direct patients towards mental health services when necessary, and ensures that mental healthcare is integrated into the treatment plan for TMD. Clear recommendations for guidance and predetermined referral pathways with templates for referral letters make it easier for OMFS clinicians and general practitioners to care for patients holistically, and this multidisciplinary care will optimise outcomes and bring us in line with National Institute for Health and Care (NICE) guidelines.

Our database will help in the planning of services, and our findings add power to the argument for additional psychiatric and psychological support for OMFS units. The database is invaluable for the assessment of patients’ symptoms and their responses to new treatments.

IMPARTS can be customised and updated to increase its specificity as questionnaires develop, and the system is a powerful tool for audit and research.
Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patient’s permission

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

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