SHORT REPORT

Service evaluation: Three subjective questions that aid in identifying frozen shoulder—Within a multi-centre musculoskeletal physiotherapy department in primary care

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1 | INTRODUCTION

Frozen shoulder is a prevalent condition seen in primary care in the UK, 2%–10% of the general population and up to 20% of the diabetic population (Hanchard et al., 2020; Rae et al., 2019; Walker-Bone et al., 2004). Frozen shoulder is characterised by stiffness, pain, and limitation in function. Frozen shoulder is associated with variable prognosis and management strategies (Pandey & Madi, 2021; Rangan et al., 2020; Rex et al., 2021). It can be difficult to assess, diagnose and differentiate from other shoulder pathologies (Lyne et al., 2022). This is mainly due to commonality in aetiology and subjective findings in people presenting with shoulder pain. Physical examination is an integral part of frozen shoulder diagnosis. Therefore, an early identification is important to deliver good quality of care. The delivery of care in primary care settings is changing in the UK, with remote consultations on first contact becoming more prevalent in MSK settings (Rennie et al., 2022). It is also important to note that telephone assessments remain far more in number than assessments over video-based platforms in primary care settings (Murphy et al., 2021). This presents with a new set of challenges in diagnosing frozen shoulder and may cause delay in delivery of care.

There are subjective pain related complaints of frozen shoulder originally described by Codman in the 1930s and more recently by Atkin et al. (2016). These include pain constant in nature, pain on lying on the side at night and no radiating pain below the elbow. With stiffness in the shoulder being a common underlying feature. There has been a lot of research on aetiology, pathophysiology, and physical examination of frozen shoulder. However, there is a gap in the literature on exploring the relationship between key pain related subjective complaints and diagnosis of frozen shoulder.

The musculoskeletal physiotherapy service in East Lothian National Health Service, Scotland, consists of a telephone consultation to triage on first contact for self-referring patients. It was noted that pain related questions were regularly asked in these remote consultations when assessing shoulder pain; however, as discussed before, their relevance has not been evaluated in the literature in depth. Therefore, a service evaluation was carried out to investigate the relationship between three questions related to pain (i.e., Is the pain constant? Is there pain lying on the side at night? Does the pain radiate below the elbow?) and a diagnosis of frozen shoulder was made following face to face assessment. Additionally, this may help to provide some insight into whether frozen shoulder and other shoulder pathologies can be differentiated based on these pain related questions.

2 | METHODS

The current study was a service evaluation with a prospective design. Data considered for the current study are routinely collected, but no retrospective data were utilised for this evaluation. Instead, data were collected prospectively for a period of four months.

Data were gathered by physiotherapists from patients who met the inclusion and exclusion criteria (Table 1).

A total of 14 physiotherapists across four centres within the service took part in the study voluntarily following consent. An invitation to participate was sent via email, from a member of the administrative staff who had no seniority or management responsibility over physiotherapists. This email was sent to all MSK physiotherapists working within the service. If they expressed an interest, a participant information leaflet and a consent form were issued. Following return of a completed consent form, a link was issued to a JISC online survey; requesting this to be completed following their initial assessment of an eligible patient.

The survey consisted of yes and no answers to the following three questions:

1. Is the pain constant in nature?
2. Is there any pain on lying on the side at night?
3. Does the pain radiate below the elbow?

Along with the questions above, a diagnosis or clinical impression was also recorded. No other information was recorded or any further follow-up was carried out.

On completion, the responses were stored securely within the JISC platform and were only accessible to the researchers via a password protected login. At the end of the data collection period, the survey was closed to further responses. Data were exported to a Microsoft excel file and then copied into SPSS version 23.0 for analysis. Descriptive analysis was conducted using frequencies. Inferential analysis was conducted using the chi-square test to establish any association between the answers and the clinical diagnosis/impression. This analysis is suitable as all assumptions were fulfilled—data met with the 2×2 table requirements and the expected frequencies were greater than 5 (Field, 2009). The level of significance was set at 0.05. Cramer's V was applied to further determine the usefulness of the full question set. Odd ratio and likelihood ratio were also calculated.

3 | RESULTS

Data for 107 patients with shoulder problems were included in this service evaluation. Figure 1 depicts the corresponding frequency of diagnosis that was made by the assessing physiotherapist for each patient, respectively. Rotator cuff related pain was the most common diagnosis at 42%, followed by frozen shoulder pain at 36% of the cases. Other diagnoses included osteoarthritis, AC joint dysfunction, multiple shoulder pathologies, calcific tendinopathy, and other pathologies, which accounted for 22% of all the cases.

Frequency for each respective questions according to a diagnosis of frozen shoulder and other shoulder pathologies are represented in Table 2. It is noted that 11% of patients with a diagnosis of frozen shoulder answered no to all three questions. However, 35% of patients answered no to all three questions in other shoulder pathologies. Affirmative answers to all three questions were 11 out of 38 and 7 out of 69 for frozen shoulder and other shoulder pathologies, respectively. Answering yes to one of the questions in both conditions is similar, 47% for frozen shoulder and 46% for other shoulder pathologies.

There is an association between having a diagnosis of frozen shoulder and all questions answered positive in comparison to other shoulder pathologies (Chi-Square $p = 0.013$). The strength of this association is low to medium with Cramer's V being 0.241. The odds ratio of having frozen shoulder when answering yes to all three questions compared with other shoulder pathologies was 3.6. Similarly, the likelihood ratio of frozen shoulder was determined to be 5.9 if all questions were answered positively.

4 | DISCUSSION

According to the authors, there has not been a study that has looked at the association of specific subjective questions and diagnosis of shoulder pathology. This approach has highlighted the need for further research, considering that clinicians when assessing patients remotely rely mainly on subjective assessment to diagnose a shoulder problem. Atkins et al. (2016) suggested that the constant pain that does not radiate below the elbow and pain on lying on the affected side at night are good subjective indicators of frozen shoulder when considered with demographic factors such as age, gender, and past medical history. This service evaluation explored these questions for frozen shoulder without any consideration of the demographics and showed low to medium association. The odds ratio of 3.6 and likelihood ratio 5.9 may be clinically relevant. However, these data should be considered cautiously due to the small sample size and estimated value of Cramer's V number being 0.241. Furthermore, the questions individually do not show any association with frozen shoulder or other shoulder pathologies. The relationship between answering yes to one of the questions is high in both diagnoses and there is uncertainty on which specific question. Additionally, answering yes to any two questions suggests a high degree of variability.

There are various limitations, such as lack of demographics, no clarity on stages of frozen shoulder, past medical history, and lack of follow up as some clinicians may have a working diagnosis on initial assessment. In this study, no differentiation was made for patient demographics. It is well documented that a FS is more likely in females, with a female: male ratio of 7:3 (Sheridan & Hannafin, 2006). It is also more common in the 6th decade—mean age of onset is 52 in males and 55 for females. It has also been established that a diagnosis of primary FS is unlikely in other age groups, when other shoulder pathologies would be a more likely cause of symptoms (Rangan et al., 2015). By gathering further demographic data or by applying the questionnaire to the expected age group, the study could have been more specific to frozen shoulder presentations.

No wider past medical history was recorded as part of the questionnaire. It is well recognised the link between FS and other

TABLE 1 Inclusion and exclusion criteria for data to be included in the evaluation.

Inclusion criteria	Exclusion criteria
Aged over 16	Presenting with a non MSK condition
Presenting with shoulder pain	Symptoms suggestive of neck pathology
	Symptoms suggestive of neurological pathology
	Symptoms suggestive of a serious pathology
	Multiple joint pain

FIGURE 1 Depicts various shoulder diagnoses across the 107 patients included in this study.
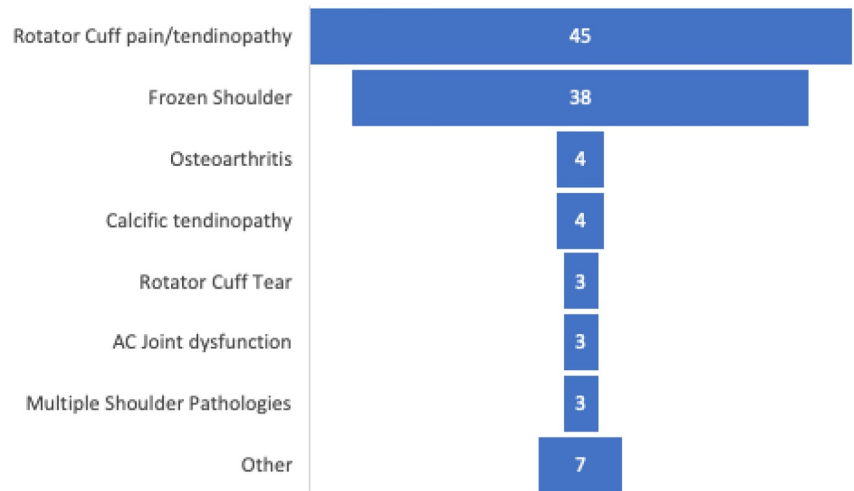

TABLE 2 Frequency of positive responses to the subjective questions versus shoulder diagnosis.

	No to all questions	Positive to any 1 of the questions	Positive to any 2 of the questions	Positive to all 3 questions	Total
Frozen shoulder	4	18	5	11	38
Other shoulder pathologies	24	32	6	7	69
Total	28	50	11	18	107

health comorbidities such as diabetes (Lamplot et al., 2018) and thyroid conditions (Cohen et al., 2020). Again, gathering this data may have enabled further insight into the role of these questions in those presenting with FS. It may also have helped identify if responses were more common in those presenting with a secondary FS related to an underlying condition or consistent across all FS presentations. It has been suggested that a diagnosis of FS is the first indication of underlying wider systemic health conditions. Therefore, it may be helpful to understand the responses to these key questions within cohort of patients presenting with systemic health conditions and whether any such association can be established. Safran et al. (2017) suggested that it may be worthwhile to screen all those with idiopathic FS for diabetes, reporting 8% of those screened were found to be prediabetic.

Physiotherapists were asked to complete only one questionnaire following the initial assessment. No request was made for further questionnaires to be completed should diagnosis change over the course of treatment. One of the fundamentals of clinical practice is to reassess subjective and objective markers at each assessment (Ryder, 2018). This is particularly relevant in the case of frozen shoulder when the condition can be difficult to diagnose in the earlier stages before the development of a clear capsular pattern. It has been suggested that up to 40% of patients who report shoulder pain may have an element of cervicothoracic cause, either in isolation or in combination with local shoulder pathology (Mintken, 2015). It is also well documented that stiffness of the cervicothoracic structure could lead to lack of shoulder mobility and subsequent incorrect diagnosis of a stiff shoulder (Wainner et al., 2007). Therefore, it is vital that assessment of those presenting with shoulder pain includes screening to consider any alternative causes of pain experienced in the shoulder region, including those of a cervical or visceral cause (Cadogan et al., 2022).

This service evaluation highlights a case for a future study to investigate the association of frozen shoulder and specific subjective questions along with consideration of demographics, past medical history, and any changes in diagnosis during management.

5 | CONCLUSION

This prospective service evaluation demonstrated some association between a diagnosis of frozen shoulder and constant pain, no radiating pain below the elbow, and pain on lying on the side at night. These results should be cautiously interpreted because of the small sample size and lack of demographic data within the sample size. This service evaluation identifies a gap in the literature which needs to be evaluated and corroborated in future research.

AUTHOR CONTRIBUTIONS

Prateek Rangra: Conceived and designed analysis, data analysis, wrote the manuscript and collated all the results. Louise Dickson: Conceived and designed analysis, helped with the initial draft of manuscript, collected the data and data analysis. Kavi C. Jagadamma: Helped with manuscript writing and data analysis.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data available on request from the corresponding author.

ETHICS STATEMENT

Ethical approval was obtained from Queen Margaret University prior to the commencement of the study. Service evaluation was approved by the Quality Improvement Team within the National Health Service East Lothian, Scotland.

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