What influences participants' treatment preference and can it influence outcome? Results from a primary care-based randomised trial for shoulder pain

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SUMMARY

Background: In randomised clinical trials (RCTs), outcome may be influenced by the opinions of the participants about the efficacy of treatments.

Aim: To examine how initial treatment preferences of participants in a shoulder pain trial affected functional outcome and future treatment preferences.

Design of study: Observational cohort study nested within a multi-centre, pragmatic RCT of steroid injection versus physiotherapy for unilateral shoulder pain.

Setting: Nine general practices in north Staffordshire.

Method: Two hundred and seven adults were randomised in the trial. Disability scores and preferences of the participants for the trial treatments were elicited at two points: prior to randomisation and 6 months post-randomisation. A good functional outcome was defined as at least a halving in the disability score at the 6 months follow-up point.

Results: Pre-randomisation preferences were: 40% for injection and 20% for physiotherapy, and 40% gave no preference. A good outcome was achieved in a higher percentage of participants who gave a pre-randomisation treatment preference compared with those who did not (62% compared with 48%; percentage difference = 14%; 95% confidence interval [CI] = -1 to 27%) with similar percentages in each preferred treatment group. However, receiving the preferred treatment did not confer any additional benefit in those who expressed a preference (receiving preferred treatment = 56%; not receiving preferred treatment = 69%). At 6 months post-randomisation, participants with a good, as opposed to poor, outcome were more likely to report as their preferred treatment the one to which they had been randomised, irrespective of pre-randomisation preference and whether the preferred treatment was received.

Conclusion: This analysis suggests that preferences prior to treatment can affect outcome, but that treatment outcome is a stronger influence on post-treatment preferences. We present some empirical evidence to support the statement that treatment preferences can have important effects on the results of RCTs.

Keywords: patient preference; cohort studies; shoulder pain; randomised clinical trials; physiotherapy; steroid injection.

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Introduction

PATIENTS' beliefs and expectations are powerful contributors to the effects of care, and they can either enhance or reduce the effect of the therapeutic interventions and thereby influence subsequent outcome.[1,2] This problem may be more salient in randomised clinical trials (RCTs) where participants cannot be blinded to their allocated treatment, a common scenario in musculoskeletal conditions.[3,4] For example, in an RCT of massage or acupuncture for low back pain, improvement was five times greater in those patients with high versus low expectations of benefit from treatment.[4]

The importance of understanding and addressing patients' beliefs about treatment is highlighted by the high rates of non-adherence to treatment plans,[5] and can lead to patients suffering from 'resentful demoralisation', in which patients allocated in an RCT to a less preferred treatment might do worse as a result.[6] Therefore, it is important to consider whether the observed treatment effect is only a result of the treatment's physiological or pharmaceutical properties, or whether it is influenced by the individual's preferences. Additionally, the effectiveness of a treatment is likely to contribute to the formation of subsequent preferences and expectations. We have explored these issues using data from an RCT of treatments for shoulder pain presenting to primary care.

Method

Study design

The study was an observational cohort study nested within a multi-centre, pragmatic RCT based in primary care; detailed methods and the main trial results have been published elsewhere.[7] In brief, nine general practices recruited 207 adults consulting with an episode of unilateral shoulder pain (53% were female; mean age = 58 years; standard deviation [SD] = 14 years). Patients were randomised to receive either a local corticosteroid injection or a short course (maximum of eight 20-minute sessions) of physiotherapy. A study nurse, blind to the treatment allocation, performed outcome assessments before randomisation and at 6 weeks and 6 months post-randomisation in the patients' homes. The North StaffordshireLocal Research Ethics Committee approved all stages of the study.

Outcome measures

For the cohort analysis presented here, all trial patients were asked about their treatment preferences by the research nurse both pre-randomisation and at 6 months post-randomisation. Information was elicited before ran-

HOW THIS FITS IN

What do we know?

In randomised clinical trials (RCTs), outcome may be influenced by pre-conceived opinions of participants about the efficacy of the treatment. Moreover, participants who do not receive their preferred treatment can suffer from 'resentful demoralisation', which may lead them to become less motivated to follow the treatment protocol.

What does this paper add?

Having a treatment preference prior to receiving the treatment appears to positively influence the outcome, but actually getting the preferred treatment seems not to additionally affect outcome. This paper provides further empirical evidence for the commonsense assumption that preferences are likely to develop as a result of treatment experiences: good outcomes lead to preferences for the allocated treatment, while patients with poor outcomes do not then have any preferences.

domisation using the following question: 'If you had a free choice, would you choose to have physiotherapy or an injection?' Patients could also record no preference for either treatment. At 6 months post-randomisation, patients were asked: 'If you had a similar shoulder problem again, which treatment would you prefer?' and given the three reply options of physiotherapy, injection or 'do not know'.

The primary clinical outcome of the trial was measured using a shoulder disability questionnaire previously validated for use in primary care.[8] A good functional outcome was defined as at least a halving in the disability score at 6 months compared with that recorded pre-randomisation. One hundred and ninety-five (94%) participants completed the 6-month follow-up period, and the percentage with a good functional outcome at this point was similar in the two treatment arms.[7] The data from the two arms have been pooled for this cohort analysis.

Data analysis

The percentage of participants who stated a preference for either, or neither, of the two available treatments was calculated at the two time points of interest. Demographic and baseline clinical characteristics were compared across the three groups of pre-randomisation treatment preference (no preference, preference for physiotherapy, preference for injection). The relationship of pre-randomisation treatment preference and functional outcome was examined within three groups: those with no treatment preference, those who did receive their preferred treatment, and those who did not receive their preferred treatment. The data were examined to determine whether functional outcome had influenced subsequent preferences by comparing participants' pre-randomisation preferences to those given 6 months post-randomisation. Analysis was carried out in STATA 6.0 software.

Results

Influence of pre-randomisation treatment preference on functional outcome

Pre-randomisation preferences were: 83 (40%) for injection and 42 (20%) for physiotherapy, and 82 (40%) patients gave no preference. Table 1 presents demographic and baseline clinical characteristics between the three pre-randomisation treatment preference groups. Females were more likely to have a pre-randomisation preference, but age did not make a difference with regard to preference. Severity of symptoms in terms of disability and pain were similar across the three groups, although those with no preference indicated a slightly longer duration of symptoms. Participants who reported other comorbidity were less likely to give a preference for physiotherapy. However, the presence of concurrent musculoskeletal pain specifically was not associated with preference. Approximately half of the participants who gave a pre-randomisation preference actually received their preferred treatment. Among those with no initial preference, similar numbers

Table 1. Demographic and clinical characteristics of participants by their pre-randomisation treatment preferences.

	Pre-randomisation preference		
	No preference (*n* = 82)	Physiotherapy (*n* = 42)	Injection (*n* = 83)
Percentage female	43	60	60
Age in years (mean [SD])	57.8 (12.6)	54.4 (13.7)	58.8 (13.9)
Baseline disability (mean [SD])	11.0 (4.6)	9.7 (4.9)	11.4 (4.2)
Baseline pain in day[a] (median [IQR])	5 (4–6)	5 (3-7)	5 (4–7)
Number of days of duration of shoulder pain (median [IQR])	60 (21–120)	40 (21–90)	42 (21–120)
Percentage with other musculoskeletal pain	66	62	61
Percentage with other comorbidity	63	45	59

IQR = interquartile range. [a]The level of pain, measured on a scale of 0–10, that participants experienced during the day at the baseline interview.

Table 2. Number of participants with pre-randomisation treatment preferences and their randomly allocated treatment.

Pre-randomisation treatment preference	Overall	Randomised to physiotherapy (%)	Randomised to injection (%)
No preference	82	41 (50)	41 (50)
Preference	125	62 (50)	63 (50)
For physiotherapy	42	24 (57)	18 (43)
For injection	83	38 (46)	45 (54)
Total	207	103 (50)	104 (50)

Table 3. Number of participants with a good functional outcome at 6 months post-consultation: effect of preferred and allocated treatment.

Pre-randomisation treatment preference	Number (%) with good functional outcome[a]		
	Overall[b]	Randomised to physiotherapy	Randomised to injection
No preference	36/75 (48)	20/37 (54)	16/38 (42)
Preference	74/120 (62)	39/61 (64)	35/59 (59)
For physiotherapy	26/41 (63)	14/24 (58)	12/17 (71)
For injection	48/79 (61)	25/37 (68)	23/42 (55)
Total	110/195 (57)	59/98 (60)	51/97 (53)

[a]Good functional outcome = at least a halving in the disability score at 6 months from that recorded pre-randomisation. [b]One hundred and ninety-five participants completed the 6-month post-consultation interview.

Table 4. Influence of pre-randomisation treatment preference and functional outcome on post-treatment preference.

Pre-randomisation treatment preference	Number (%) reporting a post-treatment preference for their allocated treatment		
	Overall	Good outcome[a]	Poor outcome[b]
No preference	30	23 (72)	7 (21)
Randomised to preferred treatment	39	26 (74)	13 (48)
Not randomised to preferred treatment	21	21 (58)	0[c]

[a]Good functional outcome = at least a halving in the disability score at 6 months from that recorded pre-randomisation. [b]Poor functional outcome = less than a halving in the disability score at 6 months from that recorded pre-randomisation. [c]Only 15 participants in this group, with none giving a post-treatment preference for the treatment they had been randomised to, nine maintaining their pre-randomisation preference and six not having a post-treatment preference.

were randomised to the two treatment groups (Table 2).

The proportion with a good outcome was higher among those who had expressed either pre-treatment preference (62% compared with 48%; percentage difference = 14%; 95% confidence interval [CI] = -1% to 27%). The outcome in those expressing a preferred treatment was similar regardless of their randomised allocation (good outcome = 61% injection, 63% physiotherapy). Receiving the preferred treatment did not confer any additional benefit (good outcome in those receiving preferred treatment = 56%; not receiving preferred treatment = 69%) and outcome was similar regardless of treatment allocation (good outcome in those receiving preferred treatment = 55% injection, 58% physiotherapy; not receiving preferred treatment = 71% injection, 68% physiotherapy) (Table 3).

Influence of functional outcome on post-treatment preference

Functional outcome, measured 6 months post-randomisation, had a varying influence on participants' post-treatment preferences. Overall, patients' preference post-randomisation accorded with the treatment they had received. In those who had not expressed a pre-randomisation preference, a significantly greater percentage of patients with a good, compared with a poor, outcome gave a post-treatment preference for the treatment they had received (72% compared with 21%; percentage difference = 51%; 95% CI = 28% to 68%). This association was stronger in participants randomised to physiotherapy (82% compared with 14%) than in those randomised to injection (60% compared with 25%).

In participants who gave a pre-randomisation treatment preference, post-treatment preferences and changes of preference were strongly influenced by outcome and by whether the treatment preferred pre-randomisation was received. Participants experiencing a good, rather than a poor, outcome were more likely to give a post-treatment preference for the treatment to which they had been randomised, with the relationships being similar within both the injection and the physiotherapy groups (Table 4). This relationship was more extreme in participants who were randomised to receive the treatment for which they had not given a preference; none of those with a poor clinical outcome gave the treatment received as their post-treatment preference, with the majority of patients (60%) maintaining their pre-randomisation treatment preference and the remainder (40%) not giving a post-randomisation preference.

Discussion
Summary of main findings
Results from this exploratory analysis of data on treatment preferences, gathered during the routine follow-up of a randomised trial, suggest that having treatment preferences prior to randomisation can influence outcome. Participants who expressed a preference for either one of the treatments tended overall to have a better functional outcome compared with those with no preference, but this was unaffected by whether preferences were met or not. Both pre-randomisation preferences and outcome appear to influence post-treatment preferences. Participants experiencing a good outcome were more likely to give their allocated treatment as their post-treatment preference, independent of their pre-treatment preference, while participants experiencing a poor outcome commonly did not have a post-treatment preference.

With respect to post-treatment preferences at 6 months, these results underscore that the study of preferences does not investigate a static characteristic. The results confirm what common sense would suggest; namely, that experience of treatment will be one determining factor in shaping or changing preferences. In this study those participants with no treatment preference were less likely overall to have a good outcome, but good outcome was associated with a subsequently ascertained post-treatment preference for the received treatment. This also raises the possibility that pre-randomisation prefer-

ence might have been influenced by prior exposure to the treatments under investigation. Such data were not available from the current trial, although future trial work from the Primary Care Sciences Research Centre will address this important issue. Overall, the findings suggest that it might be worthwhile measuring two levels of overall change in such trials: first, effects of intervention, i.e. the size of effect in those with no treatment preference; and, second, effects of preference, i.e. the additional effects of having a pre-treatment preference. Moreover, there may be an interaction between these two levels, i.e. the effect of receiving the treatment of choice, and it could be this interaction that influences the main trial results.

Relationship to existing literature

Comparison to a similar study of injection and physiotherapy for shoulder pain carried out in The Netherlands shows that both trials had similar percentages of patients reporting physiotherapy as their preferred treatment (20% in the United Kingdom [UK] study compared with 25% in The Netherlands study), but they had different percentages preferring injection (40% in the UK study compared with 20% in The Netherlands study) or having no treatment preference (40% in the UK study compared with 55% in The Netherlands study).[3] These differences in pre-treatment preference may reflect the different views of services between patients in the UK and The Netherlands and the availability of the examined treatments. Moreover, the results from this Dutch trial suggested that being allocated to the preferred intervention influenced both short-term (7 weeks) and mid-term (26 weeks) treatment success, but only in those allocated to injection.[3] The possibility that the patients in the injection groups were representative of a different spectrum of patients in the two studies might be one explanation for this contrasting finding to the UK study. Preference was also shown to be an important determinant of outcome in an antenatal trial,[9] but, this finding is not universal, since other studies show that preferences do not influence outcome.[10]

Limitations and strengths

This study was not designed to be able to fully disentangle the true treatment effects from the effects of preference. Patients with strong preferences may not consent to randomisation, which makes the study of strong preferences difficult within the framework of randomised trials.

The current trial was traditional in all respects except that participants were asked, both pre- and 6 months post-randomisation, which of the available treatments they preferred.[11] As with most randomised clinical trials, each randomised group contained participants who received their preferred treatment and those who did not. Surprisingly, a greater proportion of participants with a good outcome was seen in those who did not receive their pre-randomisation preferred treatment, compared with those that did. It may be that the former were pleasantly surprised by a treatment they had feared or not known about, and the latter disappointed with the poor performance of something they had expected to work. However, having treatment preferences appeared not to be a serious impediment to randomisation; the overwhelming majority of participants, whether or not they received their preferred treatment, participated fully. The randomisation procedure evenly allocated participants with and without a

preference to each of the treatment arms, and, although participants expressing a preference for injection outweighed those with a preference for physiotherapy by two to one, allocation was very similar in each preferred treatment group.

Implications for future research

The finding that treatment preference can influence outcome has implications for both physicians and patients regarding treatment choice. This is of particular relevance when no treatment is clearly superior and when the relative safety and costs of the treatments are similar. Additionally, in trials where blinding of the participants is not possible, information on treatment preference prior to randomisation is especially important and should be incorporated into the analysis.

The next important step will be to design and validate mechanisms to accurately measure preferences. This is likely to necessitate the use of both quantitative and qualitative approaches using data from both observational and randomised research. Several multi-stage designs have been postulated,[12,13] but they require large sample sizes and complex algebra to reliably estimate the magnitude of any preference effect. The simple methodology used to examine the influence of preference in this trial should be considered as a suitable alternative to the more complex 'patient preference' trials as it 'conserves all the advantages of the fully randomised design with the additional benefit of allowing for the interaction between preference and outcome to be assessed'.[14]

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