Non-pharmacological educational and self-management interventions for people with chronic headache: the CHESS research programme including a RCT

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Scientific summary

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Scientific summary

Background

Headaches are second to low back pain as a global cause of years lived with disability. Headaches are the most common neurological disorder treated in primary care. They account for around 3% of general practitioner consultations. Seventy per cent of people with headaches seen by their general practitioner do not get a formal diagnosis. For some people headaches become a chronic disabling disorder. There is a need for more non-pharmacological treatments to help those living with headache disorders.

Our overarching aim was to develop and test a supportive education and self-management group intervention, implementable in primary care, for people with chronic headaches.

Objectives

The objectives of the programme were to:

- develop and test strategies for recruiting people with chronic headaches from primary care [work package (WP) 1]
- develop and evaluate a brief classification interview to support diagnosis for people with chronic headaches (WP2)
- develop and pilot an education and self-management support intervention for the management of common chronic headache disorders [the Chronic Headache Education and Self-management Study (CHESS) intervention] (WP3)
- select the most appropriate outcome measures for a randomised controlled trial of the CHESS intervention package (WP4)
- run a multicentre randomised controlled trial, including an economic evaluation, of the CHESS intervention package (WP5).

Methods and results

We used an epidemiological definition of chronic headaches: headaches on ≥15 days per month for >3 months. Phase 1 of our work, WPs 1–4, consisted of interlinked systematic reviews and a feasibility study.

Feasibility study (work package 1)

Fourteen general practices in the West Midlands recruited 131 people with chronic headaches by writing to people with recorded consultations for headaches and prescriptions for migraine-specific drugs (triptans and pizotifen). Eligibility was confirmed by a telephone call by the study team. This group was our sampling frame for WPs 2–4.

Classification interview (work package 2)

We wanted to identify the population of interest for the main trial but also to feel confident that those who had other headache types not suitable for our trial were appropriately identified and referred for relevant support. We first reviewed the literature on diagnostic tools and found 38 papers validating 30 tools. We did not find any tools that were suitable for our proposed trial. We therefore organised a consensus meeting to inform our thinking on the content of a new classification tool. This was attended

by neurologists with a specialist interest in headaches, general neurologists, headache specialist nurses, general practitioners with a specialist interest in headaches and people with chronic headaches. We established what we needed to know from a person to:

- exclude secondary headaches
- exclude primary headaches other than chronic migraine and tension-type headache
- distinguish between chronic tension-type headache and chronic migraine
- identify medication overuse headache.

We used this information to develop a classification logic model for use in a nurse-delivered classification interview. A research nurse and a doctor, with expertise in headaches, from the National Migraine Centre then independently interviewed 107 participants. We found a high level of agreement between the nurse and specialist. Over 90% of study participants were classified as having chronic migraine.

Intervention development (work package 3)

Three systematic reviews informed our intervention development.

Using a meta-ethnographic approach our systematic review of the lived experience of chronic headaches (*n* = 4 studies) we found three overarching themes:

- headache as a driver of behaviour
- the spectre of headache
- strained relationships.

In our systematic review of prognostic factors in chronic headache (*n* = 27 studies), we found moderate evidence for depression and anxiety, poor sleep, stress, medication overuse and poor self-efficacy predicting a poor outcome. We found inconclusive evidence for treatment expectations, age and age at onset, body mass index, employment and headache features predicting a poor outcome.

In our systematic review of the effectiveness, style and content of self-management interventions for chronic headache (*n* = 16 studies) we found beneficial effects of the interventions compared with usual care in pain intensity, headache-related disability and quality of life. Interventions including either education or mindfulness components, and delivered in a group format, showed greater reductions in pain intensity than interventions without these features. A greater beneficial effect on mood was observed in interventions that included a cognitive–behavioural approach component than in those without this.

We interviewed seven people living with chronic headaches recruited through our charity partners. We found that participants had tried a range of therapies and interventions, some of which were helpful and others less so. Access to education and peer support was deemed positive, as was learning new skills such as relaxation, mindfulness and stress management.

We then presented our findings to 18 people from clinical, academic and lay backgrounds at an intervention development day to agree the structure and content of our new intervention. We agreed on a modular group intervention for 8–10 people delivered by a nurse and a layperson with chronic headaches. It should include educational material, self-management material and medication advice, and include a digital versatile disc (DVD) suitable to share with friends and family. We included a single face-to-face session and up to 8 weeks of telephone support with a specially trained nurse. After piloting with 13 participants, we identified that it was difficult for lay facilitators to commit to the sessions because of the unpredictable nature of their headaches. We therefore changed to using allied health professionals as the second facilitator. The final format was two group days followed by a one-to-one

session with a nurse to discuss medication, lifestyle factors and goal-setting, followed by up to 8 weeks of telephone support (individually negotiated).

Clinical effectiveness and cost-effectiveness measures (work package 4)

In our systematic review of patient-reported outcomes (46 studies evaluating 23 patient measures) we found that for a 'headache' population only the Headache Impact Test-6 (HIT-6) had acceptable evidence for its validity and reliability for use in our trial. The Migraine-Specific Quality of Life Questionnaire (MSQ v2.1) had relevance to our population. We modified this measure, changing the focus of each item from 'migraine' to 'headache' to produce the Chronic Headache Quality of Life Questionnaire (CHQLQ) and did a mixed-methods comparative evaluation of the CHQLQ and HIT-6.

Both the CHQLQ and the HIT-6 were well completed, had good psychometric properties and were relevant to the experience of headache. The CHQLQ captured the wide-ranging impact of chronic headache, in particular the emotional impact, to a greater extent than the HIT-6.

As this work was not complete before starting the main trial, we set HIT-6 as the primary outcome for the trial and the CHQLQ as a secondary outcome.

We developed three questions to capture headache frequency, duration and severity for use in a smartphone application (app) or in a paper diary. Eight feasibility participants tested the app over 11 weeks. Feedback was positive but completion rates varied. We included the app as part of the main trial.

From our work on outcome measures we identified the need for a core outcome set for migraine. This work took place after the design of the randomised controlled trial had been finalised. We identified >50 domains from our systematic reviews and our qualitative work. We did a modified, three-round electronic Delphi study with patients and professionals to identify which domains were most important. At a consensus day, when the aim was to ratify the core domains, a two-domain core outcome set was agreed for chronic and episodic migraine:

1. migraine-specific pain – to be assessed with an 11-point numerical pain rating scale, and frequency as the number of headache/migraine days over a specified period
2. migraine-specific quality of life to be assessed with the Migraine Functional Impact Questionnaire (MFIQ).

Professor Underwood, the chief investigator for this study, is a director and shareholder of Clinvivo Ltd, who provided the Delphi platform. He recused himself from any discussions related to the choice of Delphi platform for this study.

Phase 2: randomised controlled trial, work package 5

Phase 2 of the programme was a randomised controlled trial to evaluate the clinical effectiveness and cost-effectiveness of the CHESS intervention package.

We identified people with chronic headaches from general practice records. Self-referral to the trial was also possible. We included adults with migraine or tension-type headache with or without medication overuse headache. People who appeared eligible after an initial telephone call were asked to provide consent and baseline measures. This was followed by a classification interview with a research nurse to confirm eligibility and identify people with suspected non-eligible headaches.

After the feasibility study we specified that if at least 85% of our participants had migraine our primary analysis would just be on the population with migraine, with sample size inflated, if necessary, to ensure adequate statistical power for this analysis.

The randomisation allocation ratio was 1 : 1.07 in favour of the intervention group to account for clustering in one arm. Randomisation was done using minimisation, stratifying by geographical locality (Midlands and Greater London) and headache type [definite chronic migraine, probable chronic migraine (i.e. episodic migraine plus chronic tension-type headache) and chronic tension-type headache only, with or without medication overuse headache].

Our primary outcome was the HIT-6 score at 1 year. We used the Migraine-Specific Quality of Life Questionnaire as the secondary headache disability outcome. We did follow-ups at 4, 8 and 12 months.

The sample size was based on testing the clinical effectiveness in the migraine population excluding participants with just tension-type headache (n = 689 participants: relaxation arm, n = 689; self-management arm, n = 356) provided 90% power to detect a between-group difference of 2 points (standard deviation 6.87 points, from the feasibility study) in HIT-6 score at 12 months for those with migraine using a two-sided test and a 5% significance level with a 20% loss to follow-up. Some over-run on sample size was expected to allow all groups to be adequately populated. We did a within-trial health economic analysis.

Between April 2017 and March 2019, staff at 164 general practices in the Midlands and London wrote to 31,026 people and we randomised 736 people, 727 (99%) with migraine: 54% (396/727) had chronic migraine and 56% (407/727) medication overuse headache. Despite reporting chronic headache when eligibility for the study was determined, after receiving informed consent at baseline, 38% (274/727) reported < 15 headache days in the preceding 4 weeks. Unless otherwise stated, analyses were on the 727 participants with migraine. Baseline characteristics were well matched. The first session was attended by 286 out of 376 (76%) intervention participants; 259 (69%) reached the minimum adherence (day 1, and the one-to-one session) and 216 (58%) achieved full adherence to the programme.

There was no between-group difference in HIT-6 scores at 12 months [adjusted mean difference −0.3 points, 95% confidence interval (CI) −1.23 to 0.67 points; p = 0.56]. The limits of this 95% CI excluded our target (worthwhile) effect size of 2.0 points and the smaller minimally clinically important difference of 1.5 points suggested by others for studies of episodic migraine. At 4 months there was a difference favouring the CHESS self-management programme (adjusted mean difference −1.0 points; 95% CI −1.91 to −0.006 points; p = 0.049). There were few differences in secondary outcomes. The self-management group had 1.5 (95% CI 0.48 to 2.56; p = 0.004) more headache days over the preceding 28 days at 4 months. They also had improved pain self-efficacy scores at 4 and 12 months. Use of acute drugs, including both prescribed and over-the-counter drugs, and prophylactic drugs was unchanged over time with no between-group differences. Using electronic/paper diary data the difference over 12 months in number of headache days was 0.2 days (95% CI −0.11 to 0.46 days; p = 0.234), difference in duration of each headache was 0.4 hours (95% CI −0.47 to 1.28 hours; p = 0.361) and difference in average headache severity on a 0–10 scale was 0.2 (95% CI −0.08 to 0.46; p = 0.163). We found no subgroup effects. Our complier-average causal effect and sensitivity analyses were not materially different.

There were seven adverse events: two in the standard-care arm and five in the self-management arm.

The CHESS intervention generated 0.031 (95% CI −0.005 to 0.063) additional quality-adjusted life-years (QALYs) and increased NHS and Personal Social Services costs by £268 (95% CI £176 to £377), generating an incremental cost-effectiveness ratio of £8617 with an 83% chance of being cost-effective at a willingness to pay of £20,000 per QALY gained.

Our process evaluation, including all 736 participants, showed that we recruited a nationally representative population including people from practices based in all 10 deciles of the Index of Multiple Deprivation; 18% of participants were from minority ethnic groups. Intervention fidelity was good, with adherence being slightly better than competence [adherence 83% (interquartile range 67–100%); competence 70% (interquartile range 50–90%)].

We carried out semistructured interviews with a purposive sample of 26 study participants. Most participants described gaining some new knowledge or insight about their headaches from the intervention they received, and a few changed medication. Some felt more confident to manage their headaches, but many did not.

CHESS was well received by participants, facilitators and general practitioners. Participants enjoyed interacting with others and valued the opportunity to talk, share and discuss their chronic headache experiences with others in a similar situation in a safe knowledgeable space.

Patient and public involvement

There has been substantial patient and public involvement in the design, conduct and interpretation of the CHESS programme. Throughout the programme we worked closely with three UK migraine charities and a lay advisory group to help direct the research and ensure that the patient voice was embedded in our work.

Conclusions

Over the duration of the CHESS programme, we have advanced our understanding of the challenges of living with chronic headaches and made some progress in developing the methodology for running randomised controlled trials of complex interventions for people living with chronic headaches.

Our data effectively excluded the possibility that this short intervention is effective for the treatment of chronic migraine or chronic tension-type headache and episodic migraine. Although there was no effect on our chosen headache-specific outcomes, we have not excluded the possibility that it produces a worthwhile QALY gain, as measured by the EuroQol-5 Dimensions, five-level version.

The health burden of chronic headache disorders, principally chronic migraine, is debilitating. Those living with the condition warrant support to optimise their care planning according to their needs and the latest knowledge about treatment and management. Further advances in this field must be driven by new theoretically and/or biologically informed intervention models.

Research recommendations

- New work to better understand the health impact of chronic headache disorders and to identify modifiable risk factors for a poor outcome.
- Development and testing of new non-pharmacological interventions for a tightly phenotyped group with chronic migraine.
- Research is needed to support improved classification of headache disorders in primary care to allow better targeting of the available drug treatments of proven effectiveness, and reduce medication overuse.

Trial registration

This trial is registered as ISRCTN79708100.

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