‘Fit for surgery’ or ‘fit for life’? Exploring the potential of using the perioperative encounter to promote regular exercise and physical activity: an expanded evidence synthesis

Keywords

Physical Activity; Physical Fitness; Exercise; Quality of Life; Pain; Perioperative Period; Rehabilitation; Prehabilitation; Adult; Delivery of Healthcare; Focus Groups; Self Efficacy; Patient Advocacy; Technology

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Disclosure of Interest

R. Copeland reports grants from Yorkshire Cancer Research. S. Gibson reports studentship grant from NIHR ARC NWC paid to the University of Central Lancashire. A. Smith reports grants from European Society of Anaesthesiology; and consulting fees (personal payment for advice on new airway devices).

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The research reported in this 'first look' scientific summary was funded by the HSDR programme as project number NIHR127879. For more information visit https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/NIHR127879/#/

The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HSDR editors have tried to ensure the accuracy of the authors' work and would like to thank the reviewers for their constructive comments however; they do not accept liability for damages or losses arising from material published in this scientific summary.

This 'first look' scientific summary presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the HSDR Programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the HSDR Programme or the Department of Health and Social Care.

Scientific Summary

Background

There are over four million hospital admissions leading to surgery each year in England alone. The perioperative healthcare encounter (from the initial presentation in primary care until postoperative return to function) offers the potential for substantial health gains in the wider sense and over the longer term.

Aims and objectives

This project aimed to examine a broad range of evidence and knowledge to identify, and set in context, interventions applied during the perioperative period used to promote or enable physical activity and exercise in the medium to long-term. To do this, we undertook a systematic review and conducted focus group and individual interviews with those running services designed to promote physical activity. We aimed to understand the practical and contextual factors which make such interventions 'work', and to synthesise the findings from these research approaches.

Systematic review

Methods

We included randomised controlled trials and quasi-randomised trials, with adult participants (≥ 18 years of age) where at least 60% were scheduled to undergo, or had recently undergone a surgical procedure. We also included non-randomised studies, but because we found sufficient randomised trials, these provided a supplementary set to the review findings.

We included interventions that encouraged participants to engage in physical activity. These were interventions that took place in a group (such as a fitness class) or on a one-to-one level and were or were not individualised to a participant's needs. We included comparisons that were described by study investigators as 'usual care' or were another type of intervention.

We included studies that measured and reported our primary outcomes which were: 1) the amount of physical activity conducted at the end of follow-up (such as mean number of steps measured using a step counter); and 2) the number of people who were engaging in physical activity at the end

of follow-up (such as measured in a self-reported questionnaire). Secondary outcomes were: 1) physical fitness; 2) health-related quality of life at end of follow-up; 3) pain; 4) adverse events; 5) adherence; and 6) participants' experiences of taking part in the programme.

We searched CENTRAL, MEDLINE, CINAHL, Embase, PsycInfo and SPORTDiscus in October 2020. We also searched clinical trials databases and conducted backward and forward citation searches.

Two review authors independently assessed studies for inclusion and extracted data. We used standard review methods throughout; we assessed the risk of bias in randomised controlled trials and used the GRADE approach to assess the certainty of the evidence.

Results

We found 53 studies (51 randomised controlled trials and two quasi-randomised trials) with 8604 participants reporting the effects of 67 interventions. Surgical indications were cancer (11 studies), cardiac (12), bariatric (8), hip and knee replacement (12), as well as individual studies for a broad range of indications.

In more than two-thirds of studies, interventions were started postoperatively; smaller numbers reported preoperative initiation (4), or a mixture of pre- and postoperative initiation (10). Interventions more often involved multiple components or modes of delivery (55.2% of studies). These components tended to fall into three categories: education and advice (82.1% of studies), including the provision of written or verbal information and advice, physical activity recommendations, or a formal exercise prescription; behavioural mechanisms (59.7% of studies), which focused on behaviour change theories, usually through therapeutic approaches including counselling or motivational interviewing; or direct physical activity instruction (44.8% of studies) in the form of group classes or one-to-one sessions.

We analysed our results separately according to whether the intervention was compared with 'usual care' or with another intervention.

Intervention vs 'usual care'

- Amount of physical activity (37 studies, 4969 participants). We found moderate-certainty evidence that physical activity interventions may increase the amount of physical activity at six to 12 months after surgery. This was evaluated using a range of measurement values which we pooled in separate analyses. The measurement reported as minutes/day or week

included the most studies and participants (12 studies, 1947 participants), and demonstrated a small increase in physical activity when participants received the intervention (SMD 0.15, 95% CI 0.04 to 0.27). There was a consistent finding across all measures that the intervention may increase the likelihood that people would do more physical activity.

- Engagement in physical activity (10 studies, 1097 participants). We found moderate-certainty evidence that interventions probably slightly increase people's engagement in physical activity compared with usual care (RR 1.19, 95% CI 0.96 to 1.47; nine studies, 882 participants). In these results, 60 more participants per 1000 would still be engaging in physical activity at the end of follow-up after receiving the intervention. However, the wide CI in the effect estimate indicates that some people receiving the intervention may do less physical activity. Incomplete data from another study were available but not included in analysis.
- Physical fitness (15 studies, 1031 participants). Again, the outcome was evaluated using various measures which may reflect the age of participants or the reason for surgery, or both. In general, we noted a similar trend that suggested an improvement in fitness when people had received a physical activity intervention; but this low-certainty evidence included the possibility that interventions may or may not improve physical fitness at six to 12 months after surgery.
- Health-related quality of life (22 studies, 3015 participants). We found moderate-certainty evidence that physical activity interventions probably slightly increase health-related quality of life at the end of follow-up. Although the primary analysis showed a slight reduction in quality of life as well as an increase, the findings more clearly favoured the physical activity interventions once we removed studies at high and unclear risks of bias from the analysis (SMD 0.17, 95% CI 0.01 to 0.33; 12 studies, 2167 participants).
- Pain (11 studies, 1057 participants). Again, the findings for pain tended to favour the intervention. However, the estimates were all imprecise and included possible benefits as well as harms; the certainty of this evidence was low.
- Adherence (15 studies, 786 participants). The range of adherence was between 47% and 93%. However, definitions of adherence varied between studies, and because the designs of interventions differed significantly it was not reasonable to draw confident conclusions

about adherence to all physical activity interventions; we judged the certainty of this evidence to be very low.

- Adverse events (10 studies, 1410 participants). Few studies reported adverse events data and the certainty of this evidence was very low. Most events were described as not serious and unrelated to the intervention. The few events described as possibly related to the intervention were reported for only 30 participants.
- Participants' experiences of intervention (4 studies, 159 participants). Very few studies reported details of participants' experiences. Feedback was generally positive, and participants were satisfied and/or felt that they had benefited from being able to engage with the intervention. We did not downgrade the certainty of this narrative evidence.

Intervention vs intervention

Only seven studies compared one intervention with another intervention, and the differences in these interventions meant that it was often not feasible to combine data in analysis. The effects from most studies generally indicated little difference between intervention designs. One study found improved engagement with physical activity after using a clinic-based intervention compared to a home-based intervention, one small study found improved health-related quality of life with a home-based intervention compared to a centre-based intervention, and another small study found improvement in pain with a home-based compared to a centre-based intervention. But these findings were not comparable to other studies, and we judged all the evidence, which was sparse and generally inconclusive, to be very low certainty.

Case study enquiry

We sought existing services that were already promoting physical activity to people scheduled to undergo, or who have recently undergone, surgery. We noted that services appeared to fit within one of six 'models' of care: 1) spanning primary and secondary care; 2) being embedded within specialist services; 3) relying on partnerships between community non-health service providers and national health services; 4) being community- or patient-led; 5) are 'low-resource' interventions but which appear to be effective, and 6) offer residential and/or extended (18+ months) support. An annotated compendium of these is presented in the main report.

We conducted two focus group events and two individual interviews (with nine participants from eight UK-based services), using a topic guide developed together with our patient representative. The online focus group discussions and interviews were conducted between November 2020 and January 2021 during national restrictions owing to the COVID-19 pandemic. These were recorded and transcribed then analysed by one of the research team working with our patient representative to generate a list of initial codes. These were developed iteratively into three overarching themes, presented below.

Narratives of physical activity promotion.

It was clear that how activity was 'framed' to patients was important in recruiting and retaining them into programmes. This focussed around three key principles; first that programmes take a holistic, well-being approach, second, that programmes aim to motivate, inspire and support self-efficacy for 'exercise', and third, that programmes and narratives of physical activity are embedded in usual care. It was evident that there is not a single activity, or 'dose' of activity, for every patient and that *finding something that people enjoy* and building on that is the best way to increase people's activity and make new habits. There is a clinical/non-clinical paradox, such that if physical activity is presented to patients as a 'clinical' intervention i.e., as part of their treatment, they are more likely to engage. However, the actual interventions are better delivered in non-clinical settings. Finally, although services were nominally set up to promote physical activity, they in fact provide a wider range of benefits, both intended and unexpected, on mental health and wellbeing.

Setting up and running the service.

Establishing services was often cross-disciplinary, driven by enthusiasts, and more likely to succeed with the support of managers and wider clinical colleagues. Co-designing and listening to patients, as well as a continuous learning culture, was seen as important in helping to shape the best provision. Activity, as treatment, is a necessary message to engendering support from wider colleagues but their support is sometimes reliant on framing physical activity to their particular health perspective, building trust and good relationships, providing evidence, and having a lot of perseverance. Senior 'clinical champions' could aide service development. In this respect, too, patients can act as 'allies' in

promoting the service; if patients are impressed by the service, they are more likely to share this with their clinical team, which can lead to further referrals. Services were typically provided by a number of healthcare professionals, with support from others such as staff at local gyms. The personal qualities of staff, for example, having the capacity for empathy, kindness, and excellent communication is more important than their professional background. Data collection was seen as a key part of programme activity: to evaluate processes and outcomes, to help convince clinical and managerial colleagues of the utility of the service, but also to help secure further funding.

Digital delivery - the COVID-19 pandemic and beyond.

Though the COVID-19 pandemic presented substantial challenges for services the period had also presented an opportunity to consider news ways of working with patients. To varying degrees, services maintained contact with patients with heavy use of social media and follow-along videos to help keep people moving, as well as telephone and email contact, some provision of resources, online exercise diaries, and some live-group sessions. One service described a full spectrum adaption to their provision providing home exercise packs and telephone calls for people with no technical abilities or access to devices/the Internet up to a full timetable of online classes and digital heart rate monitors that meant patients could be live-tracked for safety and encouragement by physical activity trainers. They saw positive results and high engagement. However, other services gave mixed views, several indicating that new methods of engagement were not as effective as face-to-face encouragement and participation and many acknowledged inequities in access to the necessary technology, compounding disadvantage. However, services indicated that they would explore hybrid delivery models beyond the pandemic that blended some of the new digital or remote approaches they had begun with their original models of delivery. This was seen as potentially benefitting certain groups, such as patients receiving chemotherapy or with caring responsibilities that might find it more difficult to travel to sessions.

Synthesis of findings

Although collected using different methodologies and with different intentions, the findings from the systematic review and the qualitative work offer complementary perspectives on the same issue. However, our qualitative work indicates that many factors are at play in ensuring a successful outcome (such as the framing of physical activity, 'buy-in' from broader colleagues, and the space/place in which physical activity is delivered), but these were often not described or explored

in the studies where the focus tends to be on demographic characteristics of participants rather than wider structural considerations at the organisation level. We noted that data collection is an important evaluation tool for trials and for services. Services often drew on patient experience and feedback in the evolution and on-going development of their services and although some studies in the systematic review included patients' perspectives this was not reported consistently. Few of the included studies described socio-economic status of participants, numbers of people from ethnic minorities, or digital literacy, however services in practice acknowledged frustrations in relation to intersecting inequalities experienced by their patients. Although services have been developing digital and remote delivery options throughout the COVID-19 pandemic, newer digital delivery of interventions has not yet had time to feed through to clinical trials. Neither data set took priority in the synthesis of findings.

Recommendations for future research

We recommend that additional research actively engages with patients and their experiences of physical activity promotion and perioperative physical activity programmes. We would encourage further study of the tentative values and principles outlined in this report and their utility and adoption in the shaping and development of perioperative physical activity programmes. We also suggest that inequities in provision related to socio-economic disadvantages, digital access, and ethnicity should be explored. Future randomised controlled trials should include, or even prioritise, outcomes that reflect the wider range of possible benefits associated with physical activity programmes (for instance, greater feelings of control and autonomy in participants). Standardised measures for research and/or service evaluation in this field should be developed and tested.

Conclusion

The research evidence-base for interventions delivered in the perioperative setting, aimed at enhancing physical activity in patients in the medium to longer term, suggests some overall benefit in terms of engagement, levels of activity, physical fitness and quality of life. Our contextual enquiry complements the research literature and indicates that interventions should be focussed around the individual, delivered by compassionate staff in local communities, and promoted by patients' full clinical teams.

Study registration

This project was registered in PROSPERO on 19th July 2019 (CRD42019139008).

Funding

This project was funded by the National Institute for Health Research (NIHR) Health Services and Delivery Research programme and will be published in full in *Health Services and Delivery Research* (forthcoming). See the NIHR Journals Library website for further project information (NIHR127879).