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Development and evaluation of a novel preoperative surgery school and behavioural change intervention for patients undergoing elective major surgery: Fit-4-Surgery School

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Evaluation of a Pre-operative 'Surgery School'

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Summary

Group pre-operative education has usually been limited to conditioning expectations and providing education. Prehabilitation has highlighted modifiable lifestyle factors that are amenable to change and may improve clinical outcomes. We instituted a pre-operative 'Fit-4-Surgery School' for patients scheduled for major surgery, to educate and promote healthful behaviour change. Patients' views of the school were evaluated post-session and its impact on behaviour measured using a postoperative lifestyle questionnaire. The school was launched in May 2016 and was attended by 586/1017 (58%) of invited patients. Patients who did not attend: lived further away, median (IQR [range]) 8 (4-19 [0-123]) miles vs 5 (3-14 [0-172]) miles, $p < 0.001$; and were more deprived, Index of Multiple Deprivation Rank decile median (IQR [range]), 6 (4-8 [1-10]) vs 7 (4-9 [1-10]), $p = 0.04$. Of the 492/586 (84%) participants who completed an evaluation questionnaire, 462 (94%) would recommend the school to a friend having surgery and 296 (60%) planned lifestyle changes. After surgery 232/586 (40%) completed a behavioural change questionnaire, 106 (46%) of whom reported changing at least one lifestyle factor, most commonly by increasing exercise. The pre-operative school was acceptable to patients.

Introduction

Pre-operative patient education holds an established place within the surgical pathway. Traditionally delivered in outpatient clinics, it is accepted as necessary preparation for surgery that enables patients to feel better prepared, more confident and less anxious about undergoing surgery [1]. Pre-operative education has evolved, with group classes becoming an integral part of the Enhanced Recovery Programmes [2]. Classes aim to improve patients' knowledge of the surgery, condition their expectations, as well as teach practical skills and provide advice on how to recover from their surgery more quickly.

Over half of adults in the UK have two or more lifestyle related health risk factors, including malnutrition, obesity, excessive alcohol intake, smoking and inactivity [3]. The pre-operative period offers a unique opportunity to change behaviour and improve patients' health and wellbeing [4]. However, until recently, the full potential of this 'teachable moment' in promoting behaviour change has been overlooked [5]. International trials suggest that interventions to improve fitness, diet and psychological resilience improve outcomes, although as yet there is no consensus on the best method to effect these changes [6,7].

Against this background we developed and implemented a pre-operative patient education programme (Fit-4-Surgery School), which provides traditional education and support to help patients modify their lifestyles. We evaluated patients' views about the school and its impact on their behaviour so that we might improve its effects.

Methods

The University Hospital Southampton Research and Development service waived ethical approval for this evaluation of group teaching before surgery.

Interventions to improve patient outcomes after major colorectal and urological surgery were designed in September 2015 by a perioperative medicine working group, comprised of consultant anaesthetists, surgeons, nurses, a dietitian, occupational therapist, physiotherapist and a smoking cessation advisor. The first intervention we piloted was 'Fit-4-Surgery School' (school) in May 2016, developed using the National Institute for Health and Care Excellence recommendations for planning, developing and delivering behaviour change programmes [8]. We designed interventions to be practical and sustainable by considering local and individual needs, which included: setting expectations for treatment and enhanced recovery; educating patients about rates of harm, pain, its management and breathing exercises; improving nutrition and fitness; and stopping alcohol consumption and smoking tobacco. We used 12 established behaviour change techniques to encourage lifestyle behaviour changes (Table 1) [9]. We subsequently extended the service to patients scheduled for hepatobiliary, upper gastrointestinal or maxillofacial surgery.

Nurses, dietitians, and physiotherapists taught 10-15 patients (often accompanied by a friend or relative) for two hours, using structured oral presentations, illustrated by slides, supplemented by handouts that highlighted key lessons. Sessions complemented local smoking cessation services and fitness training research studies. We posted invitations to all patients scheduled for major colorectal and urological surgery. We used postcode to determine patients' Index of Multiple Deprivation Rank (IMD), using the 2015 Ministry of Housing tool [10]. We determined patients' geographical spread with an online geo-mapping tool [11]. We used logistic regression to analyse the association of variables with school attendance.

At the end of the session we invited patients to complete an anonymised evaluation. We asked participants how much they agreed with statements about their teaching session, using a five-point Likert scale that ranged from 'not at all' to 'definitely'. Patients used this scale to rate the relevancy of the sessions, whether they would recommend the school to a friend having surgery, and whether they intended to change their health behaviour. An open question was also included for any further written feedback. After their surgery we asked participants to complete a questionnaire about pre-operative changes in physical activity, alcohol consumption, smoking, and diet. We analysed responses using the qualitative multi-pass content analysis framework by Rugg and Petre [12].

Results

We invited 1017 patients to pre-operative school, from May 2016 to December 2018, of whom 586 (58%) attended. The median (IQR [range]) time from school to surgery was 22 (13-42 [1-682]) days. Attendees were scheduled for colorectal or urological surgery, 486/586 (83%), or upper gastrointestinal, hepatobiliary or maxillofacial surgery, 100/586 (17%). The characteristics of attendees versus non-attendees are reported in Table 2. Based on their IMD Rank attendees were less socially and economically deprived than non-attendees, $p = 0.04$, and patients who did not attend also lived further away from hospital $p = <0.001$.

Evaluation questionnaires were completed by 492 (84%) school participants. There were some missing data, but all questions were completed by at least 453 (92%) respondents. Almost all respondents (97%) reported they were 'moderately' or 'definitely' satisfied with the venue. The content of the sessions was felt to be 'easy to understand' by 99%, and 'well delivered' by all.

The sessions perceived to be most relevant were 'What to Expect', 'Exercise is Medicine and 'Nutrition prior to Surgery' with 94% / 87% / 74% of respondents respectively reporting the sessions to be 'moderately' or 'definitely' relevant. The smoking and alcohol sessions were thought to be the least relevant, with only 19% and 40% respectively finding the sessions useful. It was noted that the incidence of smoking among the group was 13% and 70% reported to drink alcohol.

The majority of respondents (77%), felt that the session covered what they wanted to know and 94% stated they would recommend the session to a friend having surgery, 60% of patients planned to make lifestyle behaviour changes as a result of attending.

Additional comments were provided by 166 (34%) respondents (Table 3). Recommendations for improvement included more information on stoma and wound care, 'vaping' and specialist diets. Five patients (3%) felt the school would have been better earlier in their pathway. Six (4%) expressed dissatisfaction with parking, finding the venue and the privacy of conversations with school facilitators.

Postoperatively, 232 (40%) school participants completed a behaviour change questionnaire: 106 (46%) reported they had become more active; 96 (41%) had changed their diet; 28/32 had reduced smoking; 99/162 (61%) had reduced alcohol consumption. We were unable to give a questionnaire to most of the other 354 participants before discharge from the ward.

Discussion

Over half of the patients invited to attend a pre-operative 'Fit-4-Surgery School' did so. Most of the participants found the school relevant and useful and nearly half of those who responded after surgery reported changing at least one pre-operative health behaviour.

The attendance rate at our surgery school was similar to that reported by a US programme, but less than a small UK study of 50 patients [13]. Patients from more deprived areas were less likely to attend our school than those from more affluent areas, which is consistent with lower uptake of health improvement programmes by the socially disadvantaged [14]. Impoverished patients are less healthy and die before patients from more affluent areas and they have higher postoperative mortality rates [15]. We think it likely that the 43%, relatively deprived patients, who did not attend may be those most likely to benefit from the behavioural changes the pre-operative school was intended to engender. Smoking cessation was irrelevant to most participants, as 87% of relatively affluent attendees did not smoke.

Most patients were satisfied with the pre-operative school, as reported by others [16]. About 1 in 10 participants commented that the school had increased their confidence and ability to improve their health, which concurs with the findings of other preoperative education classes [17-19]. Some wrote that the school reduced their fear and anxiety: psychological health can influence postoperative outcomes and should be a measure of peri-operative interventions [20, 21]. Many participants enjoyed interacting with healthcare professionals and other patients, which suggests that the experience of school and its potential benefits would be difficult to replicate with written material or automated online learning [22, 23].

Like other papers more than half of post-operative respondents intended to change their behaviour, which is the first step in doing so [24-26]. We employed evidence-based behavioural change techniques and provided resources at the school, including access to support services and social networks, in the hope that these would increase the rate at which the intent to improve health was realised. The imminent 'threat' of surgery may account for the relatively high rate of postoperative respondents who reported changing their pre-operative behaviour, in our study and others [27, 28]. Research suggests that about half of people who intend to change their behaviour do not [29]. The gap between intent and action may be narrowed by more intense support after attending the school [30].

Our study is subject to the weaknesses common to similar studies. Answers to questionnaires can be untruthful, perhaps due to desire to please or fear of disappointment (despite the questionnaires being anonymous). Our sample was biased: participants were different to the similar number of patients who did not attend. Less than one half of participants completed a postoperative questionnaire. Consequently, we could not assess the effect of pre-operative school in 80% of patients

invited to attend. We do not know whether the reported changes in behaviour occurred, and if they did whether the school caused those changes, as some change in pre-operative behaviour might be expected without attending school.

We intend to investigate how we can increase participation by socially deprived patients. We believe that we will be more successful if patients help determine what changes we should make. The problems of assessing interventions with questionnaires could be countered by objective measures, for instance with wearable devices that quantify movement.

In conclusion, pre-operative group education is feasible and appears to promote healthy behaviour before surgery. It is recommended that group education be considered in the development of prehabilitation pathways and should include behaviour change support that empowers patients to make healthful changes in behaviour, as well engaging patients and the public from inception. Our results suggest that attention should be paid to how more deprived patients could be helped and how the effects of pre-operative school are assessed. Objective measures of behaviour as well as validated questionnaires should be used to determine the success of pre-operative interventions in improving peri-operative outcomes.

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Table 1 Behaviour change techniques used within Surgery School (adapted from Michie et al. [9]).

| Techniques | Example of application |
|--|--|
| Goal Setting (behaviour) | Participants set their own goals for physical activity or alcohol intake. |
| Self-monitoring of behaviour | Participants use diaries to monitor alcohol or prompt exercise. |
| Social support (practical) | Participants encouraged to contact nurse, dietitian and smoking and alcohol cessation teams. |
| Instruction on how to perform a behaviour | Reduce fat consumption and eat more fruit and vegetables. |
| Information about health | Explain how exercise improves health. |
| Demonstrate behaviour | Demonstrate simple squats to strengthen legs. |
| Social comparison | Others experiences: e.g. a lady who climbed stairs in her block of flats. |
| Behaviour substitution | Low alcohol alternatives. |
| Credible source | Teaching by health professionals. |
| Avoidance/reducing exposure to cues for the behaviour | Avoid dipsomaniacs; avoid rounds of drinks at the pub. |
| Distraction | Go to a coffee shop rather than a pub at lunch time. |
| Identification of self as role model | Describe experiences of trying to increase physical activity levels. |

Table 2 The characteristics of 1017 patients invited to a pre-operative 'Fit-4-Surgery-School', categorised by whether they attended. Values are number (proportion) or median (IQR [range]).

| | Attended pre-operative school | | p value |
|--------------------------------|-------------------------------|--------------------|---------|
| | Yes (n = 586) | No (n = 431) | |
| Age; years | 68 (58-75 [19-91]) | 69 (57-76 [18-91]) | 0.995 |
| Cancer | 473 (81%) | 360 (84%) | 0.25 |
| IMD Rank Deciles | 7 (4-9 [1-10]) | 6 (4-8 [1-10]) | 0.04 |
| Deciles 1-5 | 195 (33%) | 159 (37%) | 0.1 |
| Deciles 6-10 | 387 (66%) | 254 (59%) | |
| Missing Data | 4 (< 1%) | 18 (4%) | |
| Home to hospital; miles | 5 (3-14 [0-172]) | 8 (4-19 [0-123]) | < 0.001 |

IMD, Index of Multiple Deprivation score: 1 represents the most deprived English decile and 10 represents the least deprived English decile

Table 3 The free text feedback provided by 166/586 (28%) participants who attended the ‘Fit-4-Surgery School’, categorised by theme Content Analysis of patient’ feedback [12]. Values are number (proportion).

| Themes | Number | Example |
|-------------------------------|----------|---|
| Usefulness | 89 (54%) | ‘Very useful session’ ‘I feel this is a valuable tool for people preparing for surgery’ |
| Experience | 51 (31%) | ‘A very good session’ ‘Thank you for a very interesting talk, I really enjoyed it’ |
| Presentations | 47 (28%) | ‘The tone of the delivery was just right’ ‘The whole session was very well presented and delivered’ |
| Constructive feedback | 24(14%) | ‘Diet information misleading and not accurate’ ‘Would like to know more regarding care of surgery site and stoma’ |
| Staff interaction | 18 (11%) | ‘I liked that they were happy to listen and help’ ‘Helpful, friendly, reassuring delivery. Very kind manner of nurse’ |
| Accessible | 15 (9%) | ‘easy to listen to and understand, points put over in everyday language’ |
| Benefits for attendees | 15 (9%) | ‘I will make changes to my lifestyle as a result’ ‘Helped ease some of my fears’ ‘It was nice to meet and chat to other patients’ |
| Suggested topics | 11 (7%) | ‘Ideas on sleeping well before surgery’ ‘Would like to know more regarding care of surgery site and stoma’ |
| Timing of session | 5 (3%) | ‘Could have been done earlier, only three weeks till surgery. Not really enough time to implement extra exercise’ |
| Completeness | 4 (2%) | ‘Very comprehensive without labouring the point’ |
| Environment | 4 (2%) | ‘Made to feel very welcome and at ease’ |
| Privacy | 2 (1%) | ‘Private as you wanted’ |
| Refreshment | 2 (1%) | ‘Good coffee’ |