Structured lifestyle education to support weight loss for people with schizophrenia, schizoaffective disorder and first episode psychosis: the STEPWISE RCT

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Scientific summary

The STEPWISE RCT

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Scientific summary

Background

Schizophrenia is a psychotic illness that affects around 1% of the population. The prevalence of obesity in people with schizophrenia is approximately twofold higher than that in the general population and is associated with higher levels of morbidity, especially cardiovascular disease, diabetes mellitus and early mortality.

Objectives

- To develop a group-based, structured self-management lifestyle education programme for people with schizophrenia, schizoaffective disorder and first episode psychosis.
- To conduct a multicentre randomised controlled trial (RCT) to investigate whether or not the intervention leads to a clinically important difference in weight change, as well as physical activity and diet, compared with usual care.
- To conduct a mixed-methods process evaluation to explore intervention delivery and participant and facilitator experiences, and to explain discrepancies between expected and observed outcomes.
- To conduct an economic evaluation of the intervention.
- To assess the fidelity of intervention delivery when undertaken at 10 different sites.

Design

Intervention development

The intervention development was guided by the Medical Research Council framework for complex interventions: (1) identifying the evidence base through a literature review; (2) identifying/developing a theory and modelling the process and outcomes, through consultation with service users and health professionals; and (3) four plan–do–study–act cycles incorporating qualitative interviews.

Randomised controlled trial

The trial was a two-arm, parallel-group RCT with a 1 : 1 allocation ratio, using web-based randomisation and with the principal investigator and analysts being blinded to allocation until after the final analysis.

Mixed-methods process evaluation

The process evaluation used three main approaches:

1. logic modelling, integrating contextual factors with the National Institute for Health Behaviour Change Consortium fidelity framework and Linnan and Steckler's process evaluation framework
2. a qualitative single-case design, with the unit of analysis variably at the participant level ($n = 24$ participants) and at the level of the experimental intervention programme ($n = 20$ facilitator interviews)
3. a triangulation protocol to compare quantitative process data with qualitative findings.

Economic evaluation

The economic evaluation was undertaken from a health and social care and societal perspective and included the costs of medicines and NHS professionals in primary and community care and inpatient settings, as well as social care costs (including costs of education, and employment and informal care). The cost-effectiveness of the physical activity and healthy eating programme was assessed by combining costs with the primary outcome and quality-adjusted life-years (QALYs) generated from the EuroQol-5 Dimensions, five-level version (EQ-5D-5L) questionnaire.

Fidelity of the intervention delivery

Fidelity was assessed by facilitator talk time and direct observation of the facilitator behaviour and conduct at sessions.

Setting

Community settings in 10 UK mental health NHS trusts.

Participant selection and recruitment

Potential participants were eligible for inclusion if they were adults aged ≥ 18 years with a diagnosis of schizophrenia, schizoaffective disorder or first episode psychosis, were being treated with an antipsychotic drug, were willing and able to give consent and to attend group education sessions delivered in English, and had a body mass index of ≥ 25 kg/m^2 (≥ 23 kg/m^2 for adults with South Asian and Chinese backgrounds) or were concerned about weight. People with physical illnesses that could seriously reduce life expectancy or affect metabolic measures or weight gain were excluded. Those with a primary diagnosis of a learning disability, who were currently pregnant or < 6 months post partum, who had significant alcohol or substance misuse or a (tentative) diagnosis of psychotic depression or mania or were currently (or within the past 3 months) engaged in a systematic weight management programme were also excluded.

Intervention development study

Twenty-four service users were recruited between May and December 2014 in four waves at one centre (Sheffield) to refine a prototype intervention before the RCT.

Randomised controlled trial

Between 10 March 2015 and 31 March 2016, 1223 adults with schizophrenia, schizoaffective disorder or first episode psychosis were screened for eligibility. A total of 423 consented to participate in the trial and 414 participants (target: $n = 396$) were randomised (intervention arm, $n = 208$ participants; usual care, $n = 206$ participants).

Interventions

All participants received standardised written lifestyle information about diet, physical activity, smoking and alcohol use. The use of external weight loss programmes was permitted at the individual level.

The intervention group received a complex intervention based on Bandura's self-efficacy theory, Leventhal's self-regulation theory and Marlatt and Gordon's relapse prevention model. The programme comprised (1) four 2.5-hour group-based structured lifestyle self-management education sessions, 1 week apart, facilitated by trained professionals delivering manualised content; (2) fortnightly support contacts from facilitators (face to face or via telephone, mail or e-mail, by participant preference); and (3) three 2.5-hour group booster sessions delivered at 3-monthly intervals post core sessions, reinforcing further behaviour change/self-management strategies.

The control group received treatment as usual, captured through a survey at the site level and a health and social care resource questionnaire.

Main outcome measures

The main outcome measures were weight change (primary outcome at 12 months), body mass index, waist circumference, objectively measured physical activity [wrist-worn GENEActiv (Activinsights, Kimbolton, UK) accelerometer], adapted Dietary Instrument for Nutrition Education questionnaire, blood pressure, fasting glucose, lipid profile, glycated haemoglobin, health state utility (EQ-5D-5L), Short Form questionnaire-36 items, Brief Illness Perception Questionnaire [(B-IPQ) weight], Brief Psychiatric Rating Scale, health and social care resource use (Client Service Receipt Inventory), Patient Health Questionnaire 9-item depression scale, weight loss programmes, session feedback (intervention only) and adverse events. Analyses were undertaken on an intention-to-treat basis, with the treatment effect adjusted for the baseline value, recruiting site, years since the person started antipsychotic treatment and the clustering effect of the course attended.

Results

The trial closed on 31 March 2017, with 341 (81.6%) participants completing the trial. Forty-seven (25 intervention, 22 control) participants withdrew consent, three died (intervention) and 21 (11 intervention and 10 control) participants were lost to follow-up. The intention-to-treat analysis excluded two participants (control); one was erroneously randomised, having previously not consented, and one withdrew all consent to use their data. Therefore, 412 (207 intervention and 205 control) participants were included in the analyses. Two hundred and ten participants (51.0%) were male, 349 participants (84.7%) were white European and the average age was 40 years.

Randomised controlled trial outcomes

At baseline, the groups were well balanced; however, the intervention group participants were, on average, 3 kg heavier at baseline, which is partially explained by the higher proportion of men in the intervention arm (55.6% vs. 46.3%). Three hundred and forty-nine participants (84.7%) had a diagnosis of schizophrenia or schizoaffective disorder and 63 (15.3%) were categorised as having first episode psychosis. One hundred and eleven intervention group participants (53.6%) attended three or more core sessions and one or more booster sessions; 36 participants (17.4%) did not attend any intervention sessions.

After 12 months, the primary outcome of weight change (kg) was almost identical between the trial arms, with a non-significant mean reduction in weight of 0.47 kg in the intervention group and 0.51 kg in the control group (difference = 0.0 kg, 95% confidence interval –1.59 to 1.67 kg; $p = 0.964$). Weight change by centre varied, with 15 intervention participants at one centre losing an average of 4 kg [standard deviation (SD) 4.30 kg] and 18 control group participants gaining on average 3 kg (SD 4.30 kg). In contrast, 21 intervention participants at another centre lost an average of 0.5 kg (SD 6.89 kg), whereas 24 participants in the control group lost 3 kg (SD 9.15 kg). There were no significant differences in change in weight, body mass index or waist circumference at the 3- and 12-month assessments. Laboratory and vital signs were unchanged at 12 months.

The intervention had no overall effect on dietary intake, as measured by the Dietary Instrument for Nutrition Education (DINE); physical activity at baseline was similarly low in both groups. At the 3-month assessment, weekend moderate or vigorous physical activity was significantly higher in the intervention arm, but this difference had disappeared by 12 months.

Self-reported quality of life (QoL), measured using the Short Form questionnaire-36 items, suggested higher QoL post randomisation in the intervention group for physical functioning and bodily pain, but a higher level of emotional well-being in the control group. On the main measure of the EQ-5D-5L, there was no significant difference between the groups. However, on the 'thermometer' health scale, the control group showed more improvement at 12 months, with a difference of 4.4 points ($p = 0.028$). For self-reported depressive symptoms, measured using the Patient Health Questionnaire-9, there was minimal change in both groups over time. In terms of perceptions of weight problems, the B-IPQ total score showed a small improvement in both groups over time, although the changes in the eight dimensions of the B-IPQ were mixed. There were

no significant differences between the groups for the total score or any dimension. For both groups, the observer-rated Brief Psychiatric Rating Scale showed little change over time, with no significant difference between groups.

Twelve participants (eight in the control arm and four in the intervention arm) attended one or more weight loss programmes outside the trial at 3 months, of whom five were still attending at 12 months. At 12 months, 25 participants (7.4%; 8 in the control arm and 17 in the intervention arm) reported attending a weight loss programme outside the trial.

Anonymous intervention session feedback was invited at all seven group sessions, and 708 forms were returned. Overall, the majority (≈90%) of responses were positive, with 87.2% of participants agreeing that the sessions had met their needs. Three-quarters of the free-text comments were also positive. As feedback could not be linked to individual outcomes, these were analysed by centre (five were excluded, owing to no site code). There were no significant correlations between mean weight change and mean feedback scores for centres at 3 or 12 months (Spearman's rank-order correlation = –0.20, $p = 0.476$, and Spearman's rank-order correlation = 0.042, $p = 0.454$, respectively).

Adverse events

A total of 46 adverse events occurred in 37 intervention participants and 34 adverse events occurred in 26 control participants. Fifty per cent of adverse events in both groups were psychiatric hospitalisation. Four deaths were reported, all in the intervention group; the causes were pulmonary embolism following a ruptured Achilles tendon; left ventricular hypertrophy, hypertension and obesity; diabetic ketoacidosis leading to cardiac arrest; and myocardial infarction. Three of the deaths occurred during the trial and one occurred 37 days after trial completion.

Cost-effectiveness

The incremental cost-effectiveness ratio (ICER) from the health-care perspective was £246,921 per QALY gained and the ICER from the societal perspective (including employment and education for patients and informal care) was £367,543 per QALY gained.

Process evaluation

Both the participants and the facilitators described how the intervention was popular and well received. The participants particularly enjoyed meeting others facing the same challenge of managing weight. It was relatively easy to fill places on the STructured lifestyle Education for People WIth SchizophrEnia, schizoaffective disorder and first episode psychosis programme (STEPWISE) course, indicating a high level of interest in weight management programmes among people with severe mental illness.

The process evaluation found potential barriers to self-management at the level of the individual's psychological functioning (e.g. cognitive or attention deficit) and participative capabilities (e.g. low income, anxiety about social interaction), as well as the attitudes of family members and health professionals (paternalism and gatekeeping). Detailed case studies suggested that achieving and maintaining weight loss was particularly difficult for those with first episode psychosis (< 3 years since antipsychotic treatment initiation) and for those with more severe symptoms.

Interviews with developers suggested that the intervention was well grounded in behaviour change theory and had a high level of acceptability to participants. Facilitators reported that they understood and constructed value for the intervention, but were sometimes sceptical about the commitment of senior NHS management to the programme and rarely felt adequately resourced at an organisational level. They would have preferred to have been kept abreast of changes in body weight to assess the effects of the programme on its participants. Facilitators anticipated changing STEPWISE if adopted at the sites, or integrating ideas from it into their own practice if it did not. Although there were opportunities for sharing stories and action-planning, facilitators felt that they needed greater feedback on biomedical and lifestyle data during the sessions to support individuals better.

Analysis against the logic model highlighted the potential role for quality assurance infrastructure in raising and maintaining the quality of delivery. Facilitator training courses and materials were valued and facilitators were generally skilled and motivated. Senior management commitment was generally good, but this did not always translate into appropriate resourcing, and gatekeepers did not always refer eligible patients. The availability of taxi fares for group attendance played a key part in patient engagement. The work of programme and case management was almost always described as inadequately resourced and the number of facilitators who left the trial was high (an average of 20% over 40 weeks). The reason for this was not formally assessed but was often related to work promotions rather than discontent with the intervention.

The fidelity assessment indicated that the delivery was largely as planned, with the mental health care professionals avoiding didactic teaching while adopting facilitative behaviours that allowed the participants to contribute to the groups.

Conclusions

Despite concerns about the ability to recruit and retain people with schizophrenia, the STEPWISE trial was completed successfully within the original time frame; however, the STEPWISE intervention was neither clinically effective nor cost-effective. Current National Institute for Health and Care Excellence guidance recommends that lifestyle programmes should be offered to people with severe mental illness, but does not state how these should be commissioned. The results of this trial suggest that lifestyle programmes that have been shown to be effective in other populations, such as in people with diabetes mellitus, are not necessarily effective in people with schizophrenia.

Recommendations for research

Further research should investigate if:

- a more intensive lifestyle management programme with longer periods of maintenance support, complemented by objective measures of weight, diet and exercise, delivered by more experienced facilitators or by people from different professional backgrounds is clinically effective and cost-effective
- a more flexible approach, including both group and one-to-one sessions, is more effective
- a broader approach, incorporating adjustment of antipsychotic treatments and the use of adjunctive pharmacological interventions, may be required
- it is possible to overcome the barriers to attendance at lifestyle management programmes
- other formats, including family members or carers, would be more effective
- lifestyle management programmes should be tailored on the basis of the duration of psychotic illness; for example, preventative approaches for people with first episode psychosis may need to be different from those for people with more established disease
- a lifestyle intervention should be combined with specific medication review and/or pharmacological approaches to weight management.

Trial registration

This trial is registered as ISRCTN19447796.

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