original papers

field of suicide research, as it offers the potential to listen to the voice of the individual at a critical time prior to death. Clearly, the length of the interval between the last call and the date of death will be a significant factor in selecting those calls which could benefit from examination. A formal analysis of such calls made within a defined time frame using qualitative research methods may provide valuable clues to the caller's mental state at the time of the call and offer the potential to develop improvements in service response to such callers.

Acknowledgements

We thank the coroners in Hampshire and the Isle of Wight; Anna Walker (formerly Mental Health Lead at NHS Direct, Hampshire) who acted as liaison between NHS Direct and the University of Southampton Mental Health Group and who, with the assistance of Caren Sargant (nurse advisor), matched the names provided by the coroner to records in the NHS Direct database; the NHS Direct Mental Health Team and all other staff at NHS Direct for providing valuable feedback on the preliminary drafts.

Declaration of interest

None.

References

DEPARTMENT OF HEALTH (2002) *National Suicide Prevention Strategy for England*. Department of Health.

HANSARD (2005) *House of Commons Hansard Written Answers for 5 Oct 2005* (http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo051005/index/51005-x.htm).

ISOMETSA, E., HEIKKINEN, M., MARTTUNEN, M., *et al* (1995) The last appointment before suicide: is suicide intent communicated? *American Journal of Psychiatry*, **152**, 919–922.

LUOMA, J., MARTIN, C. & PEARSON, J. (2002) Contact with mental health and primary care providers before suicide: a review of the evidence. *American Journal of Psychiatry*, **159**, 909–916.

NHS DIRECT (2005) *Executive Summary. Quarterly Performance Report* (reference O6B.005) (http://www.nhsdirect.nhs.uk).

WORLD HEALTH ORGANIZATION (1977) *Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death* (9th revision) (ICD–9). WHO.

***Michael Bessant** Regional Mental Health Lead, NHS Direct, Acuma House, Axis 4/5, Woodlands, Almondsbury, Bristol BS32 4JT, email: mike.bessant@nhsdirect.nhs.uk, **Elizabeth A. King** Senior Research Fellow, **Robert Peveler** Professor of Liaison Psychiatry, University of Southampton, Royal South Hants Hospital, Southampton

Psychiatric Bulletin (2008), **32**, 95–98. doi: 10.1192/pb.bp.105.008342

IRENE CORMAC, SHEREE HALLFORD, LISA HART, SANDRA CREASEY AND MICHAEL FERRITER

Evaluation of an integrated weight management and fitness programme in a high-security psychiatric setting

AIMS AND METHODS

To evaluate a new integrated weight management and fitness service for long-stay psychiatric patients who were obese or overweight with physical health risks. Body size and fitness were measured before and after each 10- to 12-week programme.

RESULTS

The number of patients referred to the programme was 145; 102 were accepted, 95 started a programme and 46 completed it. Analysis was by intention-to-treat. There were significant reductions in weight (P=0.001), body mass index (BMI, P=0.001) and waist size (P=0.001), and considerable improvements in hand strength (left hand, P=0.03; right hand, P=0.015), flexibility (P=0.022), lung function (P=0.001) and aerobic capacity (P=0.001).

CLINICAL IMPLICATIONS

An integrated programme of weight management and fitness is effective in reducing body weight and waist size, and in improving physical fitness in long-stay psychiatric patients. The long-term effect on patient's health and fitness needs to be monitored and strategies are needed to reduce patient withdrawal.

Obesity is a serious health risk which increases premature mortality and the incidence of diseases such as type 2 diabetes mellitus, cerebrovascular accidents, hypertension, coronary heart disease, arthritis and some forms of cancer. Central deposition of adipose tissue further increases health risk (Lean *et al*, 1995). Dietary modification and physical activity are key components of weight management programmes (National Institute for Health and Clinical Excellence, 2006; Swanton & Frost, 2007); physical exercise reduces the risk of weight gain, obesity, cardiovascular disease, diabetes and some forms of cancer (Department of Health, 2004).

Obesity contributes to the increased morbidity and premature mortality already known to occur in psychiatric patients (Harris & Barraclough, 1998). Side-effects of psychotropic medication, including weight gain (Gentile, 2006), may also increase physical health risks (Ray *et al*, 2001; Enger *et al*, 2004; Joukamaa *et al*, 2006).

A survey at Rampton Hospital (Cormac *et al*, 2005) found high rates of obesity, large waist size and a mean

original papers

increase of weight since admission of 10.62 kg in men and 12.74 kg in women. All patients in Rampton Hospital have complex mental health problems and many have physical comorbidities. In a high-security hospital, access to exercise is limited by restrictions on patient freedom of movement, whereas meals and snacks are provided by the hospital catering service and other food can be purchased from the patients' shop.

As part of a wider initiative to improve the physical health of psychiatric patients, a weight management and fitness programme was developed at Rampton Hospital to treat patients who were obese or overweight with health risks. The programmes were delivered three times per year, for 10–12 weeks, and consisted of education on weight management and exercise sessions.

Method

Health and fitness indicators were evaluated before and after each programme. The research ethics committee was consulted to confirm that this was a service evaluation and not a research project.

Staff

With a grant of £250 000 from the National Health Service Modernisation Monies, we recruited hospital staff on temporary secondment and formed a 'healthy lifestyle team'. The team members were a healthy lifestyle instructor (a member of staff with a catering background), three and a half full-time equivalent fitness instructors (three technical instructors and a half time nursing assistant), security staff, a psychology assistant and an administrator. A consultant forensic psychiatrist (I.C.) led the team with part-time support from a dietician (S.H.), a health promotion nurse and a nurse manager.

Recruitment

Patients were eligible to enter a programme if they were obese or overweight with comorbidities, such as diabetes and hypertension. They were referred to the service by their clinical team who provided information about the patients' current mental state and capacity to participate. Data were collected by the healthy lifestyle team on patients' demographics, physical and mental health, past medical history and risk factors.

Patients who agreed to join a programme underwent a structured health and fitness assessment and those accepted were offered a place on the next available programme. They were free to leave the programme at any stage.

On each programme, patients were assigned to groups according to their clinical directorate, which enabled the team to present educational material in the most effective way and to generate peer support. Attendance to at least five educational sessions was considered completion of a programme. Patients could attend subsequent programmes, with the agreement of their clinical team and the healthy lifestyle team.

Education sessions

The dietician developed the educational component and trained the healthy lifestyle instructor, who conducted the weekly education sessions. These provided general information on healthy eating, an introduction to nutrition and *The Balance of Good Health* (British Nutrition Foundation, 1998), with practical advice on portion size and choosing healthy options from the hospital menu and shop. The sessions were tailored to the intellectual abilities of the patients and motivational techniques were used, such as personal goal setting and praise. The team also used visual and educational aids, replica foods and sports equipment such as exercise balls and badminton racquets.

Fitness sessions

The fitness instructors combined many types of exercises to achieve weight loss and improve body shape, strength and flexibility. Each patient had to take part in a weekly, 1-hour fitness session combined with a weight management education session, plus an optional additional 1-hour fitness session. Activities were tailored to individual patient's fitness levels and included swimming, guided walking, indoor curling, aerobics, activities with exercise balls, circuit training, badminton and volleyball.

During fitness sessions, the instructors observed the patients closely for signs of overexertion and distress. Fitness measures were applied to assess the impact of the programme and also to provide positive feedback to the patient and to strengthen their motivation. The following measures are widely used on the general population by fitness professionals.

Outcome measures

At the beginning and end of each programme we took measurements of: body mass index (BMI), waist size, resting heart rate, blood pressure, hand strength (left and right hand), flexibility (using the sit-and-reach box), peak expiratory flow, and aerobic capacity (measured with a heart-rate monitor during a sub-maximal test on an exercise bicycle). Hand strength and flexibility are indicators of general fitness and aerobic capacity is an indicator of cardiovascular fitness. Weight was also measured weekly to assist in setting goals for the patients and a mid-term fitness assessment was offered, but these data are not reported here. Fitness assessments were not undertaken if the patient had a significant health risk such as unstable angina.

Analysis

Statistical analysis was carried out on an intention-to-treat basis, using the measurements data from patients accepted on a programme for the first time. When patients dropped out of the programme, their last results were treated as 'end of evaluation' results. The Wilcoxon matched pairs signed-rank test was used and all statistical tests were two-tailed.

https://doi.org/10.1192/pb.bp.105.008342 Published online by Cambridge University Press

Table 1. Recruitment and attrition for each patient group

	Male personality disorder	Male learning disability	Male mental illness	Female patients (all disorders)	All patients
Referred to programme	39	19	36	51	145
Accepted	25	15	28	34	102
Started	21	14	26	34	95
Completed	11	13	15	7	46

Table 2. Mean baseline measures for each patient group before a programme

	Male personality disorder	Male learning disability	Male mental illness	Female patients (all disorders)	All patients	
					Mean (s.d.)	Range
Weight, kg (*n*=83)	109.8	90.3	105.2	106.9	104.1 (22.46)	69–178
BMI, kg/m^2 (*n*=72)	32.7	30.0	33.1	39.2	34.0 (6.08)	24–56
Waist size, cm (*n*=50)	115.8	106.4	114.3	127.5	115.6 (13.35)	96–153
Resting heart rate, bpm (*n*=79)	81.3	79.0	86.1	87.2	83.7 (12.15)	60–109
Systolic BP, mmHg (*n*=50)	126.9	122.4	126.4	121.4	124.5 (14.96)	76–157
Diastolic BP, mmHg (*n*=50)	77.7	76.2	80.1	81.7	78.9 (10.56)	47–100
Strength right hand, kg (*n*=76)	38.2	34.9	38.4	23.1	34.9 (13.1)	14–79
Strength left hand, kg (*n*=76)	38.4	33.3	38.2	23.5	34.6 (11.6)	14–63
Flexibility, cm (*n*=68)	12.9	15.2	12.8	14.4	13.6 (7.8)	3–34
Peak expiratory flow, l/min (*n*=77)	523.7	470.7	561.4	436.0	510.0 (99.2)	200–680
Aerobic capacity level[1] (*n*=44)	14	9	7	11	10 (7.8)	1–29

BMI, body mass index; BP, blood pressure.

1. Beginner: 1–10; intermediate: 11–20; athlete: 21–30.

Table 3. Difference between the means at the end of the programme and at baseline with statistical significance of change for all patients

	Male personality disorder	Male learning disability	Male mental illness	Female patients (all disorders)	All patients (95% CI)
Weight, kg (*n*=83)	−1.0	−1.0	−2.0	−1.0	−1.3 (0.7, 1.9)***
BMI, kg/m^2 (*n*=72)	−0.9	−1.0	−0.7	+0.2	−0.6 (0.6, 1.1)***
Waist size, cm (*n*=50)	−1.8	−1.7	−2.7	−1.3	−2.0 (0.9, 3.0)***
Resting heart rate, bpm (*n*=79)	−1.3	+7.9	+1.2	−0.9	+1.4 (−3.8, 0.9)
Systolic BP, mmHg (*n*=50)	−0.1	+0.9	+1.7	−0.1	+0.2 (−2.9, 2.6)
Diastolic BP, mmHg (*n*=50)	+2.1	−1.9	−3.8	−0.2	−0.8 (−2.5, 3.9)
Strength right hand, kg (*n*=76)	+1.8	0.0	+3.0	+1.7	+1.8 (0.3, 3.3)*
Strength left hand, kg (*n*=76)	+2.1	+0.3	+3.0	+0.1	+1.7 (0.5, 2.9)**
Flexibility, cm (*n*=68)	+1.1	+0.8	+0.9	+0.5	+0.9 (0.1, 1.6)**
Peak expiratory flow, l/min (*n*=77)	+26.3	+11.3	+19.6	+20.7	+19.9 (9.6, 30.1)***
Aerobic capacity level[1] (*n*=44)	+3	+6	+6	+4	+4 (2.2, 6.2)***

BMI, body mass index; BP, blood pressure.

1. Beginner: 1–10; intermediate: 11–20; athlete: 21–30.

*$P<0.05$; **$P<0.005$; ***$P<0.001$.

Results

Recruitment and attrition

Four programmes were run sequentially for 10–12 weeks' duration. A total of 145 referrals were made to the programmes. One hundred and two patients were accepted, 95 patients started a programme and 46 completed five or more sessions. Twenty-five patients joined two programmes and eight patients joined three programmes. Results from attendance at subsequent programmes have not been reported here.

Where data were incomplete, the numbers of patients included in the analysis are given in brackets. This could happen for several reasons, e.g. patients declining to be measured or curtailment in assessment of those with significant physical risk factors (such as hypertension and severe obesity), where tests for aerobic capacity and lung function are contraindicated. Table 1 shows the recruitment and attrition rates for each clinical directorate.

The average number of the combined fitness and education sessions attended was five (s.d.=3.7, range

https://doi.org/10.1192/pb.bp.105.008342 Published online by Cambridge University Press

original papers

0–11). The average number of the separate fitness sessions attended was also five (s.d.=3.7, range 0–11).

Demographics

The mean age of patients at recruitment was 37.1 years (range 20–63) with a slightly higher mean age in those who completed a programme (37.91 years, range 20–63). The ethnic background of those who completed the programme was 88% White.

Comparison of 'before and after' scores

Table 2 shows the mean baseline scores by clinical directorate. The mean weight loss was 1.3 kg (s.d.=2.73, range 12 kg gain to 9 kg loss) and the mean waist size reduction was 2.0 cm (s.d.=3.73, range 8 cm gain to 8 cm loss).

Table 3 shows the mean difference between 'before and after' scores for all variables, also by clinical directorate, in addition to the significance level for difference for the combined patients.

Many patients reported that they enjoyed the fitness sessions as well as the interactive components of the weight management education.

Discussion

We have established that patients in a long-stay psychiatric hospital with chronic mental disorders will voluntarily participate in weight and fitness management programmes to their health benefit. Our findings show clinical improvements of weight loss and reduced BMI, reduction in waist size and improved fitness measures (increase in hand strength, flexibility, peak expiratory flow and aerobic capacity). The benefits from weight loss, reduction in waist size and greater aerobic capacity may lessen cardiovascular health risks and prevent the development of cardiac disease and diabetes.

There were problems with adherence to the programmes, which lowered the overall effectiveness. Patients who left their programme early did not necessarily wish to be measured or have a fitness assessment. Male patients responded better to the programme than female patients who had higher rates of withdrawal. Although there are no data on the reasons for these different attitudes, female patients tend to have more complex mental health problems and are generally more obese, which may impact on recruitment and retention. Male patients with learning disability had the lowest rates of withdrawal. Further investigation is needed into gender and diagnostic category differences and whether there is seasonal variation in effectiveness of the programme. We need to establish whether the programmes are effective in the long-term and whether improvements are sustained.

This service was expensive to design, develop and run with the cost of staff salaries and the purchase of equipment. The cost was in excess of £250 000 in the first year of operation with savings of £15 000 in the second year. We did not attempt to quantify the potential savings resulting from reduced patient morbidity as a result of the programme.

We acknowledge that staff commitment, enthusiasm and training were important factors in the success of the service. We had expected that the best achievable outcome would be stabilisation of weight for most patients so the improvements in weight loss and fitness were very encouraging. Such fitness and weight management programmes could be adapted for use in the community, day-hospital and other in-patient settings to improve the physical health of a wide range of people with mental disorders and learning disability.

Declaration of interest

None.

Acknowledgements

This programme was funded by Rampton Hospital as part of a £250 000 NHS Modernisation Fund allocation, extended for a second year.

References

BRITISH NUTRITION FOUNDATION (1998) *The Balance of Good Health*. British Nutrition Foundation.

CORMAC, I., FERRITER, M., BENNING, R., *et al* (2005) Physical health and health risk factors in a population of long-stay psychiatric patients. *Psychiatric Bulletin*, **29**, 18–20.

DEPARTMENT OF HEALTH (2004) At least five a week. Evidence of the impact of physical activity and its relationship to health: a report by the Chief Medical Officer. TSO (The Stationery Office).

ENGER, C., WEATHERBY, L., REYNOLDS, R. F., *et al* (2004) Serious cardiovascular events and mortality among patients with schizophrenia. *Journal of Nervous and Mental Disease* **192**, 19–27.

GENTILE, S. (2006) Long-term treatment with atypical antispychotics and the risk of weight gain. A literature analysis. *Drug Safety*, **29**, 303–319.

HARRIS, E. C. & BARRACLOUGH, B. (1998) Excess mortality of mental disorder. *British Journal of Psychiatry*, **173**, 11–53.

JOUKAMAA, M., HELIÖVAARA, M., KNEKT, P., *et al* (2006) Schizophrenia, neuroleptic medication and mortality. *The British Journal of Psychiatry*, **188**, 122–127.

LEAN, M. E. J., HAN, T. S. & MORRISON, C. E. (1995) Waist circumference as a measure for indicating need for weight measurement. *BMJ*, **311**, 158–161.

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE (2006) *Obesity: The Prevention, Identification, Assessment and Management of Overweight and Obesity in Adults and Children*. NICE (http://www.nice.org.uk/guidance/CG43).

RAY, W. A., MEREDITH, S., THAPA, P. B. *et al* (2001) Antipsychotics and the risk of sudden cardiac death. *Arch Gen Psychiatry*, **58**, 1161–1167.

SWANTON, K. & FROST, M. (2007) *Lightening the Load: Tackling Overweight and Obesity*. National Heart Forum (http://www.heartforum.org.uk/Publications_NHFreports_Overweightandobesitytool.aspx).

***Irene Cormac** Consultant Forensic Psychiatrist, Rampton Hospital, Nottinghamshire Healthcare NHS Trust, Retford DN22 OPD, UK, email: irene.cormac@nottshc.nhs.uk, **Sheree Hallford** Senior Dietician, Nutrition and Dietetics Service, Bassetlaw Hospital, Doncaster and Bassetlaw NHS Foundation Trust, Kilton Hill, Worksop, UK, **Lisa Hart** Health and Fitness Team Lead, Rampton Hospital, Nottinghamshire Healthcare NHS Trust, **Sandra Creasey** Assistant Clinical Psychologist, Psychology Department, Healthy Lifestyle Programme, Rampton Hospital, Nottinghamshire Healthcare NHS Trust, **Michael Ferriter** Senior Research Fellow, Research and Development Department, Rampton Hospital, Nottinghamshire Healthcare NHS Trust

https://doi.org/10.1192/pb.bp.105.008342 Published online by Cambridge University Press