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Improving the physical health of people with severe mental illness in a low secure forensic unit: an uncontrolled evaluation study of staff training and physical health care plans

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Background: The life expectancy of people with severe mental illnesses is substantially reduced and monitoring and screening for physical health problems is a key part of addressing this health inequality. In-patient admission presents a window of opportunity for this health care activity.

Methods: This study was conducted in a forensic mental health unit in England. A personal physical health plan incorporating clearly presented and easily understood values and targets for health status in different domains was developed. Alongside this, a brief physical education session was delivered to health care staff (n=63). Printed learning materials and pedometers and paper tape measures were also provided. The impact was evaluated by a single group pre-test post-test design, follow-up measures were four months post-intervention. The feasibility and acceptability of personal health plans and associated resources was examined by free text questionnaire responses.

Results: 57 staff provided measures of attitudes and knowledge before training and implementation of the physical health plans. Matched pairs analysis indicated a modest but statistically significant improvement in staff knowledge scores and attitudes to involvement in physical health care. Qualitative feedback indicated limited uptake of the care plans and perceived need for additional support for better adoption of this initiative.

Conclusion: In-patient admission is a key setting for assessing physical health and promoting improved management of health problems. Staff training and purpose-designed personalised care plans hold potential to improve practice and outcomes in this area, but further support for such innovations appears necessary for their uptake in in-patient mental health settings.

Background

People with severe mental illnesses (SMI) such as schizophrenia, bipolar disorder and depressive psychosis have a greatly increased risk of experiencing poor physical health than the general population. The extent of this health inequality has been examined in numerous studies conducted with inpatient, outpatient and community populations, showing that mortality from all causes is more than doubled for people with any mental disorder (Walker *et al.* 2015) (pooled relative risk 2.22, derived from 148 studies).

Researchers have also examined the excess mortality associated with mental illness by life expectancy. This is an approach that is particularly easy to grasp and which is frequently used to quantify risk exposures such as smoking, diabetes, and socioeconomic status. This metric usefully reflects the impact of premature mortality. A systematic review including 14 studies indicates reductions in life expectancy from birth for people with any major mental disorder diagnosis of between 7 and 24 years; whilst for people with schizophrenia and bipolar disorder the range was between 9 and 20 years (Chesney *et al.* 2014). These reductions are in excess of those attributable to heavy smoking (8-10 years) (Prescott *et al.* 1998) or diabetes (5-6 years) (Loukine *et al.* 2012).

Although the risk for death by suicide and other unnatural causes is especially elevated among people with mental illness, being around 10-fold higher than in general population comparisons (Chesney *et al.* 2014, Walker *et al.* 2015), much of the excess mortality is due to natural causes. Between two thirds (Walker *et al.* 2015) and four-fifths (Lawrence *et al.* 2013) of deaths in individuals with SMI result from physical health conditions, most commonly cardiovascular disease, endocrine and metabolic

conditions including diabetes, and respiratory illness (De Hert *et al.* 2011). These are also the most common causes of premature mortality within the general population, and to a large degree are preventable or amenable to early interventions that will ameliorate the disease course (Department of Health 2013).

It appears that multi-factorial causes operate and interact to elevate the risk of these conditions in people with SMI. Health behaviours such as cigarette smoking (Osborn *et al.* 2007a), poor diet and limited physical exercise (Osborn *et al.* 2007b) contribute substantially to risk. Additionally, commonly prescribed antipsychotic medications are associated with metabolic changes and weight gain (De Hert *et al.* 2012, Mitchell *et al.* 2013), and broader societal factors including the effects of stigma and self-stigma (Evans-Lacko *et al.* 2012) and limitations of service accessibility further influence these disparities (Mitchell *et al.* 2009).

Intervening to reduce and prevent physical health problems is an important area for those engaged with the care of people with SMI. Many of the factors relevant to the development and maintenance of these physical conditions can be addressed by improved access to preventive and health promotion activities. As a key part of this, risk factors must be considered for screening and baseline testing of important physical parameters needs to be performed. Health care providers in the UK and elsewhere have developed policies and clinical practice guidelines which recommend such regular physical health screening in this patient group (Mental Health in Scotland 2008, De Hert *et al.* 2009, NICE 2014, BMA 2014). It is of concern that despite higher rates of physical illness experienced by people with SMI and other mental health problems, physical health screening and monitoring are not necessarily given priority by mental health professionals (BMA 2014). Recent National Institute for Health and Care Excellence (NICE) guidelines for schizophrenia and psychosis note a picture of late recognition and under-treatment of physical conditions in people with SMI (NICE 2014). Two comprehensive reviews (conducted as part of the National Audit of Schizophrenia) of the implementation of physical health monitoring for people with SMI in contact with community-based mental health services in England and Wales (Royal College of Psychiatrists 2012a, Royal College of Psychiatrists 2014) have revealed that less than a third (29% and 33%) had recorded assessments of the five main risk factors for cardiovascular disease (body mass index - BMI, smoking status, blood pressure, blood glucose and lipid levels) within the previous 12 months, and that only half (51% and 52%) had BMI documented. The range of recorded measures between mental health provider organisations (Trusts) shows that practice is inconsistent as well as inadequate: BMI recording varied from 5% to 92%. In part this may be due to uncertainties as to whose responsibility physical health screening and monitoring is, and because mental health staff may lack confidence and feel ill-equipped to monitor and assess physical health problems (Blythe & White 2012).

Screening and monitoring is a prerequisite for successful prevention activities, and if conducted in an appropriately patient-centred way may enable opportunistic brief health promotion interventions and engagement in lifestyle and self-management approaches. A range of interventions to address physical health outcomes for people with SMI have been developed and evaluated, primarily in out-patient settings, in Europe, USA, Asia and Australia. Typically these use psycho-educational (including cognitive-behavioural) interventions with physical activity and nutritional education for 'healthy living' outcomes - such as weight loss or to prevent weight gain, to decrease risk factors for metabolic syndrome (Alvarez-Jimenez *et al.* 2008, Bonfioli *et al.* 2012, Nover & Jackson 2013), to enhance levels of physical activity and achieve smoking cessation (Bradshaw *et al.* 2005, Pearsall *et al.* 2014), and for type 2 diabetes self-management (Cimo *et al.* 2012).

Systematic reviews of these interventions indicate generally modest positive gains for these health promoting programmes, although the findings are mixed. Mean weight loss of around 3% of initial weight is evident from meta-analysis (Cabassa *et al.* 2010), which, although less than the commonly noted 5% to 10% weight loss criterion for success (National Heart Lung and Blood Institute in cooperation with The National Institute of Diabetes and Digestive and Kidney Diseases. 1998, Wing *et al.* 2011), is of a similar level to that identified in reviews of exercise as a means of achieving weight loss in people who are overweight or obese (Shaw *et al.* 2006).

Given that there is a widely acknowledged and pressing need to improve the screening, monitoring and promotion of physical health among people with SMI, and that the implementation of relevant recommended and evidence-based approaches is generally both inadequate and inconsistent, an intervention to address physical health monitoring and management for people with SMI was developed.

This report provides detail of the development and preliminary evaluation within a forensic mental health in-patient setting of an approach that combined a patient-held personalised physical health care plan with healthcare staff education in physical health assessment and management. There is a particularly limited literature addressing the physical health needs of forensic mental health patients; however, available evidence indicates that the health inequalities experienced by this patient group are marked: an audit of patient records over three years in a forensic and rehabilitation service in England identified among those who had been patients for this period (n=351), 34% were overweight and 32% obese, with a third treated for hyperlipidaemia and 10 per cent diagnosed with type II diabetes (Long *et al.* 2014).

Study aims

In this study we aimed to evaluate the effect of a training package addressing physical health monitoring and care on the knowledge and attitudes of mental health staff.

We also aimed to examine the acceptability and feasibility of using a purpose-designed personal health plan.

Methods

Study design

A single group pre-test–post-test design was used to evaluate impact of the training and associated resources on healthcare staff, with follow-up measures conducted four months post-intervention. Written comments provided by participants at the post-test sessions concerning physical healthcare within the unit and uptake of the care plan materials were used to provide information about the acceptability and satisfaction with the approach.

Ethics: The study was approved following submission to an independent research ethics committee (ELFTSubCommRef 2012/236). Participating staff were provided with written and verbal information about the study and gave signed consent to participate. They were assured that completing the questionnaires was completely voluntary and that although their names were required for matched analysis, these would be removed and replaced with a code to ensure anonymity.

The project was supported by a grant awarded by The London Network for Nurses and Midwives' partnership with the Florence Nightingale Foundation.

Development of the intervention

A personal physical health plan with purpose-designed patient and staff documentation and folders, incorporating clearly presented and easily understood values and targets for health status in different domains, was developed specifically for this project. It was based on a range of available resources including guides and formats for physical health monitoring in primary and secondary care such as health check forms (Rethink 2011), health passport initiatives (Anderson *et al.* 2012), the Health Improvement Profile (HIP) (White *et al.* 2009), Diabetes UK patient-held record recommendations (<http://tinyurl.com/pble7q9>) and associated diabetes education and self-management materials (www.mydiabetesmyway.scot.nhs.uk), and the monitoring forms available from several UK mental health provider services.

Many of the available forms, though comprehensive and detailed, are lengthy and not user-friendly. This tool was designed to enable patients to take a more active interest in their physical health as well as to help mental health nurses and allied health professionals address these needs. It was modelled on

aspects of the personal child health record (PCHR) or 'red book', the UK national standard health and development record given to parents/carers at a child's birth in a format designed to empower parents to oversee their child's development and care. Like the PCHR, the personal physical health plan uses a small (A5) folder to record key health indicators (in this case weight and BMI, waist circumference, blood pressure, HbA1c, peak flow, and cholesterol measures), to provide a means of setting goals, improving motivation, and encouraging collaborative working to make use of the opportunities for lifestyle change. Various iterations of the form were presented to and discussed with a group of clinicians (mental health nurses, psychiatrists and occupational therapists) based at the mental health unit in which the project was to be delivered. The views and ideas of mental health inpatient user representatives at the unit were obtained at a series of meetings, and also influenced the development of the physical health plan. The final version ('*My Physical Health Plan*' available in Appendix 1) was then distributed to patients and their key nurses, with coloured plastic folders to store them.

Alongside the introduction of this personal health plan, a single education session on physical health assessment and management relevant to patients with severe mental health problems was delivered on site to the staff on each of the wards in the unit. This involved a lecture and case study discussion together with comprehensive printed learning materials for each attendee, and the provision of resources to assist with health monitoring (paper tape measures) and lifestyle change (pedometers). The content of the session was based upon priority areas identified in clinical practice guidelines and authoritative reviews (Mental Health in Scotland 2008, De Hert *et al.* 2009, NICE 2014, BMA 2014). The risk factors, clinical criteria and monitoring of metabolic syndrome formed the central part of the presentation; the accompanying materials addressed the development and relevant monitoring and intervention approaches for three broad groups of health problems: endocrine and metabolic disorders, cardiovascular disorders, and respiratory disorders. The educational session explored the use of the physical health plan as a tool to support individualised care and self-care, and to provide prompts for regular monitoring and review. Using the taxonomy of behaviour change interventions (Michie *et al.* 2013), the training and associated plans sought to inform practice concerning: goals and planning (action planning, goal setting and review of behaviour and outcomes, identifying discrepancies between current behaviour and goal standards) and feedback and monitoring (self-monitoring of behaviour and outcomes, and provision of feedback on behaviour).

Setting

This study was conducted within a five-ward low secure mental health unit in London, providing care for 80 patients with SMI and forensic histories. This was a single sex (male) unit, and the admission criteria included definable clinical risk to others and challenging behaviours (Royal College of Psychiatrists 2012b). The patients in this forensic facility were all formally detained and had complex mental health problems, typically involving psychosis and often together with substance misuse and linked to offending or seriously irresponsible behaviour. The duration of admission and rehabilitation is for a much longer period than within general mental health services (NHS England 2013a), with people typically remaining inpatients on this unit for a year or more. The complexity and extent of these patients' problems, coupled with the potential for weight gain and development of metabolic syndrome associated with the psychotropic medications commonly used, indicate the level of need for physical health promotion.

Measures

Evaluation of the staff training used a 12-item multiple choice knowledge inventory measure of staff knowledge devised by clinical and academic nursing staff and piloted with nurse academics at City University London. This process was designed to ensure face and content validity: 4 clinical and academic nurses and 1 psychiatrist reviewed, commented and indicated their independent views about the appropriateness, relevance and representativeness of the topics covered. Example items included: *Smoking cessation medications are only appropriate for short-term use (True; False); People with Type 2 diabetes are at greatly increased risk of heart disease (True; False); Which TWO lifestyle changes assist maintaining a healthy blood pressure (Reduced salt intake; Increased fluid intake; Regular mealtimes; Increased exercise; A high protein diet).*

Most of the knowledge items requested selection either a single correct response from alternatives, or indicating *True* or *False* in relation to a statement; but for three items, participants were asked to identify two correct answers from the alternatives, providing a total possible score of 15. The item difficulty index (the percentage of correct responses to the item with missing responses scored as incorrect) for each question was examined and ranged between 0.11 and 0.93, with an overall mean of 0.56 (the chance level is 0.50 for a true-false question, and the optimal difficulty level is 0.75; whilst for a 4 alternative item, the random level is 0.25 and the optimal difficulty level is 0.625) (Haddad & Tylee 2013).

Staff attitudes and confidence about engagement in physical health care were measured using the PHASe (Robson & Haddad 2012), a 28-item measure comprised of four factors concerning attitudes to involvement in physical health care; confidence in delivering physical health care; perceived barriers to physical health care delivery, and attitudes to smoking. Scoring of each item is between 1 and 5, with 5 indicating strong agreement, with the scoring reversed for negatively worded items, such that higher scores indicate more positive attitudes. Testing of this scale in a large sample of inpatient and community mental health nurses indicated content and construct validity, and adequate internal consistency of the total scale (Cronbach's alpha 0.77) and subscales (between 0.86 and 0.61) (Robson & Haddad 2012). The PHASe questionnaire included an additional 14 questions about the frequency of involvement in general and specific aspects of physical health-care practice. The PHASe was developed to examine mental health nurses' attitudes and practice, however in mental health services the skill mix varies considerably depending on patient needs and the local context, with members of the multi-professional team as well as healthcare support workers often playing an active part in physical health promotion (NHS England 2013b). Accordingly, minor adjustment to item phrasing, changing instances of 'mental health nurse' to 'mental health professional' were made. The knowledge and attitude measures were administered immediately prior to the delivery of the education sessions and launch of the physical health plans at staff training days held for each of the wards, and the follow-up measurement was conducted four months later, at similar staff training days.

Participants: All available nurses and healthcare support workers from all wards within the unit were included in training sessions delivered as part of each ward's 'away day' staff development activities. All non-medical staff were eligible for participation, independent of their years of professional experience or educational level.

Data analysis

The questionnaire data were analysed using SPSS (version 22). Standard descriptive statistics (frequencies, percentages, means and standard deviations according to the level of the variable) were used to summarize the variables. Comparisons and associations were examined using the paired *t*-test for continuous variables. The *P* level was set at 0.05 for all comparisons. Open-ended free-text comments were read and reread to gain familiarity with the qualitative data and examined for content and emergent themes (Newell & Burnard 2006).

Findings

A total of 63 staff participated in the training sessions (60% of the total full-time equivalent non-medical care staff in the unit), 57 of whom completed baseline questionnaires. The numbers of participating staff from the five wards ranged between 7 and 16. The follow-up sessions conducted four months later were attended by a total of 58 staff, 49 of these had completed the baseline measures and consented to completion of follow-up measures.

Participant characteristics

Participants were comprised of equal numbers of registered mental nurses and healthcare support workers. Of those who were registered nurses, most (19/30, 60%) had qualified within the past ten years. Two-thirds of participants were employed at either band 3 (21/55, 35%) or at band 5 (19/55, 32%). 57% of the participants were male, and 17% were current smokers. Of the total sample, 47% (25/53) reported having received physical health training within the past 5 years; registered nurses were more likely to have received such training (16/29, 55%).

Current practice

The extent of participants' physical health care clinical activity in relation to 14 practice areas was identified by questions appended to the PHASe questionnaire. As may be seen in Table 1, most staff indicated that monitoring patient's blood pressure and weight and ensuring that a physical health assessment had been conducted at first contact with services were activities they were always or very often involved in. However, providing contraceptive advice and advice about dental health, assessing bowel habits, and supporting smoking cessation were reported as frequent parts of practice by less than a third of respondents.

TABLE 1: Current practice: statements ranked by order of agreement

Practice items	No. of staff frequently involved (always/very often)	%
Weighing clients routinely throughout their contact with our service	39/50	78%
Monitoring clients' blood pressure is currently part of my role	38/51	75%
Checking if clients have had their general physical health assessed when they first come into contact with our service	36/51	71%
Giving clients advice on the benefits of exercising regularly	31/50	62%
Giving clients advice on how to eat healthily	31/51	61%
Testing clients for glucose abnormalities (e.g. checking glucose in urine/checking a client's BM)	30/49	61%
Checking if the clients I work with are registered with a GP	30/51	59%
Helping clients manage their weight	23/51	45%
Assisting clients to attend to their personal hygiene	22/50	44%
Ensuring clients have their eyesight assessed regularly	15/49	31%
Helping clients to stop smoking	15/49	31%
Assessing clients' bowel habits	11/50	22%
Giving clients advice on dental health	8/49	16%
Giving clients contraceptive advice	2/50	4%

Registered nurses were significantly more likely than their healthcare support worker colleagues to note that their current practice frequently involved these activities: summary practice involvement scores, $M=50.44$, $SD=10.31$ vs $M=44.95$, $SD=10.00$, $t = 1.967$, $d.f. = 47$, $P = 0.05$. There was no significant difference in the participant's pre- and post-intervention summary practice involvement ratings analysed by paired t -test ($t = -1.43$, $d.f. = 45$, $P = 0.16$).

Knowledge test

The mean baseline score achieved was 8.36/15 or 56%, ranging from 5 (33%) to 13 (87%). Participants who were registered mental nurses scored marginally lower in the knowledge test ($M=8.29$ vs $M=8.39$) than those who were healthcare support workers; but this difference was not statistically significant ($t = -0.223$, $d.f. = 50$, $P = 0.824$). Participants who had attended a physical health training course during the past five years obtained higher knowledge scores than those who had not (8.50 vs 8.18), but this difference was also not statistically significant ($t = 0.626$, $d.f. = 50$, $P = 0.534$).

Analysis of pre- and post- knowledge scores of the 46 participants for whom there were sufficiently complete scores for both periods using a paired sample t -test showed a statistically significant improvement in knowledge scores between the baseline ($M=8.22$, $SD=1.81$) and follow-up ($M=8.65$, $SD=1.59$) four months later (Table 1). Although statistically significant, the importance of a change of this modest magnitude – equivalent to 55% vs 58% - is uncertain.

TABLE 2: Paired Samples t-test knowledge total scores

	Paired Differences					<i>t</i>	d.f.	Sig. (2-tailed)
	Mean difference	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Knowledge Total	-0.435	0.958	0.141	-0.719	-0.150	-3.08	45	0.004

Nurses' attitudes and confidence

Participants' attitudes were measured with the PHASe; the responses for each of the 28 items are shown in Table 3, with the statements ranked by highest level of agreement within each of the four sub-scales, together with mean scores and standard deviations for items (without reversal of negatively worded statements) and for the total scale and sub-scale scores (for these scoring has been reversed for negatively worded items). The corresponding findings derived from a cross-sectional study conducted between 2006 and 2007 among the nurse workforce of a large National Health Service (NHS) Mental Health Trust in the UK (Robson *et al.* 2013) are provided for comparison, these being the only other currently published findings using the PHASe measure.

As previously noted, scoring was between 1 and 5, with 5 indicating strong agreement with the attitude statement. As may be seen, staff respondents were generally positive about their role in the physical care of people with SMI, particularly in relation to involvement in health-promoting activity, such as advising and supporting in relation to nutrition, weight management and cardiac health, and ensuring dental and ophthalmology registration and checks. As was evident in the recording of current practice (Table 1), staff were less certain about involvement in sexual health promotion.

Staff were confident about involvement in key areas of physical healthcare, with the overwhelming majority indicating this for blood pressure recording and resuscitation, but there was less confidence about diabetes monitoring.

A large proportion (nearly 90%) of staff indicated that it was challenging to engage patients with healthy eating and exercise, but a much smaller proportion (less than a third) noted that their workload prevented them from involvement in physical health promotion activities, or that they felt their patients were not interested in improving their physical health.

Respondents' views about smoking revealed a clear rejection of any use of cigarettes to achieve therapeutic goals or enhance therapeutic relationships; similarly the notion that smoking cessation support and encouragement was not relevant to people with SMI attracted strong disagreement. Overall, attitudes to smoking within mental health services indicated a more anti-smoking stance than evident in the responses to the earlier survey using this measure (Robson *et al.* 2013).

Changes in attitudes and confidence

The participants' PHASe scores were analysed using a paired sample *t*-test to determine the extent and significance of any change before and after the training and introduction of the personalised physical health plans.

PHASe data from between 39 and 41 participants was sufficient to enable matched analysis, and this revealed a trend towards more positive attitudes to involvement in physical health promotion and care activities for each of the sub-scales and for the overall PHASe score (Table 4). Changes were of a modest size and most evident for the five items concerning smoking and the six items concerning confidence in physical health care delivery; whilst for the items relating to perceived barriers to physical health care delivery there was negligible change. The pre-post changes achieved statistical significance for the total PHASe score, but not for any of the constituent sub-scales. The analysis was repeated with missing data replaced using the conservative method of last observation carried forward; the significance values for paired *t*-test results were unchanged, with the difference in total PHASe score remaining statistically significant ($P = 0.043$).

TABLE 3: Responses to PHASe items and subscales ranked by extent of agreement (agreement = combining agree and strongly agree) at baseline

PHASe subscale items	Current Study		NHS Trust 2007/8	
	Number in agreement %	Mean (SD)	Number in agreement %	Mean (SD)
1] Attitudes to involvement in physical health care (10 items)		39.86 5.71		36.62 6.43
Helping clients manage their weight should be part of the mental health professional's role	55/57 96.5%	4.53 (0.63)	460/582 79.0%	3.89 (0.79)
Giving nutritional advice to clients should be part of a mental health professional's role	52/57 91.2%	4.26 (0.67)	478/579 82.6%	4.00 (0.83)
Giving advice on how to prevent heart disease should be part of the mental health professional's role	48/57 84.2%	4.02 (0.69)	433/574 75.5%	3.82 (0.79)
Ensuring clients have their eyes regularly checked by an optician should be part of the mental health professional's role	47/57 82.5%	3.93 (0.84)	341/581 58.7%	3.50 (0.99)
Ensuring clients are registered with a dentist should be part of the mental health professional's role	46/56 82.1%	4.00 (0.87)	317/577 54.9%	3.41 (1.05)
Mental health professionals should educate male clients about the importance of testicular self-examination	42/57 73.7%	3.84 (1.01)	340/573 59.3%	3.58 (0.95)
Mental health professionals should educate female clients about the importance of breast self-examination	42/57 73.7%	3.93 (0.86)	349/570 61.2%	3.60 (0.98)
Mental health professionals should provide clients with contraceptive advice	33/57 57.9%	3.63 (0.92)	338/570 59.3%	3.48 (1.04)
It should not be the mental health professional role to check with a client if they have had cancer screening checks (i.e. cervical smear /mammogram)	4/57 7.2%	2.32 (0.95)	131/572 22.9%	2.70 (1.56)
It should not be the role of the mental health professional to provide advice about exercise to clients	3/57 5.3%	1.97 (0.91)	69/579 11.9%	2.12 (0.96)
2] Confidence in delivering physical health care (6 items)		21.77 4.26		22.31 3.63
I am confident that I can measure a client's blood-pressure accurately	51/57 89.5%	4.25 (1.04)	561/576 97.4%	4.55 (0.63)
I am confident that I could resuscitate a client who had a cardiac arrest	48/57 84.2%	4.11 (0.79)	420/575 73.0%	3.83 (0.92)
I am confident in assessing signs and symptoms of hypoglycaemia	38/57 66.7%	3.34 (1.25)	390/578 67.4%	3.67 (0.92)
I am confident that I know which psychotropic drugs increase the risk that a client may experience cardiac problems	32/57 56.1%	3.47 (0.95)	382/576 66.3%	3.68 (0.93)
I am confident in assessing signs and symptoms of hyperglycaemia	27/56 48.2%	3.72 (0.94)	366/578 63.3%	3.61 (0.95)
I am confident that I know which psychotropic medication may cause damage to the eyes	14/56 25%	2.89 (0.98)	191/580 32.9%	2.96 (1.03)
3] Perceived barriers to physical health care delivery (7 items)		20.14 3.73		23.92 4.34
It is difficult to get clients to follow healthy-eating advice	50/57 87.7%	4.04 (0.87)	258/577 44.7%	3.12 (0.99)
It is difficult to get clients to follow advice on how to manage their weight	50/57 87.7%	4.09 (0.89)	250/581 43.0%	3.06 (1.02)
Clients are not motivated to exercise	25/57 43.9%	3.14 (1.11)	183/575 31.8	2.77 (1.06)
Clients with serious mental health problems are not interested in improving their physical health	19/56 33.9%	2.79 (1.07)	92/580 15.8%	2.18 (1.09)
My workload prevents me doing any physical health promotion with clients	17/57 29.8%	2.61 (1.18)	112/580 19.3%	2.29 (1.06)
Informing clients about the possible effects medication may have on their physical health will increase non-adherence	14/56 25%	2.61 (1.01)	125/577 21.7%	2.50 (1.08)
Clients' physical health worries are mostly due to their mental illness	10/57 17.5%	2.63 (1.13)	79/578 13.5%	2.17 (1.0)
4] Attitudes to smoking (5 items)		20.88 2.69		17.62 3.71
Staff should be banned from smoking on all healthcare premises	47/57 82.5%	4.19 (0.99)	327/580 56.5%	3.47 (1.44)
Clients should be banned from smoking on all healthcare premises	32/56 57.1%	3.61 (1.11)	121/579 20.9%	2.56 (1.22)
Staff and clients smoking together helps to build a therapeutic relationship	5/57 8.8%	1.98 (1.08)	132/579 22.9%	2.43 (1.20)
Clients should not be encouraged to give up smoking, as they have enough to cope with	5/57 8.8%	1.60 (0.75)	49/578 8.5%	2.06 (0.94)
Clients should be given cigarettes to help achieve therapeutic goals	1/57 1.8%	1.33 (0.69)	44/580 7.6%	1.90 (0.99)
Total PHASe attitude scale (28 items)		102.61 10.75		100.00 10.53

TABLE 4: Paired sample t-test: attitude and confidence - PHASe total and sub-scale scores

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of difference				
				Lower	Upper			
Attitudes to involvement in physical health care (10 items)	0.561	2.61	0.41	-0.26	1.38	1.38	40	0.176
Confidence in delivering physical health care (6 items)	0.585	2.03	0.32	-0.05	1.22	1.85	40	0.072
Perceived barriers to physical health care delivery (7 items) -	0.100	2.502	0.39	-0.70	0.90	0.253	39	0.802
Attitudes to smoking (5 items)	0.610	2.02	0.32	-0.03	1.25	1.93	40	0.061
PHASe Total (28 items)	1.923	5.73	0.92	0.07	3.78	2.10	38	0.043

Qualitative findings

Participants were invited at the post-intervention session to provide free text comments on the self-report questionnaires in response to a single open-ended question about physical health care and the uptake of the physical health plans, and these comments were examined for common themes, with the texts read and coded independently by two researchers and compared for consistency.

Legible responses were provided by 21 of 49 participants. There was a consistent acknowledgement of the importance of this area of practice and the need for initiatives and support to address it, with both nursing and healthcare support staff commenting on the proportion of patients who were overweight, the frequency of unhealthy eating patterns, and limited uptake of currently available lifestyle change opportunities.

As evident in the PHASe items concerning barriers to physical health care delivery, some respondents relayed the difficulties apparent in encouraging patients to change their diets or take exercise. Several staff noted that providing advice on smoking, diet and exercise was perceived as ‘nagging’ by some patients.

Staff felt that the personal health plans were ‘a good idea’ and that the coloured plastic folders made them more appealing. But they noted the take-up was very limited - this was explained as being due to other ‘competing duties’ and ‘other initiatives’ within the unit, as well as the ‘difficulties of changing [the] behaviours of patients’. The ‘chronic nature’ of (some) patient’s problems and behaviours was noted by several staff. The use of pedometers was discussed by several staff – although initially appealing, it had been found that only a small number of patients (less than 10 out of a total of 75 inpatients) were sufficiently motivated to make consistent and supervised use of them. The issues of developing a plan and targets for pedometer use and of incorporating this into the care plan were felt to be an added burden and hindrance to their use.

Staff noted that additional ‘support and leadership’ at ward level would be useful - and for some participants – necessary in order ‘to make a real go’ of the health plans and related resources.

Discussion

This small-scale project provides indication that brief physical health training together with personalised care plans are associated with statistically significant, albeit modest, improvements in the knowledge and attitudes of healthcare staff.

The uptake of the specially developed health plans was limited during the project period as was the use of the pedometers that were made available for supervised use. This was despite considerable efforts involving service users and clinicians to design the care plan booklets in an appealing and user-friendly

format, with emphasis on graphics, wording chosen for ease of understanding, and colourful plastic folders for storage.

In part this poor utilisation may be related to the research setting and participant characteristics. The intervention was delivered in a unit where the patients typically have lengthy histories and complex problems, often compounded by difficulties in accepting care and treatment for their mental health or of developing a sense of personal agency about managing their health. It is possible that the extended duration of problems and of inpatient treatment increases the challenges involved in motivating and establishing behaviour and lifestyle change. Although worthwhile and essential as part of the healthcare provided, health promotion interventions are increasingly difficult with the accrual of cardio-metabolic risk factors (Mitchell & De Hert 2015), and the particular needs of this patient population may well merit a more intensive and better resourced programme of support to deliver benefits in terms of the take-up of offered resources and care plan tools.

The pre-test post-test method used to evaluate this intervention is widely used in educational research, and is a low-cost, feasible approach for initial examination of effects. However, this research design is subject to clear risks of bias: there is no comparator (control) group – hence there is uncertainty whether observed changes are the result of history, maturation, or testing effects. That is, extraneous events, independent of the intervention, may influence the participants' responses or knowledge or attitudes, and these changes may incorrectly be attributed to the intervention (history). Additionally, changes occurring in the research participants (again, independent of the intervention) during the course of the study may be the cause of changes in the measured outcomes (maturation). And repeated measurements using the same or similar instruments may produce biased results (testing) because of participants' repeated exposure and familiarity with the measurement affecting their responses.

For this study, the latter category, testing effects, is likely to be the most important potential source of bias. Whilst repeated measures using an attitude scale (in this case the PHASe) is standard research practice and unlikely to limit the internal validity of the study, the use of the same knowledge measure before and after the intervention is problematic. Although educational research frequently uses this approach (Jorm *et al.* 2010, Rong *et al.* 2011, White *et al.* 2014) there is clear potential for participant learning which may increase the likelihood of positive findings. In this study, the potential for bias was to some degree mitigated by overseeing the administration of the questionnaires and ensuring that all copies were collected, and the 3-4-month period between baseline and follow-up testing (many studies apply a follow-up knowledge test directly following training delivery).

Although 60% of the non-medical care staff in the unit participated in the training and completed baseline measures, there was some loss to follow-up, and this together with items of missing data, entailed pre-test post-test analyses based on data from between 81% (knowledge) and 68% (PHASe total) of baseline respondents. Statistically significant differences before and after the intervention remained when analysis was conducted using last observation carried forward.

Patient representatives were consulted and involved in the development of the health care plan, but it is also a limitation of this small study that it was not possible to obtain the views and experiences of the patients regarding their health and use of the healthcare plan. Future developments and evaluations of this approach need to ensure the service user voice is included.

Despite modest effects and limitations in the evaluation design, this study addresses a crucial area of health care need in a manner that has potential for adaptation and further use and evaluation. Whereas most interventions addressing the physical health needs of people with SMI have been conducted and evaluated within community settings (Bonfioli *et al.* 2012), this project addressed the physical health care of people with SMI within the inpatient setting, and focussed on the needs of people with particularly long-standing and complex needs requiring admissions to a forensic mental health unit.

The personal physical health plans were developed to encourage and increase self-management and collaborative working between patients and healthcare staff, and this approach links strongly with the

personalisation and recovery agenda (Shepherd *et al.* 2008) as well as with extensive literature about long-term condition (chronic disease) management which provides strong evidence for the value of care that is centred on self-management support (Lewis & Dixon 2004, Coulter *et al.* 2015).

This study provides a snapshot of forensic inpatient healthcare staff knowledge, practice and attitudes about physical healthcare activity. Some comparison of the attitudes of participants in this study with those of a large sample of mental health nurses surveyed six years previously (Table 3) can be made, though this is limited by the differences in sample, setting, and survey timing. Findings from the current study indicate participants' stronger agreement that involvement in physical healthcare is part of their role, but a lower level of confidence in delivering this care, and more acknowledgment of various obstacles to this activity. Participants in the current study were far more critical of smoking in healthcare facilities and of any notion that cigarettes should ever be used within therapeutic relationships than staff in the previous study. These differences are likely to be influenced by setting (forensic inpatient vs entire NHS trust), by participant role and discipline (mental health nurses together with healthcare support workers vs only mental health nurses) and historical changes (particularly the development and ongoing implementation of smoke-free policies in English mental health in-patient settings over the intervening years between these observations).

Conclusion

The decreased life expectancy and heightened likelihood of disabling medical conditions among people with SMI is an issue of health inequality that requires serious attention. Alongside seeking to address modifiable lifestyle factors and better managing the side effects of psychotropic medications, physical health monitoring (such as for abdominal obesity and raised blood pressure) is a key part of the healthcare that is needed. Screening and monitoring rates are not only an essential pre-requisite for interventions, they may also provide a way of engaging people in the initial steps of behaviour change, and may enable opportunistic health promotion and the commencement of goal-setting and self-management.

This study combined brief training with the implementation of a purpose-designed tool, '*My Physical Health Plan*'; which sought to provide a format for physical health monitoring and a prompt for collaborative management and care-planning. Although modest positive changes were identified, it appears that further resource and support for the uptake of the personalised care plan is necessary. Further research is needed to explore obstacles and incentives that might optimise physical health monitoring and promotion in this environment.

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