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Protecting and improving the nation's health

Working together to address obesity in adult mental health secure units

**A systematic review of the evidence
and a summary of the implications for
practice**

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

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Summary of the implications for practice

Background

A two-way association has been identified between mental health problems and obesity, with conditions such as depression often leading to weight gain and obesity leading to depression.¹ Whilst the perceived stigma and body image issues of weight gain can negatively affect mood, in people with mental health problems, food can be used as a coping strategy, diet can be unhealthy and low mood can affect adherence to weight management programmes.²

Obesity rates are increasing in the general population, with rates increasing from 15% in 1993 to 26% in 2014, creating greater risk for morbidity.³ In 2014, the prevalence of overweight and obesity exceeded 60%.⁴ Rates of obesity are even higher in people with severe mental health problems than in the general public, due to the effects of medication,⁵ poor diet, alcohol misuse and less active lifestyles.⁶ Further, in the UK community, people diagnosed with schizophrenia are reported to have a 2–3 times greater premature mortality rate than the general population, mainly due to cardiovascular disease associated with long-term lifestyle factors such as smoking and obesity.⁷

Currently, around 6,000 people are detained in the UK in three high, 65 medium and 150 low secure mental health units due to their assessed risk to others or custodial sentences. Residents are not free to enter or leave the units at will.⁸ This study aimed to review published and unpublished UK evidence to identify how approaches to tackling obesity might be implemented in these settings.

In recent government policy, it has been recognised that the life expectancy of people living with serious mental illness is 15–20 years less than the general population and the need for parity of esteem between mental and physical health is a current priority. The Five Year Forward View for Mental Health⁹ puts forward a plan to improve physical health checks for people with severe mental health problems. The aim is for 280,000 people to be receiving physical health screening or secondary prevention by 2020. This will include improving the low take-up of tests and interventions for physical activity, obesity and type 2 diabetes.

There is NICE guidance that is relevant to this review. It includes guidance on identifying and addressing obesity, which recommends tailored interventions for specific needs and preferences that are discussed with the patient,¹⁰ guidance for behaviour change¹¹ and for ensuring workplace wellbeing.¹²

Recommendations for managing severe obesity, which cover hospital settings, include an initial assessment of Body Mass Index (BMI) and any accompanying symptoms as well as

medication, lifestyle behaviours and motivation to change.¹⁰ Access to equipment for weighing and monitoring is therefore required, as well as regular follow-up by a trained professional.¹⁰ Routine monitoring of weight, and auditing of the monitoring process, is recommended for people with severe mental health diagnoses, particularly those taking prescribed antipsychotic medication. Combined dietary and physical activity interventions are recommended in line with obesity guidance.¹³

In summary, evidence-based guidance supports the identification and assessment of BMI and outlines tailored interventions, elements of which are considered relevant for hospitalised patients and people with severe mental health conditions. However, it is anticipated that there are variations in how this guidance is implemented in practice and there is no specific guidance for the physical care of people living in secure mental health units.

Purpose

This report presents a systematic review of the evidence on the prevalence and impact of obesity in secure settings, as well as investigating interventions that might prove effective. In addition, it draws out the implications for practice for commissioners and providers of adult mental health secure settings.

Review methods

Medical and social care databases were searched using a strategy containing keywords identified from scoping the literature. Supplementary methods included consultation with stakeholders, citation and reference list searching, as well as Google and grey literature searches. We included studies using any design, from 1990–2015 published in English that were carried out in a mental health secure unit or its international equivalent.

Extent of evidence

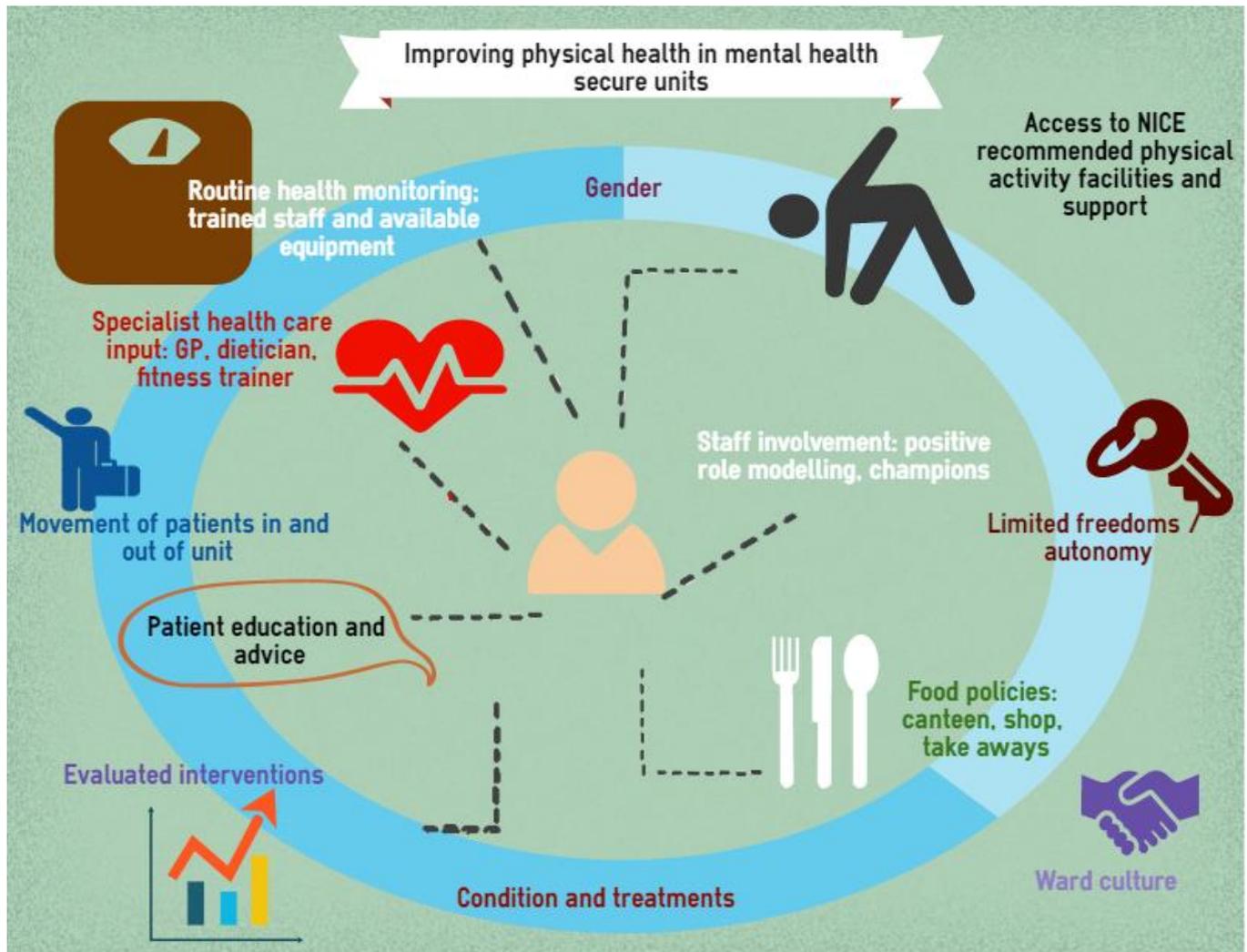
More than 2,000 citations were identified of which, after further scrutiny, 22 were included in the synthesis. Three cross-sectional studies examined the extent of obesity in UK units and a further seven assessed factors that might influence the obesogenic environment in secure units. Eight studies reported in nine papers evaluated interventions to reduce obesity and three qualitative studies assessed the views of mental health nurses about delivering physical health care in secure units. The quality of studies that were included was generally limited by study design (only one randomised controlled trial), sample size (one study included two participants) and attrition in “real world” environments, for example, movement of patients in and out of units during the study period. These limitations mean that caution is required when interpreting the effectiveness of interventions.

Further description of activities implemented in secure units to improve physical health was found in grey literature, however, these texts did not provide sufficient data to add to the evaluation findings. Stakeholder meetings provided contextual information as well as some barriers and facilitators to implementing interventions in secure mental health settings.

Main findings (see diagram)

1. Obesity and overweight are more prevalent in the population detained within mental health secure units (with rates of up to 80% reported) than in the general population (around 60%) and patients appear to be at risk of weight gain when detained.
2. Access to approaches to improve health promotion and recommended healthier food provision and physical activity support within secure mental health units is variable.
3. The limited evidence for effectiveness suggests a lack of robust evaluation of policy change and intervention to address the factors associated with obesity in mental health secure units.
4. Limited available literature suggests that multiple component changes (educational and practical) to tackle cultural as well as dietary and physical activity behavioural change among both staff and patients show promising changes.
5. Acceptability and uptake of interventions and policy changes to address obesity in mental health secure units varies between sub-groups, eg gender, condition, medication.
6. Movement of patients in and out of units can impact on intervention evaluation.
7. Policy changes that limit patient access to certain resources (eg particular types of food) require agreement with quality assessment bodies.

Themes from the evidence that impact on obesity in adult mental health secure units are illustrated in the diagram below.



Conclusion

A small body of mainly exploratory, mixed method research has identified that in order to address obesity and achieve parity of esteem between mental and physical health in secure mental health units, a number of elements need to be in place. These include access to health promotion approaches and the associated training and equipment required, a range of dietary and physical activity strategies to reduce the obesogenic environment and changes in policy at ward level that address staff and patient behaviour change. Interventions require attention to national guidance and policies, alignment with quality assessment and robust evaluation. However, there is strong evidence of the need to tackle obesity in secure settings, for example the rates of obesity are high and can worsen over time with standard care. Evidence suggests that small sequential steps are being made to change culture, policies, and staff and patient behaviours. There is much more to be explored in terms of tackling the problem. Interventions would need to be evaluated in larger-scale studies to assess how effective and applicable different approaches might be for specific populations, including those detained in secure units.

Recommendations for commissioners to support adult mental health secure units in tackling obesity

1. Commissioners work with providers to improve the obesogenic environment in secure settings, for example:
 - a. Addressing food policies such as food provision; patient access to takeaway meals and shop product selection.¹⁴
 - b. Ensuring that there is access to green space and meaningful activities and that appropriate health promotion equipment is in place.
2. Commissioners work with providers to ensure that there are enough health promotion staff and that mental health secure unit staff receive adequate health improvement training so that they can participate and support lifestyle change interventions as part of delivering holistic health care. Commissioners work with providers to ensure that these approaches are tailored to the specific needs of individuals, for example, taking into account their gender, condition and medication. Training would include:
 - a. Nutrition
 - b. Physical activity
 - c. Mental wellbeing, such as making use of the NHS Making Every Contact Count programme
3. Commissioners work with providers to ensure that a range of primary and secondary prevention interventions to reduce the obesogenic environment and promote and prolong change at an individual, ward and organisational level are being commissioned and evaluated. Commissioners work with providers to provide evidence (through research) relating to tailored health behaviour interventions and to incorporate resources for robust evaluation and that changes recommended as a result of evaluation are acted upon.
4. Commissioners to ensure that when patients move between or out of units, their individual care plans continue to pay attention to lifestyle changes that will support their health beyond the secure unit setting.
5. Commissioners work with providers to ensure that patients are involved in decision making, using community empowerment methods, so that patients can enhance their autonomy and control by making informed decisions about which interventions and lifestyle changes to adopt.
6. Commissioners to work with providers to ensure that units are healthy workplaces, in line with DH policy and NICE guidance.¹²
7. Commissioners to explore the role of contracting levers available to them, including the use of CQUINs, to support the development and application of evidence-based practice for reduction of obesity and improved healthy living.

1. Introduction

Mental health problems have a two-way association with obesity, with conditions such as depression often leading to weight gain, which in turn can trigger depression.¹ In such instances, food can be used as a coping strategy, diet can be unhealthy and low mood can affect adherence to weight management programmes.² Weight gain can be both a secondary manifestation of a mental disorder and a side effect of medication.

The common factors that are characteristic of physical and mental health problems are increasingly being recognised. For example, a recent inquiry concluded that a new way of thinking is required to address the historical division between care of physical and mental health¹⁵. There is little doubt that prevention and prompt treatment of obesity can be potentially life-saving, and certainly can reduce the physical morbidity resulting from it.

People with severe mental health problems are prone to the risks associated with obesity beyond that of the general population. However, currently, no specific guidance is available that relates specifically to obesity prevention and weight management for service users residing in secure mental health units. A priority recommendation for research is how obesity can be managed for people with conditions associated with increased risk, for example, individuals with enduring mental health difficulties.¹³ Given that no systematic review of activity within mental health secure units currently exists, and the priority status of this information, NHS England commissioned this piece of work to investigate the extent of knowledge in this area.

The review was funded by the MRC as a collaborative project (“Pathway to Discovery”) between a seconded research fellow from the University of Sheffield with a specialist commissioning team at Public Health England (PHE). A clinical advisory panel, comprising clinicians from NHS England’s Clinical Reference Groups for secure mental health services provided input at each stage of the study.

We aimed to assess the evidence base for published and unpublished evidence relating to contextual information, interventions and feasibility and acceptability of interventions to improve weight management in adults residing in low, medium or high secure mental health units.

2. Research questions

- To what extent do rates of obesity in patients from low, medium and high secure mental health units differ from the national average?
- What is the impact of these rates on health outcomes?
- What interventions are in place to facilitate effective weight management in low, medium and high secure mental health units?
- How feasible and acceptable are interventions to facilitate effective weight management in low, medium and high secure mental health units for policy makers, care providers and patients?

1. Obesity in secure mental health settings: the evidence

Search strategy

The search process was iterative, building on a scoping search of relevant databases and websites and consultation with the advisory group. A qualified information specialist provided ongoing support in identifying appropriate sources of information.

Using a range of relevant MeSH (Medical Subject Headings) terms and Free Text terms developed from keywords in the literature that aligned with the PICO as outlined above (see Appendix A), we searched medical and health professional databases including the Cochrane Library, MEDLINE, PsycINFO, CINAHL, ASSIA and Social Sciences Abstracts, supplemented by specialist websites including NICE Evidence Search, Social Care Online and the Mental Health Foundation. We also searched for grey literature using Google and sources identified by our advisory panel. In addition to these methods, we scanned the reference lists of retrieved articles for further relevant citations and carried out a citation search (Web of Science) using authors from included papers.

Data management

Citations obtained following database searches were imported into Endnote X7 reference manager software and assessed for their relevance to the research question. Codes were attributed to citations that met the inclusion criteria at title/abstract level and full papers were retrieved for final assessment.

Data extraction and quality assessment

Extraction forms were designed according to study type and the information that was required to address the research questions, keeping the format as standardised as possible. Forms were piloted on two articles of a different study type and adjusted to optimise usefulness.

All included papers were assessed using a mixed methods tool, the MMAT,¹⁶ designed for synthesis of studies that use a range of methods or mixed methods. The tool has two screening questions followed by five sections, one each for randomised controlled trials (RCT), non-randomised trials, cross-sectional studies, qualitative studies and mixed method studies.

Inclusion criteria

Participants	Adults residing in low, medium and secure mental health units.
Interventions	Any non-pharmacological intervention that aims to improve weight management and associated lifestyle behaviours for people residing in mental health secure units. This includes interventions that aim to change: individual or group dietary and physical activity behaviours; organisational or institutional policy regarding nutrition and physical activity.
Comparator	Usual care; usual practice; no comparator.
Outcomes (by individual or group)	Change in dietary intake; change in physical activity rate; change in BMI, weight and/or waist circumference measures; change in rates of CVD and/or diabetes diagnosis. Views/experiences and barriers/facilitators to providing or receiving lifestyle or policy change interventions. Costs of interventions where reported alongside evaluations.
Setting	Low, medium and secure mental health units in any OECD country.
Study Design	Reviews of epidemiological data relevant to the research question. Any study design, including systematic review or evidence synthesis that report findings from quantitative or qualitative evaluations and provide relevant outcomes.
Other	Publication years 1990–2015. English language. Unpublished literature that is UK-based.

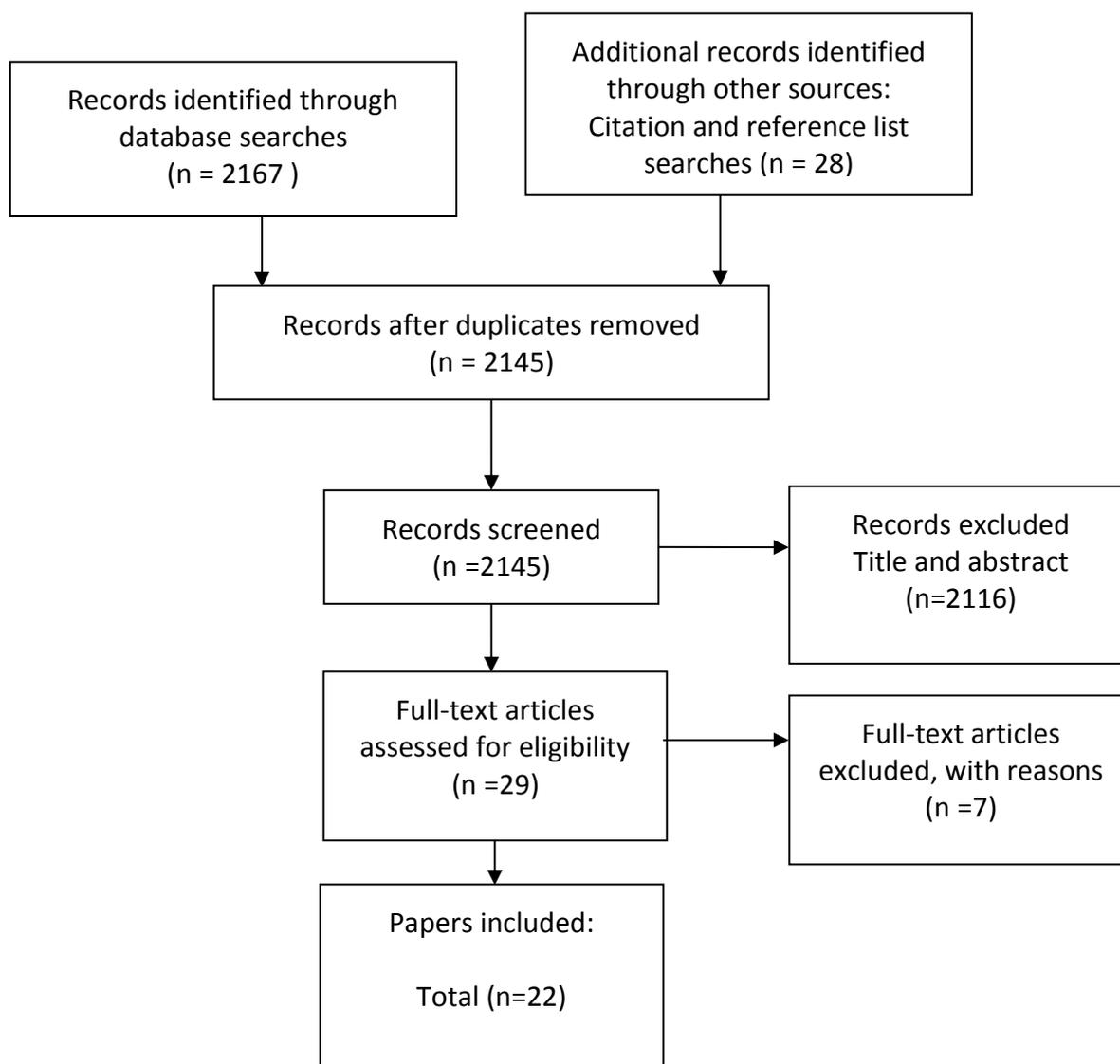
Each section requires three to four responses regarding methodological quality relating to the particular method. The quality of the one included RCT study was also assessed using the CASP tool for RCTs.¹⁷

Analysis and synthesis

Typologies were initially created of identified evidence by study design, aim of study, intervention type and population to allow description of included studies at these levels. We were also interested in the reasons for the potential bias of findings. Qualitative data was coded in a similar way and thematically analysed¹⁸ for factors that might support or mitigate the implementation of particular interventions for specific populations. Data from appraised

evidence was analysed separately to that arising from stakeholder consultations and grey literature. Feedback from advisory group consultations was noted, listed and collapsed into categories.

PRISMA: Identified citations



Three articles describe the characteristics of service users or staff in relation to obesity prevalence. Nine (eight studies) evaluate interventions designed to improve weight management or healthy lifestyles in secure mental health units. Two intervention studies included female only and one a male only samples.

Seven cross-sectional studies assess need for intervention in these settings as well as a range of factors that might contribute to an obesogenic environment. These include nurse knowledge of nutrition, the extent of take-away ordering, service user finances. Two of these studies surveyed health professionals whilst the remaining studies focused on service users, one with a female only sample (see Table 1).

Three qualitative studies assessed nurse perceptions of their role and confidence in health promotion and physical health care as well as facilitators to adopting healthy living programmes.

Quality of included studies

The completed quality assessments are charted in Appendix 2. The strength of all the included studies was the applicability to staff and patients in mental health secure units. The most common weaknesses were a lack of randomisation and comparator in evaluations (only one study used a randomised controlled design); small sample sizes and response rates lower than 60%. The majority of evaluations were carried out in one or two units.

It is clear that the included studies lack the robustness of a body of RCTs. All but one of the included evaluations could be described as “natural experiments”¹⁹ without a control. However, given that much evidence already exists for the effectiveness of dietary and physical activity intervention to address obesity, covered by NICE guidance¹⁰, and for strategies to address obesity in community populations with mental health problems, the uncertainties here are mainly around whether such interventions are feasible in secure unit populations.

The included studies provide the closest indication, short of further primary research, into what is being done to address obesity in mental health secure units and how and why such intervention may or may not succeed.

Summary of included papers

Author / date	Aim of study	Study Design	Setting	Participants Sample size	Data collection methods	Data analysis methods
Bacon 2012 ²⁰ Australia	To evaluate the impact of Nintendo Wii Fit use on engagement with PA.	Mixed methods Before-after evaluation. 8 weeks.	Secure mental health hospital (n=1)	Adult service users BMI 25-32 n=2	Accelerometer readings. Participant observation. Interviews.	Computer software to measure energy expenditure and time in PA. Thematic analysis.
Cormac 2005 ²¹ UK	To evaluate health risk factors in patients.	Cross-sectional	High secure hospital (n=1)	N=248	Semi-structured questionnaire. Physical examination.	Comparison of new and recorded data.

					Case notes.	
Cormac 2008 ²² UK	To evaluate integrated weight management / fitness service.	Before-after 10-12 week programme of five sessions (x3 per year).	High Security psychiatric unit (n=1)	Adult service users; obese or overweight with co-morbidities. Started n=95 Completed n=46	Physical and fitness measurements .	Statistical analysis. Intention to treat.
Cormac 2013 ²³ UK (follow up to above paper)	As above.	As above. Reports findings after 10-12 sessions.	High Security psychiatric unit (n=1)	As above. 206 recruited, 120 completed	As above.	As above.
Faulkner 2002 ²⁴ UK	To investigate nurse's perceptions of the role of exercise and PA.	Qualitative. Idiographic.	One Mental Health Trust.	Mental health nurses who work in inpatient settings. N=12	Interviews (one face-to-face, 11 by telephone). N=12	Constant comparison. Thematic analysis.
Forsyth 2012 ²⁵ New Zealand	To evaluate confidence and training needs of nursing staff giving nutritional advice.	Qualitative.	Forensic rehabilitation	Nursing staff involved in healthy lifestyle and weight loss promotion N=11	Interviews, knowledge questionnaire.	Thematic analysis.
Harper 2008 ²⁶ UK	To review expenditure and requisitions for foodstuff by service users.	Cross-sectional.	High secure unit.	Adult service users in one unit.	Summary data collection; state benefit increases and expenditure in shop and snack bar.	Spreadsheet and statistical analysis.
Haw 2011a ²⁷ UK	To determine the proportion of inpatients who were overweight or obese.	Cross-sectional	Secure psychiatric unit (n=1)	Adult service users N=234	Routine data	Descriptive statistics
Haw 2011b ²⁸ UK	To assess how consultant forensic psychiatrists address inpatient weight management .	Cross-sectional	Secure forensic units	Consultant psychiatrists N=442 (183 analysed)	Questionnaire	Statistical analyses to examine differences in reported measures between units.
Hjorth 2014 ²⁹ Denmark	To assess the effectiveness of a physical fitness programme.	RCT	Long term inpatient facilities (n=6)	Adult service users (n=174). N=85 completed (40 intervention,	Documentation of physiological measures and ratings.	Statistical analyses to compare intervention / control waist circumference. Linear

				45 control).		regression.
Long 2009 ³⁰ UK	To assess nutrition and eating habits of service users.	Cross-sectional Qualitative	Secure units (n=3)	Adult female service users. N=28	Questionnaire. Observation of meals using structured recording form.	Descriptive statistics.
Long 2014 ³¹ UK	To explore incidence of obesity and its complications in secure psychiatric settings.	Cross-sectional	Secure psychiatric unit (n=1)	N=351	Routine data Risk screening instrument Attendance data	Statistical analyses to compare means
Long 2015 ³² UK	To evaluate effectiveness of a range of interventions designed to increase motivation for PA participation.	Before-After evaluation 3 months	Secure psychiatric unit (n=1) One low, one medium secure ward.	Adult female service users on intellectual disabilities or personality disorder pathways. N=32	PA and "ad hoc" questionnaire; biological measures; mood monitoring measure; attendance; behaviour regulation.	Statistical analyses to compare pre- and post-intervention data.
Kasmi 2009 ³³ UK	To monitor the number of takeaways delivered over 21 days.	Cross-sectional.	Medium secure unit (n=1)	Adult service users.	Survey.	Not reported.
McCarran 2013 ³⁴ Ireland Unpublished thesis	To assess the nutritional knowledge of MH nurses working in forensic mental health services.	Cross-sectional	Forensic MH settings	Mental health nurses (n=75)	Questionnaire (Parmenter & Wardle 1999)	Statistical analyses to compare mean scores across gender, years qualified and between question groups.
Meiklejohn 2003 ³⁵ UK	To assess the extent of physical healthcare needs and desire of service users to lead a healthy lifestyle.	Cross-sectional	Medium Secure Unit n=1 unit	Adult service users. N=56	BMI measures. Semi-structured interviews.	Not reported.
Oakley 2013 ³⁶ UK	To investigate weight management strategies in medium secure units.	Cross-sectional	Medium Secure Units in England, Wales and Ireland (n=67)	Adult (n=61 units) and adolescent (n=6 units) service users.	On-line survey	Not reported
Prebble 2011 ³⁷ New	To explore how healthy living	Case Study.	Forensic inpatient facilities	Health Care Professionals (n=17)	Interviews. Meeting and case note	Content analysis. Use of theoretical

Zealand	programmes have been established and maintained.		(n=2)	Service users (n=15)	analysis.	framework.
Rylance 2011 ³⁸ UK	To examine how MH nurses perceive their role in physical care of patients.	Qualitative	Acute inpatient unit. (secure or not)	Mental health nurses. N=6	Semi-structured interviews.	Colaizzi (1978) method.
Savage 2009 ³⁹ UK	To evaluate an initiative to increase service user engagement with PA.	Before-after evaluation. 12 weeks	Medium secure forensic unit (n=1)	Adult female service users. N=6	Personal training mood measure. Evaluation of views using score. Monitoring of attendance.	Statistical analyses to compare pre- and post-session data.
Vasudev 2012 ⁴⁰ UK	To examine feasibility of maintaining a physical health record sheet.	Pilot evaluation 12 months	Medium secure unit (n=1)	Adult male service users N=15	Audit of completed record sheets every 6 months.	Statistical analyses to compare before and after data.
Wynaden 2012 ⁴¹ Australia	To obtain feedback on a healthy lifestyle programme.	Mixed method evaluation at 6 months.	State Secure Forensic mental health service.	Adult service users. N=56	Self-report questionnaire.	Descriptive statistics. Thematic analysis for qualitative data.

Narrative evidence synthesis by research aims

We performed a narrative synthesis of included study findings by research aim, taking into account different methodologies, aims of studies and population sub-groups. This was followed by a thematic synthesis, based on combined data from included studies. The narrative synthesis provides an account of the quality of evidence combined with the strength of conclusions that can be drawn from included studies.

Prevalence of overweight and obesity in mental health secure units

For this and subsequent sections, we use the World Health Organization (WHO)⁴² classification for overweight (Body Mass Index (BMI) 25-29.9), Obesity Class I (BMI 30-34.9), Obesity Class II (BMI 35-39.9) and Obesity Class III (BMI 40+). Reference to “obese” or “obesity” where no further classification is made will refer to BMI 30+. Any deviation from the WHO definitions or ambiguity within included articles regarding classification will be acknowledged. In 2014, 65.3% of men and 58.1% of women in the general population of England were classed as overweight

or obese. Men were more likely to be overweight and women were more likely to be seriously obese.⁴³

Three included papers assessed the extent of obesity and potential impact on health in UK mental health secure units between the years 2005 and 2014. Two of the studies^{27,31} were carried out within the same healthcare organisation with one study providing three-year retrospective results.³¹ Three studies used routine data or case notes with samples ranging from 248 to 351. One study supplemented this method with a questionnaire²¹ and two with a physical examination.^{21,27} Of the latter, 159 and 10 potential participants, respectively, refused to be weighed.

The mean age of samples in three studies was between 33 and 40 years and all samples included both males and females. In one study,²¹ recorded obesity rates were 36% in males and 75% in women. On admission, 16% of patients had been assessed as obese, with weight increasing. Women gained a total mean 12.74kg (SD 17.02) and men gained 10.62kg (SD 17.19). Similarly, mean waist circumference was at a level that would suggest a potential risk to health in 76% of females and 53% of males. The first of the remaining two studies, carried out within the same organisation, identified 80.6% of patients assessed as overweight or obese with higher rates of overweight and obesity class I in males (33.3% and 30.6% vs 20.0% and 22.2%, respectively). However, obesity classes II and III were more prevalent in females than in males (14.4% and 26.7% vs 12.5% and 4.2%, respectively).²⁷

A three-year retrospective study³¹ identified that 60% of patients were overweight or obese. There were less pronounced gender differences, although more females than males were classified within obesity classes I and II (28% and 7.5% vs 20.5% and 7.01%, respectively). Trends over three years showed that in women, mean BMI had continued to rise from mean 31 at admission to 33.5 at two-years length of stay then remained relatively stable. In men, mean admission BMI was 29.3, remaining relatively stable for 6 months. A sharp rise followed, reaching 32.3 at one year and a reduction over the following year to 30, followed by stability over the third year.

The authors suggest that gender differences in weight may be due to the increased sensitivity of women to the weight gaining effects of antipsychotic medication, compounded by their lower motivation to engage with physical activity. The sharp rise in male BMI was also associated with medication, such as that used for treatment resistant schizophrenia within the first year of admission to the unit.³¹

Findings from these studies highlight the problem of weight gain following admission to UK mental health secure units in a population that is already at high risk for overweight and obesity.

Addressing obesity in mental health secure units: Cross-sectional studies

Seven studies^{26,28,33,36,30,34,35} used survey methods to examine activities within secure mental health units that address obesity or potentially contribute to an obesogenic environment.

Oakley et al.³⁶ invited 67 medium secure units in England, Wales and Ireland that were registered with the Quality Network for Forensic Mental Health Services to participate in an online survey. The survey was designed to elicit estimated rates of obesity as well as strategies used to address this problem. A total of 45 units (67%) responded, including six adolescent units. Over half of the units were provided by the NHS.

Obesity rates varied widely across units with a mode of 40–50%. Of the 45 units, 19 responded that there was an effective weight management strategy and 21 that there was a dedicated multi-disciplinary team addressing obesity. Nearly all units offered healthy eating options at all mealtimes as well as access to a gym, regular monitoring of weight and physical activities. Just over 50% offered Orlistat to patients for weight reduction. Thirty-nine units reported that restricting access to certain foods was an important element of a weight management strategy, especially in adolescent units. This mainly took the form of limiting the number of takeaways, amount of unhealthy snacks that could be purchased at the shop, portion sizes, energy drinks and caffeine. Less commonly, restrictions were placed on food that visitors could bring into the unit (<50%) and/or that patients could consume when on escorted community leave (25%).

The authors³⁶ discuss the issue of human rights in relation to limiting access to foods within secure units which for long stay patients are regarded as home. The findings suggest that most units have policies that do restrict access as physicians attempt to balance the right of patients to autonomy with addressing increasing morbidity levels and life expectancy levels that are up to 20 years lower than the general population by implementing preventive measures. The authors compare this situation with that of child care whether in schools or homes, where measures have been implemented, through national regulations, to increase the health promoting value of food intake.

Oakley et al.³⁶ also argue that intrusive feeding intervention is allowed in urgent cases such as severe anorexia, and parents or child care authorities can be prosecuted for allowing a child to become morbidly obese. In adults, the Mental Capacity Act 2005 could be called upon for adults lacking the capacity to protect themselves from harm (including over-eating) and neglect (failure to prevent harm). However, currently, there is no defining point at which obesity becomes life-threatening. The authors are clear that restricting the freedoms of capacitated patients is problematic, though relevant advice and physical health assessments and interventions at the very least should be available for those at risk. Additional services could include easy access to physical activity, healthy foods and positive modelling. Including capacitated patients in discussions of ward-level food policies may reduce the ethical dilemmas inherent in imposing limitations, for example limiting access to takeaway meals.

In a short published communication, providing only limited information on methods, Kasmi³³ reports the findings of a survey of takeaway purchasing over 21 days in a UK medium secure psychiatric unit. A total of 326 individual takeaways, costing £2,736, were reported to have been purchased (mean £8.40 per order, range £3–23). Two wards in the learning disability directorate host two takeaway evenings per week, using group bookings which are included in the figures. During the 21 days, approximately 75% of patients ordered at least one takeaway, with 29 patients ordering at least one per week and 16 two per week. Four patients ordered a takeaway every other day and one ordered 15 during the study period. There were no obvious differences between ordering behaviours by unit directorates or gender. It was estimated that over one year, the mean cost of takeaway meals for one patient would be £727. For the entire unit, the total cost would be £47,423.

Kasmi³³ considers the results for individuals as an underestimate given the number of group bookings that were made in one name. It is not uncommon, for example, for a patient to order food on behalf of other patients from the ward, especially if they get ‘buy one, get one free’ deals. They suggest possible ways of reducing intake from takeaway meals through individual care plans and/or “take away rights”. However, the authors acknowledge human rights and autonomy issues that arise from restricting choice.

Consultant members of the Royal College of Psychiatrists were invited to respond to a questionnaire to identify how consultant psychiatrists are addressing weight management in mental health secure units.²⁸ A response rate of 45.9% (183 analysed questionnaires) was achieved; the remainder had either retired, were on sick leave, had moved home or did not have a clinical/inpatient caseload. Nearly half (48.6%) of respondents worked in medium secure units, 38.3% in low secure, 20.2% in high secure and 10.4% in open units. Over half (53.6%) worked only with males, 8.2% only with females and 37.7% with mixed gender.

Nearly all respondents (95.6%) reported regularly monitoring patient weight and most (88.5%) had access to a dietician for patients, though 15 consultants stated that the time available with dieticians was inadequate. Consultants estimated that a median 40% of patients (50% of females and 40% of males) were thought to be obese, though the gender difference was statistically non-significant. The figures are reported to be much higher than obesity rates in the general population in 2009 (24% for males, 25% for females).

Community meetings with patients were often used to agree policies within units. Most units (68.9%) reported some food restriction, mainly in regard to takeaways, with six units reporting a total ban and others limited to 1–3 times per week or having spending restrictions on takeaways. The second most reported restriction (n=33) related to individual care planning, usually for morbidly obese patients. Care plans included restricting high-calorie food such as fizzy drinks, confectionary and crisps. However, this strategy was voluntary and was reported to be ineffective due to poor motivation. Other reported limitations included limited access to the shop and/or limited spending at each visit, plating up meals and not allowing second helpings, the introduction of healthier foods and serving low calorie drinks. Four consultants

reported that they believed it was morally wrong to place restrictions on patients as food was one of their few pleasures.²⁸

Most units (68.3%) were reported to provide access to NICE recommended levels of physical activity.¹⁰ Reported barriers included staff shortages and low patient motivation. The most commonly reported interventions for weight management were nutritional advice (77.6%), fitness programmes (71%), healthy living groups (39.9%), gym (36.6%), weight loss groups (26.2%), walking/cycling (23.5%) and sports (18%). Nearly a quarter of consultants rated interventions as mainly ineffective, 55.2% modestly effective, 15.8% moderately effective and 0.5% highly effective.²⁸

Views about the possibility of switching medication to an effective alternative with lower risk of weight gain ranged from never possible (1.1%), through to possible for up to 25% of patients (24%) to possible for up to 50% of patients (11.5%). Nearly 15% did not know the answer to this question. The authors of this paper reported that consultants' perceptions that using alternative medication was not of potential benefit could be a lost opportunity.²⁸

One study²⁶ assessed the impact of changes in disposable income, following increases in UK incapacity and severe disability allowance in April 2006, on food expenditure in a high secure unit. Five months after these changes, 251 patients had received an increase in benefits. After one month, total revenue from benefits had increased by £12,089. There was a 45% increase in spending at the shop and a 129% increase at the snack bar between March 2005 and August 2006. The shop stocked 26% more foodstuffs in total, including 26% of foods high in fat or sugar. Of these, 62% were sweets, 16% crisps and 37% chocolate products. Following the increase in benefits, 35% more fish, meat, protein, 90% drinks or soups and 79% more packed fruit and vegetables were stocked.

Shop requisitions rose by a quarter following the increase in benefits, with chocolate and sweets accounting for 4,030,121 kcals of shop requisitions, rising to 5,034,838 kcals following the increase ($p=0.005$). If only patients who received extra benefits were included in analyses, calories equalled an extra 4,003 calories per week per patient. Dividing the extra calories between all patients (a more conservative estimate) equalled 2,956 extra calories per week per patient.²⁶

Harper et al.²⁶ recognise that a clear connection cannot be made between increased benefit and spending at an individual level. However, they conclude that in terms of calorie requirements, the equivalent of two days' worth per week per person are being purchased following the changes to benefits. This is on top of meals already provided within the unit that are calculated to provide optimum daily calories. Given the likelihood that spending on extra food will continue, the authors have some suggested ways of addressing this issue. One suggestion is to stock low calorie and healthier options at the shop, another is to also stock non-food items such as clothing, CDs, DVDs and reading material, and yet another is to provide advice on financial management and encourage saving money. These suggestions

could be introduced alongside healthy lifestyle initiatives that aim to improve diet and physical activity rates.

McCarrren,³⁴ in an unpublished thesis, used an established questionnaire⁴⁴ to assess the nutritional knowledge of nurses working in Irish forensic mental health settings in an unpublished doctoral study. Achieving a response rate of 85.7% (n=95), the sample consisted of 43 male and 52 female nurses.

The nurses had a mean nutritional knowledge score of 76 (SD 12.7) out of 110. Almost a third (31) scored more than 83 and only eight scored less than 55. The majority of nurses were categorised as having adequate nutritional knowledge with scores between 56 and 82. Female nurses achieved a higher mean score than males (78 vs 73 $p=0.048$). The author reported no significant association between nutritional knowledge and years of qualification, length of service, educational level or age. There was a significant difference in scores between clinical nurse manager 1 and 2 grades, but not between clinical nurse manager and staff nurse grades. All four sections of the questionnaire received good scores with the lowest scores attributed to questions about the relationship between diet and disease. The author suggests that future research could be carried out to explore how nurses in secure units educate patients and guide them in their dietary choices.³⁴

Two studies^{30,35} assessed the availability of healthy lifestyle promoting facilities in UK secure units and reported the changes made as a result of the findings. Long et al.³⁰ used observation and self-report to assess the eating habits of female patients in three UK secure units (level of security not given). A total of 41 women across the sites agreed to participate. Their mean age was 32.7 years (SD 8) and diagnoses included personality disorder (51%), schizophrenia/schizo-affective disorder (24%) and affective disorder (12%). All had a history of offences ranging from acquisitive to major violence and mean duration of stay was 4.4 years. Sixty per cent were obese and the remaining 40% had a mean BMI of 27.2. Twenty-eight women participated in the self-report part of the study using a 15-item lifestyle questionnaire (response rate 68%). Twenty-seven “typical” mealtimes were observed over three months.

The mealtime observed to have the highest attendance was dinner in the evening, followed by lunch, and the lowest attended was breakfast. It is therefore clear that most patients consumed a large proportion of their calorie intake in the evening and very little in the morning. Patients had the freedom to choose whatever food they preferred and could have second helpings. Portion sizes appeared appropriate although there was no guidance provided about the contents of a balanced meal. Most patients chose meals that were high in carbohydrate and fat compared to vegetables. Two carbohydrate rich puddings were served every day. Fruit was less frequently eaten and, although provided on the ward, was often only served at particular times.³⁰

The authors³⁰ report that the caloric value of meals was high so that snacking on top of this would lead to weight gain. Water was more expensive in the shop than fizzy drinks and 40% of

meals were eaten without a drink. Squash was consumed in preference to water and the amount of milk consumed amounted to a mean of 2 pints per person. Food rich in Omega 3 was served once during the observation period. Takeaway meals, some of which have a very high calorific content, could be ordered up to four times per week. Food was also eaten quickly (mean 10.2 minutes). Opportunities for staff to model eating behaviour were limited as they sat at different tables or ate at different times to patients.

The self-report questionnaire showed that over 80% of patients reported a desire to better manage their weight, eat healthier and exercise more. Whilst 51% reported having been advised by a dietician, only 35% followed that advice. Some 57% reported having at least two takeaway meals per week, as well as provided meals. Sixty per cent had at least 2 teaspoons of sugar in hot drinks and 65% reported drinking at least two carbonated drinks per day. Typical food purchased at the shop included crisps (46%); chocolate (36%); sweets (25%); chips (21%); non-diet carbonated drinks (46%); fruit (1.9%). Twenty-one per cent reported taking part in organised physical activities. There was a reported dislike of the evening meal being served at five o'clock, this seeming too early.³⁰

Long et al.³⁰ also report that changes to policy were made as a result of the study to establish a healthy eating culture, including staff training, food provision and weight maintenance. Food choices, discussed with the chefs, could be made ahead of time and were labelled in respect of health values. Food was also available that was culturally sensitive, with 20% ethically produced or organic. More oily fish was made available. Food preparation was carried out next to the units rather than centrally and heated through. Meals were dispensed by trained staff that could provide advice on balanced diet and portion size. Dinner was served later in the evening. Milk and takeaway meal intake were restricted, fruit was available all day and smoothie machines were available to provide drinks with meals. Trained staff ate with patients and catering staff attended patient meetings to provide food education and discuss choices. A dietician led motivational nutritional group sessions and a hospital-wide obesity pathway was established so that patients with a BMI of more than 30 were provided with support. Patient food satisfaction was monitored. A physically fit member of staff was available on each ward to encourage uptake of physical activity.

Meiklejohn³⁵ collected routine data from all patients residing at one UK medium secure mental health unit to assess physical health needs. Interviews were carried out with patients to explore their desire to lead a healthier lifestyle. Routine data were collected for all patients on the unit and semi-structured interviews were carried out with 56 patients (mean length of stay 18 months). Seven patients were interviewed further about body image, self-esteem, fitness and healthy lifestyle prior to being discharged. Here, we focus only on findings relating to weight management.

Data analysis showed a correlation between increased BMI and length of stay, as well as limited opportunities to carry out physical activity or develop food options. Over half of patients were positive about opportunities for physical activity though it was uncertain to what extent

interventions offered by occupational therapists were taken up. A similar number of patients also expressed a wish for more physical health care although 71% reported that their health was well managed and nearly a quarter reported difficulties in finding someone to consult about their physical health.³⁵

The researchers organised a fair to provide an opportunity for patients to speak to healthy lifestyle experts and to have assessments carried out such as BMI. The study findings resulted in a number of initiatives. A full-time fitness instructor was recruited at the unit to provide sport and ward gym sessions. Physicians assessed the medication regimen of patients to identify alternatives to weight gain inducing antipsychotics. The canteen manager was invited to ward meetings to discuss healthy food options with patients. An occupational therapist commenced weight management sessions and patient education is being developed. Group weight management sessions were not well attended at first so were replaced by individual sessions. A practice nurse employed at a nearby prison is delivering health promotion sessions for patients at the unit in exchange for specialist psychiatric sessions delivered by unit staff at the prison. Plans were put in place to recruit a permanent part time practice nurse at the unit.³⁵

Meiklejohn³⁵ concludes that more work needs to be done around training nurses about physical health care. They acknowledge the importance of assessing patients on admission and monitoring physical health throughout their stay, working closely with individuals to provide education about medication and healthy lifestyle.

Addressing obesity in mental health secure units: Intervention and policy change evaluations

Of the eight included intervention studies, only one was carried out using a randomised controlled study design.²⁹ The authors report on a cluster RCT with a sample of six long-stay inpatient facilities in Denmark. Three facilities received the active awareness and motivational interviewing intervention based on psychological theories relating to motivation and stages of change. The intervention was delivered by the project leader and a research nurse and involved sessions with staff members to raise awareness and service users to facilitate health planning. The three control facilities received usual care and physiological data was collected at all six sites at baseline and 12 month follow up. Staff and service-user measures included waist circumference, BMI, weight, lung function, blood pressure, physical fitness, alcohol and tobacco consumption. Service users also underwent blood glucose, lipid, ECG and medication assessments.

All patients from the six facilities were invited to participate (n=174) although 44% declined so that a total of 85 participants entered the trial (intervention n=45, control n=52). The authors note that this affected the power of the study, which could have had an impact on results. A further 12% of patients dropped out of the study prior to the 12-month follow-up, resulting in a total of 85 analysed datasets (intervention n= 40, control n=45). At baseline, similar proportions

of patients in both groups were diagnosed with schizophrenia (72% / 73%) and most (over three-quarters) were obese with 44% having BMI > 30kg/m.^{2,29}

At 12-months follow-up the intervention group showed a non-significant decrease in mean waist circumference of 0.75cm (95% CI -2.79 to 1.23). Decreases in blood pressure and LDL/cholesterol levels were also reported. The control group showed an increase in mean waist circumference of 2.17cm (95% CI -0.37 to 4.71) and a decrease in mean LDL/cholesterol levels. Mean HDL and blood glucose levels did not change in either group. Adjusting for cluster randomisation, sex, body fat and age, the difference in change of mean waist circumference attributed to the intervention group was reported as -3.1cm (p=0.018). However, the authors report that the difference could have been limited by the control group having regular measurements recorded, which may have inadvertently raised awareness of weight management issues and resulted in some form of intervention. The authors conclude that the intervention was not able to reduce waist circumference but prevented further increase.²⁹

Seven studies reported in eight papers^{20,22,23,32,37,39,40,41} used a pre-post evaluation design and a range of methods to assess interventions in secure mental health units. Two of these studies^{32,39} were carried out within the same UK charitable healthcare organisation. Three studies^{20,37,41} used mixed methods to identify views about implementation as well as quantitative outcomes.

Vasudev et al.⁴⁰ piloted a physical health monitoring sheet on a 15-bed male UK medium secure forensic rehabilitation unit. The monitoring sheet was designed within the trust and introduced into patient records with the aim of prompting HCPs to implement 6-monthly physical health screening. The sheet had columns for recording health measures such as weight, BMI, waist circumference, BP, blood test results, ECG, diabetes status, smoking status, cholesterol ratio and calculated 10-year cardiovascular risk. Measurement and recording were carried out by the patient's primary nurse and the junior doctor. In addition, patients were encouraged to increase their physical activity under supervision of a sports instructor and to attend 'healthy lifestyle' groups that were designed to address diet, physical activity and smoking behaviours and were delivered by trained nurses. An audit tool was designed to collect data on monitoring sheet completion and other demographic information. Data was statistically analysed at 12 months.

The majority of the 15 male patients were diagnosed with schizophrenia and were prescribed antipsychotic medication. At 12 months, eight of the original 15 patients remained on the unit; there were no significant differences between the characteristics of these and subsequently admitted patients. At baseline 80% had increased BMI and waist circumference. Feedback about health risks was given and physical activity or "healthy lifestyle" group attendance encouraged.⁴⁰

At 12 months, all monitoring sheets were complete and up-to-date. There was no change in obesity rates although there was a reduction in cholesterol ratio (possibly due to raised

awareness and increased medication prescribing) and 10-year cardiovascular risk. The authors highlight reluctance in patients to adopt healthy lifestyle modifications, perhaps due to illness severity and/or low motivation. Initially, it is reported that some patients refused to undergo measurements and equipment had to be made available to the ward. Consideration of alternative medication could also have an impact on weight management although this might be difficult due to resistance to other medications. Authors also mentioned the lack of primary care support within the unit. This small pilot study showed that regular monitoring of physical parameters can have some impact on health although, in this case, not on weight management.⁴⁰

In terms of quality, the study did not include a comparator so it is difficult to judge whether outcomes were related to the intervention. As over half the patients at 12-month follow-up were not from the original cohort, they were not followed up for the full duration of the intervention, which could have affected the results. The authors suggest that time was required for patients to become engaged with physical activity and healthy lifestyle interventions, therefore 12 months (at the most for this sample) may be too short a time to establish whether these interventions were having an impact.⁴⁰

Cormac et al.²² evaluated a 10–12 week weight management and fitness programme that was repeated within a UK high security mental health unit three times per year. The programme targeted patients who were already obese, or overweight with related co-morbidities such as hypertension or type 2 diabetes. Completion of the programme was dependent on attending at least five group educational sessions consisting of nutritional and physical activity components as well as one hour of tailored (according to fitness levels) physical activity per week with the option of an extra hour. A range of exercises were offered as part of the programme, including swimming, walking, curling, aerobics, circuit training and ball games. Physical and fitness measurements such as BMI, waist circumference, blood pressure, heart rate, flexibility, aerobic capacity and hand strength were recorded at baseline and after 10–12 weeks.²²

Seventy per cent of those invited to participate started the programme and, of these, 46 (48%) completed at least five sessions. More women withdrew from the programme than men. The mean age of participants was 37 years (range 20-63) and 88% referred to themselves as having White ethnicity. The mean number of attended sessions was five. Following the programme, a mean weight loss of 1.3kg (SD 2.73, range 12kg gain to 9kg loss) and mean waist size reduction 2.0cm (SD 3.73, range 8cm gain to 8cm loss) were recorded. The cost of providing the programme was reported as exceeding £250,000 with savings of £15,000 being recorded in year 2 (no further information was provided).²²

Males (especially those with a learning disability) responded better to the programme than females, maybe because the females were more obese at baseline. Many participants reported that they enjoyed both the nutritional and physical fitness sessions. The results were affected by problems of adherence to the programme, with some participants not wishing to have their

physical dimensions or fitness levels measured. The authors report that staff training, enthusiasm and commitment were important factors in the success of the programme.²²

As a result of positive outcomes, the intervention was continued and evaluated again after the provision of 16 programmes over seven years.²³ Of these programmes, data on 14 were available for assessment. The total number of participants referred at this point was 206, with 102 (58%) completing at least five sessions. As before, highest attrition was in females (56%) and lowest in males with LD (21%). There were staff shortage issues during the delivery of three programmes.

Mean age of participants was 36 years and mean BMI was 34(SD 6.1, range 24.9-56.0). On completion, 63% had lost weight; 21 patients lost at least 5kg after 10–12 weeks. Mean weight loss was 1.3kg (SD 3.7, range 12kg gain to 11kg loss). Females and males with learning disability were reported to have lost most weight, possibly due to higher level of commitment or a higher mean weight at baseline. The authors report no association between amount of weight lost and number of sessions attended.²³

Challenges reported by the authors include designing a programme that was accessible to patients who had a wide range of psychiatric and long-standing problems such as severe psychosis and substance misuse. However, they report that findings are promising given the challenges faced. They reported a mean loss of 1.3kg at three months and again at seven years, highlighting consistent effects. It is not known how many patients continued to lose or manage their weight long term; it is likely that many patients left the unit at some point following the intervention.²³

Savage et al.³⁹ focused on female patients in their evaluation of an initiative to encourage take-up of physical activity on one ward within a UK medium secure forensic unit. The intervention consisted of 12 weekly, one-to-one sessions of physical assessment, education about the benefits of exercise, weight training and aerobics delivered by a physically active professional, goal setting, financial reward, therapeutic input regarding body image issues, and regular, immediate feedback on the effect of the exercise on mood and wellbeing. Measurements included attendance, physical measurements, mood following physical activity and post-intervention views measured against five statements.

Of the 14 patients resident on the ward, eight were eligible and a further two dropped out. Mean age of participants was 34 years (range 20-48) and 50% had a BMI > 30. All included women had a diagnosis of personality disorder and two had a secondary mental illness diagnosis. At baseline all the participants were assessed as being at the “contemplative” or “pre-contemplative” stage of change. The total number of sessions attended was 39, with a mean of 6.5 (SD 3.0, range 3-12) per patient. Mean pre-post mood scores indicate that participants were more relaxed, happy and calm after the training session than before it began. No significant differences were found on the energetic/exhausted scores. Mean attendance increased from 39.5 (SD 21.7) in the final four sessions to 52.0 (SD 23.4) during the four

sessions after the 12 weeks had been completed. Feedback from patients was mean 5.4 (SD 1.14) for enjoyment, 6.0 (SD 0.71) for feeling more motivated to attend other sessions, 4.6 (SD 2.07) for value of completing MMM score, 5.0 (SD 2.35) for motivation to attend further activity sessions and 6.6 (SD 0.55) for benefits felt from attendance, where 1=strongly disagree and 7=strongly agree. The authors point out that increased enjoyment and motivation for exercise has the potential to reduce the extent of disturbed behaviour in mentally ill patients. Improvement in mood scores was reported to signify that this could be the case though with the acknowledgement that these effects may also be due to medication. Resource implications were one barrier to implementation reported by the authors.³⁹

Long et al.³² also report on a pre-post intervention evaluation carried out in female low and medium secure wards within the same healthcare organisation as the previous study. The female patients were on personality disorder and intellectual disability pathways. The three-month intervention was based on reinforce appropriate, implode disruptive (RAID), positive behavioural support (PBS) and nudge principles. In practice, 30 minutes of physical activity was offered each day with encouragement from prompt cards and small monetary rewards. Access to exercise was increased and physical activity supervision was made available in courtyards. Staff were trained using recognised sport, psychology, physiotherapy and nutritional principles. Participants were taught to set targets and report activities, whilst staff provided feedback.

The NZPAQ-SF was used to assess frequency, duration and intensity of activity. Biological measures such as BMI, body fat, muscle, peak expiratory flow and resting pulse rate were recorded. Mood was monitored using the MMM measure and attendance categorised as vigorous, moderate or low intensity. The BREQ-2 was used to measure decisions whether to engage in physical activity and the extent to which behaviour is internalised or amotivational. Two additional questions about general weight and health and the importance of improving physical activity levels (10 point scale, not good/important – very good/ important) were asked.³²

Authors report 100% uptake. The mean age of the participants was 27.6 years (SD 11.3; range 18-48). Most of the participants had been admitted from medium secure units or prison and had diagnoses of personality disorder (79%), schizophrenia (15%), depressive disorder (6%) and all but 28% had a secondary diagnosis of learning disability, PTSD or ASD. The main changes post-intervention were a significant reduction in mean pulse rate ($p<0.01$), improvement in motivation ($p<0.01$) and increase in attendance to physical activities at all levels of intensity (low intensity 2.4 hours vs 6.78 hours, $p<0.01$; moderate intensity 1.65 vs 3.45 hours, $p<0.05$; vigorous intensity 1.3 vs 5.5 hours, $p<0.01$) per week. Although approximately one third had lost weight, increased muscle mass and improved metabolic age, these results were not statistically significant. Positive mood changes were evident post-intervention.³²

Long et al.³² also report that staff, who initially may not regard encouraging physical activity as their job, may have become more involved due to the ward-based activities. They also aimed to target motivation in patients given the likelihood that motivation to engage in physical activity

may be low in this population. The findings that BMI and weight were not significantly reduced following the intervention was not seen as unduly concerning given that the participants showed significant benefits in other health-related and motivational parameters. Factors such as enjoyment, for example, could be important motivators leading to behaviour change. However, the authors suggest that longer-term benefits cannot be reported here and that follow up at six months is planned. Given that this article was published recently, there has not been a follow-up paper to date.

A mixed method study, using a combination of accelerometer readings, observation and interviews, was carried out to explore the impact of access to Wii Fit in an Australian secure forensic mental health hospital.²⁰ Duration of stay in the unit ranged from two months to several years. Patients with a BMI 25–32 were invited to a group Wii Fit session running twice a week for eight weeks. Staff and participants were trained in use of the Wii Fit and patients had the option of using it alone. An accelerometer was worn by those participating for 12–96 hours (1–4 days), where possible at the same time every week, to monitor activity. Due to patient movement out of the unit, only two participants provided sufficient informed consent for use of data. These patients were also interviewed about their participation.

One participant was a 28-year-old male ('Andrew') diagnosed with schizophrenia and prescribed Clozapine. He had been resident at the unit for six years during which time he gained 51.9kg. Wii Fit was new to him though he had previously used computer games. Andrew used the Wii Fit at least once per week (range 1–3) for 7–127 minutes per session. During the first two weeks he played alone at night, although in week two he started to join the group, preferring this due to his "competitive gene". Researchers observed and encouraged Andrew through weeks 3–8; he was sceptical at first as it wasn't the "real thing". Once started, Andrew found using the Wii Fit to be "awesome", enjoying the range of activities and ease of use. The Wii Fit was also an educational tool, teaching Andrew ways to become more fit and healthy (through dietary change as well as physical activity) as he felt unfit at the beginning. Andrew lost 3.4kg at the end of the eight-week intervention.²⁰

'Becky', aged 43, was diagnosed with schizo-affective disorder and mild intellectual disability. She was admitted eight months prior to starting the intervention and had gained 7.3kg since commencing Clozapine. She had no previous experience of Wii Fit. Her participation lasted 5 weeks before being transferred to another unit. Becky spent a total 570 minutes (mean 114 minutes per week, range 14–60 minutes per session), playing 2–3 days per week, sometimes twice a day. She preferred to play with researchers present, for encouragement rather than competition. Initially, she found many of the games difficult but gradually came to learn more and enjoy the activities. Becky lost 1kg over five weeks and reported that she now enjoyed exercise and wanted to do more as it was fun.²⁰

The authors assessed total energy expenditure in more detail, reporting that Andrew and Becky could expend more kilocalories during other activities such as art and hospitality classes or during sport than using the Wii Fit. However, more energy was used playing Wii Fit than on

other types of console games, and using Wii Fit added to the total amount of daily energy expenditure. Becky and Andrew were also reducing the time spent in their room sleeping or watching TV and had undergone attitudinal changes in respect of physical activity. The authors caution the overemphasis on weight loss as the main goal, since lifestyle changes can impact overall wellbeing.²⁰

The part played by researchers as role models, as ‘company’, and in encouraging activity on the Wii Fit was reported as a facilitator to maintenance of physical activity. However, the nurses were observed not to engage in Wii Fit with the patients, attributing resistance to their perceived lack of ability or reluctance to wear sports gear. Researchers observed no reluctance in nurses to join patients sitting outside smoking.²⁰ The small sample in this study was partly due to patients leaving the unit during the intervention phase and also to difficulty gaining informed consent. The findings, therefore, have limited generalisability. However, the qualitative data highlights the added psychological impact that can result from a small change in behaviour. Perceiving the intervention as “fun” rather than just a way to lose weight was an important motivator. Observations showed that role modelling could be an important influence on behaviour change in the unit.²⁰

Wynaden et al.⁴¹ also used mixed methods to evaluate a healthy lifestyle programme in an Australian forensic mental health setting. The intervention consisted of physical activity and nutritional education as well as stress relieving sessions and daily supervised an exercise classes. Patients were physically assessed before and following completion of the intervention and asked for feedback using questionnaire and qualitative methods.

A total of 56 patients were assessed (47 female and 9 male, mainly aged less than 35 years). Length of stay ranged from one month to two years. Response rate for the questionnaire was 53%. Less than one half of respondents (40.6%) reported that the programme was enjoyable, 26.4% that it was useful and 21.7% that it made them feel better. Negative responses (11.3%) came from females, suggesting that for them the programme was difficult, not enjoyable, boring, not useful, or made them feel worse.⁴¹

The main reported reason for attending the gym was to stay healthy (15%), followed by keeping fit (14.5%), enjoyment (14.1%), to reduce stress (13.2%), to pass time (11.9%), to get a routine (11%) and to help with psychiatric problems (9.2%). Some respondents (11%) reported that they thought attending a gym might influence their length of stay. The most useful activity reported was indoor cricket (19.2%) followed by circuit exercises (13.4%), stretching exercises (12.9%), volleyball (12.3%), basketball (10.2%), indoor soccer (8.6%), outdoor exercise (8%), and group exercise sessions (7.5%). Only 6.4% responses suggested that relaxation sessions were useful. The remaining 1.5% preferred all round exercise, table tennis and weights.⁴¹

Fifteen patients contributed to the qualitative evaluation; the authors grouped responses into five main themes. Patients reported that the programme helped them to manage stress and anxiety, and to relax. The programme also provided a structure and meaning to the day, and

gym sessions were anticipated in a positive way. New relationships were formed as a consequence of participating, and patients appreciated the input of exercise physiologists. Skills such as anger and frustration management were learned, allowing patients to clear their mind and achieve more focus. Finally, patients reported that the programme taught them to become more involved in their own care and monitor their results. The authors conclude that nurses have an important role in facilitating such programmes and supporting patients in health promotion activities, ensuring that they link with relevant services following discharge from units.⁴¹

Qualitative methods were used by Prebble et al.³⁷ to evaluate two Healthy Living Programmes (HLPs) carried out in New Zealand mental health secure units. One programme (A) was implemented in a medium secure rehabilitation unit with nine beds. The programme uses a treatment approach in which staff define new dietary and physical activity behaviours and direct their implementation. The second programme (B) was carried out in a minimum secure unit with 20 beds. This programme provides small group educational and practical sessions in food, exercise and social skills using a health promotion approach in which staff and patients define new behaviours.

Thirty-two patients who had engaged with either of the HLPs were invited to participate in interviews of which 15 accepted (14 male and one female). Twenty healthcare professionals, who had been involved in developing or facilitating the HLPs, were also invited to participate, of which 17 consented. Interviews with patients were carried out by service-user researchers (one from each HLP) and explored experiences of participation, impact on physical and mental health and lifestyle, self-efficacy and recovery as well as barriers to participation within a secure unit setting. Interviews with healthcare professionals were carried out by study researchers, exploring experiences of developing and facilitating the HLPs as well as barriers, challenges and enablers and their perceived effect on service user health, self-efficacy and recovery. Patient case notes were assessed for how health status details were recorded and how the programmes were evaluated, not to assess the effects of the programmes.³⁷

From Programme A, which had been accessible for four years, seven service-user participants were recruited (5 males, mean age 47 years) who had spent a mean 39.5 months on the programme (range 6-52). The programme had been initiated following the death of a young, obese patient, after which it was recognised that physical health needs were an important aspect of care. Two nurses, an occupational therapist and a consultant psychiatrist championed the programme in its early days. The programme was compulsory and became embedded into ward routines, although some flexibility was introduced to allow ability-appropriate physical activities and food choices.³⁷

Staff reported that access to records encouraged enthusiasm and engagement on the programme. Both staff and patients reported that the programme had a positive impact on patient self-esteem, confidence and life skills, with involvement increasing social interaction and peer support. Staff also indicated that the programme was beneficial for them as they

accompanied patients on walks. Staff initially met with resistance from patients at the changes made, though this diminished over time. Staff costs to meet extra support were a barrier, especially where funding was being cut. The effects of medication were also discussed, though it was acknowledged that weight loss could be achieved despite these side effects. Concerns included the tension between changing health-related behaviour and imposing restrictions on patients, for whom treats were an important aspect of life within the unit; promoting choice was a way of addressing this issue. The long-term effects of intervention were uncertain given that patients might not continue to eat healthily or exercise regularly once they left the unit. Physiologically, records showed that patient health had stabilised over 12 months, with some modest improvements. After six months no weight gain was identified and for two patients, blood pressure readings had improved.³⁷

Programme B was initiated following identification of a high level of metabolic syndrome on the unit (78%) with concerns about future health. Two nurses championed the programme, which was based on the Clubhouse Model of rehabilitation that encourages a strong group culture, facilitating peer support and education. Enjoyment and fun were also important for maintaining involvement with the programme. Both staff and patients noticed positive changes in patients' health, confidence and mood. The HLP was reported to promote a sense of vibrancy that extended beyond the ward, with other wards taking up aspects of the programme and requesting recipes or advice. Patients planned to continue activities following discharge, using tools and skills developed from the programme. Barriers identified by both staff and patients included staff resistance to change, the idea that facilitating HLPs did not form part of the nurse's job description, and that the HLP contradicted some of the forensic care protocols. Resentment was also identified due to the intervention being delivered to only a section of the ward. A reported lack of available space and resources to support the programme was evident, for example, small kitchens or no available freezer. Lack of a multi-disciplinary team approach was another weakness, with one ward having no access to a dietician.³⁷

The HLP evolved over time, becoming less authoritative regarding patients who did not comply with the HLP protocol and the tension between control and autonomy was managed day-to-day, with patients eventually recognising the benefits of the programme. Physiological measures were not recorded as consistently as for Programme A and no blood pressure records were identified. Weight was only recorded for one patient who gained 2kg over six months. Two patients with high blood glucose levels at baseline showed no change at 6 and 12 months.³⁷

The authors conclude that a consistent, multi-disciplinary team is an important factor to the success of a HLP. Both programmes were initiated by champions who encouraged change and provided education, an important factor in addressing entrenched attitudes and routines on the wards. Champions also secured funding, the extent of which determined how the programmes could develop. Differences between the two approaches (compulsory or empowerment) were identified, with the former potentially suiting a particular sub-population such as patients with learning disabilities. The latter approach was potentially beneficial to patients preparing for

discharge, with improved mental wellbeing. However, in this case the effects of the intervention could not be properly evaluated due to inconsistent data recording.³⁷

Mental health staff perceptions of delivering physical health care

Three included studies^{24,25,38} were carried out using qualitative methods to assess mental health nurse perceptions about the role of physical activity, their role in carrying out physical health care, their confidence in delivering nutritional advice, and how healthy lifestyle interventions have been established in mental health secure units.

Rylance et al.³⁸ used semi-structured interviews to explore how six nurses perceive their role in physical care of patients within a UK secure mental health unit. All the nurses perceived physical health assessment as an important part of the care pathway, though this was generally initiated by physicians. Physical health concerns might be raised by patients during 'named nurse' sessions but nurses doubted whether routine regular monitoring was carried out. There was a reported lack of equipment on wards for assessing physical health and a prioritisation of mental health needs that took up most of a nurse's time and effort.

Health promotion activities were planned or opportunistic and delivered to individuals or groups. There was concern over women's health and the effect of medication on weight. A suggested approach was to train nursing assistants to carry out physical assessments. The interviewed nurses felt that they had a low level of knowledge about physical conditions such as diabetes. When patients were unwell, a physician or specialist was called in to the unit. The authors suggest that the approach being described is at odds with current thinking, to provide holistic care. The findings imply that a ward culture of not physically monitoring patients routinely could prevail. In addition, although nurses seemed keen to care holistically for patients, they may lack the knowledge and confidence to carry out assessments, revealing a need for training in this area.³⁸

Forsyth et al.²⁵ used interviews and a nutritional knowledge questionnaire to assess nurse confidence and training needs in providing nutritional advice to patients. A total of nine nurses (6 female, 8 qualified) were recruited at a rehabilitation forensic unit in New Zealand. The dietician was a major source of information, supplemented by internet resources, TV programmes and previously developed local protocols. They therefore perceived that they held basic nutritional knowledge but lacked the confidence to convey this to patients, whom they perceived as having low levels of knowledge. Particular areas of confusion were food labelling and portion size. Staff members were reported to hold different views about nutrition due to inconsistent messages from specialists. Nurses were also wary of imposing too many restrictions on patients and contravening their human rights. Patients were reported to be resistant to change, avoiding responsibility for healthy eating and holding habits that were difficult to break. The effect of medication on weight gain was also a reported barrier for patients.

The nutritional knowledge questionnaire yielded an average score of 50% (range 41%–68%). Three nurses scored less than 50%. Knowledge of nutritional value attracted the highest scores whilst knowledge of major food groups, adequacy of intake, effect of mental health problems on appetite, food labelling, cost-saving, fibre content and risk for metabolic disease scored lowest. However, nurses reported feeling more confident about advising patients about aspects of nutrition that they knew least about.²⁵

Faulkner et al.²⁵ assessed mental health nurses' perceptions of the role of physical activity in addressing weight management in one UK secure unit. Face-to-face and telephone interviews were carried out with 12 nurses (nine female, three male) with a mean age of 35 years. All participants reported having been involved to some extent in promoting physical activity (planned or infrequent) as part of their role. Involvement included providing advice, helping to set goals and encouraging sedentary patients to become more active. Walking was the most commonly reported activity with some sports involvement. All the nurses were positive about being involved in this role, citing examples of patients recovering much more quickly when they had been engaging with physical activity, and even single episodes of activity having an impact on alertness. Physical activity was also reported to relieve frustration and stress as well as provide structure to the day and social interaction. However, the authors suggest that caution is needed to ensure that physical activity is not carried out to fill the day rather than as a way of achieving health benefits, since sedentary activities can also fill time. The tension between lifestyle choice for patients and healthy lifestyle promotion was mentioned, given that physical activity was being promoted to address health risks. If patients did not want to participate in exercise and felt they were being coerced, this could negatively affect mental wellbeing.²⁵

Additional reported barriers for patients included the relatively constrained environment of secure units for participation in exercise compared to outside and poor motivation due to mental health issues. For staff, the prioritisation of mental health, health and safety and suicide prevention within the units as well as the resistance of staff to co-participating in activities not regarded as “work” were reported issues. Whilst there was a reported move toward holistic care, staff faced challenges that continue to separate the needs of mind and body, particularly when dealing with mental health crises. The authors conclude that nurse participants framed physical activity promotion as diversion rather than therapy, which could serve to marginalise physical activity and weaken the argument for more provision within units. Researching the therapeutic role of physical activity also requires theorisation of the mind-body relationship rather than treating them as separate entities.²⁵

Grey literature – unevaluated activities

In addition to retrieving evidence from published and unpublished literature, we consulted with our advisory team to identify information about interventions that might be available in the grey literature. The June 2015 Forensic CCQI newsletter⁴⁵ ran a special edition that highlighted 17 physical health promotion initiatives being implemented in UK secure mental health units. These examples illustrate how units are responding to the call for improved physical health

care for patients with severe mental health problems. Other editions^{46,47} focus on physical healthcare and provision of high quality meals secure units, the latter citing six examples of change policies within low secure units.

2. Stakeholder engagement

Stakeholder consultations

Consultation with our advisory panel and stakeholders including commissioners, clinicians and service users raised a number of issues to take into account when identifying and implementing interventions to address obesity in secure mental health units. They included:

Organisational

- access to primary care input in secure units
- the role of the Care Quality Commission (CQC) in monitoring activities such as 'blanket' restrictions
- staff availability – this may affect feasibility of staff training for physical activity facilitation and staff availability at mealtimes. (Meals were served over the period of time that most staff were on duty, with a long interval between dinner and breakfast the following day. This could lead to patients snacking during the evening.)
- tension between controlling access to foods and autonomy; respecting human rights and the role of food as treats
- extend physical care to life-course where a range of services will be accessed, not just the duration of stay in a secure unit
- the potential impact of smoke free units on eating behaviours – patients focus on smoking breaks and mealtimes
- food can be brought in by family and friends

Intervention

- the importance of intervention accessibility (eg acute wards, where patients cannot obtain leave, may not have sufficient space for physical activity)
- the importance of integrating patient choice and preference
- the importance of a balanced healthy diet. This affects mental health as well as physical health outcomes
- the need to include staff behaviour change in interventions because staff can have similar lifestyle behaviours to patients with regard to food and physical activity. (This issue was picked up in research into smoking behaviours in mental health secure units.)
- staff and service user attitudes can focus on short-term benefits whereas behaviour change requires long-term thinking
- duration of response to interventions rather than dose effect
- the impact of medication on weight, appetite and alertness, and the extent to which clinicians are aware of alternative medications

Patient

- the need to take into account the stage of a patient's illness and what to prioritise when modifying lifestyle
- gender differences in the level of engagement with physical activity and dietary changes (women less engaged with physical activity, difficulty maintaining healthy eating) and obesity levels (women more obese)
- snacking takes place in evening when dinner is served early
- comfort eating to relieve boredom and stress
- patients can resist attempts to change behaviour if restrictions are regarded as punitive
- change more likely if service users want to change rather than need to change

3. Thematic synthesis

Data from all identified sources as described in the preceding sections were categorised thematically. Themes will be presented in detail in a publication to be submitted to a peer-reviewed journal. An outline is included in Table 2 below, along with sub-themes and data sources.

Table 2. Themes from included studies

Theme	Subtheme / detail	Papers
Extent of obesity in secure units	Higher than general population	Cormac 2005; Long 2014; Haw
	Higher in females	Cormac 2005; Long 2014; Haw
Weight management strategies:		
Physical health / weight monitoring	Planned (routine) or opportunistic monitoring Physical health monitoring sheet Availability of equipment Availability of trained staff Staff level of knowledge Staff confidence in educating patients	Haw 2011b; Rylance Vasudev Rylance Rylance Rylance; Forsyth Rylance; Forsyth
Food policies	<u>Canteen</u> : portion size, healthy options, care planning (restrict high calorie food and drink), plating meals, restrict second helpings <u>Shop</u> : healthy snacks, limited access; sell other types of goods <u>Take-aways</u> : care plans, "rights", outright ban Comparison to school policy	Oakley Haw 2011b; Oakley; Haw 2011b; Harper; Long 2009 Oakley; Kasmi; Haw 2011b; Oakley
Facilities for physical activity	<u>Access to NICE recommended PA</u> : Sufficient staff, access to facilities and interventions (gym, fitness programmes, activities / sports) Employ fitness instructor	Oakley Haw 2011b Hjorth Meiklejohn; Vasudev
Positive Modelling	Staff behaviour (eating practices) Staff behaviour (PA involvement) Staff champions (trigger and maintain intervention)	Oakley; Long 2009 Bacon Prebble
Specialist input	Practice nurse (primary care) Physician / specialist Dietician	Meiklejohn Rylance Forsyth
Patient education	Money management	Harper;

and advice	Nutrition (staff; dietician) Motivational group Weight management Health planning Group or individual	Haw 2011b; Long 2009 Long 2009 Meiklejohn Hjorth Meiklejohn; Rylance
Patient advocacy:		
Human Rights	Limiting choices Immoral to restrict treats Comparison with anorexia (urgent health need)	Oakley; Prebble; Forsyth; Faulkner Haw 2011b; Prebble Oakley
Community meetings	Discuss policies with patients	Haw 2011b; Long 2009; Meiklejohn
Ward Culture:		
Changing practice	Extent to which ward adopts a culture of healthy eating, physical activity, weight maintenance, supported by staff training (holistic care). Staff training (nutrition) Staff awareness and motivational interviewing	Long 2009; Rylance McCarrren; Hjorth
Interventions:		
Healthy lifestyle interventions	Diet, physical activity Weight management / fitness	Vasudev; Wynaden; Prebble Cormac 2008 / 2013; Savage; Long 2015; Bacon
Intervention theories	Stages of change Clubhouse Active Awareness Motivational Interviewing Reinforce Appropriate Implode Disruptive (RAID) Positive Behavioural Support (PBS) Nudge	Savage Prebble Hjorth Hjorth Long 2015 Long 2015 Long 2015 Long 2015 Long 2015
Barriers and facilitators to intervention:		
Intervention factors	<u>Motivators</u> Researcher / staff interaction Holistic, not only for weight management Compulsory or voluntary? Less authoritative approach <u>Benefits</u> Enjoyment, fun Educational / skills Competitive Fills time / adds structure to day (though this not main aim) Provides social interaction Improves mood, self-esteem, confidence <u>Barriers</u> Accessibility for broad range of MH problems Lack of available space	Bacon Bacon Prebble Prebble Savage; Long 2015; Bacon Bacon; Wynaden; Prebble Bacon Wynaden; Faulkner Wynaden; Prebble Savage; Long 2015; Prebble Cormac 2013 Prebble; Faulkner

	Lack of support resource Contradicts forensic care protocol	Prebble Prebble
Staff factors	<u>Facilitators</u> Can link patients with services to continue after discharge Positive when they see benefits to patients <u>Barriers</u> Lack of primary care input Lack of multidisciplinary team Staff shortages Low level of knowledge Not recognising PA encouragement as part of job Prioritisation of MH care Resistance to change Not wanting to wear sportswear Insufficient funding	Wynaden Faulkner Vasudev Prebble Cormac 2013 Rylance Long 2015; Bacon; Prebble; Faulkner Rylance; Faulkner Prebble Bacon Prebble
Patient factors	<u>Patient resistance</u> To having measurements taken To change Low motivation / reluctance Not taking responsibility Habitual behaviour Intervention difficult <u>Patient drop out</u> No reason given More females drop out Transfer to other units / discharge <u>Outcomes</u> Effect of medication Maintenance after discharge	Vasudev; Cormac 2008 Prebble; Forsyth Haw 2011b; Long 2015; Faulkner Forsyth Forsyth Wynaden Hjorth Cormac 2008/2013 Vasudev; Bacon Prebble; Rylance; Forsyth Prebble

4. Discussion

A mixed method synthesis of evidence was carried out to assess the extent of obesity and weight gain as issues in mental health secure units, what activities are being carried out to reduce the risk of weight gain within this setting, and the barriers and enablers to change. Qualitative evidence identified a lack of health promotion resources, such as equipment, staff and training, required to deliver physical health care in secure units. Published UK evidence identified the extent of obesity in secure mental health units and, of concern for physical health promotion, the tendency for patients to gain weight following admission.^{21,31}

A range of dietary and physical activity strategies and activities were implemented and/or evaluated at local level, including one RCT. Interventions were designed to focus on a particular activity for patients, for example, access to regular Wii Fit sessions, or on a range of interventions with a combined aim of reducing the obesogenic environment. The latter promoted gradual and prolonged change at individual, ward and organisational levels leading toward prevention of obesity from the time of admission to the wards.

At the individual patient level, duration of intervention could be curtailed due to movement out of and between units. This meant that even in longer-term studies it was difficult to assess the impact of an intervention on individual outcomes. Nevertheless, there were signs of promising psychological and social changes that could lead to a continuation of lifestyle change after discharge from the unit.

Unpublished initiatives in UK units include activities that have been developed in response to recent guidance.^{45,46,47} They illustrate how activity is being implemented, which is additional to that identified in published literature, and how unit policies can be developed to modify lifestyle behaviour in both staff and patients. However, the impact of these initiatives is mainly unknown, indicating that more evaluation is required to determine what works best for different sub-populations.

Consultation with our advisory panel and stakeholders identified a number of themes that were largely consistent with the literature, including the impact of medication, the tension between control and autonomy, and the need for food or drink related treats. This reassured us that the main issues specific to secure unit settings had been addressed in publications and that publication bias was not a particular threat to the synthesis. One theme that was identified through consultation, and only mentioned in the literature in terms of individual smoking cessation, was the impact of the smoking ban policy on eating behaviours. This is probably due to the very recent changes in policy that prevent smoking on unit premises (although individual units will interpret the policy in different ways). The impact is as yet unknown, though a ban on smoking could increase the frequency of “treat” eating behaviours as well as creating a sense of over-control of lifestyle behaviour.

A number of systematic reviews have been carried out to assess whether lifestyle change reduces obesity in people with severe mental health problems outside of secure settings. However, there are challenges to assessing the effectiveness of a range of interventions with different outcome measures across mental health conditions in various settings.⁴⁸ Even within mental health secure units, diversity is apparent between units and wards with different policies relating to low, medium and high levels of security and care plans for patients with learning disabilities and sensory disabilities as well as the range of serious mental health illnesses. This heterogeneity indicates that no particular intervention is likely to be measured as effective nor indeed acceptable, in all patients in secure units, and that a tailored approach, as suggested within obesity guidance¹⁰ with adjustments for specific populations such as learning disabilities, is appropriate.⁴⁹

It is important to improve understanding of how to address issues relating to the dietary habits and weight of patients in secure settings. However, action to help patients become more active also bears consideration, given that the reported benefits extend beyond weight. A number of included studies focus on improving physical and mental health generally, using holistic approaches of which weight management is only one potential positive outcome. For example, the impact on psychological health, as well as enhanced social interaction and support, could improve the mental health of patients in secure units.

Limitations

Most of the studies included small samples which, added to the absence of a comparator, suggest that caution is needed in making assumptions about effectiveness. However, as stated previously, the evidence for obesity intervention is presented within NICE guidance¹⁰ and this work is intended to identify how the guidance might be implemented within mental health secure units. It is also possible that publication bias has excluded studies with negative findings from becoming available.

Further research

This body of literature highlights the possibilities and also the barriers that might affect intervention implementation in secure units. It would appear that stronger evidence is required to achieve results about effectiveness. However, the setting for research and the target population pose unique problems to carrying out RCTs.

Conclusion

Evidence suggests that complex ward or unit-level interventions that integrate elements of choice and tailoring for individual abilities and preferences, as well as for different conditions, may be feasible and acceptable in secure mental health units. It would perhaps be a good start to devise broad interventions for a specific group of patients (such as females, people with learning disability) and then tailor them to specific patient needs as appropriate. These could be based on multi-component approaches that include standardised elements that conform to

NICE guidance^{10,50} with adjustments for specific populations. The secure unit could be a setting that encourages change in a way that is not possible within the community. Ways to change the culture on wards could be to engage staff in interventions and highlight the benefits of healthy eating and physical activity behaviours.

Implications for practice

One finding particular to this population is the importance of involving mental health staff in delivering, supporting and adopting lifestyle change interventions. Involving patients in decision making maintains their autonomy and helps to empower patients to care for their own needs.

Implications for research

Whilst this body of work has highlighted activities to address some of the causes of obesity in secure units, the studies are small in size and opportunistic in terms of evaluation. In order to assess the effectiveness and acceptance of interventions for changing lifestyle behaviours in mental health secure units, there is a need to better understand how UK units differ in their facilities, populations and policies as well as strategies that are deemed to be having positive effects and the barriers encountered in implementation. Further cross-sectional and qualitative exploratory research could assess these in a systematic way to map out how particular adjustments to current guidance might best facilitate intervention. This would allow complex interventions to be designed, tested and evaluated in a rigorous way, taking into account the barriers that are faced in this specialised setting.

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Appendix A: Search Strategy

forensic psychiar**"psychiatric unit

1. obes*
2. "weight manage**"
3. "weight loss"
4. diet*
5. nutrition*
6. "food habits"
7. "food services"
8. exercise*
9. "physical active**"
10. "physical fitness"
11. sport*
12. "healthy eat**"
13. "healthy lifestyle"
14. "healthy living"
15. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
16. Limit to "mental health"
17. Schizophrenia
18. Bipolar
19. "serious mental illness"
20. "serious mental disorder"
21. 16 or 17 or 18 or 19 or 20
22. intervention
23. uptake
24. prevent*
25. "health promotion"
26. Education
27. 22 or 23 or 24 or 25 or 26
28. 15 AND 21 AND 27
29. Limit to 1990 – 2015
30. Limit to "adult"

Appendix B: Quality assessment

Reference	Comments: MMAT	Comments: CASP RCT
Cormac 2005	Descriptive	
Haw 2011a	Routine data	
Long 2014	Routine data	
Bacon 2012	No comparator N=2 consented	
Cormac 2008 Cormac 2013	No comparator. 70% of those invited took part. Only 48-56% completed the programme.	
Hjorth 2014	44% refusal to participate, therefore low power.	Difficult to conceal lifestyle intervention; cluster randomisation; 44% refusal to participate therefore low power; controls may have become more aware of weight management due to frequent waist circumference measurement. Limitations acknowledged by the authors.
Long 2015	Females only. No comparator. Small sample size	
Savage 2009	Females only. No comparator. Drop out 25% Small sample size (n=6). No p values.	
Vasudev 2012	Pilot study. No comparator, small sample. 42% of follow up patients admitted after start of intervention so did not reach 12 months.	
Harper 2008	Routine data	
Haw 2011b	Questionnaire developed from literature. Response rate 45.9%	
Long 2009	Female only. Small sample (n=28) No comparator.	
Kasmi 2009	Short communication, little detail.	
McCarrren 2013	Unpublished thesis. 85.7% response rate.	
Meiklejohn 2003	Routine data and interviews	
Oakley 2013	6 units were adolescent only.	
Wynaden 2012	53% Response rate	
Faulkner 2002	No comments	
Forsyth 2012	Small sample n=6	
Prebble 2011	Qualitative evaluation	
Rylance 2012	Small sample (n=6)	

Appendix C: Data tables

Epidemiology studies

Reference	Cormac 2005
Type of study/document	Peer reviewed publication
Study design	Cross-sectional
Country	UK
Setting	High secure hospital (n=1)
Population	Adult service users
Research question/objectives	To evaluate health risk factors in patients.
Research methods	Data collection: Semi-structured questionnaire, physical examination, case notes. Data analysis: not reported.
Analysis	Comparison of new and recorded data.
Sample	N=248. Diagnoses: Schizophrenia (n=131) personality disorder (n=119) Learning disability (n=59) Mean age 39 years (SD 10.75).
Response rate and reasons	248/460. 22 unable to give consent. 159 refusals.
Main findings	Obesity 36% in men, 75% in women. 1.2% underweight. 16% admitted with BMI > 30kg/m ² Mean increase in weight since admission, 12.7kg (SD 17.02) in women, 10.62kg (SD 17.19) in men. 53% of men and 76% of women had a waist size requiring intervention for health. Mean waist size 103.1 cm (SD 14.4, range 68.5-156) in men and 110.0 (SD 18.8, range 77.0-143.0) in women. Medication associated weight gain (n=181) more likely female, non-white, shorter stay and higher BMI compared with those not taking such medication (n=67). Males showed statistically significant difference in waist size between taking / not taking medication (p=0.004), no statistically significant difference for women. Difference in mean BMI between two groups was 2.3kg/m ² more for those taking weight increasing medication (p=0.020).
Reference	Haw 2011
Type of study/document	Peer reviewed publication
Study design	Cross-sectional
Country	UK
Setting	Low / medium secure psychiatric unit (n=1: St Andrew's Healthcare Northampton) with 16 wards (570 beds).
Population	Adult service users
Research question/objectives	To determine the proportion of inpatients who were overweight or obese.

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Research methods	Data collection: Routine data Data analysis: Descriptive statistics.
Sample	234 service users detained under MHA 55% had schizophrenia/related psychosis. 85% received regular antipsychotic medication (19.7% high dose). Median age =33.5 years (range 19-64). Median length of stay =2.2 years (range 0.1-24.8). 56.8% low security care, 22.6% medium security. 53.8% had escorted leave from the ward, 34.6% unescorted leave.
Response rate	10 patients refused to be weighed
Main findings	81.6% either overweight or obese (63% female and 47% male compared with 25% and 24% respectively in general population 2008. Of these, 33.3% of males (n=144) were overweight, 47.2% obese and 20% of females (n=90) were overweight and 63.3% obese. More females than males (26.7% vs 4.2%) were morbidly obese (Class III BMI> 40 kg/m ²). Change in weight over 3 months known for n=195. 77 gained >2% body weight and 42% lost >2% body weight. 26 gained >5% body weight, 12 lost >5% body weight. Median gain in weight over 3 months =2.9kg (inter quartile range 1.2-5.0kg). Median loss in weight over 3 months =2.5kg (inter quartile range 1.4-4.4kg). 8.5% of the sample diagnosed with T2DM; 14.1% with hypertension (medicated); 30.3% had raised lipids (medicated). Obesity associated with being female (p<0.05) and prescribed at least one antipsychotic drug (p<0.0001). Primary diagnosis of schizophrenia / LD no more likely to be obese than other conditions. No correlations found between age, length of stay, ground leave conditions or level of security and BMI. Discussion: Reasons for increased incidence of obesity in females unclear but observationally, they were less motivated to attend the gym or become involved in sporting activities than men.
Reference	Long 2014
Type of study/document	Peer reviewed publication
Study design	Cross-sectional (3 year retrospective)
Country	UK
Setting	Secure psychiatric unit (n=1: St Andrew's Healthcare Northampton)
Population	Adult service users with length of stay ≥ 3 years.
Research question/objectives	To explore incidence of obesity and its complications in secure psychiatric settings.
Research methods	Data collection: Routine data Risk screening instrument, attendance data Data analysis: Statistical analyses to compare means.
Sample	N=351 (239 males, 112 women). Mean age =38.12 years (range 19-65). Mean length of stay 3.1 years (range 3-25). 53% had schizophrenia / related psychosis, 12 % personality disorder. 35% secondary diagnosis including mental / behavioural due to substance use (n=70), neurotic, stress and somatoform disorder (n=38) and depressive episode (n=15). 45% detained under section 37/41, 38% under section 3 of MHA. 46% in low security and 55% had escorted ground leave.
Response rate	Not reported
Main findings	BMI ≥ 25 (n=505; 66%) vs healthy weight (n=220. 29%). Obesity in females 28% (vs 20.5% men, p<0.05).No correlation between age, security level, legal status, mobility or leave status. Regardless of gender, lower BMI associated with moderate vs low intensity activities (p=0.005). Males attended more vigorous physical activity (6.4 hours vs 3.81 hours; p=0.007), females attended more low-intensity activities (6.34 hours vs 3.31 hours; P=0.005). 94% males and 63% females prescribed regular antipsychotics. One or more antipsychotic drug / sodium valproate more

associated with obesity (85% vs 15% $p<0.0001$; 46% vs 21%, $p<0.0001$ respectively). Three were taking Orlistat to help lose weight.

At 3 months, 6 months, 24 months and 36 months, women had significantly higher mean BMI (32.69 vs 28.84 $p<0.005$; 32.90 vs 28.76 $p<0.001$; 33.5 vs 30.07 $p<0.01$; and 33.38 vs 29.96, $p<0.001$ respectively) than males. The highest mean BMI (males and females) recorded was one year post-admission (males 29.33 vs 32.53 $p<0.001$; females 31.01 vs 33.67, $p<0.001$).

Length of stay positively correlated with female BMI ($p<0.01$), and BMI in this sample at three years was significantly increased from admission (31.01 vs 33.38, $p<0.01$).

Gender differences on admission most apparent in healthy weight / obese class I categories. 94% of men who gained weight were treated with antipsychotics. All but two females who gained weight were taking Clozapine ($n=14$). Between 12-24 months, 22 of the 24 men who lost weight were taking antipsychotic medication. All the 7 women who lost weight were taking Clozapine and 3 attended slimming sessions. Total hours spent in physical activity increased from 6.5 hours to 16 hours per week for men ($p<0.0001$) and from 5.8 hours to 12.6 hours for women ($p<0.0001$). Men spent more time in vigorous activity (5.5 hours vs 2 hours, $p<0.05$), and less time in low intensity activity (3.8 vs 5.6 hours, $p<0.01$) than women. After 24 months, more men were in healthy BMI category than women (32% vs 24% $p<0.00$) and in obesity class I (21% vs 26%, $p<0.05$).

At 24-36 months, 12 men (5%) and 4 women (4%) continued to lose weight, mainly moving into healthy category. Gender difference were significant (males 33%, females 22% healthy; males 19%, females 27% obesity class I).

Discussion: Findings confirm Haw 2011 that physical activity engagement may explain gender differences in weight change. Women may be more susceptible to Clozapine-induced weight gain.

Suggestions for intervention: Simple, accessible messages about link between nutrition, diet and MH including NICE guidelines and value of calorie reduction for cognitive as well as physical health.

Ward environment conducive to physical activity (sport/ leisure opportunities, motivated enthusiastic staff, bespoke equipment, managerial support).

Interventions that maximise appeal; dietitians employed to influence catering services and support / help deliver health promotion activities; brief and long-term interventions; Identification of and sharing of good practice initiatives.

Overall strategy: Staff training to promote lifestyle change. Food / nutrition policy that balances human rights with duty of care. Policy implementation that includes discussions with service users / ward teams around the practice of food management, e.g. second helpings, takeaways and self-purchased snacks. Weight management using motivational and CBT approaches. Promoting engagement with physical activity. Interventions designed to incorporate mood benefits, environmental manipulation, exercise supporting habits, cognitive strategies and social support. Interventions applicable to secure unit settings. Use of Metformin to treat weight gain in service users diagnosed with T2DM.

Intervention studies

Reference	Bacon 2012
Type of study/document	Peer reviewed publication
Study design	Mixed methods Before-after evaluation.
Country	Australia
Setting	Secure mental health hospital (n=1) 116 beds
Population	Adult service users; BMI 25-32
Research question/objectives	To evaluate impact of Nintendo Wii Fit use on engagement with PA.
Intervention, control (if applicable) and duration	Group session with training x2 per week as part of regular activity. Accelerometer attached 12-96 hours per week and users asked to recall what they did. 8 weeks.
Research methods	Data collection: Accelerometer readings, participant observation, Interviews. Data analysis: Computer software to measure energy expenditure and time in PA. Thematic analysis.
Sample	Consented, N=2: "Andrew": Male, aged 28 years, taking Clozapine. Weight gain 51.9kg over 6 years since admission. Never used Wii Fit before. "Becky": Female, aged 43 years, diagnosed with schizo-affective disorder and mild intellectual disability. Admitted eight months previously, she had gained 7.3kg since being prescribed Clozapine. Never used Wii Fit before. Becky participated for only 5 weeks as she was transferred to another facility.
Uptake, drop out	Whilst several participants (no number provided) used the intervention, many moved out of the unit and only two participants were able to give consent for data to be used.
Main findings	"Andrew" played Wii Fit for 7-127 minute sessions, between one and three sessions per week. In weeks 1 and 2 he played alone at night. Following this he joined group sessions which he preferred, trying to beat the scores of others. Sceptical that using the Wii Fit could help lose weight as it wasn't like doing the real activities. However, once started he enjoyed the range of activities and how different movements were required. He preferred this to other console games that did not require bodily movement. The Wii Fit was also informational, teaching Andrew how much exercise would burn off calories, which led to more reflection about eating habits and to increased enthusiasm for physical activity classes. Initial excuses not to be active stopped. He lost 3.4kg over the eight weeks. "Becky" spent a total of 570 minutes over 5 weeks on the Wii Fit, playing 2-3 times per week (mean 114 minutes per week, 29.9 minutes per session). She preferred to play while researchers were present, appreciating their encouragement and advice. She initially found the games difficult but eventually saw them as fun. Becky lost 1kg over 5 weeks and came to enjoy exercise. Both participants had previously spent a lot of their time alone in their rooms. "Becky" spent time sleeping and only coming out for drinks and cigarettes. Using the Wii Fit led to sustainable changes in attitude to physical activity. Although Wii Fit use does not require vigorous activity it led participants to enjoy participation in other forms of activity. However, field notes record that nursing staff on the unit would be willing to watch the participants play Wii Fit but not join in, sometimes stating that they wouldn't be capable. The staff would though join service users for drinks and cigarettes,

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	leading the authors of the paper to reflect on the usefulness of positive role modelling, and “showing” what to do instead of “telling”.
Reference	Cormac 2008
Type of study/document	Peer reviewed publication
Study design	Before-after 10-12 week programme (x3 per year).
Country	UK
Setting	High Security psychiatric unit (n=1)
Population	Adult service users; obese or overweight with co-morbidities.
Research question/objectives	To evaluate integrated weight management / fitness service for 10-12 weeks.
Intervention, control (if applicable) and duration	Attendance for at least five educational sessions, delivered in groups according to directorate, consisted completion of the programme. Dietician designed the tailored nutritional aspect and trained instructors. Fitness classes combined different forms of physical activity to improve strength, flexibility and body shape. One hour fitness session per week combined with an educational session plus optional extra hour of activity. Tailored to fitness levels (swimming, guided walking, indoor curling, aerobics, circuit training and ball games). Four programmes ran sequentially for 10-12 weeks.
Research methods	Data collection: Physical and fitness measurements. Data analysis: Statistical analysis. Intention to treat.
Sample	Started n=95; Completed n=46 Mean age 37.1 years (range 20-63 years). Ethnicity: 88% white.
Uptake, drop out	145 were referred initially, 102 accepted and 95 started. More females than males withdrew.
Main findings	Mean number of combined or separate sessions attended was five. Mean weight loss 1.3kg (SD 2.73, range 12kg gain to 9kg loss). Mean waist size reduction 2.0cm (SD 3.73, range 8cm gain to 8cm loss). Many users reported enjoying the fitness and interactive education sessions. However, problems with adherence affected results. Males responded better to the programme than females. Staff commitment, training and enthusiasm were major facilitators in success. Costs: >£250,000 in first year with £15,000 savings in year 2.
Reference	Cormac 2013 (follow up to Cormac 2008)
Type of study/document	Peer reviewed publication
Study design	Before-after 10-12 week programme (x3 per year).
Country	UK
Setting	High Security psychiatric unit (n=1)
Population	Adult service users; obese or overweight with co-morbidities.
Research question/objectives	To evaluate integrated weight management / fitness service.
Intervention, control (if applicable) and duration	As Cormac 2008. 16 programmes delivered between 2003 and 2010.

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Research methods	Data collection: Physical and fitness measurements. Data analysis: Statistical analysis. Intention to treat.
Sample	N=102 Mean age =36 years. Mean BMI = 34 kg/m ² (SD 6.1, range 24.9-56.0)
Uptake, drop out	Data not available for programmes 5 and 7 so only 14 programmes analysed. 206 referred in total. 58% completed the five sessions (attrition 42%). Highest attrition in females (56%) and lowest in male LD group (21%).
Main findings	Staffing shortages affected delivery of programmes 6, 13 and 14. 32% gained weight, 5% showed no weight change, 63% lost weight. Of those that lost weight, 21 patients lost at least 5kg over 10-12 weeks. Mean weight loss was 1.3kg (SD 3.7, range 12kggain to 11kg loss). Greater weight loss was observed in women, though this could be due to severity of obesity at baseline. No significant correlation between mean weight change and sessions attended.
Reference	Hjorth 2014
Type of study/document	Peer reviewed publication
Study design	Cluster randomised controlled trial
Country	Denmark
Setting	Long term inpatient facilities (n=6). Total beds n= 174. Total staff: n=330.
Population	Adult service users requiring round-the-clock care.
Research question/objectives	To assess the effectiveness of a physical fitness programme.
Intervention, control (if applicable) and duration	Intervention: Active awareness / motivational interviewing approach. Delivered by the project leader and research nurse. Focus groups with service users and staff (separately) to discuss health problems and ways of preventing risk and problems. Results fed back to staff. Individual one hour motivational interviews with service users to encourage health planning. Sessions with staff to raise awareness of health promotion, including physical activity and healthy eating, in service users. Control: Treatment as usual.
Research methods	Data collection: Documentation of physiological measures and ratings (baseline and 12 months). Data analysis: Statistical analyses to compare intervention / control. Linear regression.
Sample	Intervention n=77; Control n=97; Total n=174 77 Did not participate; N=85 for analysis (Intervention n=40; Control n=45). 72%/73% diagnosed with schizophrenia in intervention / control groups respectively. Intervention group: 58.8% male; mean age 47.9 years Control Group: 50.5% male; mean age 43.25 years All but three Caucasian (Inuit n=2, Indian n=1).
Uptake, drop out	12 dropped out during study (death n=3, moving from facility n=3, personal reasons n=6).
Main findings	Majority of the sample were obese (44.3% BMI > 30; 76.3% BMI >25). Waist circumference mean was 106cm for men and 108cm for women (intervention), 112cm for men and 109cm for women (control). Intervention Group: Decrease in WC of 0.75cm (95% CI -2.79 to 1.23). Decrease in cholesterol and LDL levels, no significant change in HDL / triglyceride. Significant decrease in diastolic BP of 3.68 mmHg (95% CI -6.88 to -0.47). Control Group: Increase of WC of 2.17cm (95% CI -0.37 to 4.71). Decrease in cholesterol and LDL levels, no significant

	<p>change in HDL / triglyceride. Controlling for cluster randomization, sex, age and body fat, difference in WC change between intervention and control was -3.1cm (p=0.018). No significant difference in fasting glucose between intervention and control groups. Discussion: Intervention did not cause reduction in WC but stopped further increase. Health interventions can improve / delay risk factors for CVD and T2DM.</p>
Reference	Long 2015
Type of study/document	Peer reviewed publication
Study design	Before-After evaluation.
Country	UK
Setting	Secure psychiatric unit (n=1: St Andrew's Healthcare, Northampton). One low (learning disability pathway), one medium secure ward (personality disorder pathway).
Population	Adult female service users on intellectual disabilities or personality disorder pathways.
Research question/objectives	To evaluate effectiveness of a range of interventions designed to increase motivation for PA participation at 3 months.
Intervention, control (if applicable) and duration	<p>Environmental, motivational, reinforcing. Theoretically underpinned by Reinforce Appropriate, Implode Disruptive (RAID), positive behavioural support (PBS) and "Nudge" principles.</p> <p><u>Environmental:</u> Provision of minimum 30minutes physical activity per day per patient. Point of decision prompts, e.g. flashcards placed in activity courtyards specifying 5-minute workouts. Supervision of groups in courtyards. Increasing proximity to exercise activities, e.g. semi-recumbent bikes on the wards. Prioritising physical activity sessions. Incentivising attendance at physical activity sessions (low intensity aerobics delivered by qualified instructors) with small monetary rewards. Encouraged to work within own limitations but to a level that might be effective.</p> <p><u>Motivating and reinforcing:</u> Staff training (nurses, psychology, physiotherapy, dietetics, sports, exercise therapy). "Make Every Contact Count" (Varley & Whitely 2011). Feedback of bio-metric and mood pre and post intervention assessment. Individualised target setting including challenges, recording activity and certificates of achievement. Timetabling and publicising varied activities to maintain interest and motivation.</p>
Research methods	<p>Data collection: New Zealand Physical Activity Questionnaire Short Form (NZPAQ-SF) which assesses frequency, duration and intensity of activity; biological measures (BMI, body fat, muscle, peak expiratory flow, resting pulse rate); mood monitoring measure (MMM); attendance categorised as vigorous, moderate or low intensity; Behaviour Regulation in Exercise Questionnaire-2 (BREQ-2), a 19-item measure of decisions to engage or not engage in physical activity, extent to which behaviour is internalised or amotivational. Two "ad-hoc" questions (10 point scale, not good/important – very good/important)"How do you feel about your general weight and health?" and "How important is it for you to improve your level of physical activity?"</p> <p>Data analysis: Statistical analyses to compare pre- and post-intervention data.</p>
Sample	<p>N=32 All female; mean age 27.6 years (SD 11.3; range 18-48). Primary diagnosis personality disorder (79%), schizophrenia (15%) and depressive disorder (6%).</p>

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	All but 28 had a secondary diagnosis, PTSD (45%), mild learning disability (45%) and ASD (10%). Majority admitted from other medium secure units (52%) or prison (48%).
Uptake, drop out	100% uptake
Main findings	<p>Significant post-intervention increase in attendance at all levels of physical activity (Low intensity 2.4 hours vs 6.78 hours, $p<0.01$; moderate intensity 1.65 vs 3.45 hours, $p<0.05$; vigorous intensity 1.3 vs 5.5 hours, $p<0.01$) per week.</p> <p>No significant changes in weight, BMI, body fat, muscle mass, bone mass or metabolic age. Around one third lost weight, increased muscle mass and improved metabolic age.</p> <p>Pre-post changes in pulse rate were significant (mean 92.7 beats per minute, SD 9.3 vs 73.4 beats per minute, SD 11.4, $p<0.01$). No change in peak expiratory flow.</p> <p>A significant improvement in motivation was shown in the BREQ-2 results: mean amotivation scores decreased from 5.01 (SD 0.43) to 3.0 (SD 1.23), $p<0.01$. External regulation and introjected regulation scores also decreased ($p<0.01$). Intrinsic regulation and Relative autonomy Index scores increased but these results were not statistically significant. These results were reflected in one question on the NZPAQ-SF regarding attitude to physical activity and exercise. Positive mood changes were evident on the MMM score (calm, more relaxed, more energetic and happy) following physical activity.</p> <p>Discussion: Significant changes in attitude to physical activity and health, intrinsic motivation to exercise and activity behaviour were evident following initiatives. However, long-term benefits are unknown; six monthly follow up sessions are planned.</p>
Reference	Savage 2009
Type of study/document	Peer reviewed publication
Study design	Before-after evaluation.
Country	UK
Setting	Medium secure forensic unit (n=1; St Andrew's Healthcare, Northampton), 14 beds).
Population	Adult female service users.
Research question/objectives	To evaluate an initiative to increase service user engagement with PA at 12 weeks.
Intervention, control (if applicable) and duration	<p>Personalised training programme (one-to-one), weekly for 12 weeks. Delivery in unit's fitness room which provides aerobic and weight training equipment. Elements of intervention:</p> <ul style="list-style-type: none"> Delivered by physically active professional Education about personal benefits of exercise Personalised assessment Small measurable goals Incentivising engagement (monetary scheme) Therapeutic activity to overcome body image / self-consciousness issues Immediate, regular, specific feedback on mood and psychological wellbeing. Monitored to improve motivation.
Research methods	Data collection: Personal training mood measures. Evaluation of views using score at 12 weeks. Monitoring of attendance. Data analysis: Statistical analyses to compare pre- and post-session data.
Sample	N=6
Uptake, drop out	Not reported
Main findings	<p>Total number of sessions attended =39, mean per service user =6.5 (SD 3.0, range 3-12).</p> <p>Mean pre-post mood scores: tense/relaxed 5.05 (SD 1.32) vs 5.90 (SD 1.02); sad/happy 5.49 (SD 1.57) vs 5.85 (SD1.20); exhausted/energetic 5.00 (SD1.28) vs 4.59 (SD 1.45); angry/calm 5.92 (SD 1.11) vs 6.33 (0.87). This suggests participants</p>

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	<p>felt more relaxed, happy and calm after training than they did before. No significant differences on exhausted/ energetic score.</p> <p>Attendance was greater in four weeks after training sessions had ended than in the four weeks running up to final session (mean 52.0, SD 23.4 vs 39.5, SD 21.7).</p> <p>Feedback from service users was mean 5.4 (SD 1.14) for enjoyment, 6.0 (SD 0.71) for feeling more motivated to attend other sessions, 4.6 (SD 2.07) for value of completing MMM score, 5.0 (SD 2.35) for motivation to attend further activity sessions, 6.6 (SD 0.55) for benefits felt from attendance, where 1=strongly disagree and 7=strongly agree.</p>
Comments	Although the authors report that some findings are significant, p values are not provided within text or tables.
Reference	Vasudev 2012
Type of study/document	Peer reviewed publication
Study design	Pilot evaluation
Country	UK
Setting	Medium secure unit (n=1), 15 beds
Population	Adult male service users
Research question/objectives	To examine feasibility of maintaining a physical health record sheet at 12 months.
Intervention, control (if applicable) and duration	<p>Physical health monitoring sheet was designed by the Trust and introduced into service user records in 2006. The sheet prompted professionals to assess patient need for regular (at least 6 monthly) CVD risk screening. Parameters include weight, BMI, WC, BP, blood tests, ECG and other lifestyle factors (smoking, alcohol etc.) Primary nurse to complete weight, BMI, BP, WC and smoking, the rest completed by a junior doctor. Feedback and advice on appropriate interventions would stem from risk status.</p> <p>Audit tool: One sheet to collect information for each patient.</p>
Research methods	<p>Data collection: Audit of completed record sheets every 6 months.</p> <p>Data analysis: Statistical analysis to compare variables.</p>
Sample	<p>N=15</p> <p>Majority had a diagnosis of schizophrenia and were prescribed antipsychotic medication.</p>
Uptake, drop out	At one year, 53% of original cohort was followed up.
Main findings	<p>Significant number identified at baseline as having increased BMI (80%), central obesity (80%) and increased 10 year risk for CVD (87%). They were given feed-back on risks and encouraged to participate in regular "healthy lifestyle" groups organised on the ward by trained nurses.</p> <p>After 12 months, 100% of records had up-to-date information. No change in parameters were observed apart from reduction in mean Total-HDL cholesterol ratio (p=0.01). Those found to have a 10-20% ten year risk for CVD increased from 6 to 10, for >20% risk the number reduced from 7 to zero.</p> <p>Discussion: Some service users initially refused to undertake physical assessments, especially WC and blood tests. Physical activity interventions were not readily taken up initially though uptake increased. None of the service users had access to a GP on the ward. Introduction of the tool resulted in regular screening for CVD risk which prompted pharmacological interventions. However there was reluctance to adopt lifestyle modification. The authors suggest that primary and secondary care services share responsibility for physical health monitoring in these settings.</p>

Cross-sectional studies

Reference	Harper 2008
Type of study/document	Peer reviewed publication
Study design	Cross-sectional.
Country	UK
Setting	High secure unit (n=1)
Population	Adult service users.
Research question/objectives	To review expenditure and requisitions for foodstuff by service users over 6 months in 2006 following substantial increases in state incapacity and severe disability allowance in April 2006.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Summary data collection from finance department: state benefit increases, expenditure in shop and snack bar. Data from shop: Patient requisitions for food and drink over a two-week period. Data analysis: Requisitions allocated one of 13 categories, seven of which were “sugars and fats”. Calorie content of each item obtained from internet data or food packaging. Spreadsheet and statistical analysis.
Sample	One unit
Uptake, drop out	N/A
Main findings	After 5 months 251 patients had received an increase in state benefits and the remaining 86 patients received an increase of 45p per week of hospital pocket money or loan. Total benefits for March 2006 was £5,608 which increased to £17,697 the following month. From March 2005 – Aug 2006 there was a 45% increase in spending at the shop and 129% increase at the snack bar. The shop stocked an extra 26% of foodstuffs in total, including 26% more foods high in fat or sugar of which 62% were sweets, 16% crisps 37% chocolate products. In addition 35% more fish, meat, protein, 90% drinks or soups and 79% more packed fruit and vegetables were stocked following the increase in benefits. Before the increase in benefits, chocolate and sweets accounted for 4, 030,121 kcals of shop requisitions, rising to 5, 034, 838 kcals (25% increase) following the increase (p=0.005). Dividing these calories between patients who received extra benefits equalled an extra 4,003 calories per week each. A more conservative estimate (i.e. dividing the extra calories between all patients) equalled 2,956 extra calories per week per patient. Discussion: The authors state that individual level data cannot be derived from the study. They conclude that the increased benefits have led to two days extra food per week being bought or requisitioned by patients in excess of hospital provided food which has been calculated to meet normal dietary needs. They suggest that food shops should sell more healthy options and low-fat and low-sugar products as well as non-foodstuffs such as clothing, books, magazines and CDs. Money management could be taught in the units and patients encouraged to take part in healthy lifestyle activities.
Reference	Haw 2011
Type of study/document	Peer reviewed publication
Study design	Cross-sectional.
Country	UK
Setting	Secure forensic units
Population	Consultant psychiatrists

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	83.6% NHS 16.4% independent sector. 48.6% medium secure, 38.3% low secure, 20.2% high secure, 10.4% open units. 53.6% worked with males, 8.2% with females and 37.7% with mixed gender.
Research question/objectives	To assess how consultant forensic psychiatrists address inpatient weight management.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Questionnaire (piloted in the unit) Data analysis: Statistical analyses to examine differences in reported measures between units.
Sample	N=442 (183 analysed)
Uptake, drop out	45.9% response rate
Main findings	95.6% reported regularly monitoring patient weight. 88.5% had access to a dietician for patients, though 15 consultants stated that the time available with dieticians was inadequate. Median 40% of patients were thought obese (IQR 25-52.5%). 50% of females and 40% of males were thought to be obese (non-significant). Community meetings were often used to agree restrictions within units. 68.9% reported some food restriction on the unit, mainly take-aways, with six reporting a total ban. Others were limited to 1-3 times per week. Some units imposed spending restrictions on take-aways. The second most reported restriction (n=33) was individual care plans (usually for morbidly obese patients) that restricted intake of high calorie food such as fizzy drinks, confectionary and crisps. This strategy was reported to be ineffective due to poor motivation leading to ignoring the voluntary agreement. Limited access to the shop and / or limited spending at each visit was another reported restriction. Four consultants reported that it was morally wrong to place restrictions on patients as food was one of their few pleasures. 68.3% reported that patients had access to NICE recommended levels of physical activity. Staff shortages (n=4) and low patient motivation (n=42) were reported barriers. The most commonly reported interventions for weight management were nutritional advice (77.6%), fitness programmes (71%), healthy living groups (39.9%), gym (36.6%), weight loss groups (26.2%), walking / cycling (23.5%) and sports (18%). 24.6% rated interventions as mainly ineffective, 55.2% rated them modestly effective, 15.8% moderately effective and 0.5% highly effective. Consultants views were spread regarding the possibility of switching medication to an effective alternative with lower risk of weight gain, from never possible (1.1%) through possible for up to 25% of patients (24%) to possible for up to 50% of patients (11.5%). 14.8% did not know.
Reference	Long 2009
Type of study/document	Peer reviewed publication
Study design	Cross-sectional. Qualitative
Country	UK
Setting	Secure units (n=3) St. Andrew's Healthcare Northampton.
Population	Adult female service users.
Research question/objectives	To assess nutrition and eating habits of service users.

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Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Questionnaire. Observation of meals using structured recording form. Data analysis: Descriptive statistics
Sample	N=28 All female. 49% detained under MH Act 37/41 and 32% under Section 3. Remaining 19% under Sections 38, 47, 48 or 49. Mean age 32.7 years (SD =8). BMI > 30 = 60% (remaining 40% mean BMI 27.2, range for total sample 21-60). Major diagnostic groups = personality disorder (51%), schizophrenia and schizoaffective disorder (24%) and affective disorder (12%). All had a forensic history including acquisitive (5%), arson (24%), serious offences against the person (41%) and major violence (29%). Mean length of stay =4.4 years.
Uptake, drop out	68% response rate
Main findings	<p>Observations:</p> <p>27 “typical” meals observed over three months. Highest attendance at meals was evening (95%) with lunch second (78%) and breakfast lowest (59%). Patients free to choose food with no guidance and to take a second portion. Portion size appropriate but advice on constitution of a balanced meal not provided.</p> <p>Most patients consumed carbohydrate and fat rich meals; vegetables and fruit much less frequently eaten. Fruit provided on wards but sometimes only at certain times, e.g. when drinks were dispensed. Two carbohydrate rich puddings provided each day.</p> <p>Caloric values of meals were such that snacking would lead to overweight.</p> <p>Foods rich in Omega 3 were available only once in 27 randomly observed meals.</p> <p>40% of meals were consumed without a drink.</p> <p>Flavoured squash was consumed in preference to water (water was more expensive in the shop than carbonated drinks); milk per day totalled >2 pints per person.</p> <p>Take away meals could be ordered up to 4 times per week. Often the caloric value of one take away meal equalled one day recommended intake.</p> <p>Meals were chosen from a serving hatch and eaten quickly (mean = 10.2 mins). Staff sat at separate tables or ate after patients had finished. Therefore opportunities for staff to model normal eating behaviour were limited.</p> <p>Questionnaire:</p> <p>82% expressed a desire to better manage their weight, eat a healthier diet and exercise more. 51% had been advised by a dietician but only 35% reported following the advice.</p> <p>Self-reported meal attendance was consistent with observations though 54% were dissatisfied with the timing of the meal at 17.00hours.</p> <p>57% reported having at least two take-aways per week (often as well as provided meals). 46% had >8 cups of tea/coffee per day compared to 64% who had <2 fruit drinks or water.</p> <p>60% had >2 teaspoons sugar in tea/coffee and 65% had >2 carbonated drinks.</p> <p>Typical food purchased at the shop:</p> <p>Crisps (46%); chocolate (36%); sweets (25%); chips (21%); non-diet carbonated drinks (46%); fruit (1.9%).</p> <p>50% consumed > one standard chocolate bar, 52% at least one bag of crisps, 75% at least one piece of fruit per day. Most</p>

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	<p>reported snacking in the afternoon (36%) or evening (46%).</p> <p>Physical activity: 21% participated in available activities. 75% of those with a risk status allowing low time off the ward reported having too few opportunities to exercise.</p> <p>Consequences: Revised policy to establish a healthy eating culture; food provision, staff training and weight maintenance. Service level agreement- increased catering, dietetic collaboration over recipe choices. Increased food choice, food to be delivered days rather than weeks ahead. Menus labelled as healthy (H), reducing (R), and vegetarian (V). Special menus e.g. Halal, Caribbean or Asian. All menus to balance Omega 3. Breakfast to exclude fried food. Goal to source food locally with 20% organic or ethically traded. Chefs prepared food every day in a kitchen attached to the unit instead of reheating chilled food. Trained staff dispensed meals to encourage healthy eating, balanced meals and appropriate portion size. Lunch and evening meals were served later to reduce evening snacking. Service user views were accessed to address ethical issues, e.g. freedom to choose food. Menus displayed each day with choice at point of service including 2x fish per week (one oily fish). Milk allowance reduced to one pint semi-skimmed per day, take-aways to two per month. Fruit available throughout the day; smoothie machines introduced and drinks served with meals. Trained staff to sit and eat with patients at mealtimes to model appropriate eating and create a social environment. Catering staff attended patient's community weekly meetings to learn about preferences and provide education. A KPI was patient's satisfaction with food; consistent reporting of 73% satisfaction has been achieved. Dietician led healthy eating groups using a motivational / educational approach. Hospital wide Obesity Care pathway established – action where BMI > 30 due to rapid weight gain. Each ward has a physically fit member of staff with role of increasing PA to recommended levels. Personal training initiatives.</p>
Comments	No post-survey comparison on outcomes.
Reference	Kasmi 2009
Type of study/document	Short communication in peer reviewed journal.
Study design	Cross-sectional.
Country	UK
Setting	Medium secure unit (n=1).
Population	Adult service users.
Research question/objectives	To monitor the number of takeaways delivered over 21 days.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Survey. Data analysis: Not reported.
Sample	Not reported.
Uptake, drop out	N/A

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Main findings	Over 21 days a total of 326 individual takeaways costing £2736 were purchased (mean £8.40 per order, range £3-23). This includes group orders from two learning disability directorate wards that have two takeaway evenings per week. Around 75% of patients ordered a takeaway during the study period. 29 patients consumed at least one a week and 16 at least two per week. Four consumed a takeaway every other day and one patient 15 in total. Mean takeaways per ordering patients was 5. At least 50% of takeaways were curries. No obvious differences by gender or acute / rehabilitation units. The average and range figures are probably inflated by the use of group bookings to one patient. Extrapolated over a year, one patient would spend a mean £727 on takeaways and the entire unit £47,423.
Reference	McCarrren 2013
Type of study/document	Unpublished thesis
Study design	Cross-sectional.
Country	Ireland
Setting	Forensic mental health settings
Population	Mental health nurses
Research question/objectives	To assess the nutritional knowledge of MH nurses working in forensic mental health services.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Questionnaire (Parmenter & Wardle 1999) Data analysis: Statistical analyses to compare mean scores across gender, years qualified and between question groups.
Sample	N=95 Females n=52 Males n=43
Uptake, drop out	85.7% response rate
Main findings	Mean nutritional knowledge score = 76 (SD 12.7) out of 110. 31 scored > 83 and only eight < 55. The majority were categorised as having adequate nutritional knowledge (score 56-82). Female nurses achieved a higher mean score than males (78 vs 73 p=0.048). There was no significant association between nutritional knowledge and years of qualification, length of service, educational level or age. There was a significant difference in scores between clinical nurse manager 1 and 2 grades, but not between clinical nurse manager and staff nurse grades. All four sections of the questionnaire received good scores though the lowest scores were on the relationship between diet and disease. Discussion: Future research could include exploring how nurses in secure units educate and guide patients in their dietary choices.
Reference	Meiklejohn 2003
Type of study/document	Peer reviewed publication
Study design	Cross-sectional.
Country	UK
Setting	Medium Secure Unit n=1 (Ravenswood House, Hampshire)
Population	Adult service users.

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Research question/objectives	To assess the extent of physical healthcare needs and desire of service users to lead a healthy lifestyle.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: BMI measures. Semi-structured interviews (n=7; pre-discharge). Data analysis: Not reported.
Sample	N=56 Mean length of stay 18 months (range 4 weeks – 8 years).
Uptake, drop out	Not reported
Main findings	<p>Length of stay correlated with increased BMI. Limited opportunities for physical activity and restrictive meal options. 71% felt their physical health was well / very well managed; 29% were not satisfied and 57% wanted more attention paid to physical health. 74% reported finding it easy to see someone about their physical health whilst 27% reported that it wasn't easy. Prior to the survey the authors report that patients often complained to staff about lack of opportunity for physical activity, however 66% of survey responses were positive in this respect. The survey did not identify to what extent opportunities such as those provided by occupational therapists were taken up. The project group organised a health promotion fair within the unit and invited staff and patients. It was attended by health promotion experts, two occupational therapy nurses and a practice nurse from a prison. Patients had the opportunity to speak to these experts. Various tests were offered including BMI and weight measurement. Patients from the admission ward could not attend due to a lack of escorts.</p> <p>Consequences:</p> <p>Exercise: A full time fitness instructor has been recruited to provide tailored sport and leisure sessions in the gym or clinical areas for those who cannot leave the ward. 140 contacts per month are made via individual or group sessions and referral protocols have been developed.</p> <p>Diet: The survey identified a number of obese patients, many of whom were potentially affected by their medication. Following the survey medical staff started to consider this side effect when prescribing. The canteen manager was invited to become involved in providing healthy options. Work to provide patients with appropriate education is ongoing. An occupational therapist ran a weight management group and, though patients appeared interested at first, attendance was low. Patients were then seen individually to offer support.</p> <p>Monitoring health care: Patients didn't have access to a GP and so practice nurse sessions have been arranged in reciprocation for psychiatric consultations at a prison.</p>
Reference	Oakley 2013
Type of study/document	Peer reviewed publication
Study design	Cross-sectional.
Country	UK
Setting	Medium Secure Units in England, Wales and Ireland (n=67)
Population	Adult (n=61 units) and adolescent (n=6 units) service users.
Research question/objectives	To investigate weight management strategies in medium secure units.

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Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: On-line survey Data analysis: Not reported.
Sample	Not reported
Uptake, drop out	67% response rate
Main findings	Estimated proportions of obesity in the units ranged from 0-10% to 80-90% with a mode 40-50%. Less than 50% of respondents felt that their service had an effective strategy for managing obesity. 21 had a multidisciplinary group to develop an obesity / weight management strategy. Most units offered healthy eating options at every meal, regular access to a gym, weight monitoring and exercise groups. Most believed that restricting access to unhealthy food and portion size was necessary. Most restrict access to take-aways, and around two thirds limit access to unhealthy food at the shop as well as additional portions, energy drinks and caffeine. Less than 50% controlled unhealthy food brought in by visitors and a 25% prevent patients eating unhealthily whilst on escorted leave. Two thirds did not agree that restricting access to food contradicted human rights. Very few believed that patients should be able to choose to eat whatever they wanted. Most felt that healthy options should be subsidised in the shop.
Comments	This article provides references to human rights and patient rights Acts.
Reference	Wynaden 2012
Type of study/document	Peer reviewed publication
Study design	Mixed method evaluation at 6 months.
Country	Australia
Setting	State Secure Forensic mental health service.
Population	Adult service users.
Research question/objectives	To obtain feedback on a healthy lifestyle programme.
Intervention, control (if applicable) and duration	Exercise programme
Research methods	Data collection: Self-report questionnaire. Data analysis: Descriptive statistics. Thematic analysis for qualitative data.
Sample	N=56 Males n=47 Females n=9 Age range 19-50 years (77% < 35 years). Length of stay < 1 month – 2 years (39% < 1 month).
Uptake, drop out	53% response rate.
Main findings	Questionnaire: 40.6% reported that the programme was enjoyable, 26.4% that it was useful, 21.7% that it made them feel better. 11.3% of responses were negative and from females, suggesting the programme was too difficult, not enjoyable, boring, not useful or made them feel worse. The main reason for attending the gym was to stay healthy (15%), followed by keeping fit (14.5%), enjoyment (14.1%), to

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	<p>reduce stress (13.2%), to pass time (11.9%), to get a routine (11%) and to help with psychiatric problems (9.2%). 11% revealed that they thought attending a gym might influence their length of stay.</p> <p>The most useful activity reported was indoor cricket (19.2%) followed by circuit exercises (13.4%), stretching exercises (12.9%), volleyball (12.3%), basketball (10.2%), indoor soccer (8.6%), outdoor exercise (8%), and group exercise sessions (7.5%). Only 6.4% responses suggested that relaxation sessions were useful. The remaining 1.5% preferred all round exercise, table tennis and weights.</p> <p>Qualitative themes:</p> <p>Positive consequences of the exercise programme:</p> <ul style="list-style-type: none"> • Facilitated the management of anxiety and stress levels and relaxation. • Provided structure and meaning to the day. • Facilitated the formation of new relationships. • Learning new skills. • Allowed patients to monitor their own results and progress and become involved in their own care.
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Qualitative studies

Reference	Faulkner 2002
Type of study/document	Peer reviewed publication
Study design	Qualitative.
Country	UK
Setting	Mental Health Trust (n=1)
Population	Mental health nurses who work in inpatient settings.
Research question/objectives	To investigate nurse's perceptions of the role of exercise and PA.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Interviews (one face-to-face, 11 by telephone). Data analysis: Constant comparison. Inductive analysis.
Sample	N=12 Male: n=3 Female: n=9 Mean age =35.25 years (SD 6.98)
Uptake, drop out	N/A
Main findings	<p><i>Promoting physical activity:</i> All had been involved in promoting PA. Walking was most common form of PA promoted; efforts made to increase access to sports and group activities. Some provided unstructured advice / encouragement when asked or for clients who remained sedentary for long periods. Others assisted clients in overcoming barriers and setting goals. All very positive about encouraging PA in inpatient settings, some clients had recovered more quickly following PA and clients return from sessions feeling more alert. All believed more should be done; half preferred to deliver PA sessions rather than exercise specialists.</p> <p><i>The role of physical activity:</i></p>

	<p>Alleviating boredom (“<i>Caged tigers</i>”) Changed focus and environment, as well as providing structure. Reduction in negative mood, e.g. frustration, anxiety and stress (through lack of outlet). No reports of PA alleviating depression. Allowing social interaction with clients, enhanced relationships with staff. However the authors point out that PA in this context is regarded more as a time filler than therapy for clients, which devalues the potential specific role of PA given that time can be filled through many other forms of activity. There was emphasis on PA as a lifestyle choice with some clients already active prior to admission (and more likely to continue). A sedentary lifestyle is thus also a matter of choice and therefore acceptable. Choice and control therefore are in tension in terms of maintaining PA or using PA as therapy. Health promotion targets risk and relies on the individual to manage risks; therefore participants did not see how they could “make” clients engage with PA even if they advise them to do so for the benefit of their health. Additional risk to mental wellbeing was thought to be potentially introduced by trying to encourage PA in those that do not want to engage. Another dilemma was that clients can only be encouraged to carry out PA within severe constraints compared to mainstream society. Poor motivation as a result of mental health problems was another reported barrier to intervention and could lead to assumptions that this is a general trend. Finally, other issues such as health and safety, prevention of suicide and treatment for mental health problems are prioritised over the encouragement of sport. Physical activity can be self-administered which has both positive and negative consequences for maintenance. Staff may also regard PA as leisure and feel discouraged from engaging in activity that does not constitute “work”.</p> <p><i>The body/mind</i>: PA can be regarded as distinct from mental processes and the therapeutic effects marginalised. However participants here were moving toward holistic practice that in theory dismisses mind/body dualism, though the crisis context focusses on medical intervention. The authors discuss the challenges that participants had in addressing how the mind/body functions as one.</p>
Reference	Forsyth 2012
Type of study/document	Peer reviewed publication
Study design	Qualitative.
Country	New Zealand
Setting	Forensic rehabilitation
Population	Nursing staff involved in healthy lifestyle and weight loss promotion.
Research question/objectives	To evaluate confidence and training needs of nursing staff giving nutritional advice.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Interviews, knowledge questionnaire Data analysis: Thematic analysis.
Sample	N=9 Female n=6 Male n=3 >30 years of age n=8 (of which 3 over 50). Staff nurse n=8

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	Psychiatric assistant n=1 Median years in MH =15 (range 2-34 years).
Uptake, drop out	Original sample n=11 Drop out n=2 (illness, working night shift). Questionnaire 100% response.
Main findings	Interviews: For n=6, dietician was main source of information; 5 also used the Internet. Nutrition protocols previously developed by staff were sources of information as well as TV shows and personal experiences. <i>Knowledge and experience:</i> Staff perceived patients as having low level of knowledge about food and nutrition due to upbringing, SES, culture, education, MH and institutionalisation. None reported having formal nutrition training; this was a barrier as they knew the basics but lacked confidence giving advice. Those who had attended dietician run sessions reported higher levels of confidence but found it challenging to pass knowledge to residents. There was a reported lack of staff to give advice. Portion control and food labelling were reported areas for confusion in both staff and residents. <i>Barriers to change:</i> Differences among staff in relation to food beliefs and practices was reported to arise from inconsistent recommendations from nutrition experts. Patients were reported to resist change, expressed by a lack of enquiry or avoiding responsibility for food choices, which challenged healthy eating promotion. <i>Realistic expectations:</i> Need for this from both staff and patients; staff aware of patient need for autonomy in terms of access to food. Breaking habits was another challenge particularly as many patients are challenged by the side effects of medication and institutionalised behaviours. <i>Reducing barriers to change:</i> Simple practical information was regarded as important to reducing barriers and creating a shared learning environment for staff and patients. Healthy snack ideas and takeaway options or versions of preferred food were seen as more encouraging than enforcing a diet on patients. Label reading, meal ideas, healthy diet on a budget and portion size were topics that were regarded as needing input. Visual images depicting the effects of unhealthy eating (e.g. poster of a cookie showing 80 minutes of running needed to burn off the calories). Questionnaire: Average score = 50% (range 41%-68%). Three scored < 50%. Nutritional value attracted the highest accuracy whilst major food groups, adequacy of intake, effect of MH on appetite, labelling, cost-saving fibre and risk for metabolic disease scored lowest.
Reference	Prebble 2011
Type of study/document	Peer reviewed publication
Study design	Qualitative. Case Study.
Country	New Zealand
Setting	Forensic inpatient facilities (n=2)
Population	Health Care Professionals; service users
Research question/objectives	To explore how healthy living programmes have been established and maintained.
Intervention, control (if applicable) and duration	Two HLPs: A: Compulsory diet and exercise programme. Staff define desirable behaviours and direct their implementation. B: Small group (4-9, by application) education and practical healthy living sessions (diet, exercise and social skills). Co-production of defined behaviours and staff support to achieve these.
Research methods	Data collection: Interviews. Meeting and case note analysis. Data analysis: Content analysis. Use of theoretical framework.

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Sample	<p>Health Care Professionals (n=17); service users (n=15)</p> <p>Programme A: n=7 service users Males n=5, Females n=2 European n= 5, Maori n=2 Age range: 30-67 years (mean 47). Diagnosis: schizophrenia n=5, intellectual disability n=2 Medication: Clozapine n=2, second generation antipsychotic n=3, no medication n=2 Time spent in programme range 6-52 months (mean 39.5).</p> <p>Programme B: Up to 9 service users Males n=8, Females n=1 European n= 4, Maori n=2, Pacific Island n=2, Asian n=1 Age range: 27-51 years (mean 36.5). Diagnosis: schizophrenia n=6, delusional disorder, bipolar disorder, or personality disorder n=3 Medication: Clozapine n=5, other antipsychotic n=3, mood stabiliser n=1 Time spent in programme range 6-26 months (mean 13).</p>
Uptake, drop out	Not reported
Main findings	<p>Programme A (4 years after initiation): OT established smaller group to try health promotion approach. <i>Initiating:</i> The death of a young, obese patient was the trigger for staff to initiate the HLP with the realisation of the importance of caring for physical as well as mental health. The HLP was championed mainly by two nurses, an OT, and consultant psychiatrist. <i>Maintaining:</i> Due to programme A being compulsory it became embedded within routines while remaining flexible in its inclusion of individualised programmes adapted to physical ability and interests. Enjoyment and autonomy were regarded as important to maintenance by staff. Choice in food and access to personal health information was also introduced after a while. Access to records was reported to encourage enthusiasm and motivation. For service users, autonomy was discussed so that developing healthy choices was seen as their own choice despite the compulsory nature of the programme. <i>Benefits:</i> Both groups indicated that health benefits such as higher self-esteem, and increased confidence and life skills were experienced by service users. Engaging in the programme affected social interaction as well as peer support. Staff reported benefits for themselves in terms of increased fitness since they accompanied service users on walks. <i>Barriers:</i> Initially staff met resistance to change of meal times and use of certain food brands. This was to some extent associated with lack of knowledge or lack of understanding why changes were being made. Over time resistance dissolved. Ordering healthy food was regarded as too expensive from existing sources so alternatives were sought. Staff costs were also a consideration in regard to support, particularly when funding was cut. Medication was another barrier though it was noted that even then it was possible to lose weight with sufficient lifestyle change. <i>Dilemmas:</i> There was concern that the healthy living approach was imposing too many restrictions on service users, given that treats were important in this environment. The need for treats was therefore incorporated into HLP to encourage maintenance. However it was an effort for staff to keep control of this aspect. There was also a debate about whether benefits would last since many would not remain in the unit. Staff considered whether the HLP was regarded as another imposed restriction rather than allowing service users to take control of their lives. Promoting choice was a way of addressing this tension.</p>

	<p><i>Health status measures:</i> Overall, records indicated maintenance of health status and modest gains over 12 months. At 6 months no weight gain was detected and at 12 months one participant lost > 2kg while another gained a similar amount. There was little change in blood lipid or GTT levels which were acceptable at baseline and at 6 and 12 months. Two service users with hypertension at baseline had acceptable readings at 6 and 12 months.</p> <p>Programme B (4 years after initiation):</p> <p><i>Initiating:</i> The trigger was that 78% of service users had metabolic syndrome with concerns over diabetes, obesity and weight gain. Two champions (nurses) promoted the programme to staff and planned, organised and supported the programme, inspired by the Clubhouse Model of rehabilitation. An important aspect was developing a strong group culture similar to that of a club. Resources were sought for information on activities and success relied on the unit manager ensuring staff were available.</p> <p><i>Maintaining:</i> Service users planned to continue activities after discharge and those who had been discharged noted that patterns and tools had been developed that could continue. Staff recognised cultural differences so that rituals were incorporated into food preparation and meal times. Group culture encouraged service users to support and educate each other. Nurses needed motivation to continue the programme though some regarded this as part of their existing role. A sense of enjoyment and fun was an important motivator.</p> <p><i>Benefits:</i> Service users reported feeling healthier, not just physically but with a reduction in worry and increased calm / happiness. Staff felt satisfaction from seeing changes in service users, particularly increased confidence. The HLP created a vibrant atmosphere and positivity beyond the ward. Other wards started to follow, borrowing recipes or asking for advice.</p> <p><i>Barriers:</i> Staff resistance was reported by both groups, attributed to poor lifestyle behaviours and lack of knowledge. Some nurses did not see the role in HLP as part of nursing. There was a view from one service user that staff were institutionalised. Resentment around splitting the ward created ideas of elitism and staff who were involved felt that cynics were waiting for the HLP to fail.</p> <p>The programme was limited by lack of space and facilities e.g. small kitchen, no freezer. Lack of funding was seen to limit specialised input. Lack of a pharmacy was seen to limit recording of lipids, and at one site there was no dietician. Lack of multi-disciplinary input was seen as a weakness. For service users HLP challenged some of the forensic protocols and structures of the ward which demotivated some staff.</p> <p><i>Dilemmas:</i> Early a decision was needed whether the group should be small or large, given that a small group would exclude service users from healthy options. This was a dilemma between quality of HPL and inclusion. The HLP was initially very restrictive with “3 strikes” policy for those breaking the protocol and exclusion for 2 weeks from the programme. This reflected the tension between having HLP rules and allowing autonomy. Compromise was sought after a while and the policy softened. There was tension between a health promotion approach and traditional forensic protocols (care vs autonomy). This was managed on a day-to-day basis. Service users felt the tension though with the realisation that it was for their own benefit.</p> <p><i>Health status measures:</i> Physical measures were not as consistent on Programme B. This was rectified once staff recognised the importance of recording data. No BP records were found. Weight was only recorded for one service user who gained 2kg after 6 months. Lipid levels were high for three at baseline with two high at 6 months though the other records were not found. Two had raised blood glucose at baseline which remained so at 6 and 12 months.</p> <p>Discussion:</p> <p>In both programmes the importance of having a MDT to deliver HLPs was recognised including dieticians, OTs, GPs, and full range of MH staff. A benefit of this is consistency across units and within the programme.</p>
Reference	Rylance 2012
Type of study/document	Peer reviewed publication

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Study design	Qualitative.
Country	UK
Setting	Acute inpatient unit (with secure section).
Population	Mental health nurses.
Research question/objectives	To examine how MH nurses perceive their role in physical care of patients.
Intervention, control (if applicable) and duration	N/A
Research methods	Data collection: Semi-structured interviews. Data analysis: Colaizzi (1978) method.
Sample	N=6
Uptake, drop out	Not reported
Main findings	<p>All nurses interviewed discussed physical health care as an integral part of care (physical health pathway), usually provided by medics on admission though nurses could pick up problems when speaking with patients in named nurse sessions. However there was uncertainty about whether physical health assessment was repeated routinely. Lack of equipment on the ward, such as for BM testing, was cited as a barrier, as was the prioritisation of mental health care which took up most time and effort. Planned or opportunistic health promotion activities were provided for individuals or groups. Two nurses mentioned women's health, with weight gain due to medication mentioned as a concern.</p> <p>There was suggestion that nursing assistants be trained to carry out assessments as the qualified nurses felt that they were not trained to do this work and had little knowledge about diabetes for example. If a patient looks physically unwell, a doctor is called and one nurse mentioned a contact file of professionals such as district or specialist nurses who can be called when necessary.</p>