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Perry, Amanda E orcid.org/0000-0002-0279-1884, Moe-Byrne, Thirimon orcid.org/0000-0002-2827-9715, Knowles, Sarah et al. (6 more authors) (2024) Utilising survey data and qualitative information to inform a logic model to support older people in custody with common mental and physical health problems: Addressing the physical and mental health needs of older prisoners (the PAMHOP study). *International Journal of Law and Psychiatry*. 102002. ISSN 0160-2527

<https://doi.org/10.1016/j.ijlp.2024.102002>

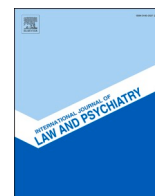
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Utilising survey data and qualitative information to inform a logic model to support older people in custody with common mental and physical health problems: Addressing the physical and mental health needs of older prisoners (the PAMHOP study)

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ARTICLE INFO

Keywords:

Criminal
Implementation
Ageing
Mental
Physical health
Systematic
Qualitative
Gender
Logic model

ABSTRACT

A growing number of older people remain in custody each year resulting in an increasing number of common mental and physical health concerns. No prior evidenced-based targeted psychological interventions support this group of people, and little is known about their needs, current activities, and health-related problems. We addressed these gaps through a project involving older prisoners, prison staff and a project advisory group in one male and one female prison site in the North of England. Systematic review evidence supports the development of an implementation tool kit addressing strategies to develop and deliver interventions that are sustainable, acceptable, and feasible in the prison environment. Prison strategies need to specifically address the needs of older people in custody. Relatively inexpensive activities, with some thought to delivery and flexibility have the potential to benefit common mental and physical health, increasing quality of life, reducing high economic and social cost, mortality, and reoffending in this age group.

1. Introduction

Internationally, the increasing numbers of older people in custody aged 50 years and above is of significant concern (Council of Europe Annual Penal Statistics, 2021; Prost & Williams, 2020). By 2030, it is estimated that older people will make up one-third of the entire prison population (Skarupski et al., 2018). With the cost of healthcare delivery rising, current UK policy recognizes that research is needed to promote and improve the physical and mental health of older adults in contact with the criminal justice system (Centre for Mental Health, 2020).

In prisons, typically those aged 50 years and older are considered appropriate for geriatric measures of care. Such adults experience accelerated ageing and develop illness between 10 and 15 years earlier than the rest of the population (Baillargeon et al., 2010; Williams et al.,

2010). Causes of this accelerated ageing include lifestyle choice, social deprivation, and the effects of incarceration itself (Care Quality Commission, 2019). As a result, older prisoners are more likely to suffer from mental ill health (particularly depression) and return to prison at higher rates than age matched counterparts in the community (Criminal Justice Alliance, 2020; De Smet et al., 2017; Fazel et al., 2004; Fazel et al., 2016; Fazel & Seewald, 2012; The Bradley report, 2009). Studies reporting on the physical health of older people in custody are scarce. Some refer to commonly reported physical health problems (e.g., chronic obstructive pulmonary disease: COPD), diabetes and obesity linked to poor diet (Fazel & Baillargeon, 2011), while often both physical and mental health problems are confounded by problems of substance misuse (Kristen et al., 2020). Those released experience barriers to accessing healthcare in the community with individuals experiencing high levels

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<https://doi.org/10.1016/j.ijlp.2024.102002>

Received 5 January 2024; Received in revised form 13 May 2024; Accepted 20 June 2024

Available online 4 July 2024

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of social exclusion (Byng et al., 2012).

Older men and women report different gender-related health needs, with females typically reporting poorer health compared with males (Aday & Krabill, 2006; Trotter & Baidawi, 2014). Additionally, in the UK the female and male prison estates are established separately to support the direct needs of those in their care, and for this reason have different functions and practices. The development of any intervention should therefore consider the gendered health needs and voice of the service user within both these custodial settings (Lee et al., 2019; Simpson et al., 2021). Randomised controlled trials (RCTs) and evidence generated from systematic reviews present information on the prevalence of health (Solares et al., 2020) and social care needs (Lee et al., 2019) but highlight a lack of focused psychological interventions (Beaudry et al., 2021). Historically, systematic reviews have not reported exclusively on this older population (Stevens et al., 2018).

To address the lack of exclusivity, our own systematic review (Perry et al., 2023) identified RCTs with outcomes of depression and/or anxiety for older people with mental and physical health problems (study protocol registered on PROSPERO: CRD42021281384). An initial 11,700 records from twenty-one databases resulted in the screening of 210 full-text articles. The findings identified no studies of targeted interventions dedicated to supporting the mental and/or physical health in this older population (Perry et al., 2023). So called “empty reviews” can however be valuable in identifying priority questions, which help frame future research (The Cochrane Collaboration, 2011).

Despite the lack of evidence for *targeted* interventions for this age group, a handful of papers within the Perry et al. (2023) systematic review did include individuals who were 50 years and above as part of their study samples. Six studies involving men; (Ambhore & Joshi, 2009; An et al., 2019; Cashin et al., 2008; Chen et al., 2016; Gold et al., 2014; Gussak, 2009) and two studies involving women (Danielly & Silverthorne, 2017; Lundstrum., 2021) included interventions such as yoga and creative arts. Due to the numbers of those aged 50 years within the studies and the lack of evidence targeting outcomes only for this subsample we were unable to comment on the effectiveness of these interventions for this population. Instead, we conducted further examination of the interventions studied using the TIDier checklist (Hoffmann et al., 2014) which allowed us to understand more about the implementation of interventions within custodial settings. There was little evidence reported on ‘how’ we implement and ‘deliver’ these interventions; few reported any adaptations nor measures of fidelity. Attrition rates varied across the included studies (ranging from 0% to 61%), indicating concerns with the acceptability and feasibility of delivering interventions for this population. The information we gathered was used to form the basis of an initial logic model (Appendix) using the GUIDED framework (Duncan et al., 2020).

To supplement the information gathered from the systematic review and the logic model, this feasibility study reports on evidence from a prison survey and a series of interviews involving prisoners, prison staff and members of the project advisory group. Data were collected to examine the views of older populations of both male and female prisoners to understand more about the protected characteristics, mental and physical health needs of this group, assess access to existing activities and activity preferences; and review the perceived sustainability, feasibility, and accessibility of these activities.

2. Methods

2.1. Study design and participants

The study took place in two HM Prison and Probation Service (HMPPS) prisons, (one male) and (one female) in the North of England. Between them, they house around 1300 offenders in West Yorkshire where health inequalities are above the national average. Ethics were approved by the East of England-Essex Research Ethics committee (REC reference: 22/EE/0120), the HMPPS National Research Committee,

each prison Governor and Healthcare Provider.

The overall study design (Fig. 1) consisted of the systematic review (stage one: reported Perry et al., 2023); stage two, identification of prisoners aged 50 years and above within each prison site and engagement through the completion of questionnaires and engagement with prison staff and the project advisory team. Eligible participants were invited to attend interviews and the evidence integrated into the systematic review findings to develop the implementation tool kit.

2.2. Survey of older prisoners

During June and September 2022, all prisoners at the two selected prisons aged 50 years and above were approached to take part in a survey using a letter, patient information sheet and informed consent. Prisoners were excluded for the following reasons: (i) having a diagnosis of schizophrenia, dementia, or a cognitive impairment, developmental or learning disability, (ii) having an active psychosis, (iii) posing a threat to the research team, (iv) those with deportation rights, and v) unable to complete the survey without the use of language line (i.e., they have poor command of the English language). Individuals were approached in person by members of the research team and given up to 48-h to decide whether they wanted to take part. For those that agreed to participate; the survey was conducted on a one-to-one basis with a member of the research team.

The survey collected data on protected characteristics: age, race, sex, disability, sexual orientation and religious belief, gender reassignment, marriage and civil partnership and pregnancy/maternity, as reported in the Equality Act of 2010 (Government Equalities Office, 2011) and used in the UK Prison Service in their annual offender equality report:

(<https://www.gov.uk/government/statistics/hm-prison-and-probation-service-offender-equalities-annual-report-2020-to-2021>) (Ministry of Justice, 2021a). In addition, demographic information, criminal history, behavioural factors, and self-reported physical and mental health outcomes were collected. The Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001) and The Generalized Anxiety Disorder-7 (GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006) were utilised to identify symptoms related to depression and anxiety using a threshold of ten on each scale to indicate presence of depression and/or anxiety. We also recorded engagement with current activities in the prison and the utilisation of healthcare services.

2.3. Prisoner interviews

Interviews were conducted on a targeted subset of prisoners who reported the presence of one or more of the most prevalent reported physical health conditions (either obesity and/or diabetes and/or COPD) and scoring above ten on the PHQ-9 and/or the GAD-7. Those eligible were approached again to see if they were willing to take part in the interviews which lasted around 30 min. The individual interviews were conducted face to face or using the in-cell telephone with the Chief Investigator (CI: AP). The interviews were informed using a semi-structured topic guide and contained seven questions in six categories to identify (i) the prisoners' perceived needs, (ii) access to current activities and activities of choice, (iii) how to get people engaged in activities and what makes an activity sustainable, (iv) how activities impact on physical and mental health, (v) what are measures of success (vi) and potential challenges upon release.

2.3.1. Staff interviews and project advisory group consultation

Between July and September 2022 staff from each prison site were purposefully selected from different operational responsibilities. Staff were approached by the CI (AP) via email, attendance at staff meetings and on the telephone. Telephone and face to face interviews lasted around 30 min using a similar topic guide to the above and contained five questions to collect information on the role, and experience of the person being interviewed. The persons' opinions about the needs of older

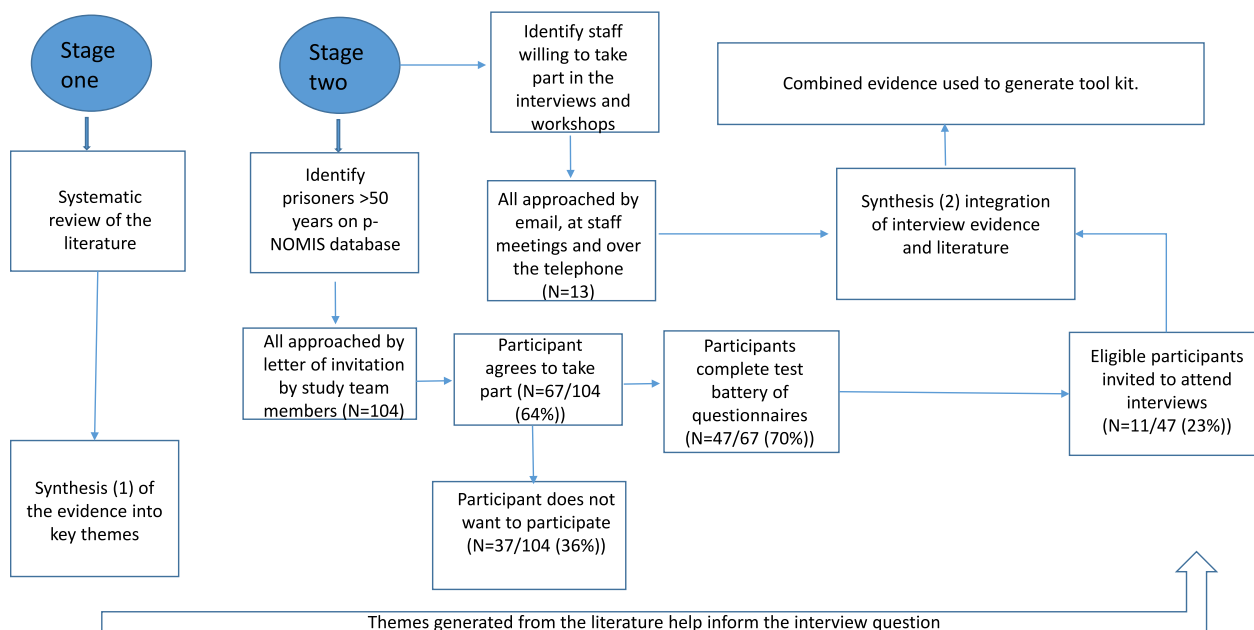


Fig. 1. Overall study design.

prisoners, the activities that are required to support mental health, logistical considerations for sustainability (e.g., what was required), feasibility (e.g., ability to deliver a consistent activity) and acceptability (e.g., barriers and challenges to engagement). Additionally, we consulted with the project advisory team in virtual meetings during September 2022 and January 2023. The advisory group complemented and sense-checked the interview findings to help inform considerations around feasibility, acceptability and sustainability to guide implementation. Interviews were transcribed verbatim by the CI (AP) and a second researcher (TMB).

2.4. Data analysis

Survey data were entered and checked by DM, CC and AP into IBM SPSS version 28 (Armonk, NY, USA). Descriptive statistics were generated from categorical variables (presented as frequency and percentage) and continuous variables (mean \pm standard deviation (SD)). For categorical data, male and female responses were compared using the Chi-squared test, while Fisher's exact test was used where the assumptions of Chi-squared test were not met. The Independent *t*-test or Mann-Whitney *U* test was used for normally or non-normally distributed continuous data, respectively. The normal distribution was determined using a histogram and Shapiro–Wilk test and conducted by CC. Researcher TMB analysed the staff and prisoners' interviews using a thematic inductive approach, and by applying the principles described by Braun and Clarke (2006). The staff and prisoner interview findings were combined to provide an overall 'picture' of the perceived challenges and barriers. Initial codes were organised in Microsoft Excel around acceptability and sustainability. Emerging sub-themes were further refined and the data within them analysed. All data (survey, interview and consultation data) were synthesised by gender and 'mapped' against the eight papers that were included in the earlier systematic review (Perry et al., 2023).

3. Results

3.1. Overall recruitment

Between the two prison sites (a total population of 1250 prisoners), 115 (9%) were 50 years and above (Fig. 2). Of these, 104/115 (90%) (68

men and 36 women) met the inclusion criteria and were approached to take part. Nearly 70% of males ($n = 47/68$, 69%) and 50% of females ($n = 20/36$, 55%) agreed to take part. Approximately half of all those that consented completed the survey and an eligible group of 11 (4 men and 7 women) prisoners completed the semi-structured interviews.

3.2. Overall demographic characteristics of prisoners

Twenty-seven males (27/47, 57%) and 20 females (20/47, 43%) completed the survey. All were native English speakers. The majority of participants regarded themselves as Christian (21, 44.7%) and were of white ethnic background (39, 83%). Most participants had children (36, 76%) and 44 (94%) participants were in heterosexual relationships. A quarter of the participants were either married (12, 25%) or separated (11, 24%). Educational attainment varied, with 8 (17%) participants having completed A levels or trade apprenticeships, 10 (21%) having received City & Guilds and BTEC Diplomas; and 5(11%) having gone to university. There were no statistically significant differences between the male and female demographic characteristics (Table 1).

3.2.1. Gender criminal history, and physical needs

Table 2 reports on factors affecting the criminal experience. More men than women had prior convictions (81% vs 30%, $p < 0.001$). Men were significantly more likely than women to enter prison at an earlier age (26 years vs 40 years, $p = 0.004$). Women were more likely to be on remand compared to men (20% vs 0%, $p = 0.027$). Attempted suicide was significantly more common in women than men (26% vs 61%, $p = 0.03$), but no significant differences were found on reporting of self-harm behaviour (22% vs 50%, $p > 0.05$).

Women were more likely to report physical health issues such as hypertension, (15% vs 55%, $p = 0.005$), pain (22% vs 55%, $p = 0.032$), back pain (19% vs 55%, $p = 0.013$), and sleeping problems (48% vs 84%, $p = 0.016$). They were also more likely to report anxiety (30% vs 80%, $p = 0.001$), and post-traumatic stress disorder (PTSD) (19% vs 55%, $p = 0.013$). No differences were seen for self-reported depression (48% vs 70%, $p > 0.05$).

Regarding the standardised mental health measures, there was no statistical difference between males and females on meeting the threshold for depression using the PHQ-9 > 10 (27% vs 56%, $p > 0.05$) nor for anxiety using the GAD-7 > 10 (23% vs 44%, $p > 0.05$).

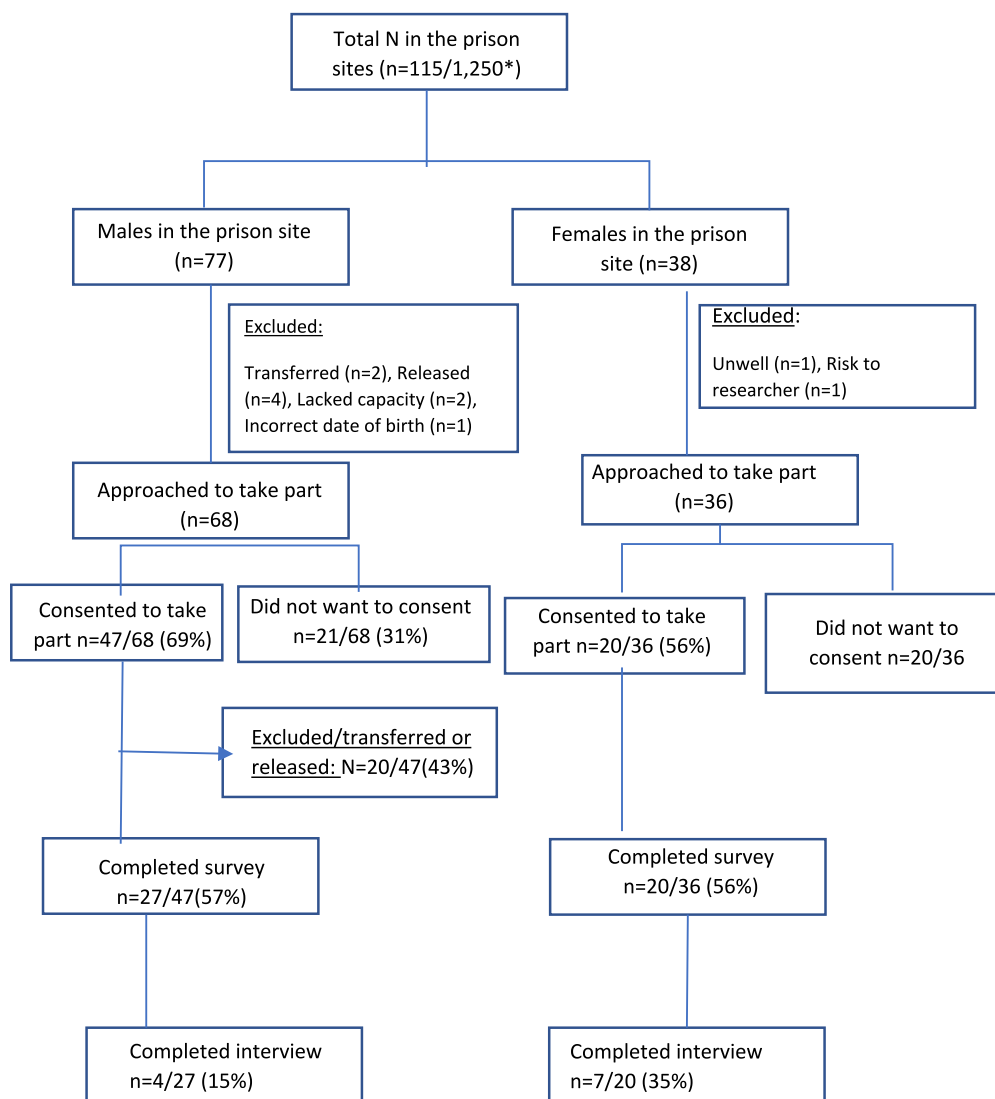


Fig. 2. Recruitment of participants by prison site.

*NB the overall figure is based on the maximum capacity of each prison site rather than the absolute number of people in custody across the duration of the study.

3.2.2. Gender and social connectivity in prisons

Women were more likely to have more family support than men (59% vs 78%, $p > 0.05$), although the differences were not statistically significant. Both men and women reported regular telephone contact with family members (89% vs 89%, $p > 0.05$). Women were more likely to report being visited by someone compared to men (30% vs 72%, $p = 0.007$). There was no significant difference between men and women in terms of regular contact with family and friends, either by email or letter (37% vs 50%, $p > 0.05$). More men than women said they preferred to live on a separate wing for the older prisoners (70% vs 33%, $p = 0.035$). There was no significant difference in terms of hours spent in a cell (17.8 h vs 18.7 h, $p > 0.05$), having a job in prison (82% vs 67%, $p > 0.05$), or having enough money in prison (59% vs 67%, $p > 0.05$).

Nearly 90% of the group reported they had been bullied while they were in prison (89% vs 94%, $p > 0.05$) and more women than men reported feeling lonely (37% vs 50%, $p > 0.05$). Men and women were equally likely to have a history of alcohol abuse (41% vs 42%, $p > 0.05$), while men were more likely to report prior drug abuse (48% vs 37%, $p > 0.05$). Prior to custody more men than women claimed some form of work benefit jobseekers/universal credit (63% vs 22%, $p = 0.014$), and more women than men were likely to claim housing benefit (19% vs 61%, $p = 0.005$).

3.2.3. Structured activities and daily routine in prison

More men preferred gym activity compared to women (50% vs 17%, $p = 0.03$). Women were significantly more likely to prefer yoga and art related activities than men (0% vs 22%, $p = 0.023$ and 12% vs 50%, $p = 0.007$ respectively). Reading (46% vs 44%, $p > 0.05$), listening to music (19% vs 17%, $p > 0.05$) and watching TV (46% vs 56%, $p > 0.05$) were popular in both men and women; and nearly 1/3 of men and women liked to attend workshops (31% vs 22%, $p > 0.05$). Both men and women expressed that they would like to have the opportunity to socialise with those of their own age to reduce isolation and to promote the ability to talk with others (12% vs 22%, $p > 0.05$).

3.3. Staff and prisoner interview findings and project advisory group consultations

Eleven staff interviews (five male and six female) from across the prison sites were conducted. Interviewees were specifically targeted from different discipline areas (one from operational, six from health-care, two from education, and two from workshops). Consultation with seven advisory group members involved in a virtual meeting in September 2022 and January 2023 (three male and seven female) were taken into consideration. Eleven prisoners (four male and seven female)

Table 1
Demographic characteristics.

| Demographic characteristic | Overall (n = 47) | Male (n = 27, 57%) | Female (n = 20, 43%) | p-value |
|----------------------------|---|--|--|-----------|
| Marital status (n,%) | Single/never married 21 (45.7%) Married/partnership 12 (26.1%) Divorced/separate 11 (23.9%) Widowed 2 (4.3%) | Single/never married 12 (44.4%) Married/partnership 8 (29.6%) Divorced/separated 7 (25.9%) Widowed 0 (0%) | Single/never married 9 (47.4%) Married/partnership 4 (21.1%) Divorced/separated 4 (21.1%) Widowed 2 (10.5%) | p = 0.433 |
| Sexual orientation (n,%) | Heterosexual 44(93.6%) Bisexual 1 (2.1%) Gay/lesbian 1 (2.1%) Other 1(2.1%) | Heterosexual 27(100%) Bisexual 0(0%) Gay/lesbian 0 (0%) Other 0(0%) | Heterosexual 17(85%) Bisexual 1(5%) Gay/lesbian 1 (5%) Other 1(5%) | p = 0.07 |
| Ethnicity (n, %) | White 39(83%) Mixed 2(4.3%) Asian/Asian British 2(4.3%) Black/Black British 3(6.4%) Not stated 1 (2.1%) | White 22 (81.5%) Mixed 1(3.7%) Asian/Asian British 2(7.4%) Black/Black British 1(3.7%) Not stated 1 (3.7%) | White 17(85%) Mixed 1(5%) Asian/Asian British 0(0%) Black/Black British 2(10%) Not stated 0 (0%) | p = 0.768 |
| Have children (n,%) | Yes 36 (76.6%) No 11(23.4%) | Yes 21(77.8%) No 6(22.2%) | Yes 15(75%) No 5(25%) | p = 1.000 |
| Education level (n,%) | Higher education (university level) 7(16.2%) BTEC /A level/ GCSE 32 (74.4%) None 4 (9.3%) | Higher education (university level) 5(19.2%) BTEC /A level/ GCSE 18 (69.2%) None 3(11.5%) | Higher education (university level) 2(11.8%) BTEC /A level/ GCSE 14 (82.5%) None 1(5.9%) | p = 0.053 |
| Religion (n,%) | No religion 13 (28.3%) Muslim 5 (10.9%) Buddhist 4 (8.7%) Christian 21 (45.7%) Pagan 3(6.5%) | No religion 9 (34.6%) Muslim 5 (19.2%) Buddhist 1 (3.8%) Christian 10 (38.5%) Pagan 1(3.8%) | No religion 4 (20%) Muslim 0(0%) Buddhist 3 (15%) Christian 11 (55%) Pagan 2(10%) | p = 0.096 |

were eligible to take part in the interviews.

To higher level headings acceptability (barriers and challenges to engagement) and sustainability generated a total of fifteen sub-themes that were generated from the thematic analyses and the GUIDED logic model framework (Duncan et al., 2020).¹ The fifteen sub-themes were collated into different categories to explore the broader areas of acceptability and sustainability in more detail. The different categories included the prison environment, strategies to encourage engagement

¹ Acceptability: (barriers and challenges to engagement), strategies to encourage the engagement of older people in custody, staff supporting the relevance of the activity; working together, prisoners wanted to have a sense of purpose; activities needed to be meaningful, what activities do staff and prisoners say they want to do?, staff and prisoners talked about the importance of promoting social connections, the current educational offering was not tailored to the need of this age group, older people in custody were not heard, activities need to be tailored and adapted to meet the needs of older people in custody, activities were too long. Sustainability: a flexible model of delivery is required, activities relied upon the talent of one staff member, poor organisation meant people in custody were unable to attend activities, a holistic operational approach is required, and integration into the community was poorly coordinated.

Table 2
Factors affecting the prison experience.

| Criminal history, mental and physical health needs | Male (n = 27, 57%) | Female (n = 20, 43%) | p-value |
|--|--------------------|----------------------|-----------|
| Prior conviction | 22, 81% | 6, 30% | p < 0.001 |
| Age at first prison sentence (yrs) (Mean) | 26 yrs | 40 yrs | p = 0.004 |
| On remand | 0, 0% | 4, 20% | p = 0.027 |
| Attempted suicide | 7, 26% | 11, 61% | p = 0.03 |
| Self-harm behaviour | 6, 22% | 9 (of 18), 50% | p > 0.05 |
| PTSD | 5, 19% | 11, 55% | p = 0.013 |
| Hypertension | 4, 15% | 11, 55% | p = 0.005 |
| Pain | 6, 22% | 11, 55% | p = 0.032 |
| Back problems | 5, 19% | 11, 55% | p = 0.013 |
| Problems sleeping | 13, 48% | 16 (of 19), 84% | p = 0.016 |
| Self-report Anxiety | 8, 30% | 16, 80% | p = 0.001 |
| Self-report Depression | 13, 48% | 14, 70% | p > 0.05 |
| Anxiety (GAD-7 score > 10) | 6 (of 26), 23% | 8 (of 18), 44.4% | p > 0.05 |
| Depression (PHQ-9 score > 10) | 7 (of 26), 27% | 10 (of 18), 56% | p > 0.05 |
| Experiences of social isolation | | | |
| Financial support by family in prison | 16, 59% | 14 (of 18), 78% | p > 0.05 |
| Visited by someone | 8, 30% | 13 (of 18), 72% | p = 0.007 |
| Regular contact with family and friends (email/letter) | 10, 37% | 9 (of 18), 50% | p > 0.05 |
| Regular telephone contact with family members | 24, 89% | 16 (of 18), 89% | p > 0.05 |
| Enough money to live on | 16, 59% | 12 (of 18), 67% | p > 0.05 |
| Being bullied | 24, 89% | 17 (of 18), 94% | p > 0.05 |
| Feeling lonely | 10, 37% | 9 (of 18), 50% | p > 0.05 |
| Alcohol abuse | 11, 41% | 8, 42% | p > 0.05 |
| Drug abuse | 13, 48% | 7 (of 19), 37% | p > 0.05 |
| Claiming benefit - jobseekers/universal credit | 17, 63% | 4 (of 18), 22% | p = 0.014 |
| Claiming benefit - housing benefit | 5, 19% | 11 (of 18), 61% | p = 0.005 |
| Hours spent in cell (hours) (Mean) | 17.8 h | 18.7 h | p > 0.05 |
| Job in prison | 22, 82% | 12 (of 18), 67% | p > 0.05 |
| Enough money to live on in prison | 16, 59% | 12 (of 18), 67% | p > 0.05 |
| Preferred to live on older prisoner's wing | 19, 70% | 6 (of 18), 33% | p = 0.035 |
| Structured activities and daily routine in prison | | | |
| Gym | 13 (of 26), 50% | 3 (of 18), 17% | p = 0.03 |
| Yoga | 0 (of 26), 0% | 4 (of 18), 22% | p = 0.023 |
| Arts related | 3 (of 26), 12% | 9 (of 18), 50% | p = 0.007 |
| Reading | 12 (of 26), 46% | 8 (of 18), 44% | p > 0.05 |
| Listening to music | 5 (of 26), 19% | 3 (of 18), 17% | p > 0.05 |

(continued on next page)

Table 2 (continued)

| Criminal history, mental and physical health needs | Male (n = 27, 57%) | Female (n = 20, 43%) | p-value |
|--|--------------------|----------------------|----------|
| Watching TV | 12 (of 26), 46% | 10 (of 18), 56% | p > 0.05 |
| Workshops | 8 (of 26), 31% | 4 (of 18), 22% | p > 0.05 |
| Socialise with those of their own age | 3 (of 26), 12% | 4 (of 18), 22% | p > 0.05 |

activity preferences, the importance of social connectiveness, having a sense of purpose, perceived activity relevance, the educational provision, the prisoner voice, tailoring and adapting activities, integration into the community and a flexible model of delivery. The evidence was used to supplement the logic model.

3.3.1. Acceptability: the prison environment

The suitability of the prison environment for delivery of activities was an element that was discussed by staff and prisoners: staff commented on the impact of the prison environment on the engagement of people wanting to take part in activities and the suitability of the prison wings: *The wings are noisy and loud and not suitable* (staff, ID 206). There was also an agreement between prison staff and prisoners that the excessive amount of noise in the prisons made older prisoners feel intimidated, reinforcing a lack of confidence and feelings of being withdrawn from the prison community. *I find that the general clientele cause the elderly to withdraw. I think this is because of the noise people as go in and out of the cells – this can cause them to retreat and be intimidated, not wanting to go on medication queues or go and collect their meals – they are scared that medication is going to be removed from them and they would rather be in pain* (staff, ID 205). Prisoners echoed these concerns: *I would like a wing for 45+. We have lots of lads who are older and it can be wild on the wings, older people need to chill out* (male prisoner ID 135). Barriers to engagement reported by staff included those relating to having the right kind of ‘buy in’ and sufficient interest in the activity that was being offered: *I think the biggest barriers are trying to sell the idea and the benefits of what we have to offer to them – they think they don't really need it or want it* (staff, ID 210). *The barrier to engagement was probably also exacerbated by the process of withdrawal and reduced confidence to be part of the wider prisoner community.*

3.3.2. Acceptability: strategies to encourage the engagement of older people in custody

Despite the challenges, there was the sense from staff that interventions needed to be ‘marketed’ in the right way to obtain buy in this included careful consideration for how they worded activities: *We have to be careful how to word the clinic and what we do, for example we have now a clinic called ‘well man clinic’...before we had it as ‘physical and mental health clinic’ but we didn't get many attending* (staff, ID 201). Prison staff and prisoners acknowledged that trying a new activity could be daunting, staff talked about how to engage with this group; focusing more on making the person feel at ease and being approachable: *when they come into prison it is hard to get them interested and they have choice of what they want to do in the prison so the library or kitchens – they can be a bit daunted by the fact that they are doing something completely new and making them feel relaxed and be approachable and you can get a lot out of them and vice versa* (staff, ID 209). Other prisoner-peers were used to encourage engagement and this was reported as a positive initiative by both staff and prisoners: *Having people in the same location, challenges are if something is new or they don't know anyone, don't have confidence or comfortable that they haven't been before. Encouraging when you don't want to go is when get most benefit. Someone to go with is good* (male prisoner, ID 128).

3.3.3. Acceptability: what activities do staff and prisoners say they want to do?

Vocational and skills-based courses were preferred especially by female prisoners. Some reported the requirement to have more workshops such as arts and crafts, *It would be nice if there was an arts and crafts group* (female prisoner, ID 62). *Over 50's group to sit and chat/knit* (female prisoner, ID 74). *We have a yoga group and a Friday morning coffee event. It is hard to say what would be good. I am not sure if we offer art or music – we have a pool table but definitely something that helped people to be more social would be good* (staff, ID 203). The main element of all activity preferences was the need to be social with other people of a similar age. Doing activities that involved creativity was a key area of interest for both men and women. *Much greater benefit for all prisoners and probably older prisoners is the mental health benefits of doing something creative e.g., through art with which we have struggled for funding and more vocational courses* (staff, ID 210).

3.3.4. Acceptability: staff and prisoners talked about the importance of promoting social connections

Relatively simple activities were promoted throughout the conversations; all key elements of these activities supported the idea of making social connections with prisoners of the same age: *previous work in another prison used to have an older people wing together the social contact is really important. We had an older people's group with newspapers and coffee and chat trying to get this interaction going together* (staff, ID 206). It was recognised by staff that those who were older in the prison were more likely to become socially isolated: *they tend to be quite an isolated group and do not have healthy support networks in the community* (staff, ID 204). Prisoners also wanted more time to be able to socialise and mix with other people: *Less time banged up to be able to socialise and mix with people* (male prisoner, ID 123). An element of a group sporting activity was suggested particularly targeting those who may have fewer family connections

We have a range of sporting activities, but these are generic – I think opening up some more social activities for all would be good. Relationships can be difficult, maybe they have lost friends or parents to live with – back up support is less obvious with this group than with the younger age groups. (staff, ID 207).

3.3.5. Acceptability: prisoners wanted to have a sense of purpose; activities needed to be meaningful

Activities involving helping and supporting other prisoners were recognised as having some of the most meaningful social engagements *The most beneficial things are being a listener and helping others. I did teach people how to learn to write and help people. I got a sense of achievements for both. Sense of achievement made me feel good to be a part of it* (male prisoner, ID 128). The positive aspects of helping someone else reinforced a sense of feeling good and having a sense of purpose.

3.3.6. Acceptability: staff supporting the relevance of the activity; working together

Interventions needed ‘to fit’ both the prison regime and available resources. Recognition from prison senior management team was an important consideration in generating some momentum and registering the impact of the activity within their longer-term strategy; made the activity more likely to be implemented and sustained: *I think we have two important elements – something that has a recognised benefit and someone to lead it within the prison. Prison and healthcare need to be together to make sure that people are behind it and recognise support for the activity to go ahead.* (staff, ID 204).

3.3.7. Acceptability: the educational provision was not tailored to the needs of this age group

Prison education provides functional Maths and English to level 1–3. Many in this age group were unlikely to engage in employment upon release. Staff felt there was a gap in the provision of educational courses,

advocating that the current educational provision did not provide the right kind of educational opportunities leading to positive learning within this age group: *“I feel that generally speaking, one of the limitations we have in the prison system is that we are geared around the qualifications – but I would advocate un-credited courses such as taster courses so that the most able of the older people would have this option. This would also mean that people could sign up to an uncredited reading programme and people can see the benefit without the pressure of working towards a qualification”* (staff). Staff talked about the narrow range of options and the limited opportunities for education in people who might not want to take an accredited course. *“Having a greater range of options for education would mean that people could try something out and see how they find it and then maybe move onto accredited programs.”* (staff, ID 210). Prisoners also supported this viewpoint with many of them asking for alternatives to the more traditional functional Maths and English that is aimed primarily at younger prisoners who may be seeking employment upon release. Despite these challenges, staff did acknowledge that people in custody were offered a limited provision of activity choices that did not reflect the needs nor requirements of this age group: *“the biggest barrier would be in pursuing them so if we had a freer option for people to have a taster session this might encourage those to come along”* (staff, ID 210). *“Much greater benefit for all prisoners and probably older prisoners is the mental health benefits of doing something creative e.g., through art with which we have struggled for funding and more vocational courses”* (staff, ID 210). Short courses, taster sessions and an opportunity to attend something that didn't lead to a qualification was supported by those in this age group.

3.3.8. Acceptability: older people in custody were not heard

Supporting other studies in the wider literature there was a sense that older prisoners were not heard; those that were younger tended to take priority: *“a lot of the time they don't feel listened to that they are in pain as it is classified as drug seeking behaviour professionals need to be mindful that it might not be drug seeking behaviour so we have to have evidence of the problem.”* (staff, ID 208). Staff and prisoners both spoke about the focus of rehabilitation being on that of younger prisoners: *“also, more money was spent on younger prisoners on rehabilitation than the older prisoners as the latter didn't make a fuss about it therefore, they seemed to get ignored. If you have an older prisoner who doesn't cause any problems then we are likely to not do anything to support the rehabilitation”* (staff, ID 201). *“It is difficult to get the right people to listen to you and to take you seriously.”* (female prisoner, ID 55). The focus on those that were younger was also reflected in the prison site strategies that didn't feature alternatives to employment upon release and only examined those that were more likely to commit further criminal acts.

3.3.9. Sustainability: tailored and adapted activities to meet the needs of older people in custody

Lots of activities on site could be tailored to the needs of those that were older. Staff spoke about the adaptations of gardening activities: *“Some people couldn't push a lawn mower, but they might go into the green house and put seeds into the seed trays - some go on the tomatoes, it gives them a sense of responsibility and hopefully they take these skills home with them and then show their grandchildren the skills. It is about passing the information on and giving them a different outlook in life and I give them the knowledge they need”* (staff, ID 209). Other popular choices (particularly for the men) was use of the gym. This was less attractive to the women and for some, use of the gym was daunting: *“we are unlikely to get uptake for the gym (in the female prison) and it is hard to persuade people as part of their treatment that they should go to the gym for people that have never done physical exercise before.”* (staff, ID 203). Encouraging people to attend the gym that might not have been before could include a few trips to get individuals familiar with the environment, what and how the equipment works; and then a supported short small group session for those that were going to try out the gym for the first time.

3.3.10. Sustainability: activities were too long

Other staff members commented that older prisoners didn't tend to utilise the gym because the music was often played too loud and the length of the session (around 3 h due to the line route movement of prisoners) was too long for this age group. *“For some people 3-3.5 hours in a group is too long to engage people. It is too intense. This is linked to the regime of the prison. We had hoped that engagement would be better if they can dip in and out a couple of test sessions a week for 30 minutes or an hour per week”* (staff, ID 210).

3.3.11. Sustainability: a flexible model of staff delivery is required

A strong theme that emerged was the requirement to deliver activities with limited staff resources. Insufficient staffing meant that activities could not go ahead. Staff reported that there were times when activities were cancelled at the very last minute. Activity delivery often relied upon the talent of one staff member, creating no opportunity for flexibility when that person was on leave or unable to deliver the activity due to a different shift pattern: *“Also being reliant on one member of the group so if that person is on sick or holiday then others can run the group so that it is a holistic approach that all staff can buy into. It needs to be sold for the service as opposed for an individual. - It needs to make sure that the healthcare team have a focus on it.”* (staff, ID 206). The logistics of the prison regime had an impact on moving people to different locations across the prison site with staff, getting off the wing is difficult. *If you are not on a list, you cannot get off the wing, this is a problem. People haven't turned up to take people to activities, sometimes short staffed on a weekend when locked up 23 h, and fed through the door, with no access outside.”* (male prisoner, ID 123). Communication between staff groups led to confusion about where people should be attending when unlocked. Staff felt that operational prison staff and healthcare teams could work together better to deliver activities. The promotion of a holistic operational approach was advocated by staff members: *“I think we have two important elements – something that has a recognised benefit and someone to lead it within the prison. Prison and healthcare need to be together to make sure that people are behind it and recognise support for the activity to go ahead.”* (staff, ID 204). This holistic approach would aid communication but also provide flexibility to the delivery of an activity.

3.3.12. Sustainability: integration into the community was poorly coordinated

Staff referred to ‘gaps in service provision’, and difficulty getting access to the right services in the community: *“in terms of needs it can be support in the community of which there are lots of gaps – for example housing is a big issue and a lot of people are released homeless and there is a need for support in this area and a point of contact although we have a through the gate team about services they can access in the community.”* (staff, ID 207). Sometimes staff recognised that older prisoners being released were not considered in relation to travel arrangements and priorities would be given to those people who were younger, even when the custodial sentence might have been longer: *“I spoke to a group of prisoners recently and one of them who was 65 years plus, who had been in for a while, was being released and he said that he felt quite nervous about it. We support younger people to get on the bus, travel with them and make sure they get from A to B but we don't do this for our older men.”* (staff, ID 201). Staff recognised that older people being released into the community were more likely to experience a ‘skill gap’ in technological advancements or in how to use a mobile phone: *“the preparation beforehand is key – there has to be some responsibility on the part of the prison but it can be quite daunting. We made sure someone had a taxi last week to get to their accommodation – for some people we aren't told in advance so they are left if it happens quickly and people in the community people don't know – what to do.”* (staff, ID 206).

3.4. Mapping information from the survey and interviews onto the systematic review evidence

The mapping exercise was conducted in two ways. First, we compared the activities chosen by the men (Table 3) and women in custody (Table 4) against the research evidence from the prior systematic review (Perry et al., 2023). This was to ascertain whether the chosen activities had any prior established evidence-base. Second, we identified the key targeted needs that benefited mental health from our survey to identify whether the chosen activities met those needs. Most activities arguably fit one or more of the identified needs, although only two (family history and socialising) met the requirement for family connections. Activities were more likely to target mental health than have a perceived benefit to both mental and physical health.

Six studies from the systematic review (Perry et al., 2023) aligned

with the activity preferences that male prisoners had mentioned. The activities included art therapy (Gussak, 2009), music therapy (Chen et al., 2016; Gold et al., 2014), health education and exercise (Cashin et al., 2008), yoga (Ambhore & Joshi, 2009), and mindfulness (An et al., 2019). Out of these six studies, only four reported the participation of male prisoners over 50 years old (Ambhore & Joshi, 2009; An et al., 2019; Chen et al., 2016; Gold et al., 2014). Of those four, only three reported positive impacts on mental health outcomes (Ambhore & Joshi, 2009; An et al., 2019; Chen et al., 2016). Only two yoga studies from the systematic review (Perry et al., 2023) matched the activity preferences mentioned by those of the female prisoners (Danielly & Silverthorne, 2017; Lundstrum., 2021).

Table 3
Synthesis of male activities.

| Male list of activity preferences (Number requesting the activity) | No. of systematic review studies (type of activity) country of study, (author and year of publication) ^β | No. of Available males over 50 in the study sample ^ε | Did the study have a positive impact on mental and/or physical health outcomes for >50s | Targeting the need(s) as identified through the survey findings | | | | | |
|---|---|---|--|---|------------------------|--------------------|--------------------|------------------|----------|
| | | | | Purposeful Activity | Connectivity in prison | Family connections | Promotion of sleep | Mental Wellbeing | Physical |
| Extra time in gym (18) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Reading (13) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | |
| TV (12) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | |
| Art-related activities (8) | 1(Art therapy) USA (Gussak, 2006) | 0 | NA | ✓ | ✓ | | ✓ | ✓ | |
| Workshop – job in prison (8) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | ✓* |
| Socialising/ association/ network (6) | 0 | NA | NA | | ✓ | ✓ | ✓ | ✓ | |
| Listening to music (5) | 2 (music therapy) China (Chen et al., 2016) ¹ , Norway (Gold et al., 2014) ² | 21/200 (11%) ¹ ; 7/113(6%) ² | Chen et al. (2016) showed a significant impact on depression and anxiety | | | | ✓ | ✓ | |
| Any educational (psychology, sociology, horticulture, plumbing) (5) | 1 (health education and exercise program) Australia (Cashin et al., 2008) | 0 | NA | ✓ | ✓ | | | ✓ | |
| Family trees/ historical (4) | 0 | NA | NA | | ✓ | ✓ | | ✓ | |
| Getting qualification/ learning skill (e.g. cooking) (3) | 0 | NA | NA | ✓ | ✓ | | | ✓ | |
| Support groups on the wing (e.g., Alcoholic Anonymous) (2) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Outdoor group session (1) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | |
| Yoga/mindfulness (1) | 2(1 Yoga, 1 mindfulness) India (Ambhore & Joshi, 2009) ³ China (An et al., 2019) ⁴ | 4/90 (4%) ³ ; 9/54(17%) ⁴ | Ambhore and Joshi (2009) showed a significant impact on anxiety with An et al. (2019) showed a significant impact on depression and anxiety with Mindfulness | | ✓ | | ✓ | ✓ | ✓ |

Notes: ^β Systematic review only involved Randomised Controlled Trials (RCT) that focused on adult prisoners aged 50 years or older. We identified these participants through their age range, mean age, and standard deviation provided in the paper. ^ε the exact number of male prisoners aged 50 years and above provided by the study authors. *depends on the type of workshops.

Table 4
Synthesis of female activities.

| Female list of activity preferences (Total number requesting the activity) | No. of systematic review studies (type of activity) country of study, (author and year of publication) ^β | No. of available females over 50 in the study sample [£] | Did the study have a positive impact on mental and/or physical health outcomes for >50s | Targeting the need(s) as identified through the survey findings | | | | | |
|--|---|---|---|---|-------------------------|--------------------|--------------------|------------------|----------|
| | | | | Purposeful Activity | Connectivity in prisons | Family connections | Promotion of sleep | Mental Wellbeing | Physical |
| Group (e.g. an over 50s group, a diversity group, having coffee, bingo, knitting, arts, crafts tea, coffee, scrabble, chat/network/puzzles/chess/woodwork (13) | 0 | NA | NA | | ✓ | | ✓ | ✓ | |
| Exercise, walking, around the grounds/ gym/ indoors/dancing (11) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | ✓ |
| TV (11) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | |
| Art related activities (9) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | |
| Reading (8) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | |
| Family history/ family tree / genealogy (7) | 0 | NA | NA | | ✓ | ✓ | | ✓ | |
| Yoga – mindfulness/ meditation (6) | 2 Yoga [USA (Danielly & Silverthorne, 2017) ⁵ USA (Lundstrum., 2021) ⁶ | 1(6/34 (18%) ⁶ | Lundstrum. (2021) showed a significant impact on depression | | ✓ | | ✓ | ✓ | ✓ |
| Workshops – job in prison (6) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | ✓* |
| Listen to music (3) | 0 | NA | NA | | | | ✓ | ✓ | |
| In cell activities (2) | 0 | NA | NA | | | | ✓ | ✓ | |
| Gardening (2) | 0 | NA | NA | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Getting qualification/ learning skill/ computing (2) | 0 | NA | NA | ✓ | ✓ | | | ✓ | |
| Access to the library computer (1) | 0 | NA | NA | ✓ | ✓ | | | ✓ | |
| Cooking (1) | 0 | NA | NA | ✓ | ✓ | | | ✓ | |

Notes ^β Systematic review only involved Randomised Controlled Trials (RCT) that focused on adult prisoners aged 50 years or older. We identified these participants through their age range, mean age, and standard deviation. [£] the exact number of female prisoners aged 50 years and above provided by the study authors. *depends on the type of workshops.

4. Discussion

Findings from this study point to the need for criminal justice and public health policymakers to focus more attention on the health of older adults in custody. Although this group is known to be at high-risk for common mental health disorders (depression and anxiety), they also present with a range of complex physical health conditions. Despite this, the effectiveness of interventions to support the mental health of this group remains uncertain, with only a handful of studies ($n = 8$) including ‘within-study samples’ of people who are 50 years and above, offering no evidence about what ‘works for this population (Perry et al., 2023).

Drawing on data from our survey and the series of interviews (in this study), we identified knowledge to improve our understanding of how such interventions could be implemented and perceived as sustainable, feasible and acceptable. Implementation measures using the GUIDED Intervention Development Checklist framework (Duncan et al., 2020) provide a structure for the development of subsequent logic models to inform future research to address and report on the implementation constructs. Such models allow us to develop a better understanding of how a specific programme theory leads to outcomes. This initial logic model, derived from the multiple data sets, may have particular use in supporting future development work, such as RCTs or implementation

programmes, because it can help anticipate variation across sites, rather than suggesting a universal ‘one size fits all’ approach. Through this understanding, intended users can design their interventions around local and contextual knowledge, ensuring that relevant practice is linked to individual prison strategies and key performance indicators (Atkinson et al., 2017; Yardley et al., 2015).

Careful consideration about the implementation of interventions in this context is particularly important because previous RCTs report challenging and complex problems in relation to the delivery of research in prisons (Kouyoumdjian et al., 2015). Implementation mechanisms help us to examine how relevant interventions are feasible and acceptable and can be sustained. Strategies to support the successful delivery of complex interventions in this environment are necessary (Skivington et al., 2021), particularly as an often-cited barrier to uptake is poor adherence (Kirsi et al., 2018; Martin et al., 2005; Vonbank et al., 2017). Our experience of these challenges was consistent with prior studies (e.g., nearly half of males were released or transferred by our survey time point). Our findings support other evidence that indicates the use of brief interventions (with an optimum length of two weeks) may enable the inclusion of as many people as possible in custody, particularly those who have a short-term stay (Lundstrum., 2021). We also found there were no significant differences in anxiety and depression between men and women. This contradicts the broader literature, which indicates that

incarcerated women report experiencing more serious psychological distress, such as anxiety and depression, than incarcerated men (Archambault et al., 2013). The reason for this discrepancy may be due to the small sample size used in our study, which did not show a significant difference between the two groups.

Prison and healthcare professionals together should regularly capture information on this age group to aid the coordination of resources that might support and promote positive mental health and improve health literacy. Recent evidence directs resources towards training criminal justice staff in evidence-based practices to buffer the adverse health impacts of contact with the criminal justice system. For example, Phelps et al. (2022) found that adult probationers who had poor relationships with their probation officers were more likely to experience worse health (Phelps et al., 2022). Additionally, a 'different kind of approach' is required from prison staff to consider 'how and whom' should support and engage older people in custody. Staff training in understanding cognitive decline, supporting empowerment, and increasing engagement using peer-to-peer support may also be valuable.

Different views on the suitability of mixed units of young and older prisoners have been presented in previous studies (Wangmo et al., 2017). The physical layout of prisons and variation in the prison population across the UK is often prohibitive to providing private space for people who are older whilst still retaining the opportunity to mix and socialise with younger prisoners. In the US, some attempts to organise the physical layout of the prison based on age stems from a recognition that older prisoners are less likely to generate institutional misconduct. This means that fewer staff resources are required to support these prisoners, providing an opportunity to use staff resources more efficiently to support the differing needs of those that are younger and potentially more disruptive. This may have implications for efficiency in correctional operations and staffing decisions (Augustyn et al., 2020).

Prisons need to embed flexible models of delivery that speak to small teams of staff involved in the delivery of activities to improve the consistency. Unpredictable changes in the prison environment highlighted a potential perceived lack of control, with associated negative impacts on prisoner mental health. Different staff employment roles (for e.g., weekend and evening work) would enable activities to work outside of the standard prison regime; perhaps mimicking more of what would usually be available in the community (i.e., going to work during the daytime and attending an exercise class in the evening). In addition, creating different ways to deliver the same activity would reach more people who prefer to embrace activities in different ways. For example, exercise routines in-cell or in small groups on the wing, or by attending a walk around the prison perimeter and/or a gym class reflect the idea that 'not one size fits all'. Use of outdoor space was a priority for both men and women; the benefit to mental health in being able to walk around outside is supported by other research that refers to nature-based interventions (NBI). NBI can improve depressed mood, reduce anxiety, and enhance positive affect (Coventry et al., 2021). This coupled with the idea of using spaces for different purposes may help offer a change in the environment, even if used for just a short time with the optimal dose range for benefit to mental health in the community being between 20 and 90 min.

Staff referred to the requirement to obtain significant 'buy-in' from the prisoners themselves, chiming with previous research (Ridley, 2022). Encouraging prisoners to become active partners in projects promotes ownership in idea generation, creating activities that are more likely to be acceptable. However, the desire to instil a sense of ownership within the confines of the judicial system requires careful monitoring. It may be just as important to challenge older prisoners with activities that they may not have previously considered.

Connectivity and social opportunities were considered important. Offering creative and inexpensive ideas for new activities and/or different ways for people to socialise with those of their own age is particularly important for well-being, as well as integration back into the community (Age UK, 2019) and may also mitigate some concerns

about the possible decline in, or lack of family contact as people age). In our study, we found that most people still had relatively strong family connections, although women were more likely to receive visits than men. Loneliness was reported in both groups and is a known risk factor for to depression (Centers for Disease Control Prevention, 2021); opportunities to maximise social connections is therefore important in maintaining good mental health and well-being.

The UK Prison Strategy White Paper (2021) (Ministry of Justice, 2021b) reported that educational provision in prisons has not kept pace with the increasingly high standard of skills required by employers in the community. Despite this acknowledgement, the report remains focused on the provision of basic level 1–3 numeracy and literacy for younger people within the prison population. In our study, most older prisoners already had a substantial number of other higher-level qualifications, leaving them with no developmental educational provision. Although due to the limited sample size, our results may not be representative of the wider population of older people in custody, the findings would support the opportunity to provide a broader skills-based taster vocational and education provision across the prison estate.

This study is not without limitations. This small-scale feasibility study; is likely to warrant further exploration of the findings and refinement of the logic model will be required before it can be used within the wider HMPPS estate. For these reasons, there is a generalisable concern that this UK prison population is unlikely to represent other incarcerated older populations in countries where the reasons for incarceration and the protected characteristics of this group may differ (e.g., Australian Bureau of Statistics, 2023; Suzuki & Otani, 2023). The study focuses on older people in custody with common mental and physical health conditions, excluding those with schizophrenia, cognitive impairment and learning disabilities. This limitation means that we can only consider these findings within this sub-sample population, restricting the findings of the results. Research considering those with other mental health diagnoses are required to examine the practical and feasible differences in our findings and subsequent development of the logic model. Individual prison site strategies need to address the growing needs of older people. Relatively inexpensive activities, with consideration of flexible delivery models and benefits to mental and physical health, could help increase quality of life and reduce high economic and social cost, mortality and reoffending in this age group.

Funding

This study/project is funded by the NIHR [Research for Patient Benefit Fund (NIHR203484)]. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

Role of funding

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

A. Supplementary data

Supplementary data to this article can be found online at [<https://doi.org/10.1016/j.ijlp.2024.102002>].

CRediT authorship contribution statement

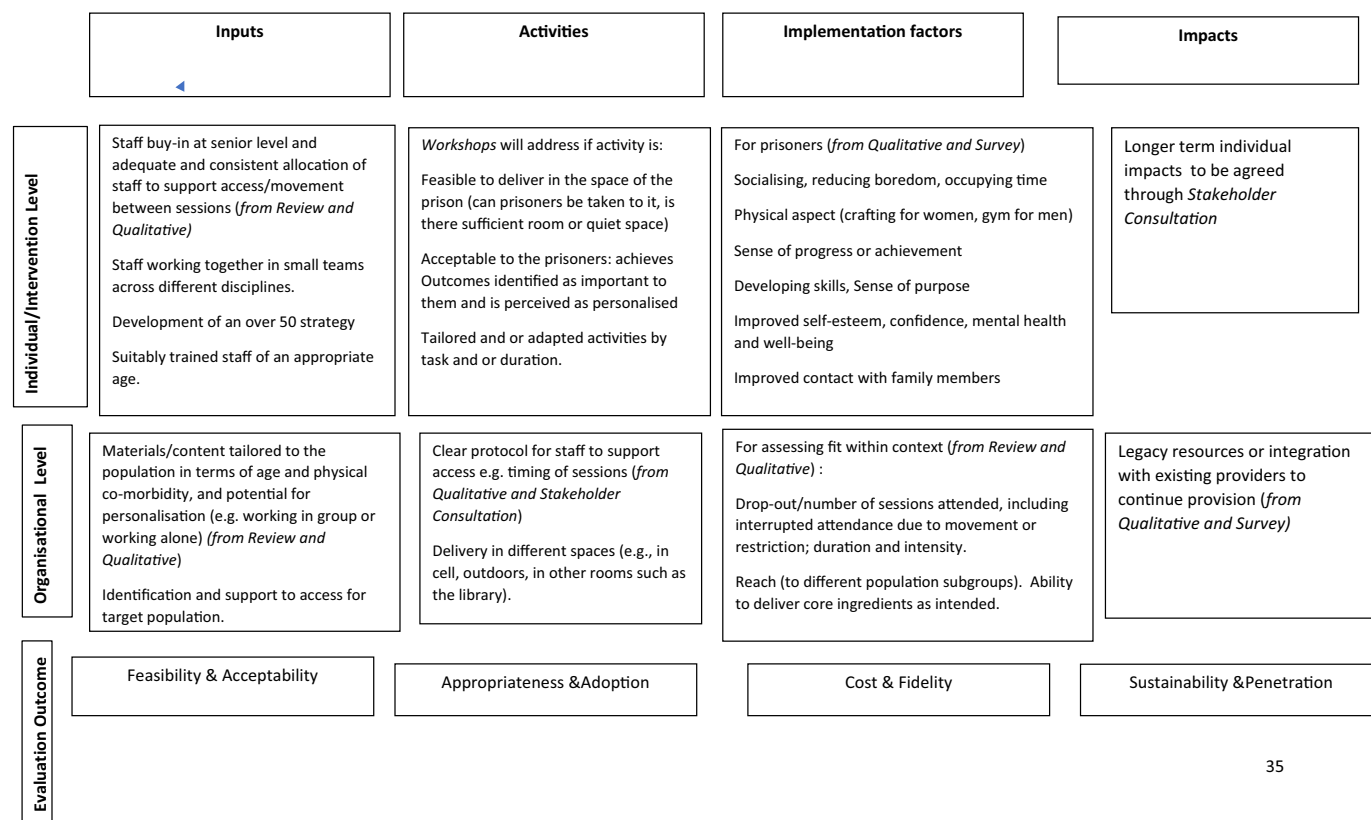
Amanda E. Perry: Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Project administration, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Thirimon Moe-Byrne:** Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis. **Sarah Knowles:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation. **John**

Schofield: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Chidsanu Changsiripun:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Rachel Churchill:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Kevin Williamson:** Writing – review & editing, Writing – original draft, Resources, Project administration, Conceptualization. **David Marshall:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Steve Parrott:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

None.

Appendix A. Appendix 1: initial logic model



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