**A systematic review of the impact of sport-based interventions on the psychological well-being of people in prison**

**Abstract**

**Purpose**: The primary aim of this study was to review the impact of sport-based interventions (SBI) on the psychological well-being of people in prison. Secondary aims were to identify whether psychological theory of health behaviour change was included in the design and evaluation of interventions, and the inclusion of additional non-sporting components.

**Methods**: A textual narrative synthesis followed a systematic search of six databases, based on PRISMA guidelines, and conducted during April 2016. Inclusion criteria were people in prison, aged 15 or over, involved in a facilitated SBI. The outcome was impact on psychological well-being and all study designs were considered. Search results were reduced from 10,749 studies, to 14 (nine quantitative and five qualitative) after screening.

**Results**: Interventions lasted from six weeks to nine months, with nine being multi-component. A positive affect on psychological well-being or related variable was reported in twelve studies. However, there were inconsistencies in measurement, a lack of baseline data and limited follow-up. Health behaviour change theories were a notable omission across the interventions.

**Conclusions**: SBIs display a positive trend toward beneficial impact on psychological well-being within prisons. However, future studies should aim to address identified measurement inconsistencies and weak research design, and also include psychological change theory in their design. This will better enable practitioners and researchers alike to identify the key psychological mechanisms impacted and how, subsequently implementing SBIs with increased understanding and confidence in their contribution to prisoner psychological well-being.

**Keywords:** sport, physical activity, mental health, prisoner health, sport for development

**Introduction**

Recent reports from across multiple jurisdictions highlight poor mental health and psychological well-being within the prison population as endemic (United Kingdom - Mental Health and Criminal Justice Report, [Duncan], 2016; United States - Travis, Western, and Redburn, 2014; Australia - Australian Institute of Health and Welfare, 2015). The Mental Health and Criminal Justice Report (2016) identified key services, partnerships or actions, which when combined, aim to meet the needs of the complex and diverse spectrum of mental health issues within the prisons. Although not identified within the report, regular physical activity is widely advocated to have a beneficial impact on mental health and well-being (Lancet, 2016; World Health Organisation, 2016), and evidence from systematic reviews demonstrates the positive effect of physical activity on mental well-being (Arent, Landers & Etnier, 2000; Biddle & Asare, 2011). Therefore, although within prisons primary mental health care will be the lead service, the provision of sport and physical activity is one service which is potentially well placed to meet a portion of the mental health and well-being needs. To date however, there has been no systematic review of the impact of sport based interventions on psychological well-being within prison populations.

 Cognisant of the prevalence of poor psychological well-being in the prison population and the potential for sport and physical activity to positively impact upon it, the results of a study into the provision of health promotion within physical education (PE) programmes across the secure estate in England and Wales (Lewis and Meek, 2012) provide pause for thought. Remedial PE provision was the most common (73% of establishments), whilst, programmes explicitly aimed to improve mental health were provided in only 23 of the 142 secure estates surveyed (16%). However, any efforts to improve psychological well-being through PE programmes and/or related sport and physical activity interventions should first systematically assess the available body of evidence, which is therefore the primary aim of this review.

 Guidance provided by the Medial Research Council (MRC) advises the involvement of health behaviour change theory at all stages of the design and evaluation process of interventions (Moore et al., 2015). However, when evaluating sport for development programmes designed to positively impact at-risk youth, Hartmann (2001) and Baldwin (2000), identified the absence of clear and coherent theoretical foundations as substantive issues. The absence of theory limits our understanding of why interventions are effective (or not), what the effective components are, and how to replicate them across different domains and populations. Or as Michie and Abraham (2004) surmise, key questions are: do they, how do they, and why do intervention programmes work? Therefore, the review will also aim to identify the presence of appropriate theory within the included studies.

 Although no systematic review of the topic was identified, Gallant, Sherry and Nicholson, (2015), did conduct a thematic analysis which identified three key themes pertaining to sport and recreation activities within prisons, the first of which was health and well-being outcomes for inmates. The remaining two themes were (i) to aid the rehabilitation process; and (ii) as an offender management tool. Specific outcomes associated health and well-being were: reducing health risks for older inmates (Amtmann, Evans & Powers, 2001), increasing general physical fitness (Meek & Lewis, 2012; Nelson, Specian, Campbell & DeMello, 2006), reduction in depression, anxiety, stress (Battaglia et al., 2014; Buckaloo, Krug and Nelson, 2009, Martos-Garcia, Devis-Devis & Sparkes, 2009) and hopelessness (Cashin, Potter & Butler, 2008). Outcomes related to the rehabilitative process were the development of pro-social identities and improved positive networks with individuals external to the prison (Meek & Lewis, 2014a; Van Hout & Phelan, 2014; Draper, Errington, Shaheda & Stanley, 2013) and improved communication and coping strategies (Leberman, 2007).

The identification by Gallant et al., (2015), of separate “health and well-being” and “rehabilitative” themes, although useful in delineating outcomes impacted upon by sport and recreation, suggests that the two are mutually exclusive. However, well-being, in particular psychological well-being, covers both affect and psychological functioning with two distinct perspectives: (a) the hedonic perspective, which focuses on the subjective experience of happiness and life satisfaction: and (b) the eudaimonic perspective, focusing on psychological functioning, self-realisation and flourishing (Ryan & Deci, 2001). Taking this into account, it is plausible to consider the rehabilitative theme identified by Gallant et al., (2015) as central to, rather than separate from, improved psychological well-being. This is not to suggest that Gallant et al. (2015) have explicitly set out to paint themes (a) and (b) as incompatible, rather an observation that the dividing lines are hard to draw. This view resonates with Huta, (2015), who commented that psychological well-being is often used without clarity across the literature to refer to a multitude of outcomes or benefits (Huta, 2015).

 It is worth noting that although studies examining the impact of sport based interventions within prison populations have been described as limited (Meek and Lewis, 2014a, pg.96), and “embryonic” (Gallant et al., 2015, pg.46), there does exist considerable research into the use of sport as a development tool to promote well-being for broader at-risk populations, whilst also delivering societal benefits, such as social cohesion and crime reduction in their communities (Coalter, 2009; Nichols, 2007; Cameroon and McDougal 2000). Arguments and testimonies are presented by practitioners, service users, and those whom Coalter (2013, pg.4) labels ‘sport evangelists’, extolling the virtues of sport-based interventions on one side; whereas empirical evidence often warns of a disconnect between the views of the practitioners and those seeking objective evidence of impact (Coalter, 2013; Lubans, Plotnikoff and Lubans, 2012; Hartmann and Kwauk, 2011; Kay, 2009; Sandford, Armour and Warmington, 2007).

Kay (2009), highlights that it is widely recognised that the claimed benefits attributed to sport over-reach the research base as the evidence of sports social impacts is unsatisfactory in all contexts, not just international development ones. Methodological research shortcomings identified include: lack of clarity in planning and specifying programme outcomes; lack of base-line data for comparison; short-termism in projects and evaluations; conceptual difficulties in defining measures for evaluating programme outcomes; and difficulty in attributing causality (Collins and Kay, 2014; Coalter 2013; Lubans et al., 2012, Biddle and Asare, 2011; Collins, Henry, Houlihan & Buller, 1999). These criticisms can therefore serve as useful guides when assessing the evidence base for sport-based interventions and their impact within prison populations.

It is also worth considering if the use of sport in prisons to impact psychological well-being mirrors the different classifications identified within Coalter’s (2007) analysis of sport for development programmes. In this, Coalter differentiates between: (a) Traditional forms of sport provision, which would for example include, independent exercise in the prison gym, with an implicit assumption or explicit affirmation that the exercise has inherent developmental properties; and (b) Sport Plus in which sports are adapted and/or augmented with parallel programmes to overtly maximise development objectives, A third classification of Plus Sport is also defined by Coalter, in which sport’s popularity is used to attract participants to programmes of education and training, where the systematic development of sport is rarely an aim.

Therefore, the primary purpose of this systematic review was to determine the impact of sport-based interventions on the psychological well-being of people in prison. A second aim was to review the intervention studies to determine what theory of behaviour change is included within the design and evaluation of sport-based interventions within prison. Finally, the review will examine the extent to which sport is provided as a stand-alone intervention or augmented with additional components in line with the sport-plus model, such as peer mentoring, life-skills classes etc. The review will follow a mixed-methods format, incorporating both qualitative and quantitative studies. Harden (2010) makes the case that the mixed-methods model enables the integration of quantitative estimates of benefit (or harm), with increased qualitative understanding from the people the interventions are targeting. The net benefit is therefore increased utility and impact of findings, to better inform policy and practice.

**Method**

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines were followed in the current review (Moher et al., 2015). A review protocol detailing the main objectives, key design features and planned analyses was registered with PROSPERO (ID number: CRD42016040005).

A systematic search was conducted in April 2016 in six databases: 1) Criminal Justice Abstracts by EBSCO; 2) National Criminal Justice Reference Service (NCJRS) Abstracts; 3) Scopus; 4) SPORTDiscus; 5) Ovid PsycINFO; and 6) Web of Science. Each database was searched from the year of their inception until April 2016. The search included the use of truncation, wildcards and MeSH terms as appropriate, adjusting for each database. Table 1, details the keywords chosen by the authors, in consultation with the institute librarian and reflecting practice and previous research, designed to enable the identification of prison based studies detailing interventions falling under the broad definition of ‘sports-based’. With regard to the outcome category, psychological well-being is considered a complex and multi-dimensional construct (Huta & Ryan, 2010). Mindful of this complexity and the multiple definitions attached to psychological well-being (Huta, 2015), we felt it would be restrictive to prescribe our own keywords to this category for the on-line search, and chose to assess this at the screening stage, with the authors examining the study outcomes for the inclusion of items related to psychological well-being.

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| PICOS | Inclusion Criteria | Exclusion Criteria | Keywords |
| Participants | * People in prison
* Aged 15 or above
 | * Chronic physical or mental illness.
* Physical disabilities.
* Aged below 15 years of age
* Population not serving a prison sentence at time of intervention.
 | * Prison
* Criminal
* Offender
* Remand
* Probation
* Felon
* Inmate
* Convict
 |
| Intervention  | * A facilitated sport-based intervention
* Sport-based intervention can include any physical activity component including any aerobic activity, exercise, physical training or fitness.
 |   | * Sport
* Exercise
* Physical activity
* Outdoor activity
 |
| Outcomes | * Impact on psychological well-being.
 |  |  |
| Study Design | * Due to the anticipated paucity of experimental studies available within the complex environment of prison settings, study design was left open to all qualitative and quantitative designs.
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| *Limiters* | * English language
* Peer Review *(post electronic search)*
 |  |  |

*Table 1: PICOS Elements for the Review Protocol and Associated Search Keywords*

**Eligibility Criteria**

The eligibility of the studies for inclusion is summarised in Table 1. No restriction was placed on the choice of research design, due to the complex nature of prison-based research. Within the controlled prison environments, traditional benchmark factorial research designs such as randomised control trials are rare. Although no restriction was placed on research design, eligibility criteria for type of studies reviewed consisted of those published in English language and in peer reviewed publications. The latter of these was assessed by two of the authors (DW & GB) at the screening stage, rather than relying on the electronic database classification. To ensure a level of methodological rigour was adhered to, non-peer reviewed articles or grey literature including non-peer reviewed reports, editorials, and Masters or PhD dissertations were excluded. Participants were those in prison at the time of exposure to the intervention and aged 15 years or over. This age distinction was made as within the UK, typically those aged under 15 will be held in a Secure Children’s Home (SCH), and those over 15 will be held in either a Young Offender Institute (YOI) or Secure Training Centre (STC). In contrast, within the United States, typically a single distinction is made, with those aged 17 and under classed as juveniles, although this can vary between states and in some cases juveniles can be tried as adults and imprisoned accordingly. Studies specifically detailing populations with intellectual and physical disabilities were excluded.

The intervention was required to be sports-based, although in line with the sport for development literature, the sporting component(s) could be adapted or augmented with, for example, life skills classes mentoring, community placements, sports personality guest speakers (i.e. “sport-plus”). As there are various definitions of sport available we were guided by that offered by the European Sports Charter (Council of Europe, 2001): *“Sport means all forms of physical activity which, through casual and organised participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships or obtaining results in competitions at all levels.”* (pg.3). Therefore included studies incorporated any physical activity component, including aerobic activities, yoga, exercise, physical training or fitness.

The type of outcome measures the review sought to identify and examine were those related to psychological well-being. This provided conceptual difficulties as several studies explicitly targeting psychological well-being incorporated measures of mental ill-being, i.e. depression and anxiety. As acknowledged by Tennant et al., (2007) these constructs reflect different approaches in relation to the understanding and measuring of psychological well-being within the literature, namely a focus on measuring either poor mental health or positive mental health. Given the embryonic nature of research within this field, rather than exclude studies which focused on measuring ill-being as a related construct of psychological well-being, they were included and this issue will be addressed further in the discussion.

**Quality Assessment and Risk of Bias**

To accommodate the broad scope of methodologies present in the studies identified, the quality assessment tool ‘QUALSYST’ from the “Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields” (Kmet, Lee & Cook, 2004), was chosen to assess the risk of bias. This pragmatic tool enables the assimilation of both quantitative and qualitative studies, with an overall assessment score ranging from 0 to 1 assigned on the basis of 14 individual criteria (quantitative studies) or 10 individual criteria (qualitative studies). Specific criteria were scored (“yes” = 2, “partial” = 1, “no” = 0), and items not applicable to a particular study design were marked “n/a”, and were excluded from the calculation of the summary score. An overall score ranging from 0-1 was then calculated for each paper by dividing the total sum score obtained across rated items by the total possible score, with a resulting rating of *weak* (0.00–0.49), *moderate* (0.50–0.74), or *strong* (0.75–1.00).

**Data Extraction**

Eligibility and quality assessments of the included articles, in line with the respective criteria outlined previously, were assessed by two independent reviewers (DW and GB) in a structured format. Following independent review, the researchers discussed findings and reached agreement. In the case of continued disagreement, a third reviewer was available (DH). The key characteristics from each study were carefully extracted by DW and assimilated into a hierarchy of two categories, quantitative or qualitative. Data extraction was completed in a structured format, retrieving the authors names, country in which the study was conducted and prison type, study research design, sample size, age and gender, aims of the intervention, alongside the intervention description, duration and frequency. The outcome measurements retrieved were indicators of psychological well-being (or ill-being), the measurement tool used and whether or not the intervention had a significant positive or negative effect (p<.05). Cohen’s *d* effect size was calculated for each intervention where the mean and standard deviation score was available. Outputs from the data extraction were assessed by a second researcher (GB), and following discussion, information was clarified or added to as required.

Data Synthesis

Due to inclusion of both qualitative and quantitate studies within the systematic review, a textual narrative approach was adopted to synthesize the data extracted. Barnett-Page and Thomas, (2009), in their critical review of methods for the synthesis of qualitative research highlight the appropriateness of a textual narrative approach for synthesizing evidence of different types (e.g. qualitative, quantitative, economic etc) and identifying heterogeneity and issues of quality appraisal. It was therefore considered that this data synthesis approach best suited the study aims.

**Results**

The search strategy identified 10,749 studies (2279 from Criminal Justice Abstracts by EBSCO; 2918 from National Criminal Justice Reference Service (NCJRS) Abstracts; 1515 from Scopus; 1673 from SPORTDiscus; 1253 from Ovid PsycINFO; 1109 from Web of Science and two from a hand search of reference lists of retrieved studies; see Figure 1). Following removal of duplicates, (293), 10,456 articles were screened using their title and abstract. This screening resulted in 65 articles remaining which were screened in full.

Of the 65 articles reviewed a further 51 were excluded based on the following criteria: six were not peer reviewed; one was a non-prison based population; five detailed a population including participants under 15 years of age; four examined populations specifically suffering from chronic physical and/or mental illness; 29 did not examine a specific sports-based intervention; and six did not include a psychological well-being outcome measure. This resulted in 14 studies for inclusion in the final analysis (which includes one study identified in the reference lists of retrieved studies, the other was excluded).

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| --- | --- | --- | --- | --- | --- |
| **Identification** | **Records identified through database searching****(n = 10,747)** |  | **Additional records identified from reference lists****(n = 2)** |  |  |
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| **Screening** |  | **Records screened for title and abstract after de-duplication (n = 10, 456)** |  |  |  |
|  |  |  |  |  |
|  |  |  |  | **Records excluded for irrelevant titles and abstracts (n = 10, 391)** |  |
|  |  |  |  |  |  |  |
| **Eligibility** |  | **Full-text articles assessed for eligibility (n = 65)** |  |  |
|  |  |  |  |  |  |
|  |  |  | **Full-text articles excluded with****reasons (n = 53)** |  |
|  |  |  | 1. **Not peer-reviewed = 6**
2. **Non - prison population = 1**
3. **Underage = 5**
4. **Chronic physical / mental illness= 4**
5. **Not a specific SBI = 29**
6. **No measure of psychological well-being = 6**
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| **Included** | **Studies included in synthesis****(n=14)** | **Studies included Qualitative****(n = 5)** | **Studies included Quantitative (n = 9)** |  |

*Figure 1: Flow Chart of Study Selection Process based on PRISMA (Moher et. al, 2015)*

**Quality Assessment and Risk of Bias**

Table 2 details the estimated risk of bias for all studies meeting the inclusion criteria, Tables 3 and 4 detail scores on each risk area. Eight articles received a low risk of bias assessment and six received a medium assessment. It should be noted that QualSyst allows for ‘n/a’ on some criteria, where a condition is not possible to assess. Therefore, when assessing sports-based interventions within prison, if conditions such as intervention type and blinding of subjects was not possible in a randomised control trial (RCT), it was classified as ‘n/a’, rather than having a negative impact on the quality assessment.

|  |  |
| --- | --- |
| Quantitative Studies | Qualitative Studies |
| Author(s) | **QualSyst Score (0 – 1)** | **Risk of Bias** | **Author(s)** | **QualSyst Score (0 – 1)** | **Risk of Bias** |
| Battaglia et al., 2014 | 0.88 | ✪ | **Amtmann & Kukay, (2016)** | 0.55 | ✪✪ |
| Bilderbeck et al., 2013 | 0.96 | ✪ | **Gallant et al, (2015)** | 0.70 | ✪✪ |
| Harner et al., 2010 | 0.79 | ✪ | **Leberman (2007)** | 0.85 | ✪ |
| Hilyer et al., 1982 | 0.96 | ✪ | **Meek & Lewis (2014a)** | 0.75 | ✪ |
| Libbus et al., 2016 | 0.67 | ✪✪ | **Parker et al., (2014)** | 0.55 | ✪✪ |
| Martin et al., 2013 | 0.73 | ✪✪ |  |  |  |
| Munson (1988) | 0.92 | ✪ |  |  |  |
| Nelson et al., (2006) | 0.50 | ✪✪ |  |  |  |
| Williams et al;, (2015) | 0.86 | ✪ |  |  |  |

**Table 2: Summary of Quality Assessment and Risk of Bias (**✪**=Low;** ✪✪**=Medium;** ✪✪✪**=High)**

**Characteristics of the Intervention Studies**

*Study Design*

Information including study design, sample size, gender, age and intervention details, along with the key findings of the included studies were extracted and are presented in Tables 5 and 6. Of the 14 studies identified, nine were quantitative, 4 were qualitative and one included mixed methods, with the psychological well-being component identified through qualitative methods (one study by Gallant et al., 2015 reported four separate interventions, all utilising qualitative methods). Within the quantitative studies, four were RCTs, two were pre-post-intervention design with a non-randomised control group, one was repeated measures, and two were cross-sectional. The qualitative studies were mainly conducted via interview, two interviewed participants post intervention only, one study conducted interviews post the intervention and again at three months follow-up, one study interviewed and observed participants during the intervention, and one study utilised a broad spectrum of qualitative tools, including interviews, focus groups, written feedback from participants video diaries and a participatory research event hosted at the authors institution involving participants since released or still remaining in custody, on special release.

The interventions consisted of either sport only, or sport as part of a broader multi-component intervention, using additional educational or counselling components, in line with Coalter’s definition of “sport plus”. Six of the studies detailed sport only interventions (Battaglia et al., 2014; Bilderbeck et al., 2013; Harner et al., 2010; Libbus, Genovese & Poole, 2016; Munson, 1988; Gallant et al., 2015). Two of the studies incorporated a session on goal setting and motivation (Hilyer, Wilson, Dillon & Caro, 1982; Amtmann & Kukay, 2016). One of the studies included sport alongside goal-setting and weekly nutritional seminars (Martin et al., 2013). One study focused on an intervention which included sport alongside cognitive behavioural techniques and psychotherapy (Nelson, Specian, Campbell Tracy & Demello, 2006). One study detailed an intervention based on outdoor adventure activities, alongside social, creative and reflective activities (Leberman, 2007), and the remaining three studies were centred on sport interventions, delivered as part of a comprehensive development programme including for example, life-skills classes, peer review and mentoring, case-worker support, and “through-the-gate” transitional support where required, for example in relation to family re-engagement (Meek and Lewis, 2014; Parker, Meek & Lewis, 2014a; Williams, Collingwood, Coles & Schmeer, 2015).

The sample size across selected studies ranged from two (Amtmann & Kukay, 2016) to 105 participants (Nelson et al., 2006), with the majority of studies (9 out of 14) including solely male participants. Total population across all studies was 614, with 527 males (86%) and 87 females (14%). The duration and frequency of interventions ranged from 20 days, full-time (outward bound programme, Leberman, 2006), to nine months, consisting of exposure to intervention for one hour, twice a week (Battaglia et al., 2014). Two of the studies did not specify an overall duration for the programme, (Nelson et al., 2006; Gallant et al., 2015), detailing only that they were ongoing activities which participants could engage in on multiple occasions. Only two of the studies, both qualitative, included longer term follow-up results. Leberman (2007) interviewed 14 of the original 27 participants at three months post-course attendance, and Meek and Lewis (2014a) conducted interviews with 38 participants after their release from prison. Although there is no specific detail on the interim time lapsed prior to follow-up interviews.

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| --- | --- | --- |
| **Studies**  | **Quality assessment qualitative studies** |  |
|  | 1. Question/ objective
 | 1. Study design
 | 1. Context
 | 1. Theoretical framework
 | 1. Sampling strategy
 | 1. Data collection
 | 1. Data analysis
 | 1. Verification

procedure | 1. Conclusion
 | 1. Reflexivity
 | Summary score |
| Amtmann & Kukay, (2016) | 2 | 1 | 2 | 2 | 0 | 1 | 0 | 0 | 2 | 1 | 11/20 = 0.55 |
| Gallant et al, (2015) | 1 | 1 | 2 | 2 | 0 | 1 | 2 | 2 | 2 | 1 | 14/20 = 0.70 |
| Leberman (2007) | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 17/20 = 0.85 |
| Meek & Lewis (2014a) | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 0 | 15/20 = 0.75 |
| Parker et al., (2014) | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 2 | 0 | 11/20 = 0.55 |
| 2 = yes; 1 = partial; 0 = no |
| **Table 3** |
| Quality assessment tool with the Qualsyst tool (Kmet et al., 2004) |

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| --- | --- | --- |
| **Studies**  | **Quality assessment quantitative studies** |  |
|  | Question | Study design | Selection | Subject characteristics | Random allocation | Blinding investigators | Blinding subjects | Outcome | Sample size | Analytic methods | Estimate of variance | Confounding | Results | Conclusion | Summary score |
| Battaglia et al., (2014) | 2 | 2 | 1 | 2 | 2 | n/a | n/a | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 21/24 = 0.875 |
| Bilderbeck et al., 2013 | 2 | 2 | 2 | 2 | 2 | n/a | n/a | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 23/24 = 0.96 |
| Harner et al., 2010 | 2 | 1 | 2 | 2 | n/a | n/a | n/a | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 19/24 = 0.79 |
| Hilyer et al., (1982) | 2 | 2 | 2 | 2 | 1 | n/a | n/a | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 23/24 = 0.96 |
| Libbus et al., (2016) | 2 | 2 | 1 | 1 | 0 | n/a | n/a | 2 | 1 | 2 | 0 | 1 | 2 | 2 | 16/24 = 0.67 |
| Martin et al., (2013) | 2 | 1 | 2 | 2 | n/a | n/a | n/a | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 16/22 = 0.73 |
| Munson (1988) | 2 | 2 | 1 | 2 | 1 | n/a | n/a | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 20/24 = 0.92 |
| Nelson et al., (2006) | 1 | 1 | 1 | 0 | n/a | n/a | n/a | 1 | 2 | 1 | n/a | n/a | 1 | 1 | 9/18 = 0.50 |
| Williams et al;, (2015) | 2 | 2 | 2 | 2 | n/a | n/a | n/a | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 19/22 = 0.86 |
| 2 = yes; 1 = partial; n/a = not applicable  |
| **Table 4** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Quality assessment with the QualSyst tool (Kmet et al, 2004) |

*Quantitative Assessment of Psychological Well-being*

Table 6 provides details of the aims, measures and outcomes of all selected studies. Across the nine quantitative studies included, 12 different assessment tools were detailed measuring items related to psychological well-being or ill-being. The Beck Depression Inventory was used three times (Hilyer et al., 1982; Harner et al., 2010 & Libbus et al., 2016) Two other measures were used twice, and the Self-esteem Inventory, also used by Hilyer et al. (Form A) and Munson (Form B), and the Perceived Stress Scale (Bilderbeck et al., 2013 & Harner et al., 2010). Examples of other measures used were the Profile of Mood States (POMS), the State-Trait Anxiety Inventory (both by Hilyer et al., 1982), the Symptom-90 Checklist Revised (Battaglia, 2014), a single item measure of self-esteem, with a reported concurrent validity of 0.93 with the Rosenberg Self-Esteem Scale, (Williams et al., 2015) and two additional measures were non-validated questions incorporated into custom questionnaires measuring several different factors (Martin et al., 2013; Nelson et al., 2006). Of note is the fact that no studies incorporated questionnaires directly measuring psychological well-being, for example, The Warwick Edinburgh Mental Well-being Scale (Tennant et al, 2007).

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| --- | --- | --- | --- |
| Author and Year of Publication | Research Design | Sample size; gender; age; prison type | Intervention |
| Battaglia et al., (2014)Italy | RCT | 64; M; 18-50L/M security: male | 9 months, supervised training protocols, 1hr, 2xWeek; 3 Groups: 1) Cardiovascular plus resistance training (CRT); 2) High intensity training (HIST); 3) Usual care |
| Bilderbeck et al., (2013)US | RCT | 93 M; 7 F;$\overbar{x}$ age = 38.47 Prisons, L/M security; male/ female/ YOI | 2 Groups: 1) Yoga classes (hatha yoga postures, stretches, breathing exercises), 2 hrs 1xWeek for 10 weeks; 2) Care as usual. |
| Harner et al., 2010 | Within group repeated measure design | 21\*; F; 36 +M security; male | 2 hrs, 2xWeek for 12 weeks.Iyengar yoga (focus on correct postural alignment, use of blocks and props) |
| Hilyer et al., (1982)US | RCT | 43 M; 15 – 18YOI: male | 90 mins, 3xWeek for 20 weeks.2 Groups: 1) Brief meetings with goal setting, flexibility training, weight training, run with gradual progress: 2) Care as usual |
| Libbus et al., (2016)US | Pre-post-intervention design with a non-randomised control group | 45; M; 18 – 502 county jails; no security level information. | 12 weeks, 1 hr, 3xWeek 2 Groups: 1) Aerobic Exercise; 2) Usual Care |
| Martin et al., (2013)Canada | Cross-sectional (other items were repeated-measures)  | 16; F; 18+M security; female | 6 weeks, minimum commitment 3xWeek.2 Groups: 1) exercise (circuit stations and aerobic routine) and nutrition programme; 2) Usual care |
| Munson (1988)US | RCT | 39; M;$\overbar{x}$ age = 17.2H security; male | 10 weeks, 1xWeekThree groups1) leisure education; 2) physical activity; 3) informal discussion |
| Nelson et al. (2006)US | Cross-sectional | 105; M: not reportedH security; male | Physical activity (approx. 30mins day; 4xWeek) aim at improving upper, lower and midsections of body (e.g. push-ups, sit-ups, lunges), delivered alongside cognitive behavioural techniques, Gestalt psychotherapy, transactional analysis and moral reconation therapy (MRT). |
| Williams et al., (2016)UK | Pre-post-intervention design with a non-RC group | 24; M: 18-21YOI | A 10 week rugby academy, including 72 hours of rugby, alongside a range of activities leading to accredited awards and exercises in functional skills in literacy and numeracy. |
| Amtmann and Kukay (2016)US | Mixed-methods(psychological well-being measure = interviews) | 2; M; 16 & 19YOI | An 8 week fitness coach led programme; one facilitated hour of motivation and exercise per week. |
| Gallant, Sherry & Nicholson (2014)Australia*STUDY 1* | Interviews, cross sectional | 12; M; 20 – 60H security; male | Weekly soccer program, established in partnership with not-for-profit organisation. Involved follow inmates and visiting teams. Additional information on intensity and duration of program not detailed.  |
| Gallant et al, (2014)*STUDY 2* | Interviews, , cross sectional | 12; F; not reportedL/M/H security; female | Softball program, delivered twice each week. Overall duration of program and session length not detailed |
| Gallant et al, (2014)*STUDY 3* | Interviews, , cross sectional | 3 M; 4 F; not reportedL/M/H security; mixed M/F | Physical exercise program, including soccer, football, softball and a boot-camp. Run on rotating weekly basis with different cohorts. Overall duration of program and session length not detailed |
| Gallant et al, (2014)*STUDY 4* | Interviews, , cross sectional | 6; M; not reportedL/M/H security; mixed M/F | Australian rules football competition. Local teams brought into prisons to play bi-weekly. Inmates participate in finals at off-site location. Overall duration of program and session length not detailed |
| Leberman (2006) | Post intervention and 3-month follow-up interviews | F; 27; 18-48No prison security information | A 20 day residential of outdoor adventure activities, incl. ropes courses, sailing and hiking. Course also included social, creative and reflective activities.  |
| Meek and Lewis (2014a) | Pre-post interviews, focus groups, diaries (written and video), participatory research event; participants followed over two years | 79; M; 18-21Plus 11 prison and delivery staff; gender/ age not reportedYOI | A 12 week Football or 15 week Rugby Academies Intensive coaching, fitness training, matches, group activities, guest speakers and peer review exercises. |
| Parker, Meek and Lewis (2014a) | Interviews, observation and documentary analysis. | 12; M; 15-17YOI | 12 week sport based academies: 6 x 1.5hrs weekly on the theoretical aspects of sport, 6 x 1.5hrs practical sessions. Plus, wrap around multi-agency support package, including sports coaching, qualifications, life-skills mentoring, community placements and pre-release settlement support. |

*\*Sample size reported as 21, however only 6 completed the intervention.*

*Table 5: Characteristics of the selected intervention studies. Gender: (M=Male; F=Female) Prison Security Level: (L=Low; M=Medium; H=High).*

**Effect of Interventions**

Table six provides detail for the effect of all studies reviewed. Five of the seven quantitative studies which incorporated pre and post measures related to either psychological well-being (e.g. self-esteem) or ill-being (e.g. depression, anxiety) reported significant improvements. Hilyer et al. (1982) reported significantly more favourable results for the intervention group versus control in all but three of fifteen variables, with large effect sizes for increase in Self-Esteem Inventory (*p < 0.001, d = 1.23*), and decreases in trait anxiety (*p < 0.001, d = -1.71*) and BDI (*p < 0.001, d = -1.83*). Battaglia et al., (2014) reported significant decreases in depression for both intervention groups (Cardio and Resistance Training & High Intensity Strength Training) in comparison with the control group, (*p < 0.05, d = -0,75*), and (*p < 0.01, d = -0.82*) respectively. Bilderbeck et al., (2013) also reported significantly favourable results for the yoga intervention group versus control, with significant increases on positive affect, and decreases in perceived stress and psychological distress (*p < 0.05*).

Two studies reported no significant positive or negative changes across time-points (Munson, 1988 & Williams et al., 2016). In the remaining two studies, which employed a post-intervention survey to measure items related to psychological ill-being (Martin et al., 2013 [stress levels] and Nelson et al., 2006 [stress, depression and anxiety]) a strong majority of participants reported a positive impact for intervention (94% of participants in the former and 75% in the latter).

Findings from the qualitative studies highlighted a positive impact on psychological well-being and ill-being for all programmes, with improvements in self-concept, self-confidence, self-esteem, positive thinking, stress, and anxiety. Meek and Lewis, (2014a) and Parker, Meek and Lewis, (2014a), which both focused on sport-based interventions with significant wrap around services, reported positive impacts on self-esteem, self-efficacy and increased pro-social behaviours and attitudes. Amtmann & Kukay (2016) reported perceived benefits of increased confidence and reduced stress levels, with Leberman (2007), in her evaluation of female offenders and outward bound activities, also reporting increased confidence and self-esteem.

Only Leberman (2007), reported the presence of adverse effects. These were identified by participants in the three-month follow-up study, which is also noteworthy, as only Leberman, (2007) and Meek and Lewis, (2014a), included post-intervention follow-up. Six from 14 of those interviewed at follow-up by Leberman, reported a perceived negative effect on mood due to a lack of purposeful activities to engage with on return to the prison environment following intervention. There was a feeling that the intervention had therefore been a waste of time as nothing they learnt had been put to good use, and that they had been “let down”. (Leberman, 2007, p 121).

In light of the majority positive findings reported, it is worth noting that none of the qualitatative studies explicitly identified impact on psychological well-being or mental health as an aim at the outset of their programmes. This is in contrast to seven out of the nine quantitative studies, which explicitly stated impact on psychological well-being, or related concepts, for example, self-esteem, as a specific aim. This omission within the qualitative studies is important as it potentially impacts on the ability to understand and replicate the factors affecting changes in psychological well-being. This is considered further within the discussion.

*Inclusion of Theory*

Although MRC guidance advises the involvement of behaviour change theory at all stages of the design and evaluation of health interventions, no behaviour change theory was presented in association with the sport or physical activity element within the studies reviewed. Two of the included studies (Leberman, 2007; Harner et al., 2010) did provide an explicit reference to an underpinning theory of change or philosophy for the impact of the sport-based intervention on psychological well-being. Leberman identified Kurt Hahn’s philosophy, centring on personal and social development through challenging adventure experiences, with real consequences. Harner et al., designed their intervention around a gender-responsive programming framework developed by Bloom, Owen and Covington (2003), which identifies six guiding design principles (Gender, Environment, Relationships, Services, Socioeconomic status and Community). Nelson et al., (2006), cited the inclusion of psychotherapy techniques, Kohlberg’s moral reconation therapy (MRT). Other included studies highlighted within their literature reviews the potential biological links between exercise and improvement in, for example, depression, but failed to provide an explicit reasoning for their own intervention design. This is not to suggest all programmes referenced within the studies exist in isolation from suitable theories or behavioural frameworks, which might affect the desired outcomes. Rather, the studies examined, purposefully or otherwise, have not included descriptions of them.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Author, Year of Publication and Country | Theory/ Framework | Aims | Measure(s) | Result(s) |
| Battaglia et al., (2014)Italy | None provided | Improving psychological well-being and evaluate any psychological effects of the two training protocols. | Symptom Checklist-90 Revised | Effects on Group * CRT Group: Significant decrease in Interpersonal Sensitivity (I-S) and Global Severity Index (GSI) (*p* < 0.01);
* HIST Group: Significant decrease in anxiety (ANX) and Phobic Anxiety (PHOB), (*p* < 0.05).
* Usual Care group, significant increase in DEP (*p* < 0.05)

Effects on Intervention Group v Control* Significant decrease in depression (DEP) scores for both CRT (*p* < 0.05, *d* = -0.75) and HIST (*p* < 0.01, *d* = -0.82), versus usual care.
 |
| Bilderbeck et al., (2013)US | None provided; highlights the complexity of yoga and the challenge of attributing well-being to particular components.  | Hypothesised that the practice of yoga will be associated with improved mood and psychological well-being. Secondary aim to examine impact of yoga on impulsivity aspect of executive functioning.  | * Positive and Negative Affect Scale
* Perceived Stress Scale
* Brief Symptom Inventory
 | Effects on Group* Yoga Group: Significant increase in positive affect (*p* < 0.05), and significant decrease in perceived stress (*p* < 0.001) and psychological distress (*p* < 0.01).
* Usual Care: significant decrease in perceived stress (*p* < 0.05).

Effects on Intervention Group v Control* Significantly higher positive affect reported for Yoga group versus usual care (p < 0.05)
* Significant decrease in perceived stress (p < 0.05), and psychological distress (p < 0.05) versus usual care.
 |
| Harner et al., (2010)US) | Gender responsive framework adopted (Bloom et al, 2003).  | Primary aim to test feasibility of group format exercise intervention; Also, hypothesised that Iyengar yoga may increase psychological well-being, and observed effect on depression and anxiety symptoms and perceived stress.  | * Beck Depression Inventory-II
* Beck Anxiety Inventory
* Perceived Stress Scale
 | Intervention Group* Significant decrease of BDI score (p < 0.01),
* Anxiety scores decreased (p = .06)
* Stress scores initially dropped but returned to baseline by end of 12 weeks.
 |
| Hilyer et al., (1982)US | Group-counselling based on Carkhuff approach. | To investigate if physical fitness training delivered by skilled counsellors bring about positive physiological and psychological changes. | * Self-Esteem Inventory (Form A)
* POMS
* State-Trait Anxiety Inventory
* Beck Inventory of Depression
 | Effects on Intervention Group v Control* Significant increase in Self-Esteem Inventory, Coppersmith total (*p* < 0.01, *d* = 1.23)
* Significant decrease in both trait (*p* < 0.01, *d* = -1.71) and state anxiety (*p* < 0.01, *d* = -0.61))
* Significant decrease in Beck Inventory of Depression (*p* < 0.01, *d* = -1.83)
* Significant decrease in 4 out of 6 POMS affective states: depression (*p* < 0.01, *d* = -0.49); fatigue (*p* < 0.01, *d* = -1.39); confusion (*p* < 0.01, *d* = -1.41); and anger (*p* < 0.05, *d* = -1.39). No significant changes in tension and vigour.
 |
| Libbus et al., (2016)US | None provided | To document the efficacy of an organised aerobic program for decreasing depression in the population. | Beck Depression Inventory (BDI) | Effects on Group* Intervention group significant decrease in BDI mean scores (decrease of 18.76; (*p* = 0.0001)).

Effects on Intervention Group v Control* Intervention group significantly lower scores versus control (p=0.0001).
 |
| Martin et al., (2013)Canada | None provided | Offer regular nutrition and fitness program to women in prison; catalyse the adoption of LT values in personal health and fitness; to assess the beneficial health effects of programme | Self-reported change at end of programme on Energy Level, Sleep Quality and Stress  | Effects on Intervention Group* Energy: Worse/same 0; Somewhat improved 5; Really improved 11.
* Sleep Quality; Worse/same 3; Somewhat improved 8; Really improved 5.
* Stress level: Worse/same 1; Somewhat improved 6; Really improved 9.
 |
| Munson (1988)US | None provided | To investigate the effects of leisure counselling on self-esteem, leisure functioning, attitudes toward self, leisure and work, and leisure participation and satisfaction | Self-Esteem Inventory (Form B, 25 items) | NS results for any group |
| Nelson et al. (2006)US | Biological theories proposed for link between exercise and improved mood.  | Designed to elevate moral reasoning and mental cognition, thereby reducing anti-social behaviours. Develop new behavioural habits to assist with re-entry into society. | One question:*“Does the exercise help you in moments of depression, stress and anxiety?”* | Of 105 participants, 75% reported positive benefit. |
| Williams et al., (2016)UK | None provided | Develop positive attitudes toward self and others, support personal development, reduce psychological crimognenic factors, aid re-engagement with society and provide re-settlement opportunities. | Self-esteem (1 Question) "I see myself as someone who has high self-esteem." | NS |
| Amtmann and Kukay (2016)US | None provided | To improve fitness assessment performance from one assessment to the next. | n/a (Qualitative) | Improvements in self-concept and enhanced sense of well-being. |
| Gallant, Sherry & Nicholson (2014)Australia*STUDY 1* | None provided.  | To increase access to sport and recreation opportunities and facilitate stronger transition process to the community on release. | n/a (Qualitative) | Positive mental (increased happiness, reduced stress, anxiety, tension) and physical health outcomes; diversionary service; privilege, which also modified behaviour in prison; learn new skills; model appropriate social behaviours (fostered sense of pride/ achievement). |
| Gallant et al, (2014)*STUDY 2* | None provided. | To engage inmates in sport as a method of rehabilitating prisoners during confinement.  | n/a (Qualitative) | Positive mental (reduced stress and anxiety) and physical health outcomes; improved social interactions; diversion from daily monotony; constructive outlet to vent frustration and anger; participation a privilege - incentive for improved behaviour. |
| Gallant et al, (2014)*STUDY 3* | None provided. | To provide meaningful physical activity to occupy inmates’ time and to develop links to similar established programs in the community (to be accessed upon release). | n/a (Qualitative) | Pass time and alleviate boredom and resultant impact (arguments); positive impact on physical and mental health (stress and anxiety); personal challenge; something to connect with outside of prison away from 'old crew'. |
| Gallant et al, (2014)*STUDY 4* | None provided.  | To provide meaningful physical activity to occupy inmates’ time and develop stronger links with community, | n/a (Qualitative) | “A few” reported increase in physical health and one reported positive impact on mental health (reduced stress and anxiety related to family issues). Effective diversion; model behaviour on release; create harmony amongst various indigenous inmate groups.  |
| Leberman (2006) | Kurt Hahn philosophy centring on personal and social development, and development of personal potential and self-esteem through challenging adventure experiences with real consequences. | Targeted at inmates due for release within the year and provide opportunities for inmates to work on personal development. Exploring who they are, where they have come from and what they want to do with their lives.  | n/a (Qualitative) | Development of personal skills, e.g. increased self-confidence and self-esteem. Development of interpersonal skills, e.g., teamwork and communication. Also, participants reported the programme provided a good environment to apply learning from different courses. |
| Meek and Lewis (2014a) | Theory / Framework of Programme not explicit in paper. Emerging themes in analysis mapped onto 7 key resettlement pathways | To use sport as a way of engaging young men in identifying and meeting their resettlement needs in transition from custody to community. | n/a (Qualitative) | Beneficial impact on prion life and culture; preparation for release; resettlement support; attitudes, thinking and behaviour; and in promoting desistance from crime; positive impact on health and diet. |
| Parker, Meek and Lewis (2014a) | None provided | To use sport to facilitate personal development and social inclusion/ cohesion.  | n/a (Qualitative) | Improved pro-social identity, diversionary activity, increased sense of achievement, increased self-efficacy and confidence |
| *Table 6: Results of included intervention studies examining impact on psychological well-being. (NS = not significant)* |

**Discussion**

 The purpose of this review was to conduct a textual narrative synthesis of the evidence examining (i) the impact of sport-based interventions on the psychological well-being of people in prison; (ii) the extent to which sport is used alongside additional activities within the interventions; and (iii) determine whether studies incorporated health behaviour change theory in the design of the interventions.

Before assessing the collective evidence for impact on psychological well-being, of note was the diverse definitions and measurements the studies associated with the concept of psychological well-being. Huta and Ryan, (2010), comment that psychological well-being is a complex and multi-dimensional construct, which was reflected in the fact that measures of ill-being were selected much more frequently than measures of well-being, This approach perhaps represents an historical trend, reflected in the broader observation by Seligman (1998) during his APA presidential address, that psychology had focused almost exclusively on pathology since World War II and would benefit from an increased focus on positive phenomena. Pollard and Lee (2003) also ward against assessing only a single domain of well-being, which is often primarily a deficit indicator. Only three studies, (Bilderbeck et al., 2013; Harner et al, 2010 & Hilyer et al., 1982) used multiple measures, although almost exclusively deficit measures. Future research within the prison population, could therefore make efforts to be more balanced and clear when choosing measurement scales, focusing on both increases in well-being and decreases in ill-being, and being specific regarding their definition of psychological well-being.

Although seven from nine of the quantitative studies reported a positive impact on psychological well-being (or ill-being), results from the qualitative studies were less equivocal with all five reporting positive impact on psychological well-being. Qualitative studies also reported a mix of perceived impacts on psychological well-being and ill-being. In contrast to the quantitative studies, impact on psychological well-being, however described, was never explicitly identified at the outset as an aim in any of the qualitative studies, which renders the pathway from intervention design to well-being outcome more difficult to clearly identify and duplicate.

The majority of studies included within the review, eight from fourteen, incorporated sport as part of a multi-component intervention, ranging from additional goal-setting and motivation sessions (Amtmann & Kukay, 2016), to multiple wrap-around supports (Meek & Lewis, 2014a). Two key questions arise from this: i) does one approach increase the potential for impact on psychological well-being? and ii) within the multi-component approaches, what portion of any subsequent impact can be attributed to the use of sport? The latter mirrors previous concerns regarding the attribution of causality in sport for development programmes targeting at-risk populations (Coalter, 2013, Bateson, 2012; Lubans et al., 2012). Considering the first question, results from the nine quantitative studies provide no clear answer regarding the ability of one intervention design to produce the greater impact. Five of these nine studies were sport only interventions, with four reporting significant positive impact on psychological well-being. Of the remaining four ‘sport-plus’ interventions, three reported a positive impact on psychological well-being, although two of these were based on a single non-validated item within a post-intervention survey. The multi-component “Get Onside” rugby intervention reported no significant positive or negative impact on self-esteem. Within the qualitative studies, four from five could be clearly described as “sport-plus”, and all five reported a positive impact, with one also highlighting adverse effects. Future research, with a clearer focus on psychological well-being, could begin with an attempt to differentiate the impact on the hedonic and eudaimonic constructs, of these varying approaches. It would appeal intuitively that sport-plus interventions would have a greater eudaimomic effect with their multitude of wrap-around and transitional services.

Attempting to disentangle the various components of sport-plus interventions and attribute impact on psychological well-being to one element would be problematic and speculative within the current review. A similar problem was also observed by Kay (2009) concerning sport for development programmes, who highlighted the difficulty in deconstructing and attributing causality. Munson (1988, pg. 309) did purposefully provide for a sport only group with “no attempt to dwell on thoughts, feeling or behaviours”, and a leisure counselling group, without any physical activity, however neither group showed significant positive changes on psychological well-being.

MRC (Moore et al., 2005) advise that any attempts to understand why sport-based interventions might have a positive impact on psychological well-being, will benefit from the inclusion of theory at the design and evaluation stage. This enables testing against said theory, and replication with refinement for future impact. Conversely, the reported involvement of theory in the design and evaluation of the interventions within the studies reviewed was minimal, with Harner et al. (2009) and Leberman (2007), representing an exception to this. This finding resonates with the views of Hartmann, (2001), and Baldwin, (2000), that the absence of clear and coherent theoretical foundations were substantive issues for sports development programmes aimed toward at-risk youth. In the absence of any of the qualitative studies explicitly stating impact on psychological well-being as an aim, the lack of framework or theory detailing how that might be achieved is no surprise, and perhaps an unfair criticism. However, even if considering the broader aims of these programmes, no change theories were presented. Also, the fact that positive impact on psychological well-being was reported as an outcome, despite not being an explicit aim, highlights the benefit a guiding framework or change theory might afford in isolating the pertinent mediators and moderators of the positive impacts. In concluding their own study, Meek and Lewis (2014a), reflect the greater need identified across all the studies examined here, by highlighting the need for further research to establish the complexities of how these sports based programmes are effective. That is, what behaviour change theories might assist with our understanding of the specific role sport has to play in sport-based interventions, particularly multi-component interventions, within prison populations. Potential themes emerging from the qualitative studies would point to the importance of providing opportunities for teamwork, personal and shared achievements, supportive and encouraging environments and positive self-presentation as mediators of impact (Leberman, 2007; Meek & Lewis, 2014 & Parker, Meek & Lewis, 2014a)

Mindful of previous critiques concerning non-prison based sport for development programmes, it is not surprising that within the complex confines of prison research, similar issues were identified. Lack of baseline data and short-termism have been identified as limitations (Chamberlain, 2013; Collins et al., 1999), and the same was noted with the studies examined in the current review. Only eight collected pre and post intervention data and only two included a medium to long-term follow-up, as a result of which Leberman, (2007), identified adverse impacts. Results therefore highlight a need for longitudinal assessment for impact on psychological well-being. Although longer-term studies would be preferable to assess impact, mindful of the difficulties of prison-based research, even the inclusion of a three-month follow-up provides useful insight into the transferability of impact, positive and negative, as demonstrated by Leberman (2007). Future research should also address the gender imbalance present in the current review, with only 14% female representation. Although this reflects the lower proportion of females within the overall prison population, Meek and Lewis (2014b) highlight the increased risk of female prisoners to poor mental health and self-harm in comparison to both females in the community and their male counterparts in prison.

**Conclusion**

The current review examined the impact and content of sport-based interventions on the psychological well-being of people in prison, and the inclusion of health behaviour change theory in the design of the interventions. A positive trend was observed in the use of sport-based interventions to make a positive contribution to the psychological well-being of people in prison. However, the heterogeneity of interventions and outcomes, alongside the methodological weaknesses outlined, prevent any firm conclusions. It is recommended that future research uses a broad range of robust measures related to psychological well-being, and in doing so utilises pre-post designs and incorporates follow-up. Researchers and practitioners are also recommended to embed and test change theories within their interventions, which would lead to a better understanding of what works and why. This in turn can lead to practical guidelines regarding sport and exercise service provisions within prisons to explicitly target a positive impact on psychological well-being.

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