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## Review

# Systematic review into obesity and weight gain within male prisons

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### ABSTRACT

*Objectives:* To review current studies on obesity and weight within male prisoners. Including assessment of factors which influence obesity and weight change during imprisonment.

*Study design:* A systematic review.

*Methods:* The systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist. A literature search was conducted using defined exclusion and inclusion criteria for relevant studies published between 2000 and 2016.

*Results:* The findings show the prevalence rates of obesity for prisoners range from 8.1% to 55.6%, with prison population often having lower levels of obesity than the general population. The findings are inconclusive into those factors that influence weight change and obesity during imprisonment, though potential factors and their mechanisms are highlighted.

*Conclusion:* Current literature highlights the complex relationship between imprisonment and weight. A significant amount of evidence exists to suggest that obesity levels are similar or lower in prison population compared to the general population. Future research might explore more intensively the various factors influencing prisoners' weight change within prison, including food, diet, activity levels and other relevant factors in relation to weight change, using both quantitative and qualitative methods.

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## 1. Introduction

The World Health Organisation (WHO) defines obesity as abnormal or excessive fat accumulation that presents a risk to health [1]. The WHO estimates that in 2014 more than 1.9 billion adults were overweight with over 600 million of these being obese [1]. Obesity is associated with developing many severe chronic diseases including diabetes, coronary heart disease, hypertension, stroke and osteoarthritis [2,3]. As such obesity is associated with an increase in mortality [4,5], which can reduce an individual's life expectancy by seven years [6]. Obesity is associated with an increased prevalence in those who are socially and economically deprived [7].

Prisoners have greater physical and mental health needs than the general population [8] and comprise some of the most disadvantaged people in society with a significant proportion being illiterate, homeless and/or being unemployed before entering prison [9]. Prisoners' greater health needs may be explained as they are more likely to engage in behaviour which puts their health at risk [10,11]. Furthermore, imprisonment can adversely affect the physical and mental health of prisoners [12,13].

Prisoners' control over the two most important risk factors [1] which can lead to obesity, an individual's diet and physical activity, is varied. Prisoners are usually supplied with food by the prison but often have the option to purchase additional food from prison canteen, though this can vary in different countries [14]. Physical activity within prisons is dictated by the prison regime, which controls what activity a prisoner can participate in and for how long. The prison regime, and so the extent of potential physical activity, can vary in different prisons typically depending on the security status of a prison and individual prisoner. A further risk factor for weight gain within prisons is the high prescribing of psychotropic medication [15], which is associated with significant weight gain [16].

Two theories, the deprivation and importation theories, have been proposed to explain how imprisonment can lead to a change in a prisoner's behaviour that might influence their health. In the deprivation theory, the process of imprisonment deprives the individual of their freedom, possessions, autonomy and relationships [17] and causes the prisoner to go through a process where they adapt and assimilate the prison culture [18]. One of the most significant influences on health is through the prison code which has been explained as the unwritten rules of the prison community, which dictates the fundamentals of how prisoners behave and interact with each other [19]. This code identifies the need for a tough persona by the prisoner, where they have to show they can cope with prison life, avoid showing any weakness and be willing to fight [19,20]. This social status is associated with health and wellbeing, with prisoners wanting to increase their muscularity and therefore their weight [21,22]. The importation theory, on the other hand, assumes prisoners enter prison with behaviours and attitudes from their community, so health-related behaviour is influenced by an individual's social, mental and demographic characteristics [23]; as such individuals with poor regard to their health in the community may continue this behaviour while in prison.

Studies into prisoner behaviour during imprisonment have shown different cultures and behaviours exist in male and female prisons [24–26]. Differences between male and female prisoners have been shown to extend to prisoners' health-related behaviours [27,28]. For example, in relation to weight change and obesity, female prisoners have a higher prevalence of eating disorders, while also continuing behaviour from the community which can affect their weight such as laxative abuse and vomiting [29].

These differences were shown by a systematic review [30] aimed at investigating non-communicable diseases within prison, which found incarcerated men were less likely to be obese than those in the general population in all countries except the USA, while imprisoned females were more likely to be obese than non-imprisoned females in Australia and USA. These findings suggest the influence of imprisonment on weight and weight-related behaviours may be gender specific. Since the publication of this review, a number of other studies focusing on obesity and weight change within male prisons have been published. The systematic review described here will, therefore, incorporate the most recent studies and assess how imprisonment affects obesity and weight change among the worldwide adult male prison population. In particular, the review will draw on recent literature in an attempt to identify potential risk factors for obesity and weight gain within the prison environment.

## 2. Methods

### 2.1. Literature search

This review was carried out in accordance with PRISMA criteria [31]. A literature search was developed and carried out by one researcher, searching Web of Science, Pubmed and Embase for relevant studies between the years 2000 and 2016. This time period was selected as this would provide an accurate description of obesity and weight change within prisons relevant to the current prison population. This is due to the increased focus in recent times on ensuring prisoners receive equivalent care to those in the general population [12,32]. Keywords used for the search were BMI, weight, prison\*, offender, jail, correctional, obesity and incarceration. These were combined with Boolean operators to provide relevant results. The retrieved results were assessed for relevance by the study author (KC) in two phases. The first phase involved screening the title and abstracts for relevancy and excluding those that did not meet inclusion criteria. There was full inter-rater agreement on article screening. The second phase involved reading the full texts of selected studies, and those consistent with review criteria were included. All the reviewers (KC, DA and AD) agreed on the final articles to be included with any disagreements resolved by debate and consensus. Where more than one paper referred to the same study, the study presenting the results in more detail in relevance to obesity and weight gain within prison was selected. The references of the retrieved articles were reviewed to identify any relevant articles that may have been missed from initial electronic search.

### 2.2. Inclusion and exclusion criteria

Only those peer-reviewed articles published in the English language, between the years 2000 and 2016, were included. Studies were only included if they assessed adult males (16 years and above), those that did not differentiate between male and female participants were excluded. Studies that collected data only at the time of admission into prison were excluded as these did not provide any information on how imprisonment affected an individual's weight. The primary study outcome was obesity status, weight and weight change during imprisonment.

### 2.3. Data collection and analysis

The literature review initially identified 2404 potentially relevant articles, after removal of duplication 1206 articles remained. These were assessed against inclusion and exclusion criteria, which resulted in 36 articles being full text analysed. After further

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