



Systematic Review

Insights into Factors Impacting on Non-Communicable Diseases in the Prisons of Pakistan- A Scoping Review

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ABSTRACT

Non-Communicable Diseases (NCDs) continue to increase globally, including where recorded among prison populations. Pakistan, like many low- and middle-income countries is facing significant health system challenges. Little is known about NCDs in its prison population. A scoping review mapped and described what is known about factors impacting on NCDs in the prison population of Pakistan. **Objective:** To describe factors impacting Non-Communicable Diseases (NCDs) in the prison population of Pakistan and to inform policy and improve prison conditions, nutrition, and healthcare for effective NCD management and care. **Methods:** A comprehensive search was conducted on Web of Science, PubMed and EMBASE, restricted to publications from 2000 to 2023. Eight studies fulfilled the eligibility criteria. Records were independently screened, charted and content analysis was undertaken. **Results:** Six themes were generated; Nutritional and dietary provisions, Physical activity and body mass index; Substance use and dependence; Hypertension and diabetes; Access to medical care and Mental health. Prior and detention related risk and lifestyle factors underpin the chronic ill health of people living in prison. These include prior history of smoking and alcohol use, and situational aspects of prison conditions causing environmental stress, malnutrition and sedentarism. Where reported, hypertension, obesity and depression were high among people in prison. **Conclusions:** Prisons are fundamental to the domestic NCD response. Prisons in Pakistan require dedicated resourcing to improve basic conditions, nutrition and healthcare allocations for all people living in prisons. The review highlights the need for prison-based NCD screening, diagnosis, treatment and care in Pakistan, in close alliance with specialist care in hospitals. Further health research is warranted to examine the effectiveness of NCD policies and practices in place in contemporary prison systems in Pakistan.

INTRODUCTION

Non-Communicable Diseases (NCDs) are increasing globally. The main risk factors for NCDs are smoking, alcohol consumption, unhealthy diet and lack of physical activity. According to the most recent data provided by the World Health Organisation (WHO) NCDs are responsible for the deaths of 41 million individuals each year, which is 71% of the deaths occurring around the world [1]. Despite the fact that NCD risks and progression of disease has an impact on individuals of all nationalities, ages and classes, some striking inequalities exist in the burden of disease, particularly in low resource countries and in marginalised groups such as people living in prisons [1]. This is due to a

variety of lifestyle and environmental factors such as alcohol and tobacco use, sedentary behaviours, consumption of salt and an unhealthy diet, and lack of access to healthcare [2]. NCDs in Pakistan are a rapidly increasing public health challenge with health systems largely unprepared for a robust response [3]. There is a dearth of available prevalence data and identification of relevant NCD risk factors in Pakistan [4]. A recent communication by the WHO in 2018 determining various countries profiles for NCDs showed that NCDs are accountable for 58% of all deaths in Pakistan [5]. Nutritional conditions and cardiovascular diseases were

cited to be responsible for 35% and 29% of the deaths respectively, followed by cancers (8%), respiratory disorders (5%) and diabetes (3%) [5]. There are over 11.5 million people deprived of their liberty on any given day, a more than 25% increase in prison population since the year 2000 [6, 7]. The WHO has identified that NCDs are one of the biggest threats faced by people living in prisons [8]. Prisons are mandated to uphold the right to health of people deprived of their liberty including access to preventative and curative health care, and are accountable for creating a safe and healthy environment for people deprived of their liberty [9]. The total prison population of Pakistan accounts for 87,712 individuals, including pre-trial detainees (70%), female prisoners (1.6%), minors (1.6%) and foreign prisoners (1.2%) [10]. According to the Federal Ombudsman of Pakistan, the national overcrowding rate in the prison system of 116 prisons is 136.8%, with significantly higher percentages depending on the prison [11]. This leads to insufficient living space, poor or non-existent ventilation, limited sanitation and hygiene facilities, inadequate nutrition, and interrupted medical supplies impacting on the health and lives of people living in prison. Medical facilities tend to be extremely poor in the Pakistan prisons, particularly for women and which contribute to increased mortality rates in the general prison population [12, 13]. Research by Qadir TF et al., in 2017 showed that mental health care services for prisoners, including a follow-up or proper rehabilitation systems are completely lacking in Pakistan [14]. Very little is known about NCDs in the Pakistan prison population. Hence, a scoping review was conducted which maps and describes what is known about factors impacting on NCDs in the prisons of Pakistan.

METHODS

The methodological framework developed by Arksey and O'Malley served as a guide for the scoping review and covered the following key steps: defining the research question; looking for related studies; choosing studies; charting the data; and compiling, summarising, and reporting the findings [15, 16]. The underpinning research question was; what do we know about factors impacting on NCDs in the prisons of Pakistan? The protocol for this scoping review was developed using the PRISMA guidelines for scoping reviews [17]. A comprehensive search was conducted in 2023 on various electronic databases such as Web of Science, PubMed, EMBASE and Google Scholar with no date restriction as shown in table 1.

Table 1: Search Terms

Initial Terms	Related Terms
Prison	Inmates, Jail, Gaol, Incarcerate
Obesity	Obese, Overweight, Body Mass Index, Nutrition, Diet, Nutrition Assessment, Nutrition Surveys, Dietary Behaviour, Fruit Intake

Non Communicable Disease	Cardio-Vascular Disease, Diabetes, Obesity, Smoking Status, Alcohol Consumption, Hypertension, Dietary Salt, Cancer
Physical Activity	Exercise, Physical Inactivity, Sports

Results from the electronic search were downloaded into EndNote software and duplicates were deleted, where possible. All title and abstracts were screened thoroughly to identify records meeting the selection criteria. The exercise was supported by hand searching in the reference list of included records. Eligibility criteria were applied to identify records for inclusion, using the PCC framework as shown in table 2.

Table 2: Eligibility Criteria

PCC Element	Include	Exclude
Prison	Setting: Studies Based on a Prison Setting	Studies Referring to other Population Groups
	Population of Interest: People Living in Prison of All Ages, Any Gender And From Any Majority or Minority Group	
Concept	Outcome: NCD Measured (Cardio-Vascular Disease, Diabetes, Obesity, Smoking Status, Alcohol Consumption, Hypertension, Dietary Salt, Cancer)	Studies That Did Not Report Relevant NCD/ Health Experiences Relating To The Specified Prison Population
Context	Geographical Coverage: Drawing on Primary Data from Studies Focusing on Pakistan	Studies that did not Focus on Pakistan
	Language: Studies Published in English Language	Languages other than English
	Period of Interest: Studies Published from 2000-2023	Published Outside of 2000-2023
Research Type	Type of Studies: All Empirical Peer Reviewed Studies with no Restriction on Methodology (quantitative, Qualitative, Clinical Case or Mixed Method).	Commentaries, Letters to the Editor, Reviews.

Records were independently screened by author one with support from the authorship team. Eight records fulfilled the eligibility criteria and were subsequently charted (author; year of publication; location and setting; study design; sample characteristics; key outcomes) [16]. Data were then analysed using a content analysis approach [18]. All the studies were read thoroughly to familiarise with extant information and supported by a coding exercise of text using a process of selective reduction by generating manageable content categories and subsequent generation of code categories. Figure 1 displayed the PRISMA Flowchart.

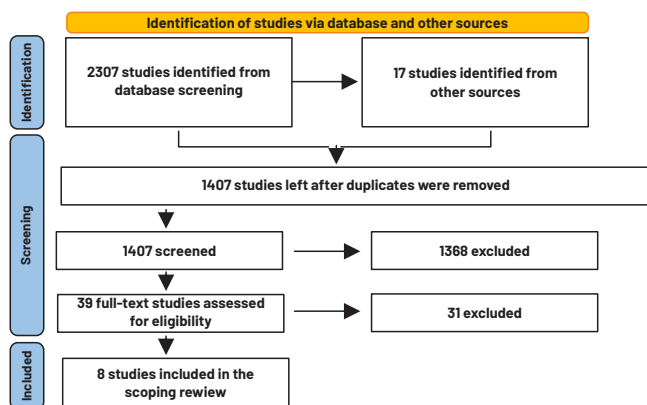


Figure 1: PRISMA Flowchart

RESULTS

All of the studies were published after the year 2005. Authors were commonly from Pakistan. All were cross-

sectional studies and investigated NCD risk factors in prison populations located in various urban areas and provinces of Pakistan. Six themes were generated in the content analysis; Nutritional and dietary provisions, Physical activity, and body mass index; Substance use and dependence; Hypertension and diabetes; Access to medical care and Mental health. Prior and detention related risk and lifestyle factors underpin the chronic ill health of people living in prison in Pakistan. These include prior history of smoking and alcohol use, and situational aspects of prison conditions causing environmental stress, malnutrition, and sedentarism. Where reported, hypertension, obesity and depression were high among people in prison. It was included that illustrative quotes from qualitative studies where appropriate as shown in table 3.

Table 3: Charted Records

Study Reference	Study Design	Location of Study	Focus	Type of Participants	Number of Participants	Conclusions (see in text for prevalence data)
(Mukhtar et al., 2013) [19]	Cross-Sectional	Prisons Located in Four Provinces; Sindh, Punjab, Baluchistan and Khyber Pakhtoon Khuwah	Dietary Behaviours of Female Prisoners	Female Prisoners Aged 16 Years and Over	269 Females	High prevalence of NCDs in people living in prison. High incidence of smoking in people living in prison compared to normal population. Poor dietary provisions: low fruit intake and high oil consumption
(Khattak et al., 2008) [20]	Cross-Sectional	Various Female Prisons	Dietary Scales of Female Prisoners and Children	Female Prisoners and Children	Not Mentioned	Insufficient nutritional adequacy in people living in prison
(Qadir et al., 2014). [21]	Cross-Sectional	Karachi Prison	Health and Nutritional Status of Prisoners	Male Prisoners Aged 18-65 Years	433 Males	Inadequate and nutritionally imbalanced diets resulting in the people of prison developing nutritional deficiencies. People living in prison malnourished and underweight. Common use of substances by people living in prison
(Manzoor et al., 2022) [22]	Analytical Cross-Sectional	Kot Lakhpat Prison in Punjab	Gender Differences in Health Status of Prisoners	Male and female Prisoners	320 Prisoners	High frequencies of hypertension. High rates of depression and anxiety
(Hafizullah et al., 2014) [23]	Cross-Sectional	Central Prison in Peshawar	Peshawar Heart Study (PHS) to Identify Risk Factors for Cardio-Vascular Disease	Male and female Prisoners	166 Prisoners	Lack of physical activity and sedentary lifestyles in people living in prison. Frequent smoking and high rates of obesity and hypertension
(Jat et al., 2020) [24]	Descriptive Cross-Sectional	Malir and Central Jails in Karachi	Substance and Tobacco use by Prisoners	Male Prisoners Aged 18-65 Years	600 Males	High prevalence of substance abuse in people living in prison
(Shahid et al., 2014) [25]	Cross-Sectional	District Jail in Lahore	Mental Health Status of Prisoners	Male Prisoners	100 Males	High rates of depression in people living in prison
(Khan et al., 2012) [26]	Cross-Sectional	Central Prison in Peshawar	Prevalence of Depression of Prisoners	Female Prisoners	64 Females	High frequencies of depression and high incidence of smoking observed in people living in prison

Nutritional and dietary provisions

Four studies revealed various nutritional deficits in provisions allocated by prison systems. A study analysing the dietary behaviours of women living in prison in four

different provinces in Pakistan showed that approximately 76% of the females living in prison had no access to any fruits in a week whilst 17% received 1-3 servings of fruit and 7% received 5 or more servings a week [19]. Of note was

that most women that had access to fruit in various prisons of Pakistan were foreign nationals from Nigeria, Guinea, India, Bangladesh and Thailand [19]. Women and children appeared to be particularly disadvantaged in another study on various prisons in Pakistan, by the general provision of food consisting of pulses and cereals, and the lack of allocation for children [20]. When fruits and vegetables were provided, these were seasonal and locally available [20]. A cross-sectional study performed in the Central jail of Peshawar found that out of the 166 interviewed people living in prison, it was recorded that: "About 83 (50%) were consuming largely vegetables in access of 1400 grams a day. No fruit intake was reported in their meals by 98 (59%) prisoners" [23]. In Karachi prison, nutritional deficiencies in males and lack of satisfaction with quality of food were also identified [21]. Detailed food patterns analysed by Fawad A *et al.*, revealed that 77.5 % of the prisoners in the Peshawar Central prison were consuming 50 to 500 grams of meat on a regular basis and with 12% consuming more than 500 grams of meat [23].

Physical activity and body mass index (BMI)

Several studies assessed physical activity, BMI and changes in weight of people living in prisons. Males living in Karachi prison reported rates of high sedentarism. Only 9% reported that they: "Exercised regularly and went to the gym located within the prison on a regular basis." 13.16% stated that they "exercised but not on a regular basis." [21]. Both genders living in the Central Prison of Peshawar also reported lack of physical activity with 71.7% indicating they had no regular exercise schedule [23]. A survey performed to investigate BMI amongst women living in selected prisons across the various provinces in Pakistan showed that the mean BMI of these women (n=269) was 26.63 (the normal BMI range is 19-24.9) [19]. This study also reported that 46.5% had a normal BMI, while 26.4% and 27.13% were reported to be overweight (BMI = 25-29.9) and obese (BMI > 30), respectively. A different study by Fawad A *et al.*, revealed similar findings among males showing an average BMI of 26.52, with 52% having a BMI higher than 25, 35% categorised as overweight and 23.5% were regarded as obese [23]. Qadir M *et al.*, reported on a 0.9% increase in malnourishment from the point of committal to the time of study [21]. Those classified as underweight also increased by 17.5% and 37% experienced weight loss [21].

Substance Use and Dependence

The majority of included studies described the levels of substance use behaviours (alcohol, tobacco and drugs) during their time in prison. A study of 320 people living in the Kot Lakhpat prison of Lahore showed that 5.3% of both genders reported experience of consuming alcohol [22]. Amongst a sample of 269 women living in prison in various provinces of Pakistan, 24.9% were categorized as current smokers and the youngest age at which they started smoking was found to be 10 years [19]. Individuals that had

reported to be smoking daily were further categorised as consuming 1-4 cigarettes daily (18%), 5-10 cigarettes daily (49%), 11-15 cigarettes daily (12%), 15-20 cigarettes daily (16%) and more than 20 cigarettes daily (5%). Most women were observed to smoke manufactured cigarettes (87.5%) whilst the rest smoked homemade cigarettes (such as biiri and huqqa) (12.5%) [19]. A study focusing on 433 males living in Karachi prison revealed high rates of smoking with 68.67% reported to be smokers [21]. High rates of smoking were documented in both genders of people living in the Central prison of Kot Lakhpat Lahore; where 320 people living in prison (29.7%) were smokers [22]. Similar results were shown in the Central Prison of Peshawar where 21.7% of the interviewed males were found to be active smokers [23]. In the same prison, 60.1% of women smoked cigarettes (n= 140) and 28.1% smoked 1-5 cigarettes every day, 17.2% smoked 6-10 cigarettes daily, 15.6% smoked 10-15 cigarettes daily [26]. Drug use and dependence was also investigated but was relatively low. A study of 433 males living in Karachi prison reported that a combination of street drugs (naswar, pan, gutka and manpuri) were used by 18.71% [21]. 5.77% were dependent on drugs like heroin, cannabis ("ganja"), hashish ("charas") and opium [21]. Women living in the Central Prison of Peshawar were interviewed and 93.7% had not used any drug [26]. In the Kot Lakhpat prison of Lahore, 9.1% of people living in prison reported drug dependence (72.4% were male) [22]. A study of 166 people living in Peshawar Central Prison revealed that 28.3% (47 prisoners) were addicted to snuff ("naswar"). In Malir Prison of Karachi 23.3% of people living in the prison reported substance use, with 90% reporting various of routes to administration; 8% reported injecting drug use [24]. Moreover, heroin (52%) was found to be the most popular among prisoners followed by crystal meth (17%), cannabis (15%), synthetic substances (8%), ice (5%), opioid (1%) and other substances (2%) [24].

Hypertension and Diabetes

In Karachi prison, Qadir M *et al.*, reported that 87 people were found to be hypertensive, with 29 suffering from diabetes and hypertension [21]. Males and females living in the Central Prison at Kot Lakhpat Lahore reported that hypertension was the most common NCD, with 26.25% identified as hypertensive [22]. A cross sectional study carried out in the prison of Peshawar involving 166 male and female prisoners showed that the mean diastolic BP was 87.7 mmHg and the mean systolic BP was 136.8 mmHg. Moreover, it was reported: "34.33% had systolic BP more than 140 mmHg while 61.44% had diastolic BP more than 90 mmHg" and met the criteria for hypertension [23]. The study additionally tested the blood cholesterol level and documented that 37.95% of the prison population had cholesterol levels higher than 180 mg/dl, with a mean cholesterol of 178.9 mg/dl. Mean blood sugar level was noted to be 135 mg/dl and 2% were found to have a blood

sugar level of more than 180 mg/dl [23].

Access to Medical Care

Only one study assessed levels of access to healthcare. Manzoor I *et al.*, described medical facility provisions in the Central Prison at Kot Lakhpat Lahore [22]. Despite having a doctor and a medical centre in the prison, only 77.2% of people living in the prison reported having access to medical facilities, 56.3% reported regular check-ups and 61.9% obtained essential medication.

Mental Health

Although mental illness was not specifically searched for as part of this review, a number of included studies also reported on prevalence of mental health conditions among people living in prisons in Pakistan. A study by Shahid I *et al.*, examined the prevalence of depression, stress and anxiety in the male prison population (n= 100) in the District Prison of Lahore [25]. Prevalence of depression was found to be 85%, according to the Beck Depression Inventory (BDI) scale. 35% suffered from severe depression, 20% were reported to be suffering from moderate depression and 30% experienced mild depression. Those with a history of childhood sexual abuse (BDI= 48) and substance abuse (BDI= 29) had a higher BDI score compared to those with no history of childhood sexual abuse (BDI= 20) and substance abuse (BDI= 14). Moreover, the co-morbid presence of NCDs, such as heart disease, diabetes and hypertension etc raised the BDI score level from 21 to 36 [25]. A study in the Central Prison of Kot Lakhpat Lahore also reported on the mental health profiles of the prison population, and stated that: "Out of 320 prisoners, 50% were depressed, 62.2% reported an anxiety state, and 43.1% had mood tantrums." [22]. Fawad A *et al.*, in their study referred specifically to women, and highlighted that those who were married, middle aged and from a low socioeconomic background were at a higher risk of being depressed compared to others [23].

DISCUSSION

The review maps and describes what is currently known about NCDs in the Pakistan prison population and health factors related to conditions of detention. Included records show that rates of NCDs are high in prison populations in Pakistan and that there is also a high prevalence of risk factors such as overweight and obesity, poor diet, hypertension and a history of substance use. Despite the vulnerabilities of the prison population in Pakistan, the only study examining access to medical services suggests that this is very poor, thus compounding the adverse impact of an overcrowded prison environment on people's health. People living in prison are disproportionately impacted by poverty, ill-health, prior traumas, stigma and discrimination [6-8]. It was speculated that vulnerability to risk of NCD development (for example diabetes, hypertension, mental health disorders) in prison

populations in Pakistan could potentially be due to prior exposure to poverty, marginalisation and stigmatisation and prior unhealthy lifestyle behaviours (for example substance use, obesity and overweight) of people in conflict with the law, and exacerbated by the conditions of detention (poor quality and inadequate nutrition, inability to exercise, high levels of stress). Dietary behaviours are one of the leading risk factors of NCDs [27]. Severe forms of malnutrition are linked with increased risk of developing cardiometabolic NCDs [28]. This is especially pertinent to the adequacy of food provisions in Pakistan prisons. In high income countries, provision of adequate and balanced nutrition for imprisoned people appears more common, than in low resource setting. For example, Edwards JS *et al.*, examined the diet of prisoners in England and revealed that prison populations were able to choose a nutritionally balanced diet, with an exception of some nutrients [29]. Additionally, the service of food in the prisons of Australia was evaluated by Williams P *et al.*, and it was found that people living in prison were receiving an acceptable variety of food that met most nutritional requirements [30]. Several studies in this review indicate the need for increased resourcing of prison health budgets in Pakistan to include greater variety of nutritious food, including a specific allocation for all women and children living in prison. Providing a nutritionally healthy and well-balanced diet is vital in prisons in Pakistan, and interventions to design menus according to the Recommended Daily Allowance (RDA) should be operationalized [21]. One study illustrates the complexities of maintaining a healthy weight in prison in Pakistan [23]. Being obese or overweight is associated as one of the main risk factors of increasing NCDs worldwide [31]. Obesity is also linked with progressively more sedentary lifestyle and increased consumption of oil in meals [32]. The review also points to concerning levels of substance use and dependence, but also unaddressed high rates of mental health symptoms and disorders in Pakistan's prisons. Depression in particular appears high in the prisons of Pakistan. Globally, cardio-vascular diseases have been reported to be one of the biggest cause for increasing mortality in prisons, above substance abuse and mental health [32-34]. There is a link between cigarette smoking and mental health issues such as depression, panic and anxiety disorder [35, 36]. Alcohol consumption has been associated with increased suicide inside prisons [37, 38]. In the United Kingdom, Steadman HJ *et al.*, reported on relatively low rates of depression among females living in prison, particularly when compared to levels documented among Pakistani female in prison [39]. A possible explanation for this is the potentially better prison environment in the United Kingdom and the accessibility to appropriate health care in prisons. Authors in a number of studies have suggested culturally

appropriate interventions such regular prayers and recitation of the Holy Qur'an to help with depression and stress [23]. Shahid I *et al.*, added that successful measures such as musical therapy proposed by Gold C *et al.*, could also be adopted in Pakistan to help reduce mental health issues and risks of suicide in prisons [25, 40]. Access to healthcare is a basic right for those living in prison. Prisons in low resource settings such as in Pakistan generally struggle with resourcing of the health response. The WHO advises screening individuals for the risk factors of NCDs, on their arrival to prison in order to detect any early signs of poor nutrition and well-being, harmful alcohol and substance use, smoking and sedentary behaviours [41]. It underscores that it is important that people in prison go through these detailed health and well-being assessments to recognise all of their physical and mental health needs so appropriate medication and facilities can be provided to this population [41, 42]. Given the lack of detection of NCDs in prison populations in Pakistan it is vital to have up to date facilities along with regular medical check-ups and screening of all persons to screen and detect any NCDs at an initial stage so that treatments can be started immediately. This is especially the case for women who do not experience equal access to healthcare in prison in Pakistan [43]. This scoping review was conducted systematically following published guidelines and is the first to focus on documenting extant literature and understanding of NCDs in the Pakistan prison system. Limitations center on the restriction on the English language, thereby potentially missing Urdu records. Scoping reviews also do not include a quality assessment of methodology of included records.

CONCLUSIONS

The scoping review highlights the need for national surveillance and monitoring of NCDs to include prison settings in Pakistan. Efforts to improve standards of care and environmental conditions of detention, including access to basic needs provisions (i.e. food, NCD drugs), opportunity to exercise and access recreational areas inside prisons, and access healthcare (including mental healthcare) in prison can assist in supporting people living in prison, and ultimately inhibit progression of concerning rates of NCD related chronic ill-health. Prisons in Pakistan require dedicated resourcing to improve basic conditions, nutrition and healthcare allocations for all people living in prisons. Further prison health research is warranted to examine the effectiveness of NCD policies and practices in place in prison systems to improve the health and well-being of the prison population of Pakistan. Decongestion measures could include greater application of non-custodial (or alternative) community sentencing measures.

Authors Contribution

Conceptualization: TS

Methodology: TS, MCVH, EP

Formal analysis: TS, MCVH, EP

Writing, review and editing: TS, MCVH, EP

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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