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Faculty of health sciences / Department of community medicine

# PHYSICAL ACTIVITY AND PRISONER'S HEALTH

*A qualitative systematic review*

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**FELIX MUKIZA**

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**Supervisor: BENTE MORSETH**

**Associate Professor, Department of Community Medicine,  
University of Tromsø**





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One hardly ever travels alone through this vastly changing academic landscape. I am happy to have come to know and appreciate not only the diversity of people's, but more importantly, the uniqueness of challenging patterns. It is with humility and gratitude that I wish to acknowledge the great minds that have transformed and shaped my ideas over time. I am extremely grateful to my supervisor Bente Morseth, for her constructive inputs and valuable reflections that led to the achievement of this thesis.

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## **Abstract**

A qualitative systematic review was performed in order to examine the importance and benefit of physical activity to prisoners' life course, while in incarceration. Physical activity can promote health and prevent diseases and is an important public health means used in the treatment and prevention of various diseases, as well as in the treatment of some mental illnesses such as depressive and anxiety disorders. The prison population has a higher risk of non-communicable diseases and a higher rate of psychological difficulties than the general population. Increase in the range of the physical activities in prison has been seen as one of the numerous measures that will have the greatest positive effect in reducing prisoners' high risks to many diseases as well as improving prisoner's health and well-being. I argue in this thesis, that prisoners while in incarceration should be offered sufficiently planned opportunities for regular physical activities. The main premise of this argument is that if prisoners are exposed to a range of planned bouts of good physical activity routines while they are in prison, their propensity to be exposed to such non-communicable diseases as a result of being in incarceration may be reduced, and they may possibly continue the routine when they get out of prison.

PubMed, PsychINFO, Cinhal and Cochrane Library databases were systematically searched to identify articles for this study. Quality appraisal was conducted to determine those articles which met inclusion criteria. In all fourteen studies from eight different countries were included in the final synthesis. A thematic framework was used to analyze and synthesize data from selected articles.

The review found the following: physical activity has social, physical and psychological benefits to prisoners. In addition, participating in various physical activities can contribute to decrease sedentary behavior and increase their capacities to cope with difficulties of life found in prison. Organized physical activities in prison offered enjoyment, fun, good feeling and was used as incentive for good behavior, rapid rehabilitation, and has been found to help prevent reoffending while facilitating social integration of prisoners when they leave prison. In light of the above, the study asserts that physical activities should be made an integral part of the organization and running of prisons and correction programs.

**Key words:** Physical activity, exercise, sport, prisons, prisoners, wellbeing, health promotion and health prevention.

## **Abbreviations**

US	United States
UNSMR	United Nations Standard Minimum Rules
ICCPR	International Covenant on Civil and Political Rights
CPT	European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment
WHO	World Health Organization
UNODC	United Nations Office on Drugs and Crime
ICPS	International Center for Prison Studies
HIPP	Health in Prison Project
GRR	Generalized Resistance Resources
SOC	Sense of Coherence
RCT	Randomized Control Studies

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# Chapter 1

## 1.1 Introduction

Physical activity has both health promoting and disease prevention benefits. An increase in physical activity is one of the measures that would have the greatest positive impact on the health of a population. If everyone follows the recommendation of the physically active on daily basis, the health of the population would improve considerably and health care cost on state health systems would drop dramatically (1).

Prisoners are vulnerable to a special set of health problems due to changes in their pattern of life in a new environment due to low or no activity. Imprisonment conditions linked to lock ups and isolation comes with limits on prisoners' movement, contribute to inactivity which results in changed patterns of life for prisoners.

When one becomes a prisoner, one's movement is adversely curtailed, leading to a sedentary lifestyle, a situation which predisposes prisoners to a wide range of diseases. This is due to the new limits of any kind of physical activity defined as 'any force exerted by skeletal muscle that results in energy expenditure above resting level' that may include a 'full range of human movement, from competitive sports and exercise to active hobbies, walking, cycling or the physical activities of daily living' (2).

In addition, this new state of affairs may not be favorable to healthy conditions. They may be predisposed to health problems, notably the infection and contraction of non-communicable

diseases such as obesity, diabetes type 2, cardio vascular problems and mental disorders like stress, depression or anxiety related to low activity levels.

Numerous studies (3, 4, 5) indicate that the prison population has a higher risk of contracting certain diseases and a higher rate of mental illness than the general population. Knowing the generally poor living conditions in and among prison inmates, it should come as no surprise that their health status, both physical and mental, is considerably worse than the population at large (6). Several critical factors influence the health of inmates. These include low rates of education completion and literacy; poor employment histories and financial instability; unstable accommodation; poor social networks and extensive criminal histories.

The health of prisoners is of significant public health concern because their health issues would eventually be passed on to the general community, both as disease and financial burden by increased utilization of health services once released from prison custody. My hypothesis is that increase in the range of the physical activities is one of the measures that will have the greatest positive effect at improving prisoner's health and well-being. Moreover, if prisoners are exposed to a range of planned bouts of good physical activities route while in prison, they may possibly continue the routine when they get out of prison. I argue in this thesis, that prisoners should be offered enough opportunities for physical activities which are planned and aimed at the improvement in their health while in incarceration, and these activities should be made an integral part of the organization and running of prisons and correction programme because of the numerous and obvious benefits that such a health programme holds for both prisoners, community and the state health finances. By physical activity, in this thesis, I mean 'planned bouts of physical activity usually pursued for personal health and fitness goals'. This kind of activity is 'volition,

planned, structured, repetitive and aimed at improvement or maintenance of any aspect of fitness or health' (7).

## **1.2 Purpose of Study and Research Question**

The main purpose of this study was to examine the importance and benefit of physical activity to prisoners' life course, while in incarceration. To achieve this aim, the study was guided by the following research question: What are the health benefits of physical activities to prisoners' health and how does physical activity affect life in prison?

## **1.3 Thesis Composition and Structure**

The thesis is structured in six chapters. Chapter One (1) covers the introduction, the purpose of the study and research question. Chapter Two (2) outlines mainly the theoretical framework. Chapter Three (3) deals with the research process. Here, the method, selection and procedure used for the study received a fuller description. Chapter Four (4) is devoted to analysis and discussion. Chapter Five (5) is about summary of findings and methodological considerations and finally chapter six (6) concludes and provides recommendations and paves way for further studies in this area.



## **Chapter 2**

### **2.1 Theoretical Framework**

In this chapter I discuss two main issues namely prison system and physical activity and how they impact or influence one another. I also consult the salutogenic theory as a guide to health promotion for prisoners and occupation justice as the concept of social justice, fairness and empowerment of people who may experience social exclusion like those in prison as an example.

### **2.2 What is a Prison and what is its purpose?**

A prison, also known as a penitentiary or correctional facility, is a building in which people are legally and physically confined or kept while awaiting trial or sentence. It serves as a punishment for crimes committed if they have been convicted (8). In post-conflict, prisons are sometimes also used to detain mentally ill or traumatized persons who cannot be placed elsewhere. In critical situations, illegal immigrants, refugees, political prisoners, previous war combatants, and sometimes even victims of crime are put in prisons while they await trial, documentation processing or even deportation (9). The objective of imprisonment is to get prisoners to respectfully perform the sentence passed by the court, and to facilitate their rehabilitation so as to prepare them for their return to society. The prison system offers states a number of inherent advantages. First is the possibility to drive an offender who poses a threat or have the opportunity to commit a crime through incapacitation; second is to provide harsh punishment so that neither an offender nor other citizens will find it appealing to commit crime in the future (deterrence); and third, is to rehabilitate offenders through various programmes in order to correct them from criminal behavior (10). Broadly, prison systems serve as rehabilitation spaces for offenders. It offers detained people the opportunity to reform and return to their society to lead their productive lives free of crime. The

rehabilitation process may be either long or short term, and could vary in terms of what pertains in each segment of the process from one prison system to another. It will also depend on the structure and system of the prison system in place in a country. During rehabilitation, prisoners are introduced to new things and knowledge, as well as new patterns of life as a way to bring their attention to some important issues for their lives. One of such new knowledge and ways of living is the need to take care of their health, through engaging in meaningful activities such as physical activity which may be beneficial for their health and survival during and after incarceration.

### **2.3 The General Structure of a Prison System**

Globally, prisons exist to enforce societal rules, maintain the safety of the general population, provide punitive sentences to offenders, and rehabilitate prisoners (11). While the goals of prison systems globally are relatively similar, the structures and organization of prisons systems around the world differ in many ways and respect (11). For example, the typical daily routine is structured by set of times for meals, showering, regular security check, staff shift out and sleep. Many prison systems around the world have different sorts of prisons to contain different groups. The differences in design, capacity, function, facilities, population, culture and location mean that no two prisons are alike. For the most serious criminals, there are maximum-security prisons, where the movement of every prisoner is closely monitored so that they have little chance of escape. For the majority of medium-security prisons, prisoners are expected to work, attend educational programmes, or participate in other activities that can prepare them for release. And, there are open prisons that have a very low level of security for those who present no threat to public safety (12). In open or low-security prisons, prisoners are allowed to work in the community or to go on home leave but must return at an appointed time. Bastoy prison in Norway is an example of such an open prison.

What happens in prisons is intrinsically linked to how the criminal justice system as a whole is managed, as well as the pressure from a political system and the public at large (13). Some countries have a number of prison systems in operation, independent from one another, with varying degrees from federal prisons, state prisons, and county to district prison systems. Others have a prison system that is organized nationally, with the central prison administration having full authority over regional and local administrative departments. In the United States (US), for example, criminals sentenced for federal offences are held in institutions of varying levels of security operated by the Federal Bureau of Prisons (12). But the majority of prisoners are held in state institutions, some of which house several thousand inmates in maximum-security facilities. However, prisoners who have been charged with minor offences, or who are serving short sentences, are most commonly held in municipal jails (12).

In Brazil, Germany and India, which practice a federal system of governance for instance, prisons are administered not by the national government but by individual states (13). In other countries, the prison department is under the authority of the police or military institutions and managers and staff who may have received no training regarding prison management. The choice of such administrative functions and management of prisons system by different countries reflect largely the different national approach to crime and crime management.

Some governments adopt a punitive approach to crime. This approach fails to address the underlying factors that lead to criminal behavior. Thus, the prison becomes the place where members of the most disadvantaged and vulnerable groups of society gather in large numbers, alongside a much smaller number of dangerous and violent offenders (13). In



general, the U.S. prison system, often successfully at preventing an offender from causing harm to the general population, is often times unsuccessful at rehabilitating inmates because of high rates of recidivism (14).

On the other hand, some governments adopt a line of correction which is focused on rehabilitation and social reintegration. Nordic prison systems are an example. They appear to do a more efficient job at reducing recidivism due to providing educational services, thereby making the rehabilitation of prisoners successful (11). While in many African countries, lack of financial resources, qualified personnel and political will, stops realization of educational services and rehabilitation (15).

As said before, one goal of a prison is to serve as a deterrent. This is done through punishment with the overall goal of reforming. Although punishment is an essential part of the justice system, on its own it does not stop people recidivism. This can range from the inability of the inmate to conform to society, to the inability of the correctional system to properly reform the inmate. It is the responsibility of a citizen to possess and portray the behavioral and ethical standards of society. If they cannot uphold such standards, they must be confined from society until they can accept the standards. One opinion given is that the criminal must pay his debt to society and therefore giving them free health service, education and training can be seen as unfair because it reduces the funds available for those who have not committed offences. But if the criminal spends his time in prison cell doing and learning nothing, is society best served? That is why in the best interest of the society, the prison system must provide the criminal better job assistance to cope more effectively with life inside and outside the prison. If a citizen is released from a correctional system without attaining the accepted societal behavior and ethics, then the system has failed. Although

protecting the general public should be the primary function of the prison systems, increased attention should be placed on possible interventions which can be integrated into the prison system including educational service and rehabilitation, in order to prevent cyclic nature of offence, arrest, release and repeat which does nothing to reduce recidivism, overcrowding in prisons or to build safer communities.

## **2.4 International Protocols on Prisons**

In order for prison systems to be managed in a humane manner, national policies and legislation must be guided by the numerous international standards developed to ensure that the human rights of prisoners are protected and that their treatment as a priority is aimed at ensuring their social reintegration (16). The United Nations, according to Rule 58 of the United Nations Standard Minimum Rules (UNSMR) sets out broadly the legal implications as well as the obligation on states concerning the treatment of people confined or held up in prisons as follows:

“The purpose and justification of a sentence of imprisonment or a similar measure deprivative of liberty is ultimately to protect society against crime. This can only be achieved if the period of imprisonment is used to ensure, so far as possible, that upon his return to society, the offender is not only willing but able to lead a law abiding and self-supporting life” (9).

In addition, the UN Basic Principles for the Treatment of Prisoners indicate how the entitlement of prisoners to the highest attainable standard of health care should be delivered.

In Principle 9, it states the following: “Prisoners shall have access to health services available in the country without discrimination on the grounds of their legal situation” (17).

Further in 62, it states the following:

“The medical services of the institution shall seek to detect and shall treat any physical or mental illness or defects which may hamper a prisoner’s rehabilitation. All necessary medical, surgical and psychiatric services shall be provided to that end” (18).

Following from the above, it is clear that the United Nations rule views prisons as correctional facilities whose main purpose for its establishment is to offer rehabilitation for prisoners while in incarceration as well as an opportunity for social integration for prisoners when they eventually end their time in these spaces. According to Article 10 of the International Covenant on Civil and Political Rights (ICCPR), “All persons deprived of their liberty shall be treated with humanity and with respect for the inherent dignity of the human person.” (9). These persons include prisoners who are confined in correctional facilities. Thus, even while incarcerated, prisoners shall retain all their human rights and fundamental freedoms and should be detained in safe conditions, ensuring their right in accordance with international human rights standards (9). Basic human rights apply as much to a prisoner as to any other member of society. The only difference is that prisoners cannot enjoy their right to freedom for a set period of time. He or she should otherwise be treated like any other human being, with full respect for their inalienable rights. By treating prisoners fairly, humanely and demonstrating respect for their rights, the belief in such treatment is that prisoners will learn and eventually adopt such a positive life style and attitudes in their dealing and interactions with the members of the general public when they eventually leave prison.

Again, from the protocols cited above, it is clear that prison administrations have a responsibility not simply to provide health care but also to establish conditions that promote the well-being of both prisoners and prison staff. Prisoners should not leave prison in a worse condition than when they entered. This principle is further reinforced by Recommendation No. R (98) 7 of the Committee of Ministers of the Council of Europe (1998) and by the European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment (CPT), particularly in its 3rd general report (Council of Europe, 1993), concerning the obligation of states to safeguard all aspects of health care in prison (12)

## **2.5 Prisoners Health: Basic Principles**

In common with all other human beings, prisoners are entitled to “the highest attainable standard of physical and mental health” (19). One of many rights prisoners is the right to medical services and all necessary facilities and activities that will promote their health and wellbeing, including the engaging in planned physical activities while incarceration. The World Health Organization (WHO) and the Council of Europe strongly recommend that closer links be made between prison and public healthcare (17). The adaptation of the Moscow Declaration on Prisoners Health as part of Public Health (WHO Regional Office for Europe, 2003), has led to the development and improvement of the standards of prisoners health care in many European countries, reflecting WHO recommendations (20).

Further, the Madrid Recommendations in 2010, called on all 65 participating countries to address the problems of the health of prisoners while in incarceration and how the absence of good health services for people in prison can be a huge threat to public health, especially communicable diseases. It charged public health advocates to take a leading role in moving forward the health protection agenda for prisoners in prison locally, nationally and globally (21).

Health service provision is included in prison system around world and is a key challenge in many countries. Prison health services are almost always severely underfunded and understaffed and sometimes non-existent (22). The United Nations Office on Drugs and Crime UNODC cited in 2011 following:

“Poor health services in prison settings, where they exist, are generally substandard and under-funded, characterized by shortage of staff and of essential medications. Often health care in prison settings works in complete isolation from the general health care system, hampering the quality of health care and continuum of care following release. The lack of adequate resources and healthcare services in prisons significantly hinders the social reintegration of prisoners, while leading to the spread of transmissible and life-threatening diseases in prisons, and the community”(22).

There is a clear public health interest in good prison health care linked closely to the national health services. The continuity of care between the prison and the community is a public health imperative because the vast majority of prisoners will one day return to civil society, often to the communities from which they left. In addition, they may come into the larger community with infectious diseases which they could infect others with (10), thus leading to a huge financial drain on the public purse.

## **2.6 Worldwide Prisons Health Situation**

Prison populations are growing on all five continents. According to the International Center for Prison Studies (ICPS) publication in October 2013, it was estimated that more than 10.2 million people are held in penal institutions throughout the world, mostly as pre-trial detainees/remand prisoners or as sentenced prisoners (23). In the 15 years since the first edition of the World Prison Population List, the estimated world prison population has increased by some 25-30% but at the same time the world population has risen by over 20%. The world prison population rate has risen by about 6% from 136 per 100,000 of the world population to the current rate of 144 (23). The fact that there are now over ten million men, women and children in prisons around the world should be a matter of grave public concern.

Prison population rates vary considerably between different regions of the world, and between different parts of the same continent. For example in Africa the median rate for western African countries is 46, whereas for southern African countries, it is 205. In Europe the median rate for western European countries is 98, whereas for the countries spanning Europe and Asia (e.g. Russia & Turkey), it is 225 (23). The reasons for the increase in the number of prisoners in developed countries are only partly explained by variations in rates of crime (24). However, in many countries, the majority of prisoners come from minority and marginalized groups and they are likely to have existing health problems on entry to prison,

as they are predominantly from poorly educated and socio-economically deprived sectors of the general population, with minimal access to adequate health services (16).

Health is a fundamental human right, for people in detention as well as for those who are not in detention (18). The health of prisoners is among the poorest of any population group and the apparent inequalities pose both a challenge and an opportunity for health systems of many countries. The high rates of imprisonment in many countries, and the disproportionate prevalence of health problems in prison should make prisoners health a matter of public health importance. Prisons are extreme high-risk environments for the transmission of communicable diseases such as HIV, Tuberculosis and Hepatitis, due to overcrowding, poor nutrition, limited access to health care, continued illicit drug use and unsafe injecting practices, unprotected sex and tattooing. Overcrowding itself leads to unsafe and degrading conditions, increases the risk of transmission of infections and impedes prisoners' access to purposeful training opportunities, exercise and fresh air (25). The prevalence of these diseases is many times higher in prisons than in the community. Because of this high prevalence rate, health protection and promotion measures, recognizing the prison environment as a unique opportunity for interventions must be in place to address the right of prisoners to equivalent health care as available in the community (26).

Considerable review, policy development and change are required to meet all health needs for prisoners in order to promote their health and prevent disease. This will help the community around prisons because one day they will be released into these communities. Regular and organized physical activities will be one of the measures which need to be taken in consideration.

## 2.7 Physical activity

According to World Health Organization in 2013, physical inactivity accounted for 6 % of all global deaths and was the fourth leading risk factor for global mortality (27). In addition, physical inactivity was the main cause for approximately 21–25% of breast and colon cancers, 27% of diabetes and 30% of ischemic heart disease burden (27). Regular physical activity such as walking, cycling, or the physical activities of daily living has significant benefits for health (7). Physical activity has also closely related terms: exercise, physical fitness and sport. Exercise involves a planned, structured and repetitive activity for the purposes of conditioning any part of body (28). Physical fitness, in contrast with physical activity and exercise, is a set of attributes or characteristics that people have or achieve that relate to their ability to perform a given physical activity task in a specified physical, social and psychological environment and these attributes include muscle strength, body composition, cardio respiratory fitness and flexibility (7). Fitness is also a result of genetic factors, with some lucky individuals having a natural capacity and physique to excel at physical challenges. This becomes more noticeable in competitive sports, such as distance running, or weight lifting where the best performers have a genetically superior body that is in peak condition through vigorous training (28). Evidence to date, however, suggests that it is regular participation in physical activity rather than any inherited component of fitness that is related to health (29). Finally the term “sport” is used when speaking about physical activity which involves structured competitive situations governed by rules. In many European countries, the term sport is used to include all exercise and leisure time physical activity (7).

The health benefits of physical activity are seen in children and adolescents, young and middle-aged adults, older adults, women and men, people of different races and ethnicities,

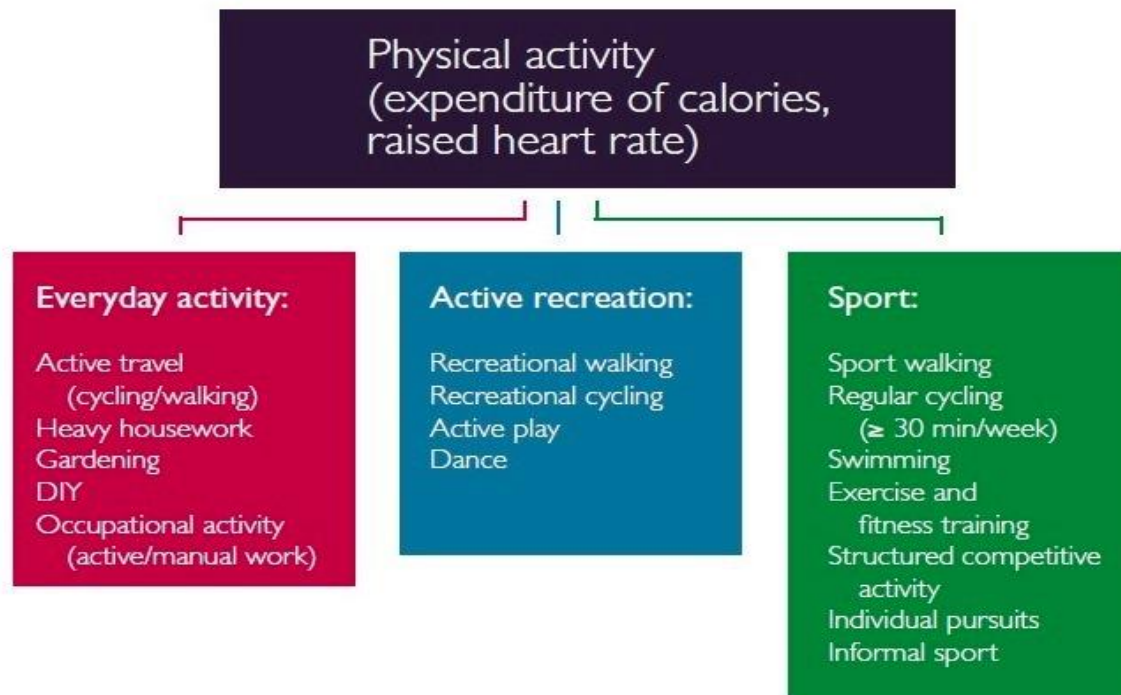
and people with disabilities and chronic conditions(30). The human body is built for movement. When people become more active; they reduce their risk of early death from heart disease; some cancers and diabetes; they manage their weight better, increase their tolerance for physical work; and they improve their muscle and bone health. They are also likely to improve their psychological well-being, life quality and prolong life. Through regular consistent physical activities, most organs and tissues in the body become positively affected by physical activity and adapt to regular exercise (1).

The Norwegian Directorate of Health's recommendations for physical activity, states that adults "should be physically active at least 150 min per week. The intensity should be at least moderate, as in fast walk (31). For children and adolescent "should be physically active for at least 60 minutes every day. Activities should be varied and include both moderate and high levels of intensity" (32).

Low levels of physical activity are now a major public health problem, affecting both children and adults. The public health impact of inactivity is as great as other unhealthy lifestyle choices such as smoking or unhealthy eating leading to long term lifestyle related illness such as type 2 diabetes, hypertension, osteoarthritis, etc. (7). Individuals of all ages, both men and women, achieve health benefits by exercising, and greater physical activity is important to improve well-being and quality of life (1). Many people with lifestyle diseases who engage in exercise have recorded remarkable improvements in their health sometimes to the point that medications are reduced or even no longer necessary. From the public health perspective, promoting physical activity among all people will produce the greatest health gain, with groups who are least physically active having the most gain (7).



**Figure 1: Physical activity**



Source: Start Active, Stay Active, (2011): *A report on physical activity for health from the four home countries' Chief Medical Officers*. London – UK(33).

### **2.7.1 Physical Activity and Mental Health in Prisons**

It is well documented that the prevalence of psychiatric morbidity and substance misuse is higher among prisoners than the general population (34). According to studies undertaken in a number of countries, 50 to 80% of prisoners have some form of mental disability (15). In New South Wales, Australia, 80% of prisoners have a psychiatric disability, compared to 31% of the general population (24). Research conducted among 23,000 prisoners in 12 western countries concluded that several million prisoners worldwide probably had serious mental disabilities (34). About 4% of male and female prisoners have psychotic illnesses, 10% (men) to 12% (women) have major depression, and 42% (women) to 65% (men) have a personality disorder, including 21% (women) to 47% (men) with antisocial personality

disorder (14). Research in the Netherlands (16) has also shown that 89% of all prisoners have depressive symptoms and 74% have stress-related somatic symptoms. Factors that often apply in prisons and that could adversely affect mental health can be overcrowding, dirty and depressing environments, poor food, inadequate health care, aggression (which may take many forms, such as physical, verbal, racial or sexual), lack of purposeful activity, the availability of illicit drugs and either enforced solitude or lack of privacy and time for quiet relaxation and reflection. Thus, imprisonment is clearly associated with mental health problems among those who are subjected to it. (19)

Mental health in prison can be divided into three categories: that which is brought into the prison by the inmate; that which is latent in the inmate but is triggered or exacerbated by the prison situation; and that which is newly created by the prison (35). All prisoners are at risk of developing a range of mental disabilities in prisons, irrespective of whether or not they had particular mental health care needs on entry and when they are inside prison, they may develop serious mental disabilities, if appropriate actions are not taken.

Nurse et al (36) report that the primary negative impact on mental health in prison was the impact of isolation and lack of activity: nothing to do; no mental stimulation and little opportunity to engage in education; or skills and job training in some facilities. To reduce this, there should be opportunities for inmates to occupy themselves- whether by work, by organized physical training or other activities. Physical activity can contribute in reducing distress and particularly depression; and access to the various activities like painting, drawing or sculptures has been shown to have a major impact on self-esteem and confidence, promoting better relaxation, improved sleep, increased energy and improved anger management (19). Thus, activities should be made available to enable prisoners make the best

use of their time while in prison. Educational courses such as vocational and physical education have a major role to play in improving self-esteem and adapting prisoners for release.

### **2.7.2 Physical Activity and Physical Health in Prisons**

The World Health Organization defines health as follows: *“Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”* (19). Physical health is one of the components of the meaning of health and could be seen as the ability to perform daily tasks without any physical restriction caused for example by diseases or disability of the body parts. In general, inmates have a wide variety of risk factors such as overcrowding, unhygienic materials sharing (through haircuts, for example), poor physical conditions, and isolation that have been associated with poor physical health (37, 38).

In addition, physical and environment factors, such as housing, sanitation, lack of privacy, fire safety, food processing, and unsafe work conditions highly influence the physical health of inmates (35). These conditions contribute to various infectious disease such as HIV, hepatitis B and tuberculosis, sexual abuses (sometimes coercive), dental problems, cold and influenza, vision or hearing disorders, chronic disorders like musculoskeletal disorders like rheumatism, backaches and cardio vascular disorders (37, 39) which are usually reported by prisoners.

Prisoners are considered marginalized and they seem to be worse off along almost every single variable that is comparable to the normal population (40). Further, many detainees have an accumulation of welfare deficiencies which makes this an even more severe state (41). Prisoners should be seen as potentially healthy body rather than just a correctional entity

and need support in adopting healthy behavior, including appropriate levels of physical activity (35). Focusing on resources and capacity for prisoners is more important in promoting their health. To reach a state of complete physical, mental and social well-being, an individual must be able to identify and realize his or her aspirations, satisfy these needs, and change or cope with the environment (42).

### **2.7.3 Physical Activity and Health Promotion in Prisons**

The World Health Organization, in the Ottawa charter (42) defines health promotion as “the process of enabling people to increase control over and to improve their health”. The Ottawa Charter extends the concept of health promotion to include all forms of social and political changes that was aimed at promoting the health of people (43). In health promotion, health is often defined both as a resource “which gives people the strength to function and (the) resilience to face the challenges one is exposed to through life” (43).

In many European countries, attention has been focused on basic principles concerning prisoners’ health. These principles form the basis for WHO/Europe’s commitment to help member states improve health in prisons, and public health services generally across Europe; and to recognize them as fundamental international standards in the Moscow Declaration of 2003 (44). In 1995, under the auspices of WHO Regional Office for Europe (WHO/Europe), an international collaborative framework, the Health in Prison Project (HIPP) was formed. HIPP is a European network working for better health in prisons. It is premised on the tenet that prisons can be treated as a setting for health promotion practice (45).

The WHO health in prison project, introduced the concept of health in prisons or health promoting prisons. Good prison health is essential to good public health:

“The risk to health are reduced to a minimum; essential prison duties such as maintenance of security are undertaken in a caring atmosphere that recognizes the

inherent dignity of every prisoners and their human rights; health services are provided to the level and in a professional manner equivalent to what is provided in the country as a whole; and a whole prison approach to promoting health and welfare is the norm” (19).

The greatest impact on public health, in the form of reduced morbidity (incidence of disease), can be achieved if the physical activity of people with sedentary lifestyles are increased, such as the socioeconomically group, such as those with a hereditary predisposition for cardiovascular disease, the obese, smokers or those in prisons. Commentators argue that the health promotion prison should include all facets of prison life from addressing individual health needs through to organizational factors and physical environments (46). The Ottawa charter have been used by others to map health promotion in prison is a useful framework for envisaging these facets of prison life and. Its application is demonstrated as below:

### **Health Promotion in Prison**

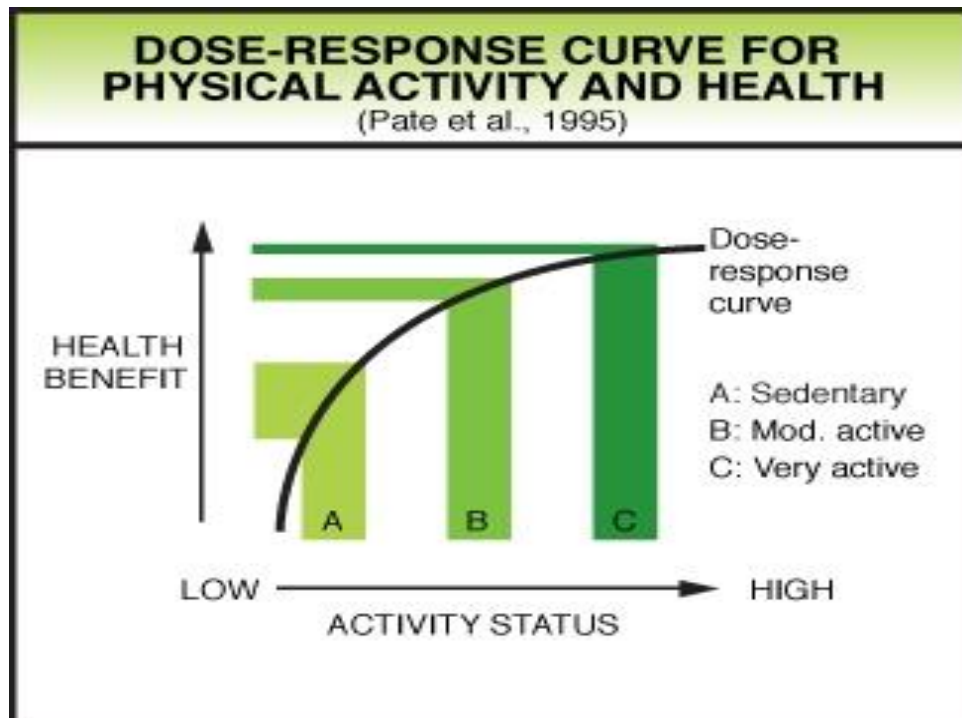
<b>Strengthen Community Action for Health</b>	<b>Build Health Public Policy</b>	<b>Develop Personal Skills</b>	<b>Create supportive Environments</b>	<b>Re-orient Health Services</b>
Prisons should form partnership with community organizations to facilitate successful prisoner reintegration into society. For example, closer collaboration with housing and employment agencies.	Policies must ensure that health choices are promoted not demoted in prison. For example, prisoners should have access to drug-free wings and meaningful work opportunities.	Individual skills and health education programs should be provided within the prison. These should specifically address the needs of the prison population. For example parenting skills programmes, drug awareness courses etc.	Consideration should be given to the physical environment (overcrowding, layout etc) and attention to maintaining social contact with families (opportunities for family visits, telephone calls, good visiting facilities). <u>Adequate food and regular physical activity and time outdoors should be provided.</u>	Prisons should shift from a reactive service, based on a medical model to a more holistic, upstream approach.

**Source:** Ramaswamy, M and Freudenberg, N (2007): *Health Promotion in Jails and Prisons: An alternative paradigm for correctional health services* (46).

The benefits of changing sedentary lifestyle to involve one that includes exercises for those in prison can have the greatest potential for public health benefit. To promote the health of inmates and mainly their physical health, physical activities such as walking, jogging, stationary cycling, and jumping rope should be made available. Although some health benefits seem to begin with as little as 60 minutes (1 hour) a week, research shows that a total amount of 150 minutes (2 hours and 30 minutes) a week of moderate-intensity aerobic activity, such as brisk walking, consistently reduces the risk of many chronic diseases and other adverse health outcomes(30).

The benefit of changing sedentary people to exercising people has the greatest potential for public health benefit:

**Figure 2: Dose response curve for physical activity and health**



Adapted from Pate et al., (1995) (47)

## **2.8 Salutogenic Theory - A Guide to Positive Approach**

In promoting health and well-being for prisoners, it is important to focus to their resources and capacity instead of their impairment or on why they are in prison (35). In 1979, Aaron Antonovsky a medical sociologist introduced the Salutogenic model in his book “Health, Stress and Coping” (48). This model represents an orientation focusing on “the origins of health” rather than the traditional pathogenic orientation focusing on the origins of illness. The basis of the Salutogenic model is the process of enabling individuals, groups, organizations and societies to emphasize on abilities, resources, capacities, competences, strengths and forces in order to create a sense of coherence and thus perceive life as comprehensible, manageable and meaningful (49). The main question of interest to Antonovsky was how so many people survive and do well despite experiencing high loads of stress. He attempted to solve this question by attributing the effects of stressors to the adequacy of an individual’s tension management. Two concepts of Generalized Resistance Resources (GRRs) and Sense of Coherence (SOC) were explained in relation to how an individual manage tension and stress (48).

The GRRs, defined by Antonovsky as the “Property of a person, a collective or a situation, which as evidence or logic has indicated, facilitated successful coping with the inherent stressors of human existence.” (48). GRR is characterized by under load-overload balance, and say that participation in shaping outcomes (empowering processes) provide a person with sets of meaningful and coherent life experiences, which in turn create and increase a strong sense of coherence (49). According to Antonovsky, these resources can be embedded in the social and physical environment (example social support, good employment, safe environment). These are stable resources that the individual carry with them into many situations. What GRRs does is to mediate the effects of stress and provide experiences of

consistency, balance and ability, which in turn shape the outcome of different situations for each individual. When these experiences are repeated, they build up the SOC (48). Antonovsky's idea of Sense of coherence (SOC) is related to wellbeing and is of importance for individuals in public health care (49). SOC is a flexible and adaptive dispositional orientation that enables successful coping with adverse experience and the maintenance of good health. It has three components: comprehensibility (the extent to which stimuli from one external and internal environment are structured, explicable, predictable of being chaotic and disordered); manageability (the extent to which resources are available to a person to meet the demands posed by these stimuli); and meaningfulness (the extent to which these demands are challenges worthy of investment and engagement) (50).

According to Antonovsky, people who have developed a strong SOC tend to perceive their situation as understandable, manageable and meaningful (48). Strong SOC suggests that an individual possesses resources (such as social support and ego identity) that enable the person resist and cope with various kinds of stressful life events such as those that they can meet in prison. The more resistance resources an individual has, the better are her or his chances of developing a strong SOC. On the other hand Generalized Resistance Deficiencies (GRDs), is associated with negative resources (or lack of positive) that weaken a person's SOC (51). Individuals with high SOC will more likely define "a stimulus as a non-stressor or a stressor as "irrelevant or benign". This is because they have a confidence in and the experience that these things will work out well (48).

"What the person with a strong SOC does is to select the particular coping strategy that seems most appropriate to deal with the stressor being confronted and chooses from the repertoire of generalized and specific resistance resources at his or her disposal what seems to be the most appropriate combination." (48)

According to longitudinal studies, a strong SOC has been reported to predict better health and decrease the risk for chronic conditions example diabetes and coronary heart diseases (49).



Several studies have confirmed the predictive validity of high SOC for good quality of life among various study populations (49). SOC has also been associated positively with self-esteem and self-efficacy (49). According to Antonovsky (48), people with strong SOC will engage in adaptive health behaviors more often than those with a weak SOC. This was confirmed in a study by Wainwright et al (52), where a strong SOC was associated with more health promoting behavior choices, independently of social class and education. Studies have suggested that a strong SOC is also associated with higher levels of physical exercise (53).

Prisoners are found in low socio-economic status and their chances of getting strong SOC's may be low because of various problems related to imprisonment, and thus it is imperative to increase their chances. Therefore getting opportunity for doing physical activity (which is a good behavior), may contribute to their development of self-esteem or self-efficacy, reduce stress and thus increase SOC which will help them to resist and manage the challenges found in prisons in a positive way.

## **2.9 Occupation Justice**

The prison regime allows prisoners little opportunity to make decisions, exert their autonomy or become empowered (25). The deprivation of liberty makes prisoners dependent on the detaining authorities for the respect of their basic human rights. Prison authorities therefore have a responsibility not only to enforce a lawful decision to detain an individual, but also to ensure the prisoner is accorded fair human right treatment and care while in detention (9). Prisons should be places where individuals are sent by courts of law to serve a term of imprisonment, and that while there, inmates should be given the opportunity to improve themselves and prepare for a successful reintegration into the community. The issue here is that, through being exposed to greater opportunities for occupational engagement and occupational role development, prisoners are more likely to achieve success in long term community reintegration (54). Occupation is understood as a fundamental basic human need

and refers to everyday activities or tasks people do to occupy themselves such as looking after them, enjoying life and contributing to social life (53). The occupations people choose to do influence their lifestyles, their social relationships, their health, well-being, and participation in society (56). This understanding addresses the relationship between health and occupation and underpins the importance of human participation in occupations of daily life.

A lack of access to basic human occupations can lead to occupational deprivation, defined as “the prolonged preclusion from engagement in occupation of necessity and or meaning due to factors that stand outside the control of the individual like imprisonment for example”(57). Occupational deprivation may arise when populations have limited choice in occupations because of their isolated location, their ability, or other circumstances. Those who work or live in prisons, locked forensic mental health hospital wards, or refugee camps know the power of occupational deprivation (54). The term occupational deprivation, therefore, draws attention to the broad social and political forces that deprive people from engagement in meaningful activities due to circumstances beyond their control (58).

In penal settings, deprivation from occupational engagement has been suggested as a contributing factor in prison riots, prison suicide, and episodic disorientation and psychosis in inmates (54, 59). Engagement in activity has also been suggested as a coping strategy used by inmates (59). The results of sustained occupational deprivation may not only be threatening to the safety of the individual but to the institution as a whole (59). This fact, coupled with the evidence that lack of occupational engagement during incarceration may negatively impact successful community reintegration. The concept of occupational justice, developed from social justice, shares common beliefs in societies through a set of ethical, moral and

civic principles related to fairness, empowerment, equal access to resources and sharing of rights and responsibilities (55).

From a Western perspective occupational justice has been described as a justice for difference: a justice to recognize occupational rights regardless of age, ability, gender, social class or other differences (60). Occupational injustice emerges when participation in occupations is barred, confined, marginalized, exploited, excluded or otherwise restricted (55). An occupational justice lens may be used to meet the vision of an occupational just world by enabling the empowerment and social inclusion of people who experience social exclusion (60). In an occupational just world, access to participate in occupations of personal meaning and societal value is seen as a right (55), therefore occupation in various physical activities for prisoners is seen as just and is one way to give them greater responsibility for self-maintenance. Not only would this provide a sense of personal control, but it would also foster the development of skills related to planning, problem solving and organization, skills which are vital for their successful community reintegration and occupational functioning when they leave prison.

## **2.10 Relevance of Theory to Thesis**

The theory reviewed indicates what prison is and how it affects the prisons health. We have seen that good prison health is essential to good public health. Inmates have the same rights as the general population. This is particularly the case in relation to health. The relevant literature showing connection between participating in physical activity and various health benefits such as psychological and physical benefit have also been presented. These health benefits from physical activity apply also to people in incarceration.

In addition, the theories of salutogenic and occupation justice were consulted because their relevance to the issue of health promotion and wellbeing of prisoners. Salutogenic theory is designed to focus on health-enhancing (salutary) rather than risk factors for disease; to view the person (prisoners in our case) in a holistic manner rather than as at risk for a particular disease; and to examine factors that bring a sense of meaning and coherence to life. When confronted with stresses, people want to be motivated to cope (meaningfulness), to believe the present challenge can be understood (comprehensibility), and to recognize that resources exist that will help them cope with the challenge (manageability). Salutogenic theory shows that both the resources available along with the ability to use them and the appropriate coping strategies are crucial for people in prison thus giving them opportunity to increase such resources is of importance. Participating in various physical activities should be considered as a resource with positive outcomes and strategy to promote health of people in incarceration. People who develop a strong SOC do not only live longer, they also have a tendency to choose positive life behaviours like being active and having better eating habit. They manage stress and negative life events better; indeed they manage better if struck by acute or chronic disease. Regarding the outcomes of Wellbeing, a strong SOC correlates strongly to a good mental health, perceived health and quality of life (61).

To conclude, the salutogenic theory provides an excellent framework for positive approach to the management of prison health with the focus on physical activities as important contribution to the development of generalized resistance resources and sense of coherence to prisoners. From the public health perspective, promoting physical activity to all people will produce the greatest health gain, with the least active like those in prison having the most gain (9).

Finally the theory of occupation justice suggests that prisoners should get opportunity to engage in occupations. This has been proposed as a coping strategy used by inmates. Occupation in various activities for prisoners are seen as just and one of the many ways to give them greater responsibility for self-maintenance.

## Chapter 3

### 3.1 Methodology

#### 3.1.1 Selection of literature

This study is based on a qualitative systematic review. Literature from secondary sources was consulted. The following procedure was done: First a manual search for books and journal articles related to prisoners health and physical activity was done. This was followed by a systematic search from reputable electronic databases to identify articles that are available. In addition other sources of information from the internet mainly Google scholar and WHO website were consulted. The broader selection criterion that was used to select studies for this research was mainly based on the quality of the studies which are relevant to my thesis topic

#### 3.1.2 Identification of relevant studies in different databases

The following electronic databases were searched from January 1993 to January 2014: PubMed, PsycINFO, CINAHL and Cochrane Library. Search was done according to the PICO process.

**The search strategy that was employed in the search process is as follows:**

Population: Prisoners OR Inmates.

Intervention: Physical activity OR exercise OR sport

Comparison: Inactivity OR sedentary

Outcome: Improved health OR wellbeing OR good health

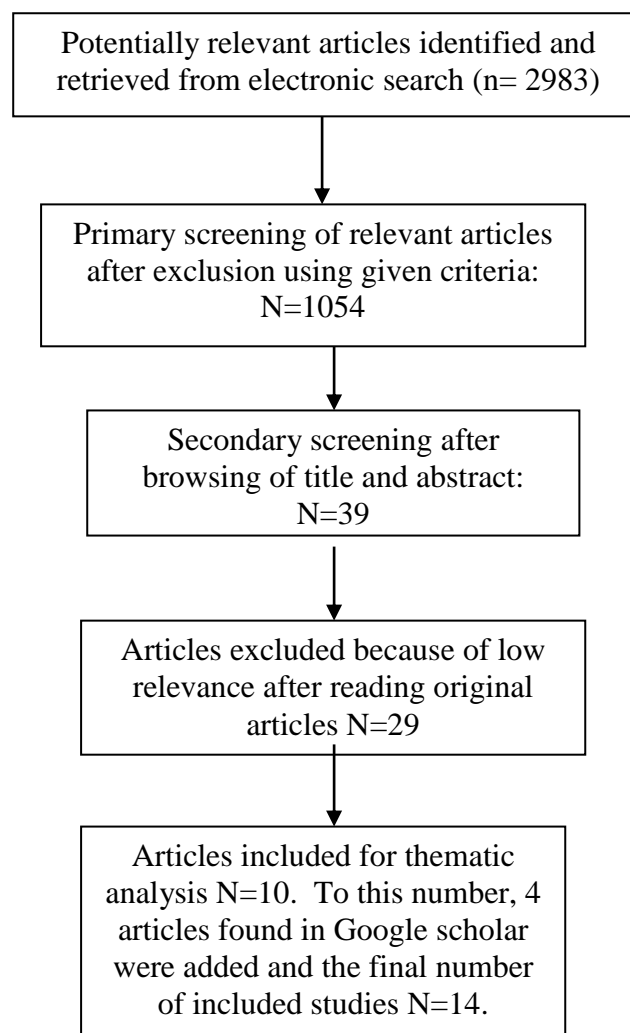
*Search strategy from Cochrane library and PubMed are presented in Appendix 1.*

#### 3.1.3 The Process of Inclusion/Exclusion of the Study

The selection criteria for this study included the following: works published in English; studies that showed evidence regarding outcomes associated with prisoners participating in organized physical activities compared to those who did not participate in any planned

physical activities while in incarceration; studies in which the prison sample population have been in detention more than two months; and finally it was limited by year of publication of literary works, that is, the range from January 1993 to January 2014. Unpublished studies, even if they fall within the set criteria set above were excluded. The search was subsequently refined, and the number of articles reduced, by excluding less relevant literature. Studies were not excluded because of geographic areas, gender or age.

### **A Summary Flow Chart of Study with Inclusion /Exclusion Process and Search Results**



*Figure 3: Selection process for studies included in analysis.*

After the initial search, 2983 articles were retrieved. Using the inclusion criteria, the number of articles was pruned to 1054. To assess the remaining studies for relevance, I browsed through all the titles and abstract of each article and then selected studies which were relevant to my thesis. This led to a further reduction to 39 articles. After reading the full articles, 29 articles were rejected because of their low relevance, further narrowing the articles to 10 studies, which were used in this study. A supplementary search in Google scholar found 4 more articles which meet the selection criteria and these were then added to the 10, making up a total of 14 articles for this study. The 14 articles covered studies of prisoners' life and physical activity from the USA (n= 5), Spain (n= 2), Australia (n=2), England (n=1), France (n=1), Italy (n=1), Lithuania (n=1) and Canada (n=1). The summary of these 14 studies with their aims, participants and key findings are presented in **appendix 2**.

#### **3.1.4. Critical Appraisal**

To appraise the methodology used and theoretical dimensions of the included research articles quality, a framework based on 10-item standardized checklist/appraisal tool for qualitative studies developed by the Critical Appraisal Skills Program/quality assessment (CASP) was used (62). The focus of this checklist is one the following criteria: validity of research findings, credibility and relevance. CASP was used only as a guide to appraise the selected articles in order to identify their strengths and weaknesses. It was however not used as a tool to exclude any of these articles for this study.

#### **3.1.5 Thematic Analysis/Synthesis of Selected Studies**

Thematic framework was used to analyze and synthesize data from articles. Thematic analysis is a qualitative research method which has been widely used in health promotion research (63, 64) because of its capabilities to identify, analyze and report patterns within



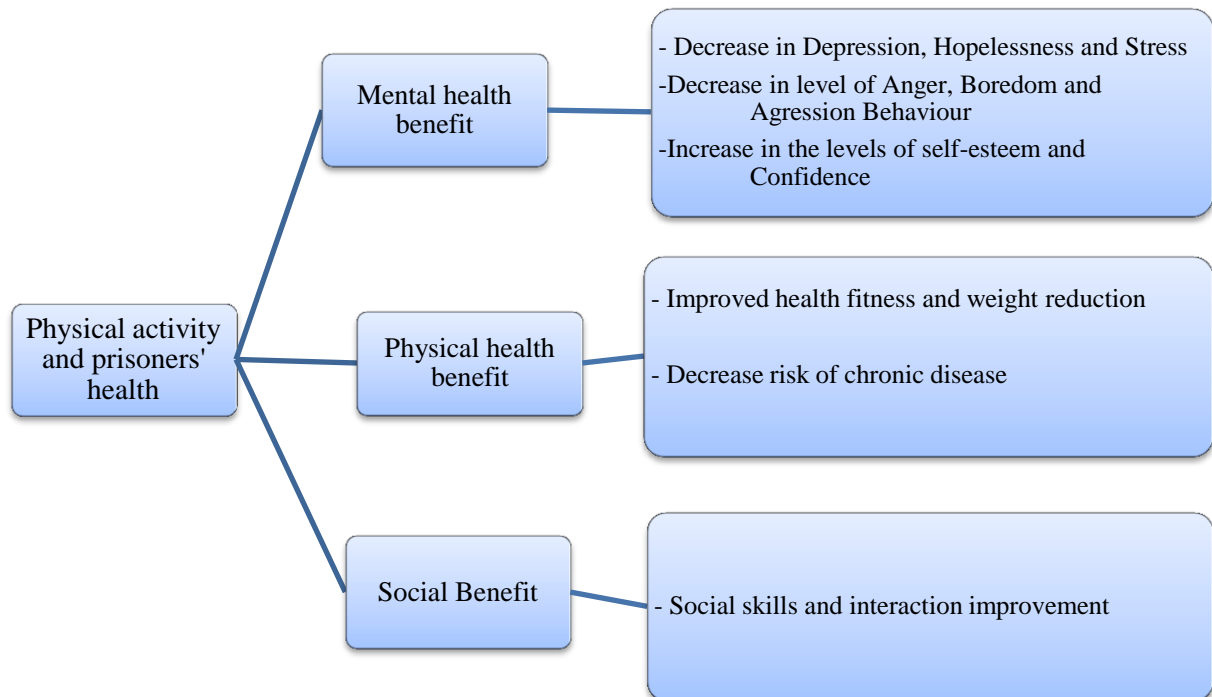
large data sets. Above all, the strength of this type of analysis lies in its theoretical freedom (65) as thematic analysis offers one of the best possibilities to organize and describe a data set in rich detail (65). Also, this framework frequently goes beyond organization and description to the interpretation of various aspects of the research topic, while highlighting similarities and differences, as well as generating unanticipated insights (65).

Identifying the topics or themes in each study was done by bringing together components of idea and views embedded in the data from articles. After reading and re-reading the articles several times, I proceeded by generating codes which were considered pertinent to the research questions that underlined the entire thesis. Coding is a primary process for developing themes within the raw data. This process permits data to be segregated, grouped, regrouped and relinked in order to consolidate a meaning and explanation (66). In this analysis, the coding of the material was based on the principles described by Braun and Clarke (65). After this, I combined the codes to generate sub themes which were evaluated by looking for similarities or issues that had the same aspect within different sets of data to form a key theme. Once a clear idea of the various sub-themes and how they fitted together emerged, this is followed by a qualitative analysis to determine the final defining and naming of themes. This process covered different aspects of the correlation between prisoners' health and physical activity.

Over all, three themes emerged from this analysis, constituting three distinct issues for discussion namely physical health benefit, mental health benefit and social benefit of physical activity in the life course prisoners while they are in incarceration. These themes were then organized in a thematic analysis network (67; 65), and illustrated in a diagram below to show the various aspects of these broad topics (See Figure 4).

**Figure 4: Thematic analysis network:**

This figure shows the three overarching themes and the related subthemes that emerged from our analysis.



**3.1.6 Ethical approval**

Literature and data used draws on previously published materials. Therefore, no ethical approval was needed for access to them.



## **Chapter 4**

### **4.0 Results and Discussion**

In this chapter, I present the results from the selected articles. This will be done in respect to the purpose of this study, which is to elucidate potential health benefits of physical activity among prisoners while in incarceration, and to what extent engagement in physical activity influence their lives. The analysis of the data from the selected articles highlighted three major benefits: mental health, physical health and social benefits, each of which had sub-categories that are also discussed.

### **4.1 Mental Health Benefit**

One of the key themes that emerged and continually came to the fore in the discussions in the various articles chosen was mental health, in particular decrease in depression, hopelessness, and stress; increase in the levels of self-esteem and confidence, as well as a decrease in the levels of anger, boredom and aggressive behavior. According to the World Health Organization (WHO), mental health is defined as:

‘as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.’ (68)

A balanced state of mental health is important in the life of every human being and is a good determinant of one’s quality of life. Lack of mental health may result in chaos and disruption in the daily life course of not just the individual, but also for the running and sustenance of an entire community. However, this kind of state of being becomes even more essential when one finds him/herself in prison which is by its nature a closed community, thus making it a

particularly risky environment as its very nature can aggravate the onset of such mental illness and health distress (25).

In this part of the discussion, I will concentrate on the key issues mentioned above. I will begin with one of the issues that came out more forcefully in the various articles under study. This is the issue of a marked decrease in the levels of depression, hopelessness, and stress among prisoners who engaged in some form of physical activity while incarceration.

#### **4.1.1 Decrease in Depression, Hopelessness, and Stress**

*Findings:* A key issue that seems to dominate among prisoners who were engaged on a daily basis in some form of exercise while in prison is the decrease in the levels of depression, hopelessness and stress. A study conducted by Nelson et al (69) reveal that 75% of prisoners experienced a lessening of depression, stress and anxiety as well as an improvement in their physical shapes and fitness levels after engaging in exercise. Another study developed in the USA by Buckaloo et al in 2009 showed significantly lower levels of depression, stress and anxiety among inmates who exercised compared to those who did not (70). A quasi-experimental study conducted in a male prison reported that a 12-week program of regular aerobic exercise decreased symptoms of depression drastically (71). A cross-sectional study based on a questionnaire issued to a sample population of 914 inmates in New South Wales, Australia, showed a statistically significant correlation between increased self-reported exercise and a decreased level of hopelessness. Furthermore many of the inmates report indicated that as exercise time increased, hopelessness decreased (72). In a related study, which was conducted in a Canadian female prison by Elwood et al in 2013, inmates reported a decreased stress level of 94% as well as improved sleep of 81% after engaging in a physical activity program. They also found that participating in exercise program provided inmates an opportunity to have some fun and enjoyment which in turn reduced their levels of stress

about being incarcerated (73). The direct effect of such engagement on participants is described by some of them this way:

“I didn’t feel as depressed as I did before –exercise makes me feel better in my mind. This exercise was fun!”

“It reduces stress. I felt very good afterwards and it was fun” (73).

*Discussion:* From these studies, it is clear that structured and regular physical activity as a social activity not only helps to divert prisoners’ attention from their current situation but also acts as a distraction from difficult situations or feeling of negativity that they may encounter in their new environment. The findings from these articles indicate that engagement in physical activity provides a good outlet for prisoners to think through some of these demands as a way of learning to adapt. This view can be explained using Antonovsky’s Salutogenic Model which is concerned with the relationship between health, stress and coping (61). The aim of this model is to understand how people manage stress and stay well through an individual’s Sense of Coherence (SOC) and Generalized Resistance Resources (GRRs). These resources account for an individual’s capacity to either survive a stressful situation or succumb to it. Prisoners who are engaged in physical activity can be said to be actively utilizing these resources and thus explain the positive effect of physical activity on their lives and health while incarceration, allowing them to manage their incarceration in a positive and healthy way.

It is clear that prisoners who engage in some form of sports or exercise find it easier to adapt to their new prison environment faster than those who do not and the reasons for these are due to their own sense of coherence and GRR which they maximize to their benefit. Hence, engaging in some form of exercise on a daily basis served as an effective coping mechanism which helped them to deal with the fact of being incarcerated (70). These results are

consistent with earlier reviews on the positive relationship between physical activity and psychological wellbeing (7).

However, some of the findings showed mixed results. For instance results from Buckaloo et al.(70) seem to indicate numerous extraneous variables present in prison (age, offense type, amount or type of contact with the outside world, and sentence length) that have all been historically found to influence levels of depression, stress and anxiety among inmates. Hence, a decrease in emotional distress cannot be fully accounted for through exercise participation, but could be due to social support and encouragement given by friends and teammates'. Thus, though exercise served as a part of a 'general long-term coping strategy for inmates', emotional improvement due to exercise alone may be erroneous as it cannot be completely attributed to inmates engagement in any form of exercise.

Nevertheless the results of the study establish that there is close link between physical activity and the alleviation of mental and emotional distress and that exercise is helpful regardless of the type of physical activity. These findings are consistent with previous research suggesting that regular exercise can result in a marked reduction in depression levels (71). Results from these studies reveal that prisoners who engaged in some form of exercise seem happier than their counterparts who did not. Those who take part in exercise had lighter mood, and seem more hopeful about both their stay in prison as well as their eventual return to their communities. These findings (hope, happiness) are related to an individual's strong Sense of Coherence which is inbuilt in each one of us and which comes to the fore in times of crisis and competition. Prisoners who engage in physical activity are able to maximize their SOC which they use to protect themselves against anxiety, depression, burnout and hopelessness (61).

#### **4.1.2 Decrease in Levels of Anger, Boredom and Aggressive Behavior**

*Findings:* Another psychological benefit that prisoners gained from engaging in some form of physical activity is its ability to aid in the decrease in the levels of anger, boredom and aggressive behavior which are major phases that many prisoners experience during their period of incarceration (71). This state of being may produce in the individual different emotional moods ranging from anger at his incarceration, boredom at the new rules and regulations to new restrictions on his movement. Two studies(74,75) indicated in their results and findings the positive effect physical activity has on reducing anger, boredom and aggressive behavior, all negative emotional states that many prisoners experience while they are in prison. Engaging in any form of physical activity has been shown to aid prisoners in dealing with these emotional states. A female prisoner in a Spanish prison captures it this way:

“I do sport because it makes me feel good. I love it and, because it calms my anxiety and relaxes my nerves. You have close contacts with other people every day . . . With sport, you spend energy and you can control yourself better” (75).

Coupled with these negative feelings of entering prisons and accepting the new role of being a prisoner is the fear of not being able to find a way to cope with incarceration. This state of being, according to many prisoners, can put huge stress on them (70). While in prison, other factors such as discrimination, temperature, noise and crowding have also been known to increase development of aggression among inmates. A qualitative study in the UK by Parker et al (76) showed that physical activity can confer significant psychological benefits and promote the rehabilitation of inmates in reducing impulsive behavior.

In a study done by Wagner et al in 1999 in the US on a group of inmates who took part in exercise as a weight-training showed significantly lower levels of aggression variables and increased morale (74). The inmates who participated in this study admitted that lifting



weights did, provide them with a release from the stressors of life in prison. It is of course an appeal to use this simple tool (physical activity) to reduce the stigma of no satisfaction that lead to the spiral represented by insecurity, stress, anxiety, anguish, fear, anger and violence. Verdot et al in 2010 studying detainees' mood and wellbeing in a French prison found that 'regular physical activity has a psychological benefit such as release from anxiety or stress and also has effect as antidepressant' (77).

The findings also indicate that prisoners who engaged in exercise showed a keen awareness not to break any prison rules so as not to lose access to exercise equipment (74). This new orientation was compared with that of other inmates who did not engage in any form of exercise who showed a total lack of interest in fulfilling such demands since access to exercise equipment was not a factor in explaining their behavior as well as their motives for either obeying or violating prison behavior (74). The results of the study appear to indicate that such a move is an effective means against many measured mood disorders that prisoners may experience due to their incarceration.

Nonetheless some of the results show a weak link between physical activity engagement and a reduction in aggressive behavior, anger and boredom. For example, some of the conclusions from some of the studies are inconclusive as they do not establish a direct correlation between the reduction in aggression among inmates thereby any firm link between such outcome precisely as a result of engaging in physical activity to prisoners behavior while in incarceration. In addition, some of the studies do not clearly establish firmly empirical evidence that relates lack of exercise (specifically, weight lifting) to a decrease in vigor or positive moods states and many of the conclusions from these studies are speculative and require further investigation to establish clearly this link.

Nevertheless, many of the results highlight an overwhelming argument that taking part in physical activity may not only induce a calming effect and produce a positive feeling on its participants, but also offer both psychological benefits related to aggression levels among incarcerated population, leading to prisoners to be less likely to be disruptive, cause trouble or self-harm.

*Discussion:* From these studies, it is clear that engaging in various physical activities serves as an incentive for good behaviour and promotes social control within the prison (74, 75). Through exercise, prisoners learn what is acceptable behaviour and this can be important to replace the unacceptable criminal behaviour they had before imprisonment. These personal changes may occur within inmates with regular access to exercise. This does not benefit only the inmates but also society as it can reduce the likelihood of future criminal behavior on the part of these prisoners upon their eventual release from prison. Participating in regular physical exercise helps inmates by reducing their tension and temper, thereby enhancing their psychological well-being.

#### **4.1.3 Increase in the Levels of Self-esteem and Confidence**

*Findings:* Approximately 60% of the studies reviewed report a positive association between physical activity participation and higher levels of self-esteem (78). Vaiciulis et al in 2010 conducting a cross sectional research on inmates' physical activity levels and engagement as a way of evaluating the possibilities it has in developing inmates healthy lifestyles and self-esteem indicated that physical activity not only contributes to overall self-esteem but is also related to higher levels of physical competence (79). The results of the study showed that self-esteem in physically active inmates was statistically significantly higher than in physically inactive inmates. From the study, it becomes clear that physical competence,

particularly with regard to conditioning and sport is important as it contributes to inmates' continual engagement with something meaningful while in confinement. Thus, the very perception of being competent may help motivate prisoners to continue to be physically active as they progress through their sentence.

*Discussion:* These findings were consistent with earlier studies which have shown that the effects of confinement upon health are consequently aggravated by mood disorders that may lead to psychotic syndromes, auto mutilation and suicide (77). Self-esteem and contentment with psychological state in physically active inmates has been found to be statistically significantly higher than in physically inactive inmates (79). Engagement in physical activity has also been found to be an effective motivator in stimulating inmates to make the best use of the time in custody as continual engagement could increase progressively an inmates' confidence and contribute to a greater sense of personal competence and confidence as well as self-esteem. As one inmate explains:

“You can see a difference as well. Like, I'm much fitter...more confident with people, more confident when I play sport because when I first come in I'd get the ball and just pass it to someone else but now I get the ball and take people on that.....” (76).

These findings are consistent with earlier findings that positive self-esteem of inmates has a direct relationship with their social and personal development (80). Those who showed a strong sense of responsibility tended to be more physically active than inmates who did not consider themselves responsible (79). These results indicate that while physically active inmates tended to move towards more social activity involvement due to high self-confidence, inactive inmates appeared to move away from social activities, leading them to progressively become isolated.

When an inmate has low self-esteem, their beliefs will often be negative. Holding on to these negative beliefs lowers their resilience and ability to cope with the stresses of life in difficult environment such as a prison. This can place them at a higher risk of developing mental health problems such as ‘mood disorders, violence, depression and social phobia.

Engagement in exercise has also been shown to increase prisoners’ self-esteem and confidence. Daily life in prison is characterized by a remarkable number of regimes, schedules and norms due to the prison’s physical constraints and stressful environment which makes coping sometimes challenging for prisoners. When you are in prison, your rights are limited, your movement curtailed and you cannot do what you want or feel. This can cause frustration which can negatively affect inmates’ self-esteem and confidence leading to a loss of motivation and decrease in their interest in activities around them. Such situation can impair the inmate’s self-esteem resulting in inmates trying to escape from isolation time in custody by engaging in risky behavior such as taking drugs or developing an aggressive or violent personality (25). One way through which prisoners can cope with such environment is to participate in exercise and sport. Prisoners who participate in any form of exercise have been found to appear to exude a high level of confidence. They also displayed clear sign of high levels of self-esteem and responsibility in their dealings with other prisoners, the prison administrators and even to themselves.

## **4.2 Physical Health Benefits**

Even though the mental health benefits that prisoners who engage in physical activity gain cannot be overstated, another benefit that may accrue to its participants is an improved physical health that engagement in any form of exercise offers. In this section, I will concentrate on the physical health outcomes of exercise to prisoner’s overall physical health.

Physical health outcomes related to engagement in physical activity comes in many forms. However, due to the limitation of space imposed on the thesis, I will limit the discussion to two main benefits namely improved health fitness and weight reduction, and decreased risk of chronic diseases.

#### **4.2.1 Improved Health Fitness and Weight Reduction**

*Findings:* Physical fitness is the ability of the body to function both effectively and efficiently when performing on activity without becoming exhausted too quickly. This may include strength, muscular endurance, aerobic endurance, speed, flexibility, and balance (7). In a Canadian study in a female prison (73), 16 women prisoners were asked if they had noticed improvements since they started participating in the fitness program, with all reported “yes”. Prisoners received technical feedback from coaches as well as direct information regarding their specific sport skills, strength, endurance, flexibility, and coordination, which may reinforce and solidify their physical perceptions. Ten out of the sixteen women reported improvement in both self-esteem and weight loss, while nine reported that they had experienced an increase in strength. Eight reported increased stamina and five reported an improvement in their posture and weight reduction (73). These findings were important for inmates who often reported weight gain attributed to the metabolic changes of drug withdrawal, high-carbohydrate prison diet, and prison canteen options limited to high-calorie snacks, boredom and inactive lifestyle as a result of their imprisonment (73, 81).

In a related study, Perez-Moreno et al. studied the effects of a 4-month concurrent cardio-respiratory and resistance training program on the cardio-respiratory fitness, lower and upper body dynamic strength endurance, muscle mass and quality of life of adult prison inmates who are HIV/HVC co-infected that were enrolled in a methadone maintenance program (82). They concluded that supervised exercise training program produce significant gains in

training group in the functional capacity (cardio respiratory capacity and dynamic strength endurance) which can improve the overall physical fitness of incarcerated people.

A reported study by Nelson et al. in a maximum security prison in the USA on a programme which incorporated 30 minutes of exercise up to four times a week over six months or more and its impact on 120 inmates (69) revealed that inmates benefitted from the programme in terms of weight reduction accompanied by increased in energy, strength and stamina levels as well as enhanced muscle tone. The overall results of the study indicate the positive effects of exercise on inmates' physical fitness levels generally (69). The following were some of the comments from prisoner concerning the programme and their expected outcomes in another study conducted in USA (83):

“Soon as I heard about the program, it was a godsend. It was my opportunity. I have lost weight and my strength has gone up”.

“...the program helped him do physical things with increased stamina and durability”.

A randomized control study conducted in an Italian prison also revealed interesting findings concerning the positive impact of supervised physical activity on the overall fitness and health status of prisoners (81). Three main groups namely the experimental (2 groups) and a control group participated in the study. Whereas the experimental groups saw a marked improvement in their general strength levels, the control group witnessed a decrease in their agility level (81).

*Discussion:* It is clear from the findings that engaging in physical activity can guarantee strength and good fitness levels sufficient to sustain daily life in prison while also decreasing the risk of chronic disease. Exercise plays a major role in developing and maintaining the health of prisoners. This is especially true when faced daily with high-fat, high-sodium prison

food (83). Overall, prisoners who engaged in physical activity showed a significant reduction in infirmary visits and reduced use of medication and improved self-defense (83).

It must be pointed out though that measurement of physical activity impact on its participants is a complicated process, and no single method is suitable for all purposes (69). Also, the voluntariness of participation (assuming that individuals who volunteer for such programmes may be already highly self-motivated) as well as the results in such impact studies may be skewed because of other external variables in the prison environment such as bad nutrition, lack of the necessary facilities and resource capacities as well as specialized personnel to ensure the substance of such programmes can all influence the outcomes of physical activity programmes in prisons. In addition, many of the studies on physical activity displayed clear methodical limitations and high attrition rates of participants. The impact of such limitations were far reaching on the results with many of the studies being inconclusive and thus required further studies to establish a firm link between physical activity and its physical health benefits on participants. Again due to some of these high attrition rates, coupled with small sample sizes for such studies, many of the findings may not necessarily generalize to other jail populations in other places. These findings point to the fact that engagement in some form of physical activity can contribute significantly to prisoners feeling better, while also giving them energy. Also, regular physical exercise practice among prisoners has been found to reduce sleep problems such as insomnia (84).

#### **4.2.2 Decreased Risk of Chronic Disease**

*Findings:* A second benefit of physical activity engagement on the overall physical health of prisoners is a decreased risk of chronic disease. Amtmann et al reporting on the benefits of a physical exercise programme for men over the age of 40 at the Montana State Prison found statistically significant improvements in the experimental group when compared to the results

of the control group in the areas of body composition, heart rate and muscular endurance pushes ups and sit ups (83).

A prisoner who participated in the programme had this to say about it:

"Before I started the program and participated in the stretch exercises, I was having problems just bending over and putting on my shoes because I was so stiff in my hips and back. ...now I can pull my legs up to my waist."

The results of a randomized control trial of a 12 week exercise and health education programme in a correctional facility in New South Wales, Australia, found statistically significant improvement in the parameters of resting heart rate and endurance among the experimental group (85). The programme targeted inmates who were in their forties with a chronic illness as well as inmates who had displayed high risk factors for developing such chronic illness. An Italian study cited above has also found that experimental groups produced significant gains in the functional capacity (cardio-respiratory capacity and CVD risk decrease) of incarcerated males (81). These findings support that of Amtmann et al. who also found statistically significant improvements in these parameters as cited above (83). There was overwhelming evidence to support the fact that physical activity can improve the quality of life, reduce morbidity and premature mortality as well as improve the overall health and well-being of people suffering from a wide range of chronic illnesses. Also, it was found that physical activity can assist in decreasing the risk factors for developing a chronic illness (85). The researchers concluded that such exercise programmes are not only good for health but also are financially beneficial as it reduced health service utilization.

*Discussion:* From the studies, it is clear that exercise programmes for the management of chronic illness is an effective way to improve the general health of inmates, especially those who have developed some chronic illnesses as it has been found to significantly aid in reducing premature mortality and decrease symptomatology in inmates who have already



developed such illness. Recent studies into the cost benefits of exercise programmes in prison have shown that such a move is financially beneficial for health service providers as inmates who engage in physical activity are less likely to utilize hospital and community-based health services than their non-participating counterparts (83). Overall, exercise becomes a potentially effective therapeutic tool for individuals living under difficult conditions such as in prison as it offers them an opportunity to improve their health status.

### **4.3 Social Benefits**

The last but not the least of the benefits that accrue from engaging in physical activity is social benefits. Participation in physical activities may facilitate social interaction as it offers a great way to meet people and bond with them, learn the tenets of fair play, teamwork, solidarity and has a great impact on minimizing the incidence of engaging in antisocial behaviour (25).

#### **4.3.1 Social Skill and Interaction Improvement**

*Findings:* According to a study by Vaiciulis et al, physical activity is a decisive factor capable to cause significant influence on inmates' social skills (79). Engagement in sport while in custody appears to offer a context within which shared interests can promote a level of communication which would not usually take place in such a setting. Such evidence serves to demonstrate how engagement in team sports can help people in custody develop their social skills in terms of listening, collaborating and working together. As one prisoner opines:

“Yeah, you see them round the prison but you don't really talk to them. But when you see them in the gym an' stuff and they're doin' the same work-out as you're doin', then you get to talk to them. You just start communicating with them, y'know what I'm sayin"... (76).

In a study undertaken in the US by Wagner et al (74), an exercise programs targeting adult inmates found out that one of strategies to facilitate interaction and improve social skills in prison is through inmate participation in physical activities. Engagement in sports or exercise by inmates fostered and developed their interpersonal skills such as trust, cooperation, team work, acceptable outlets of stress, increase access to new social environments, identify activities that serve as alternatives to addictions, enhanced their self-esteem by realizing success with a given pursuit, develop decision making and problem solving skills which influences them in choosing to adopt healthier lifestyles. All of these helped them to form social bonds with others (86). Some of the inmates rightly capture it this way:

“Yeah, it’s like, in prison you meet different people in the gym sessions an’ that. You’re in there doin’ a bit of ‘shoulders’ an’ they’re given you hints on how to get bigger an’ that”. (76)

An’ while you’re workin’ out you’re talkin’ with them.

“Yeah ... [before] I came in I used to smoke weed an’ that and I never used to talk to no one really. But I started to do sport an’ you get to know people an’ you get more confident talking to them an’ that ... I talk to the family, I talk to the ‘missus’ [girlfriend] an’ that. Sport’s definitely kept me out of trouble while I’ve been in prison”. (76)

“When I first come here I was on the [prison] wing and I used to mouth off at staff and have fights an’ all that. But on social time, if I’m off the wing doing sport, I’m not getting into trouble ... You’ve got to behave to keep coming [to Academy sessions]. And so I kept coming and started to enjoy it.... So, it taught me how to behave really; just started behaving” (76).

*Discussion:* These findings highlight the impact that sport participation has on the personal development of inmates as it fosters the development of social and communication skills which can help inmates re-envisage a more positive future and perceive of themselves in more positive light thereby promoting resistance from subsequent offending. Participation in physical activities has been found to serve as an incentive for good behaviour which promotes acceptable social skills and control necessary for everyday life in prison. Through it, they develop new interests which could evolve into a career, develop awareness of

personal needs and appropriate avenues to satisfy themselves. With such acquired social and communication skills, prisoners will be better equipped to articulate their needs which, in turn, increase their chances of receiving appropriate help and support to make the transition back into society smooth and less complicated. Again, improved social skills will also help inmate in their attempt to assimilate prison culture as well as in their communication with the prison officers and other convicts as they seek to get materials and non-material benefits (79).

However, not all the studies showed that engagement in physical activity necessarily has a positive effect on the development of social skills. Rather, in some studies, physical activity has been found to develop antisocial behaviour and negative personal qualities (e.g. dominion, hostility, selfishness, disobedience to rules and disruptive behaviour). In addition, some of outcomes of studies on sports have found that sport can affect harmful habits, for instance, alcohol consumption; athletes may also have a narrower circle of interests, be unable to communicate with their peers and have an exaggerated self-confidence. For instance out of eleven social skills assessed in the study by Vacilicus et al., only two skills were determined to be statistically significant comparing physically active and inactive inmates. Thus, engagement in physical activity cannot guarantee the development of good social skills, hence, it should not be seen as the single exclusive factor in the development of such skills but only as a part of the overall process that determines the development of social skills.

## Chapter 5

### 5.1 Findings Related to Theoretical Framework

The findings obtained in this study highlight the positive psychological, physical and social outcomes that prisoners gained from participating in any type of physical activity. It emerged from the findings that such outcomes are important and useful to prisoners' health. These outcomes transcended factors such as prison type, continent, country, age, gender, criminal status and condition of the detention.

In the majority of the studies selected and analysed, I found the following: First, there was a statistically significant decrease in the rate of depression, low levels of worry, stress, boredom, anxiety, aggression, identity loss, remorse and anger associated with imprisonment among prisoners who regularly engaged in some form of physical activity compared to those who did not. Second, prisoners who engaged in physical activity showed a marked improvement in their social skills and fitness levels. In addition, many of the findings also indicated that prisoners who engaged in physical activity reported that they were sleeping well. Third, it was revealed that prisoners who engaged in exercise or sport did so for the enjoyment, fun and the good feeling that the activity offered. This enhanced their mood which in turn increased their self-esteem. Finally, I found that prisoners engaged in physical activity as a coping strategy to deal with difficulties of life found in prison.

These findings could be explained through the theory of salutogenesis developed by Aaron Antonovsky. According to this theory, coping can be facilitated by the General Resource Resistance (GRRs) which can be developed when an individual participates in various social activities such as physical activities. GRRs are constant resources which strengthen a

person's sense of coherence (SOC). Thus experiences and reflections obtained from participating in various physical activities can increase an individual's GRRs which in turn would strengthen his/her SOC and allow him/her to perceive his life as manageable, meaningful and comprehensive (48). Thus, coping mechanisms triggered by certain experiences and learned through important life changes such as being incarcerated may over time contribute to develop strong SOC which in turn can help prisoners to choose positive life behaviours such as being physical active and get better food habits (61).

A major finding from this study was the coping strategy employed by prisoners through their engagement in physical activity. This strategy raised prisoners' awareness of the need to not break any prisons rule so as not to lose access to exercise equipment. Therefore participating in exercise proved to a good incentive for good behaviour on the part of prisoners and served as a social control measure within the prison.

## **5.2 Methodological Considerations**

### **5.2.1 Limitation**

The findings in this study should be considered in light of methodological limitations related to the analysed articles. The first limitation is related to the low number of randomized control study found and analysed. Only 3 RCT studies out of 14 were selected and analysed. The advantage of using RCT is that it can reduce bias by minimising allocation and balancing both known and unknown confounding factors. For example, in a study by Wagner et al, the investigators preferred a randomized research design but prison policies in that prison did not allow for randomization. Only those prisoners whom prison officials allowed to participate in the study were assigned to the experimental group.

The second limitation is related to the fact that some studies were based on voluntary participation which might cause selection bias. Those individuals who are more motivated to increase their physical activity level may agree to participate in the evaluation to a higher degree. However, the voluntary participation is an ethical requirement. Individuals that are not ready to become more physically active should not be forced to participate.

The third limitation is the low level of participants in most of the studies selected. In some of studies, the sample size was made up of about 9 or 10 participants in control and experimental groups (82). Instances of this nature raise questions about issues of validity and generalization of findings. However, the reliability of the thesis conclusion is not affected by the fact that some of the studies have low sample size.

The fourth limitation is related to self-report measurement. In studies such as the one conducted by Cashin et al (72) in Australia about the relationship between exercise and hopelessness, the reported measure of exercise was based on self-report. Measurement of this kind can raises questions concerning the reliability of measurement as it could assumed that such reported measurement could be influenced by the individual's memory or expectation, thus reducing the answers to recall and desirability bias (87). In addition, self-reported facts from detainees might not sufficiently reflect reality and may be susceptible to several self-presentation biases, including exaggeration or denial of real result and the wish to present oneself in a positive manner. These biases are likely to be particularly relevant in prison settings, where the prisoners may fear the consequences of truthful responses (88). Again, I have to mention that measurement of physical activity is exceptionally difficult and the accurate assessment of an individual's activity levels remains a controversial and difficult area (7). Nevertheless, in some studies like the one conducted in Italy by Battaglia et al,(81)

the significant gains obtained in functional capacity reflected the great potential of exercise interventions for improving the health status of incarcerated people.

The fifth limitation is based on high level of attrition rate (drop out) in some studies. This is because prisoners who are involved in study may be released before the end of the study or transferred to other prisons mid-way through their participation in the study, reflecting one of the inevitable challenges of conducting study in prison. Coupled with this, many studies involved only male inmates, the inclusion of woman would have given a good representative sample, however, this do not affect the conclusion reliability.

Lastly, it is not clear whether all participants responded to the physical activity measure, including the physical activity in which they engaged specifically for their sport, and to what extent the physical activity in which they engaged was separate from the usual activities they participated in. This is the case where inmates were either exercising or not exercising before data collection began. Continuing this research through a longitudinal design will allow the opportunity to examine these relationships further.

Despite these limitations cited above, it is believed that the positive outcomes from participating in regular physical activities can yield health, social and financial benefits.

### **5.2.2 Strength**

There are, however, strengths to be considered for this study. Participants in selected studies varied in age and include young, adult and old from age of 15 over; and were located in different continents especially in countries of western societies. This means that the result of some studies could be useful to countries in western societies. The step by step process used to arrive to my findings has been described earlier in chapter 3. In addition, studies included

in the review were obtained by following the principles of conducting a qualitative systematic review and it was important to show how these studies were obtained and treated. The methods were set out in a research protocol, which defined the research question, a comprehensive search of databases, inclusion and exclusion criteria, the data extraction process, quality assessment and data synthesis of included studies. All articles were critically appraised and reported in a consistent and transparent manner and all the studies included in this review were published in known and reputable journals. Unpublished materials were not used in this study.

The obtained results highlight the potential health benefit of exercise in detention. It provides valuable information to be used in the process of health promotion in prisons. Exercises indeed show multiple inputs in custody, subject inmates to distraction, occupation and romping specific physical and psychological benefits. These mental and physical changes help prisoners in a stronger recovery and preparation for public life after release.





## **Chapter 6**

### **6.1 Conclusion, Recommendation and Further Research**

#### **6.1.1 Conclusion**

There are prisons in any part of the world and they will continue to exist because people will continue to commit crime. However, being imprisoned does not necessarily mean the denial of a one's fundamental rights, but only a restriction of rights such as free movement. Prisoners though in detention, remain a part of the community and will eventually return back into the community.

However, the ability to move successfully from the correctional environment to being a productive citizenship often depends on how offenders spend their time during incarceration. Prisoners with record of participation in various physical activities while in prison are known to experience significantly fewer problems and hence better re-integration back into the community. Thus individuals entering in prison system require opportunities to maintain and improve their health and wellbeing. Insufficient physical activity is a public health problem and physical activity is essential in maintaining good health for prisoners of all ages.

This study has demonstrated positive social, physical and psychological benefits of engagement in physical activity to prisoners' health and behaviour. In fact, participation in sport activities can be a vehicle for developing inclusion, acceptance and social skills; and generally, it can contribute in reducing recidivism.

In addition, organized exercise has been found to decrease sedentary behaviour for the most disadvantaged and excluded individuals in our society and also increases an individual's

capacities to cope with and ‘survive’ imprisonment. Prisons have been identified as one key setting for health promotion because it is an environment that houses excluded groups with demonstrable health inequalities and who are “hard to reach”. The negative effects of custody on the health of prisoners can be reduced to a barest minimum if we address the health of prisoners as we will be addressing health inequalities (25).

Introducing physical activity program in prison can be an effective way to address such health inequalities. Different physical activities delivered in a specific, well-coordinated, task-oriented and well-allocated way might make a contribution in an all-encompassing policy strategy committed to improve the health of prisoners. Furthermore, funding prison health promotion through the introduction of physical activity programmes is likely to be sound economic investment, as it has been found to help prevent reoffending as well as improve inmates’ health (25). The findings of this study provide valuable policy information for managers of prison systems and prison policy makers, about lifestyle factors in prison and their association with physical activities: changing conditions of imprisonment is of public health benefit. Apart from avoiding overcrowding and mutual annoyances for detainees in multiple bed cells, providing a secure and calm prison environment, offering more sports opportunities, providing adequate care for medical problems and adequate psychological and social support to relief stress, seem all to be promising approaches in this respect.

### **6.1.2 Recommendations**

Based on the findings and conclusions presented above, the following recommendations are suggested:

1. Organized physical activities and various sports programmes should be made an integral component of the administration and the management of prisons. All those

involved should facilitate, support and encourage as much as possible the various physical activities as part of the daily routine for prisoners.

2. Prisons should employ professional physical training instructors to conduct physical activities programmes and educate prisoners about the health benefits of physical activities and the negative effects of inactivity.
3. While in incarceration, prisoners should participate in specific physical activities with the aim to promote their health and rehabilitation for a better reintegration after release.
4. Supportive physical environment in prisons, with access to equipment and large number of adequate facilities and activities should be provided for prisoners around the world.

### **6.1.3 Further Studies**

Further research examining outcome of organized physical activities in prisons should be conducted in developing countries because the studies found and analysed in this review were predominantly conducted in many developed countries. Further research is necessary for more accurate assessment of measurement of activity levels.

In addition, further research should be conducted with a high participation rate. Such studies would improve generalizability of results. Coupled with the above, longitudinal studies are required to follow prisoners up after release. To investigate the extent of physical activities influence on released prisoners' lifestyle and career choices; and also to determine the behaviour changes observed in the prison environment and how these have been maintained in their life outside. Such studies are important because their outcomes will reveal areas of weakness and strength of such programmes. They would also allow the measure of recidivism among those who were engaged in exercises. Finally, the majority of studies

found were done in male prisons; therefore women prisoners should also be another issue of focus.

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## Appendices

### Appendix 1

Search Name: **Cochrane Library search strategy**

Date Run: 24/02/14 13:13:19.617

Description:

ID	Search Hits
#1	MeSH descriptor: [Prisoners] explode all trees 197
#2	MeSH descriptor: [Criminals] explode all trees 24
#3	MeSH descriptor: [Motor Activity] explode all trees 14652
#4	MeSH descriptor: [Exercise] explode all trees 12693
#5	MeSH descriptor: [Sports] explode all trees 9216
#6	MeSH descriptor: [Sedentary Lifestyle] explode all trees 222
#7	#1 or #2 217
#8	#3 or #4 or #5 or #6 18075
#9	prison* 627
#10	inmate* 190
#11	physical activit* 14526
#12	exercis* 43466
#13	sport* 11723
#14	improved health 33452
#15	wellbeing 1077
#16	good health 24442
#17	#7 or #9 or #10 679
#18	#8 or #11 or #12 or #13 57400
#19	#14 or #15 or #16 47897
#20	#17 and #18 and #19 90

### Pub Med search strategy

(((((prisoners [Title/Abstract]) OR inmates [Title/Abstract]) AND physical activities [Title/Abstract]) OR exercise [Title/Abstract]) AND health benefit [Title/Abstract]) OR improved health [Title/Abstract]

## Appendix 2

The summary of 14 studies included in final synthesis with their aims, participants, methodology and key findings

Author / Study Design	Country	Title	Participants/Sample	Methodology	Key Findings
1. Battaglia, C. et al (2013) RCT	Italy	Benefits of Selected Physical Exercise Programs in Detention: A Randomized Controlled Study	Seventy-five male subjects were enrolled in the study and randomly allocated to three groups: the cardiovascular plus resistance training protocol group (CRT) ( $n = 25$ ; mean age $30.9 \pm 8.9$ years), the high-intensity strength training protocol group (HIST) ( $n = 25$ ; mean age $33.9 \pm 6.8$ years), and a control group (C) ( $n = 25$ ; mean age $32.9 \pm 8.9$ years) receiving no treatment.	A repeated measure design was used to evaluate the effects of two different training protocols on subjects in a state of detention.  Pre- and post-experimental protocol was used. At the beginning and at the end of the experimental protocol all subjects were tested to evaluate their fitness level and health status.	Both CRT and HIST protocols produced significant gains in the functional capacity (cardio-respiratory capacity and cardiovascular disease risk decrease) of incarcerated males. The significant gains obtained in functional capacity reflect the great potential of supervised exercise interventions for improving the health status of incarcerated people. Current results suggest that supervised physical activity improved fitness and health status in prisoners.
2. Cashin A et al (2008) RCT	Australia	Fit for prison: Special population health and fitness programme evaluation	A randomised control trial. The recruited participants were randomly assigned to an exercise or wait list group using a computer programme (n10, respectively). The group assigned to the wait list continued usual exercise regimes and had the opportunity to participate in the exercise programme in the following cycle. Twenty male inmate participants with a	Pre and post programme health assessments that included resting blood pressure and heart rate, weight, body mass index, waist girth, peak flow measures, peripheral saturation of oxygen, blood glucose levels and 6 minute walk test.	Statistically significant improvements in resting heart rate and endurance were found. Conclusions: The health and fitness programme positively impacts on the health of inmates with a chronic illness. A further study with a larger sample size would be productive

			chronic illness, two risk factors for developing a chronic illness or who were over the age of 40 years.		
3. Perez-Moreno et al, 2007  RCT	Spain	Effect of exercise training in Spanish prison inmates.	27 male inmates. Randomly assigned training group of 14 and control group of 13.	This study utilized a single blind design.  Twenty seven of the participant finally agreed to enter the study and were randomly assigned to either a training (n = 14) or control group (n = 13).	Significant Quality of life (QOL) increase in treatment group. Supervised exercise training can improve the overall physical fitness of incarcerated people.
4. Buckaloo, Krug & Nelson, (2009) /  Prospective cohort study	USA	Exercise and the low security inmate: change in depression, stress and anxiety.	60 male inmates from Oklahoma Dept. of Corrections. 30 exercise group and 30 no exercise group.	Inmates who were exercising or not exercising prior to the beginning of the study completed the Beck Depression Inventory II, Life Experiences Survey, and Daily Hassles Survey. The lead author asked inmates who do and do not exercise regularly to participate in this experiment. The inmates completed the three assessment scales, plus a demographic form asking their age, race, type of charge, time served, and time remaining in current sentence.	Exercise results in lower depression/anxiety and more positive life experiences compared to those who didn't exercise regardless of the type of exercise and number of sessions participated in. Regular weight lifting increases inmates' self-confidence and social skills by reducing tension levels. Exercise has been shown to induce a sense of calmness for the individuals who regularly partake in exercise regimens. As previously discussed, exercise provides inmates with a productive way of coping with and managing stress and increases social interaction, which can aid the offender in contributing to society upon release. Without the development of such coping and managing strategies, inmates are at greater risk for



					recidivating and posing a threat to society
5. Verdote ch. Et al 2010 Prospective cohort study	France	A simple tool to ameliorate detainees' mood and well-being in prison: physical activities	A total number of 26 male subjects, imprisoned between 3 to 48 months participated to the study. Aged between 20 and 59 years. Sexual offences Two groups, one of 15 which followed physical program and 11 wished to remain sedentary.	Data were collected by auto-administered psychological tests and physical evaluations. The participants were divided into two groups: 15 "Sportsmen" (aged 20 to 57 years, Mean: 33.3 ± 9.4) who chose spontaneously to follow the physical programme; and 11 "References" (aged 26 to 59 years, Mean: 39.1 ± 11.5), who did not and wished to remain sedentary. Each "sportsman" participated in two to three physical exercise sessions per week.	The data showed a statistically significant effect of the physical program on the evolution of perceived stress, of depression, of self-esteem, of physical mobility and perceived pain as revealed by the ISPN (health-related quality of life). Skill and equilibrium were also improved. It should be relatively easy to facilitate the use of physical exercise programmes, aiming at improving the quality of life, which the present data suggest to be effective against the measured mood disorders.
6. Cashin A, Potter, E and Butler , T(2008)  Cross-sectional study	Australia	The relationship between exercise and hopelessness in prison	914 Australian inmates. Relationship between level of self-reported physical exercise and mental wellbeing.	Data were collected on self-reported activity level and the Beck Hopelessness Scale was administered. These data were used to assess the relationship between the participants' self-reported level of physical activity in minutes per week in prison and psychological well-being as measured by the Beck Hopelessness Scale. Interviews were conducted with inmates in the prison in which they were currently incarcerated.	A significant inverse relationship between self-reported exercise in minutes per week and hopelessness was identified. The need to include exercise as a factor in inmate health plans is discussed. As increased exercise volume is correlated with decreased hopelessness, the potential to decrease rates of self-harm provides further impetus to include exercise as a factor in inmate health plans.

					There was a statistically significant correlation found between increased self-reported exercise and decreased hopelessness as measured by the Beck Hopelessness Scale in this prison cohort.
7. Nelson et al, 2006  Prospective cohort (pilot study)	USA	The effect of moderate physical activity on offenders in a rehabilitative program	120 inmates in a maximum security prison in the USA which incorporated 30 minutes of exercise up to four times a week over six months or more	A strictly confidential and voluntary questionnaire was developed and used. One hundred five inmates (87.5%) agreed to participate in the pilot study, while fifteen inmates (12.5%) declined to participate.	Regular moderate physical activity produces positive mental and physical benefit for offenders. Concluding that participants experienced physical benefit in terms of weight reduction accompanied by increased energy, muscle tone, strength, stamina and anti criminal lifestyle
8. Vaiciulis V, Kavaliauskas S, Radisauskas R (2011).  Cross sectional study	Lithuania	Inmates' physical activity as part of the health ecology	Sufficiently physically active inmates (n=185) physically inactive inmates (n=135).	A written questionnaire was used in the study. For data analysis, the respondents were divided into two groups: Physically active and inactive. Two software programmes were used in processing the collected data: SPSS and Excel.	The study results showed that self-esteem in physically active inmates is statistically significantly higher than in physically inactive inmates (p=0.033). Self-esteem and contentment with psychological state in physically active inmates from In this study, the probability that the convicts who have a strong sense of responsibility tend to be more physically active than the inmates who do not consider themselves responsible is 7.4 times higher.
9. Garcia D. M, Devis, D.J and Sparkes ,	Spain	Sport and physical activity in a high security	In total 39 participants were formally interviewed,	This paper draws on data generated from a two-year ethnographic	We provide details of the following key themes that

<p>C.A(2009)</p> <p>Ethnographic study).</p>		<p>Spanish prison: anethnographic study of multiple meanings</p>	<p>some of them several times. These included 20 prisoners, 12 educators/monitors, plus five guards and other officials</p>	<p>study.</p> <p>The following methods were used to collect data: observation; field notes; and interviews.</p>	<p>emerged from the analysis: (a) escaping time; (b) perceived therapeutic benefits; (c) social control; (d) gendered dimensions; and (e) performing masculinity.</p>
<p><b>10.</b> Libbus,K M. Genovese J A and Poole, J M(1994)</p> <p>A quasi experimental study</p>	<p>Missouri -USA</p>	<p>Organized Aerobic Exercise and Depression in Male County Jail Inmates</p>	<p>25 subject from one jail and 20 inmates from another prison constituted a control group. Participant age: 18-50</p>	<p>Two factor design: (exercise group and a control group). The treatment group engaged in a regular, progressive aerobic exercise program consisting of 3 one hour sessions each week for 12 weeks. Except pre and post exercise measurement, nonintervention was delivered to the control group. Both groups completed the becks depression inventory (BDI) twice, with a 12 week interval between tests.</p>	<p>12-week program of regular aerobic exercise decreased symptoms of depression in treatment group. As measured by the BDI, exercised group had significantly lowered scores compared with the control group. P =0.0001</p>
<p><b>11.</b> Parker A, Meek R, and Lewis G (2013)</p> <p>Prospective cohort.</p>	<p>UK</p>	<p>Sport in a youth prison: male young offenders' experiences of a sporting intervention.</p>	<p>The respondent sample comprised 12 young men aged 15–17 years</p>	<p>The study utilised those methods of enquiry traditionally associated with qualitative research (i.e. participant/observation, semi-structured interviews and documentary analysis) in order to explore respondent experiences of the sports-based intervention in question. A fieldwork journal was used to record everyday events, whilst observations and interviews were carried out during educational activities either in classroom or PE settings, i.e. in and around the gym and sports hall. Alongside interviews with residents, discussions also took place with mentors, caseworkers</p>	<p>The paper concludes by highlighting that sport/physical activity can confer significant psychosocial benefits and promote the rehabilitation of young people leaving custody, particularly when integrated into wider programmes of support and provision</p>

				and PE staff. Interviews with respondents were recorded and transcribed in full.	
<b>12.</b> Wagner, McBride & Crouse, 1999  Prospective cohort study	USA	Effects of weight training exercise on aggression variables in adult male inmates levels(Texas)	A total of 116 experimental group participants and 86 control group participants followed 8 week study and completed all three data collections.	There were a selection of a training group and a control group. At the beginning of the 8 week study, participants completed both the BPAI and POMS tests. After 4 weeks the tests were administered a second time, then again at the conclusion of the 8 week study, the control group was asked neither to participate in any weight training activities nor to participate in any other formal physical activity programme. This was verified by a questionnaire distributed at the end of the study.	Verbal Aggression, anger, hostility all decreased in treatment group. Found substantial measured reductions in the frequency and severity of verbal aggression, hostility, and anger. Inmates who participated in this study admitted that lifting weights did, in fact, provide them with a release from the stressors of life in prison. Applying these findings to correctional facilities, allowing inmates access to exercise equipment on a regular basis may very well reduce the frequency of misconduct, which could arguably improve the prison setting not only for the inmates but for the staff as well.
<b>13.</b> Elwood R M, et al (2013).  Prospective Cohort (pilot study)	Canada	Incarcerated women develop a nutrition and fitness program: participatory research.	Sixteen women in prison completed the program evaluation	Pre and post program assessments included a self-administered questionnaire and body measures. 16 women completed the pilot program. Prior to the beginning they completed a questionnaire and at the end of program they completed a follow up questionnaire. Difference between pre and post program measurement were tested.	Weight, body mass index, waist-to-hip ratio, and chest measurements decreased, and energy, sleep, and stress levels improved by the end of the program. The majority of participants reported an improvement in energy level, sleep and stress level at the completion of the program.
<b>14.</b> Amtmann, et al (2001).	USA	Measured and Perceived Effects of a Correctional	32 inmates agreed to be part of the research and were present for the	1. Experimental and control group were selected and went	Exercise program targeting older inmate(above 40)

<p>Prospective Cohort Study.</p>		<p>Wellness Program.</p>	<p>first assessment. They were the control group for the infirmary visits hypothesis.  Out of this group, 25 were present for the final fitness assessment: One inmate had died and six had decided they did not want to participate a second time.</p> <p>Sixty-two inmates overall participated in at least two fitness assessments.  This group was the experimental group and the data were used for statistical analysis.  Out of the group of 62 inmates, 22 were still participating in the wellness program during the four-month period used to study the number of infirmary visits.</p>	<p>through a fitness programme assessment from the start to the end. The t test was used on the gains of the experimental and control group for the statistical analysis of the fitness component.</p> <p>2. Open-ended interviews were conducted to determine if the participating inmates perceived benefits from the program.</p>	<p>have helped them adopt healthier lifestyles and form social bond with peers of similar age range while not having to compete with the younger inmates for the exercise equipment. There were improvements in physical fitness of program participants.</p> <p>Program participants were concerned about their health, wanted to contribute to society. Older inmates appreciated the opportunity to interact with their peers in an atmosphere where a sense of unity and camaraderie could develop. The article describes these opinions as important because they give researchers insight into what may be a valuable rehabilitation tool.</p>
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