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Prevalence, Associated Risk Factors and Effects of Depression among Prison Inmates: Case of Buea Central Prison South West Region-Cameroon

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ABSTRACT
Very few studies on mental health have been carried out with respect to Cameroonian prisons with none addressing depression amongst inmates. The aim of this study was to investigate the prevalence, associated risk factors and effects of depression amongst inmates in Buea central prison. A total of 296 inmates including 254 adult male, 22 females and 20 minor male were selected for the study. Data on depression symptoms was collected using PHQ-9 and semi structured questionnaires and all inmates were diagnosed/classified as not depressed, mild, moderate and severe depression based on PHQ-9 scores of 0-4, 5-9, 10-19 and 20-27 respectively. Result revealed that the prevalence of depression in Buea central prison is 93.2% and the prevalence of mild, moderate and severe depression are 20.9%, 58.7% and 13.5% respectively. Identified risk factors such as; missing love ones, being detained, lack of psychosocial support and low economic status were significantly higher in depressed than non-depressed inmates (P-value 0.0002, 0.001, 0.006, and 0.029 respectively). Three identified effects of depression such as hyper anger, frequent tiredness and low self-esteem significant were significantly higher in depressed than non-depressed inmates (P = 0.002, 0.0115, 0,019 respectively).Our findings revealed that the prevalence of depression in Buea central prison is high and stands at 93.2%. Missing love ones, being detained, lack of psychosocial support and low economic status are risk factors of depression and hyper anger, frequent tiredness and low self-esteem are the effects associated with depression in Buea central prison.

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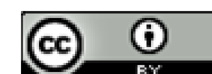

BACKGROUND

Depression has always been a problem for human beings. Philosophers and writers pointed out that the long-standing existence of depression as a health problem have had no effective ways to be treated (Ban, 2014). Depression was initially called melancholia which appeared in ancient Mesopotamian texts in second millennium B.C. (Ban, 2014)). At this time, all mental illnesses were attributed to demonic possession and were attended to by priests. The first historical understanding of depression was thus that depression was a spiritual (or mental) illness rather than a physical one. However, early Romans and Greek doctors thought that depression was a biological and psychological disease (Blazer *et al.,* 1994; Horvath and Weissman 1995). Thus, gymnastics, massage, special diets, music and baths as well as concoction of poppy extract and donkey's milk were used to alleviate depressive symptoms (Patten 2002). Hippocrates, a Greek physician later classified mental illnesses into categories that include; mania, melancholia (depression), phrenitis (brain fever) and thought that melancholia was caused by too much black bile in the spleen. Thus he used bloodletting, bathing, exercise, and diet to treat depression British (Science Museum, 2009).

In 1621, Robert Burton published "Anatomy of Melancholy" in which he described the psychological and social causes (poverty, fear and solitude) of depression. In his work, he recommended diet, exercise, distraction, travel, purgatives (cleanser that purge the body of toxins), bloodletting, herbal remedies, marriage and even music as treatments for depression Silverman 1968). During the beginning of the age of enlightenment (the 18th and early 19th centuries), it was thought that depression was an inherited, unchangeable weakness of temperament which led to the common thought that affected people should be shunned or locked up. As a result, most people with mental illnesses and poor and some were committed to institutions (Nemade *et al.,* .,2015)

Between 1938 and 1955 several reports indicated that the prevalence of depression in the general population was below 1% and the life time risk for depression was estimated as 3% to 4% worldwide (Ban, 2014).

Depression as a common mental disorder, it is characterized by persistent sadness and a loss of interest in activities that

an individual normally enjoys, accompanied by an inability to carry out daily activities, which be after at least two weeks (WHO, 2019). It can lead to a variety of emotional and physic al problems and can decrease a person's ability to function at work and at home (APA, 2013). There are several forms of depressions which include; major depression, psychotic, atypical, bipolar disorder, seasonal affective disorder, dysthymia and postpartum depressions (Mayor Clinic, 2019). The most common type of depression is major depression (major depressive disorder) which account for 7% adult U.S population of debilitating mental health at any given time. Depression is characterized by the presence of five or more symptoms for a period of 2-weeks and represent a change from previous functioning, with at least one of the following symptoms: low mood, loss of interest or pleasure in normally enjoyable activities, Low self-esteem and pain without clear cause (Maideen *et al.,* 2014; Bedaso *et al.,* 2 018).

Evidence has been presented that depression is associated with the environment when comparing developed versus developing countries (WHO, 2001) and prison environment versus general population (Bland *et al.,* 1998). The prevalence rates of depression in developing countries is higher than in developed countries (WHO, 2001). This is because some environmental factors contribute to the genesis of depressive disorders in developing countries and include; high rates of poverty, a lack of social welfare and high rates of endemic infectious diseases (Nwaopara and Princewill, 2015).

The prevalence of depression is much higher in prison environment than in the general population (Gambhir *et al.,* 2015; Rao *et al.,* 2018). Prison environment neutralizes the formation and development of basic human values, contributes to stigmatization, alters the inmate's conduct and leads to temporary or even irreversible psychic sequelae which can lead to depression and anxiety (Nwaopara and Princewill, 2015). Depressive disorders might be present before admission into prison environment and might be further exacerbated by being detained. However, mental disorders might also be developed during imprisonment itself as a result of prevailing conditions, possibly due to torture or other human violations (Arboleda, 2007). Although depression is common among inmates, there is uncertainty over its etiology (cause) and risk factors, which complicates the management (Rao *et al.,* 2018). Risk factors of depression among inmates include; overcrowding, lack of recreational activities, high level of uncertainty, loss of freedom and opportunities, loss of interpersonal relationship, employment and social roles, low economic status, missing love ones, substance (drug) abuse/addiction, and family history of condition (Bedaso *et al.,* 2018).

World Health Organization (WHO) estimates that about 350 million people worldwide are affected by depression (Bedaso *et al.,* 2018). Out of these people suffering from depression, 85% live in low- and middle-income countries (Abdu *et al.,* 2018) and women are more likely than men to experience depression (Kessler *et al.,* 2005). Over 11 million people are held in penal institutions throughout the world either as pre-trial detainees/remand prisoners or having been convicted and sentenced (Walmsley, 2018) and about 11% of the prisoners are suffering from depression and anxiety (Beyen *et al.,* 2017). In Africa, the prison population is estimated to be 1,162, 440 inmates and in Cameroon it is estimated to be 29,341 inmates (Walmsley, 2018). According to studies conducted in different parts of Africa, 10.4% to 82.5% of the prisoners are depressed and the disorder is higher among females and young age groups (Naido and Mkize, 2012).

There are several levels of depression; mild, moderate and severe depressions which are related to the cumulative effects of the associated risk factors (Chetcha *et al.,* 2018) and varies among prison due to differences in prison environment and condition, lack of` psychosocial support, lack of rehabilitation structures, inadequate provision of health care, financial constraints and overcrowding (Nwaopara and Princewill, 2015).Depression effects on inmates are as follows: ; low self-esteem, frequent tiredness, hyper anger, always feel anxious, feel deep sadness, constant feeling of frustration, and feel like to take your life. Diagnosing depression is based on some of the following methods: PHQ (Patient Health Questionnaire), Center for Epidemiologic Studies Depression Scale (CES-D), Beck Depression Inventory (BDI), Major Depression Inventory (MDI).

A Prison is an institution for the confinement of persons who have been remanded (held) in custody by a judicial authority or who have been deprived of their liberty following conviction for a crime (Coyle, 2019). The original purpose of confining a person within a prison was not to punish them, but was a means of keeping the perpetrators of a crime detained until the actual punishment could be carried out. This was usually in the form of corporal punishment such as beaten with a whip, or capital punishment which used a variety of methods to claim the lives of condemned individuals. The intention was to cause the guilty person pain (Crime Museum, 2017). Before the creation of prisons, victims of crime were punished by death penalty. A London Philosopher named Jeremy Bentham was against the death penalty and thus created a concept for a prison that would be used to hold prisoners as a form of punishment. In the 19th century, prisons were built for the sole purpose of housing victims of crimes and stripped of their personal freedoms. The inmates were often forced to do hard labor while they were incarcerated and to live in very harsh conditions.

Africa's late 19th century prisons were not merely catch basins for the victims of colonial oppression, they were also manifestations of European racial superiority. European settlers and conquerors looked upon African people as subhuman, savages who were unable to be "civilized." (Kenya, Tanzania and Uganda (1969).For example, white prisoners unlike their black counterparts enjoyed higher quality clothing, food, and shelter, as well as vocational training aimed at preparing them for release, rehabilitation, and reintegration (Peté, 1986).

In Cameroon, the majority of prisons are old and unsanitary. Buildings are poorly ventilated, and accessing toilets and water is challenging. Poor hygiene conditions and difficulties accessing health care, compounded by overpopulation, lead to health problems (Namondo, 2013). Since 2011, newer facilities have been built and the state has undertaken prison renovation projects. In the north and east the country, a large number of arrests have taken place in the fight against

the armed group Boko Haram. Many arrests have also occurred in connection with the repression of protest movements in the English-speaking region of the country (in French). The adoption of the Anti-Terrorism Act in 2014 has broadened the spectrum of reasons for arrest and detention. Cases of arbitrary detention, torture and ill-treatment are denounced. Many people are arrested without evidence in the name of fighting Boko Haram, including children as young as five years old. These prisoners are held in military camps without trial for several months (Prison Insider, 2016).

Very few studies on mental health have been carried out with respect to Cameroonian prisons with none addressing depression amongst inmates. This research is aimed at investigating the prevalence, associated risk factors and effects of depression amongst inmates in Cameroonian prisons; Case of Buea Central Prison.

Forms of depression

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) includes signs and symptoms of even more types of depression.

Major Depression:

The most common type of depression is major depression. Major depression as a common mental disorder, it is characterized by persistent sadness and a loss of interest in activities that an individual normally enjoys, accompanied by an inability to carry out daily activities, which be after at least two weeks (WHO, 2019).

Dysthymia*:* Dysthymia is a type of depression that causes a low mood over a long period of time perhaps for a year or more, says Halaris.

Postpartum depression is characterized by feelings of extreme sadness, anxiety, fatigue, loneliness, hopelessness, suicidal thoughts, fears about hurting the baby, and feelings of disconnect from the child (Mayor Clinic, 2019).

Seasonal Affective Disorder (SAD): Extreme Winter Weariness.

This type of depression usually starts in early winter and lifts in the spring, and it can be treated with light therapy or artificial light treatment (Mayor Clinic, 2017).

Atypical Depression:

Despite its name, atypical depression is not unusual. In fact, it may be one of the most common types of depression and some doctors even believe it is under diagnosed.

People with this depression type may also gain weight, be irritable, and have relationship problems. Other features of atypical depression include low mood reactivity (ability to feel better when something good happens) and a long-standing pattern of being extra sensitive to interpersonal rejection (Cristancho & Mario, 2015).

Psychotic Depression:

Psychosis a mental state characterized by disorganized thinking or behavior; false beliefs, known as delusions; or false sights or sounds, known as hallucinations doesn't typically get associated with depression. But according to the National Alliance on Mental Illness, about 20 percent of people with depression have episodes so severe that they develop psychotic symptoms.

"People with this psychotic depression may become catatonic, not speak, or not leave their bed," April 2012 in the Journal of Clinical Psychiatry, found that the combination of medications was more effective than either drug alone in treating this serious type of depression (American Psychiatric Association, 2000).

Bipolar Disorder*: From High to Low (and Back to High Again)*

If your periods of extreme lows are followed by periods of extreme highs, you could have bipolar disorder (a type of depression previously called manic depressive disorder because symptoms can alternate between mania and depression)(Mayor Clinic, 2017).

Mania:

Symptoms of mania include high energy, excitement, racing thoughts, and poor judgment (Mayor Clinic, 2017).

Premenstrual dysphoric disorder, or PMDD, is a type of depression that affects women during the second half of their menstrual cycle. Symptoms include depression, anxiety, and mood swings.(American Psychiatric Association, 2000).

Situational depression:

Also called adjustment disorder, situational depression is triggered by a stressful or life-changing event, such as a job loss, the death of a loved one, trauma or even a bad breakup.

Symptoms of situational depression may include excessive sadness, worry, or nervousness, and if they don't go away, they may become warning signs of major depression (Timothy *et al*., 2017).

Levels of depression

Depression can be:

Mild: Scores within (5-9) on the PHQ-9).In mild depression, the hallmark symptoms of depression "tearfulness, hopelessness, helplessness, irritability, fatigue and negative thinking" manifest in less intense forms, Serani said. "Mild depression can feel as if you're extra tired, extra moody, extra achy more so than usual."

Some people aren't even aware that they're depressed, she said. Others know they're struggling. But "they can make it through the day without too much effort." Still, mild depression can pose significant health risks, including cardiac issues and premature mortality, said Serani, author of the books Depression and Your Child and Living with Depression.

"Some mild depression can be short-lived," remitting after a stressful event gets better, Serani said. (This stressful event might be a divorce, illness, financial issues or unemployment.) "Others are chronic, and can last for many months, even years." Still other mild depression may develop into moderate or severe depression, she said (Serani,2013).

Moderate: Scores within (10-19) on the PHQ-9.This can be also categorized alongside moderately severe depression (Cherney, 2017). In terms of symptomatic severity, moderate depression is the next level up from mild cases. Moderate

and mild depression share similar symptoms. Additionally, moderate depression may cause problems with self-esteem, reduced productivity, feelings of worthlessness, increased sensitivities, excessive worrying.

The greatest difference is that the symptoms of moderate depression are severe enough to cause problems at home and work. Significant difficulties can be felt in social life.

Moderate depression is easier to diagnose than mild cases because the symptoms significantly impact daily life. The key to a diagnosis, though, is to talk to a doctor about the symptoms being experienced (Cherney, 2017).

Severe : Scores within (20-27) on the PHQ-9): Severe (major) depression is classified as having the symptoms of mild to moderate depression, but the symptoms are evident and noticeable, even to your loved ones.

Episodes of major depression last an average of six months or longer. Sometimes severe depression can go away after a while, but it can also be recurrent for some people.

Diagnosis is especially crucial in severe depression, and it may even be time-sensitive.

Major forms of depression may also cause: delusions, feelings of stupor, hallucinations, suicidal thoughts or behaviors (Cherney (2017).

PHQ-9 scores of 5, 10, 15, and 20 represents mild, moderate, moderately severe and severe depression (Chetcha, Kamga, Um, Ntone and Mbanya (2018).

Prevalence of depression

Epidemiological studies conducted among prisoners in many countries have shown a high prevalence of psychiatric morbidity. The magnitude of severe mental disorders was five to ten times higher among prisoners compared to the general population. (Bland *et al.,* 1998).

Mental disorders occur at high rates in all countries of the world. An estimated 450 million people worldwide suffer from mental or behavioral disorders (Making Standards Work, 2001). These disorders are especially prevalent in prison populations. The disproportionately high rate of mental disorders in prisons is related to several factors: the widespread misconception that all people with mental disorders are a danger to the public; the general intolerance of many societies to difficult or disturbing behavior; the failure to promote treatment, care and rehabilitation, and, above all, the lack of, or poor access to, mental health services in many countries. Many of these disorders may be present before admission to prison, and may be further exacerbated by the stress of imprisonment. However, mental disorders may also develop during imprisonment itself as a consequence of prevailing conditions and also possibly due to torture or other human rights violations (Report of the United Nations Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health, 2005).

Fazel did two large-scale systematic reviews of severe mental illness in prisoners worldwide separated by a decade. The first one done in 2002 showed that 10% of men and 12% of women had major depressive disorder. The second one done in 2012 analyzed data on 33,588 prisoners in 24 countries and reported similar prevalence of major depressive disorder: 10.2% in men and 14.1% in women. The prevalence of major depressive disorder in prisoners of low-income countries was 22.5%, which is more than double the prevalence of 10.0% in high-income countries (Fazel, 2002).

Mental health is the greatest challenges for the current and future generations. Worldwide, out of the 66 million people suffering from depression; majority (85%) were from low and middle income countries (Beyen et al., 2017). The prevalence was more common among the prisons population than the community. However, a worldwide consideration given to the problems is very low, particularly for prisoners (WHO, 2001).

To assess level of depression and associated factors among prisoners in prisons of Northwest Amhara Regional State, Ethiopia, Institutional based cross sectional study was employed on 727 prisoners selected by multistage random sampling from three prisons of northwest Amhara. Of the total prisoners participated (649), 284 (43.8%; 95% CI: 39.90, 47.67%) had symptoms of depression. Detainees' satisfaction level about life before imprisonment, belief about their life after imprisonment, plan to commit suicide, social support and types of prisons were significantly associated with depression (World Health Organization, 2010).

In contemporary days, depression is the most common form of mental disorder among inmates, with a prevalence much higher than in the general population (Gambhir; et al., 2015)

Depression affects an estimated 1 in 15 adults (6.7%) in any given year (Palmer, 2005) and moreover, approximately one in six people (16.6%) will experience depression at some time in their life. Depression can strike at any time, but on average, first appears during the late teens to mid-20s. Women are more likely than men to experience depression. Some studies show that one-third of women will experience a major depressive episode in their lifetime (Kessler; et al., . 2005).

Estimated 450 million people worldwide suffer from mental or behavioral disorders (WHO, 2010). There are about 10 million people in prisons. Worldwide, prison population is being raised by around one million per decade. About 11% of prisoners world-wide are suffering from common mental health problems such as depression and anxiety (Beyen *et al.,* 2017).

Europe

In European prisons, the prevalence of depression was estimated to be 25% (Blaauw and Kerkhof, 2000).

America

While study among women's prison in Sa˜o Paulo revealed that the prevalence of common mental disorders like depression was reported as 26.6% ((Blaauw and Kerkhof, 2000).

Studies carried out in US 43% (Rowell, Draine, and Wu, 2011), Brazil 40% prevalence.(Andreoli, Dos Santos, Quintana, 2014).

Africa
According to studies conducted in different parts of Africa, 10.4% to 82.5% of the prisoners found to be depressed and the disorder is higher among females and young age groups (Naidoo and Mkize, 2012).

Out of 400 prisoners, 169 were diagnosed for depression with 59 (14.8%) for mild depression with somatic features, 57 (14.2%) for moderate depression with somatic features, 25 (6.2%) severe depression without psychotic features, while 18 (4.5%) had severe depression with psychotic features. The overall true prevalence of depression was 42.2%. Socio-demographic factors were found to be statistically significant included age (with being older acting as a protective factor), marital status, and place of living (Nwaopara & Stanley 2015). Jos maximum security prison, Nigeria 30,8% (Armiya'u *et al.,* 2013), Ethiopia and Amhara 43.8% (Beyen *et al.,* 2017).

Jimma town Ethiopia overall prevalence of depression among prisoners to be 41.9% (Zakir *et al.,* 2018).

Depression in Cameroonian population
In this section prevalence of depression in the general Cameroonian population is reviewed. Since there are no prior studies on depression in other Cameroonian prisons. According to WHO, 2017 prevalence of depression in Cameroon showed 886 273 depressed with prevalence of 3.9%.

Other studies have been carried out in the country with regards to depression as caused by other factors as follows: A study carried out at the Yaoundé Central Hospital which used the (PHQ-9) to screen for symptoms linked to depression.

In study, 78persons enrolled. The median age was 28.2 years and 23 (29.5%) had mental depression as a result of sickle cell anemia (Chetcha *et al.,* 2018).

A cross-sectional study was conducted among general practitioners, nurses, pharmacy attendants and social workers in public-owned health facilities in the four health districts in Fako Division in the South West Region of Cameroon. The survey had 226 participants with a response rate of 56.7% depressed. Two-thirds agreed that majority of the cases of depression encountered originate from recent misfortune. (Mulango *et al.,* 2018).

Signs and symptoms of depression
Generally, depressed individuals exhibits certain sign and symptoms which may include: Feeling sad or having a depressed mood, Loss of interest or pleasure in activities once enjoyed, changes in appetite, weight loss or gain unrelated to dieting, trouble sleeping or sleeping too much, loss of energy or increased fatigue, increase in purposeless physical activity (e.g., hand-wringing or pacing) or slowed movements and speech (actions observable by others), feeling worthless or guilty, thoughts of death or suicide, difficulty thinking, concentrating or making decisions. Symptoms must last at least two weeks for a diagnosis of depression (Nwaopara and Princewill, 2015).

Symptoms of Prisoner Depression
The depressed prisoner exhibits certain symptoms which may include:
- Distress at constantly seeing the prison gate, which makes prisoners feel trapped
- The depressed prisoner constantly engages in negative thinking or may even try some negative acts, like escaping from the prison
- They lose confidence in themselves and feel as if they might lose their mind and become mad.
- They experience lack of appetite and lack of sleep in the prison environment
- Behavioral changes occur making such prisoners restless and nervous
- Low Mood in Prisoner (Liji, 2017)

Risk factors associated with depression
Many of these disorders might be present before admission to prison, and might be further exacerbated by being detained. However, major depression mental disorders might also be developed during imprisonment itself as a result of prevailing prison environmental conditions, torture or other human rights violations, health, psychosocial conditions and poor administration.(Halliwell, and Richardson, 2007). Many fall into depression in prison due to one or more of the following risk factors; overcrowding, being detain, unsanitary prison environment, lack of psychosocial support, drug abuse, low economic status, poor healthcare, current health condition, history of depression, memories of illegal act, missing love ones and life with other prisoners(Beck 1967, Hoenig 1980).

Poor health condition: Lack of adequate health care in Cameroonian Prisons is a call for concern. Inmates die due to various illnesses contacted before detention or during their stay in the prison confines. This causes fear of losing life other prisoners leaving them depressed and hopeless (WHO, 2017).

Poor economic Status: Lack of monetary aids to prisoners as is common and leaves most of them in depressed states due to the inability to access basic needs (Ahmad and Mazlan 2014).

Memories of illegal acts: During their time in prison, the offenders tend to relive the moments of their crime. This makes them feel guilty and remorseful. Constantly having these thoughts may result in severe depression (American Psychiatric Association, 1994).

Detention: Prisoners are confined to a restricted space, which makes them yearn for the days spent in freedom in the outside world. Prolonged stay in the prison may lead to intense depression, which persists even after their release (Halliwell, and Richardson, 2007).

Missing loved ones: Prisoners feel loneliness, as they are isolated from their family and loved ones. They recall the days spent outside prison. These thoughts of loneliness create the mental conditions of anxiety and depression(American Psychiatric Association, 1994).
Life with other prisoners: Living with other prisoners who may be violent arouses serious feelings of insecurity and fear

in the mind of the prisoner. They live in fear of harm to themselves.(American Psychiatric Association, 1994).

Low mood in prisoners: Low mood and depression are interrelated. A low mood is characterized by sad feelings that often come and go; however, the presence of low mood that does not go away even after two weeks is a symptom of being at risk for depression. Prisoners may be affected by various kinds of low moods (American Psychiatric Association, 1994).

Substance use*:* Substance use disorders are a collective term for conditions that occur in connection with the use of chemical substances that affect psychological functions. The disorders are diagnosed on the basis of the substance that gives rise to the disorder, and the consequential condition (abuse, addiction, withdrawal etc.). Inmates who had a mental health problem as a result of substance abuse were more likely than inmates without to have family members who abused drugs or alcohol or both (American Psychiatric Association, 1994).

Overcrowding: The prisons in African countries share similar problems of overcrowding to those experienced in other developing countries. When it comes to high levels of overcrowding on a country-by-country basis, the developing countries are at the top of the list with Cameroon (296.3%) ranked the highest (Sarkin, 2008), which is a potential cause of depression.

Lack of psychosocial Support: Lack of psychosocial support amongst inmates is a great contributing factor to depression amongst inmates. The presence and support of a counselor in a prison setting will help prisoners out of certain stereotypes they hold so strong to and will help them see life from a better perspective while waiting for the end of their term (Legg, 2016).

Effects of depression

Suicidal tendencies: Internationally, suicide is the most frequent cause of death among inmates, and suicide alone represents half of all deaths in prisons. As a consequence of this, the problem of elevated suicide risk among inmates has been addressed in a number of scientific publications, and the World Health Organization has published a separate report on the prevention of suicide among inmates (World Health Organization, 2007).

Depression symptoms can get worse without proper treatment.

Constant frustration

After a few days in prison, prisoners feel as if they are avoided by society. They agonize over what others in the outside world would think about them. This arouses feelings of frustration, which are revealed in their behavior with fellow prisoners and their daily activities (Ahmad & Mazlan, 2014).

Deep sadness

Sadness might arise due to feelings of deep loneliness. Many prisoners are made to stay in solitary confinement for long periods of time. After a point the loneliness becomes unbearable and creates intense sadness (World Health Organization, 2007).

Feeling anxious

Prisoners repeatedly think about the crime they have committed. These thoughts about the crime make them feel guilty and result in severe anxiety. They exhibit unusual nervousness and restlessness (Gunter, 2004).

Unnecessary worry

Once affected by depression they worry about unnecessary things or without any reason. They look anxious all the time, thinking of something or thinking nothing at all (Ahmad & Mazlan, 2014).

Frequent tiredness

They lose interest in life, and display significant reluctance to do activities inside the prison. They give the impression of being tired all the time (Legg, 2016).

Low self-esteem

Self-esteem has an important role in determining the severity of low mood. People with depression consider themselves worthless; this may constantly disturb the mind and lead to thoughts of committing suicide (Cooper & Livingston, 1991).

Getting hyper or angry

Recurring depressive thoughts make prisoners unable to take things, whether good or bad, easily. Hence, they express anger over every small matter. They may not even know the exact reason for their anger (Cooper & Livingston, 1991).

Prisons in Cameroon

The majority of prisons in Cameroon are old and unsanitary. Buildings are poorly ventilated, and accessing toilets and water is challenging. Poor hygiene conditions and difficulties accessing health care, compounded by overpopulation, lead to health problems. Since 2011, newer facilities have been built and the state has undertaken prison renovation projects.

In the north, and east of the country, a large number of arrests have taken place in the fight against the armed group Boko Haram. Many arrests have also occurred in connection with the repression of protest movements in the English-speaking region of the country. The adoption of the Anti-Terrorism Act in 2014has broadened the spectrum of reasons for arrest and detention. More cases of arbitrary detention, torture and ill-treatment are ongoing. Many people are arrested without evidence in the name of fighting Boko Haram and Anglophone crisis including children as young as five years old. These prisoners are held in military camps without trial for several months (Prison insider, 2016).

Figure 1: Geo-location on the map represented by red dot

Buea central prison

The central prison of Buea is the main prison of the South West Region in Cameroon. The prison was built in 1907 by the German colonial administration to house 300 prisoners. Like many jails across Africa today, it is overcrowded, housing about 1291 prisoners in 11 wards (9 males and 2 females wards) which are old stone colonial buildings; more than quadruple its intended capacity (Prison authorities, 2018). In July 2008, the Cameroonian state prison administration was 352 inmates for 400 places and 52 guards. Among the detainees, there were 20 women and five minors. Presently the prison contains 1249 men, 22 women, and 20 minors distributed in 11 wards, thus, giving an average of 117 inmates per ward. This is an evidence of overcrowding amongst inmates which is one of the contributing factors to depression amongst inmates.

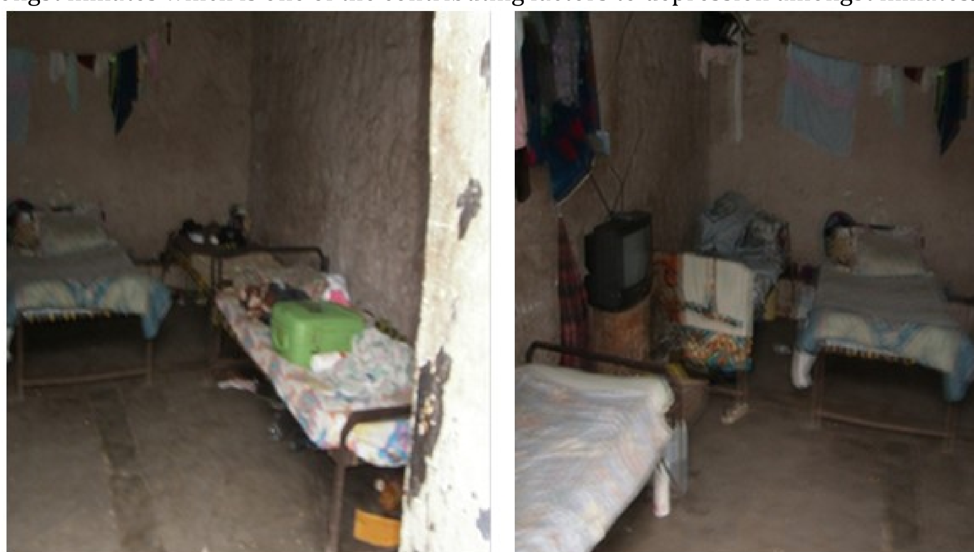

Figure 2: Male wards Buea central prison: Left 3 beds; Right 3 beds and a television

Methods and techniques in diagnosing depression

The Patient Health Questionnaire (PHQ) is a diagnostic tool for mental health disorders used by health care professionals (Pfizer 2017a). It consists of 5 scales covering depression, anxiety, somatoform, alcohol and eating. The PHQ is part of a family of related measures, including the PHQ-9, which is the depression scale from the PHQ, and the PHQ-15, which is the somatic symptom scale from the PHQ (Kroenke 2014).

Participants in two studies to determine the validity and utility of the full PHQ ranged in age from 18 to 99 years (Spitzer et al., . 1999, Spitzer et al., . 2000). A study has looked at the usability of the PHQ-9 in an adolescent population (13-17 year olds) and concluded it is an excellent tool for screening depression with this age range in primary care settings (Richardson et al., . (2010).

Beck Depression Inventory (BDI): The Beck Depression Inventory (BDI) is a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression (Beck, et al., 1961)

Major Depression Inventory (MDI): The Major Depression Inventory (MDI) is a self-report mood questionnaire developed by the World Health Organization's Collaborating Center in Mental Health (LR Olsen, et al., .2003).

Center for Epidemiologic Studies Depression Scale (CES-D): The Center for Epidemiologic Studies Depression Scale (Cole et al., 2004) is a commonly used freely available self-report measure of depressive symptoms.

Problem Statement

The prevalence of depression among inmates is higher in developing countries than developed countries (Fazel *et al.,* 2002) and varies significantly between prisons in Africa. This discrepancies (or disparity) may be due to the fact that imprisonment is not the only factor that causes depression among inmates and also because of varying prison conditions and psychosocial behaviors in these areas. Depression varies among victims of crime and innocent inmates and is said to be higher in prisons containing more innocent inmates than prisons containing more victims of crime. This is because many victims of crime have higher tendency of accepting prison state of life than innocent inmates except in situations of very deplorable prison conditions. Depression amongst prison inmates is still an unexploited area of study in the Cameroon which had been in a state of sociopolitical unrest, massive arrest of all gender and age groups. Negligence in exploring depression amongst inmates in Cameroon might increase its prevalence and morbidity amongst inmates, therefore defeating the aim of rehabilitating prisoners. This paper intends to determine the prevalence of depression amongst prison inmates.

MATERIALS AND METHODS

The Buea central prison is located in the Buea municipality which is the capital of the South West Region of Cameroon. It is located on the eastern slope of Mount Cameroon. It has geographical location: latitude 4 ° 09 '22 "north, longitude 9 ° 14' 17" east at the foot of Mount Fako.

The Buea prison was built in 1907 by the German colonial administration to house 300 prisoners. Like many jails across Africa today, it is overcrowded, housing about 1291 prisoners in old stone colonial buildings; more than quadruple its intended capacity (Prison authorities, 2018). In July 2008, the Cameroonian state prison administration was 352 inmates for 400 places and 52 guards. Among the detainees, there were 20 women and five minors. Presently the prison contains 1249 men, 22 women, and 20 minors giving a perfect explanation for overcrowding amongst inmates which is one of the contributing factors to depression amongst inmates.

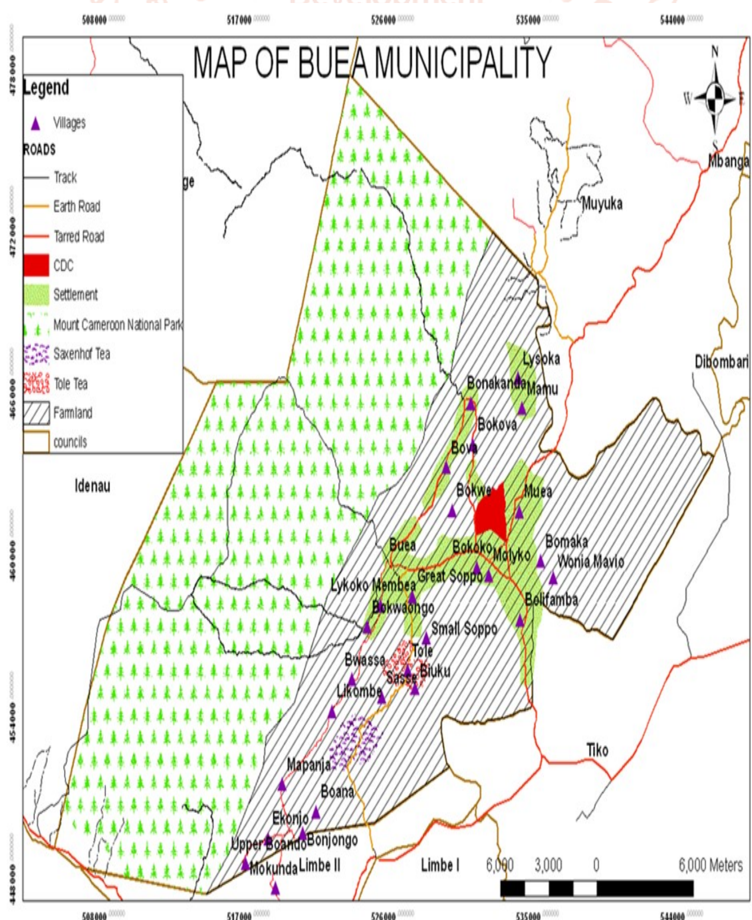

Figure 3: **Map of Buea Municipality**

Study Setting

This study was carried out at the Buea central prison for the following reasons:

- Nearness to the site of study to minimize cost.
- Representative of the whole region for possible conclusions.
- The study was carried out at the heart of the Anglophone crisis in Cameroon which made displacement to other regions and towns within the region difficult.

Figure 4: Outer view of Buea central prison

Study Design

The research was a case study carried out in Buea-case of Buea Central prison.

The participants were randomly selected from different wards and administered the test.

Target population

The study population was the entire population of inmates (convicted and awaiting trial) at the Buea central prison, Southwest Region. The participants involved adult males, females and minors. The age range of the participants was between 12 to 70 years.

Sample size calculation

According to a research carried out in Jimma town prison, South West Ethiopia, to get maximum sample size, prevalence rate (P) of 50% was taken. Single population proportion formula was used to determine sample size at 95% CI and 5% marginal error (Survey Monkey, 2018).

$n = [Z^2.P\ (1\text{-}P)]\ /\ d^2$ (Naing *et al.,* 2006)

Where,

n = Sample size

Z = Confidence level (for confidence level of 95%, Z = 1.96)

P = Expected prevalence or proportion = 50% (Abdu *et al.,* 2018)

d = d is margin of sampling error tolerated (5%, d = 0.05)

Therefore, n_i = [(1.96)2 x 0.5(1-0.5) / (0.05)2] = 3.8416 x 0.5x 0.5 / 0.0025 =384

Sample size, n_i =384

The total number of prisoners in Jimma town Correctional Institution was 1460 which is less than 10,000.Using finite population correction formula the final sample size was

$$n_f = \frac{n_i}{1+n_i/N'}$$

Where n_f = final sample size

n_i= initial sample size calculated above (384) (Abdu *et al.,* 2018).

From the above reference, likewise the above, the Buea central prison has a population which is less than 10,000.Which entails the above procedure. From the above formula to calculate final sample size,

$$n_f = \frac{384}{1+384/1291} = 296$$

Therefore the sample size for this research work is 296.

Sampling Technique

Sampling technique was random sampling. Inmates were randomly selected from 9 different prison wards sectioned into male, female and minor wards.

A systematic random sampling was done using the prisoners list and using the sampling interval size calculated using the formula where N is the total population (1291) and n is sample size (296) while k is sampling interval size. = (approximately 4). Therefore, every 4th prisoners on the list was selected (Abdu et al., 2018).

K=N/n=1291/296=4.361

Inclusion criteria

The study recruited prisoners of all ages residing at the Buea central prison.

Exclusion criteria

Prisoners who were not interested in the study and prison workers were not part of the study.

Instrumentation:

The PHQ-9 was used to diagnose the presence of depression among inmates.

The PHQ-9 is a validated depression screening tool and it is used to:

Assist the clinician in making diagnosis, quantify depression symptoms and monitor severity

PHQ-9 is a nine question instrument given to patients in a primary care setting to screen for depression. It is the 9-question depression scale from the Patient Health Questionnaire (PHQ).

The results of the PHQ-9 may be used to make diagnosis according to DSM-IV criteria and takes less than 3-mins to complete. The total of all 9-responses from the PHQ-9 aims to predict the presence and severity of depression. The total sum of the responses suggested varying levels of depression. Scores range 0-27.Scores from 0-4=depression, 5-9=mild depression, 10-14=moderate depression, 15-19=moderately severe depression, 20-27=severe

In general a total of 5 and above is suggestive of the presence of depression. Listed on the PHQ-9 sheet at the index page are PHQ-9 totals, levels of depression that they relate to a suggested treatment for each level of depression. The diagnostic validity of the PHQ was established in studies involving 8 primary care and 7 obstetrical clinics. PHQ-9 scores ≥ 10 had a sensitivity of 88% and specificity of 88% for major depression (Kroenke *et al.,* 2001)

Data collection

Under the assistance of warders, participants were invited for a talk on depression and filling of the PHQ-9 standard

and semi structured questionnaire forms on depression symptoms and socio-demographic characteristics respectively. Data on depression symptoms and prevalence were collected using PHQ-9 standard questionnaire. The semi structured questionnaire form was used to collect data on socio-demography, determine the causes and effects of depression in prison.

Data Analysis

Data collected was checked and validated for completeness and consistency and entered into an excel spreadsheet and analyzed using SPSS version 20. Data were presented as means ± SD (standard deviation) for continuous variables and as number (n) or percentages (%) for categorical variables. Bivariate analysis of categorical data using Pearson Chi square (χ^2) test were carried out to identify the factors that cause depression in prisoners. All analytical tests were two tailed and $P<0.05$ was considered statistically significant at a confidence interval (CI) of 95%.

RESULTS

Socio-demographic characteristics of the study population

A total of 296 inmates fully participated in the study out of 300 who showed up. Among these inmates, 274 (92.6%)were males while 22 (7.4%) were females with mean age of 28.84 ± 9.329 and their ages ranged from 12 to 70 years. The inmates were living in different wards based on gender, age groups, crime type and other factors. The female wing ward contained 22 (7.4%) females while the different male wards; A, B, C, D, E, F, J, K, L, and MINOR wards accommodated 10 (3.4%), 18 (6.1%), 18 (6.0%), 1 (0.3%), 20 (6.8%), 21 (7.1%), 66 (22.3%), 45 (15.2%), 55 (18.6%), and 20 (6.8%) males respectively.

The prevalence of depression was highest among females (95.5%), followed by minors (95.0%) and lastly males (92.5 %) even though there was no association with ward placement (*P*=0.816) Table 1. The inmates were people from diverse occupations which included students 98 (33.1%), farmers 37(12.5), Business 24 (8.1%) and others 135 (46.3%).

Based on gender, number of depressed individuals did not differ significantly between males (6.6%) and females (4.5%) ($P = 0.704$). The study population was divided into different age groups; 12-30 years (teen and young adult) and 31-70 years (midlife and senior adult) and the frequency of depression at the different age groups were 205 (69.3%) and 91 (31.0%) respectively (Table 1). Pearson Chi-square test showed that depression did not differ significantly with age groups ($P = 0.334$) and is most prevalent in the age group 12-30 years. The frequency of depression among students, farmers and vocation employees were 97 (33.0%), 37 (12.6%) and 160 (54.4%) respectively (Table 1). Pearson chi-square test showed that depression state is not associated with occupational status ($P = 0.731$). Depression did not vary significantly among male, female and minor inmates ($P = 0.789$).

Table 1: Socio-demographic characteristics of the study population

			Depression			
Variable	Attributes	N (%)	No (%)	Yes (%)	χ^2	*P* value
Age (Years)	12 - 30	203 (69.0)	15 (7.4)	188 (92.6)	0.931	0.334
	31 - 70	91 (31.0)	4 (4.4)	87 (95.6)		
Gender	Male	274 (92.6)	20 (7.3)	254 (92.7)	0.145	0.704
	Female	22 (7.4)	1 (4.5)	21 (95.5)		
Occupation	Student	97 (33.0)	5 (5.2)	92 (94.8)	0.628	0.731
	Farmer	37 (12.6)	2 (5.4)	35 (94.6)		
	Vocations	160 (54.4)	12 (7.5)	148 (92.5)		
Wards	Male	254 (85.8)	19 (7.5)	235 (92.5)	0.4074	0.816
	Females	22 (7.4)	1 (4.5)	21 (95.5)		
	Minor	20 (6.8)	1 (5.0)	19 (95.0)		

Prevalence of depression in Buea central prison

Based on the PHQ-9 cut off point of 5, 10, 15 and 20, 276 participants were depressed, giving a prevalence of 93.2% among the prison inmates (Figure 1).

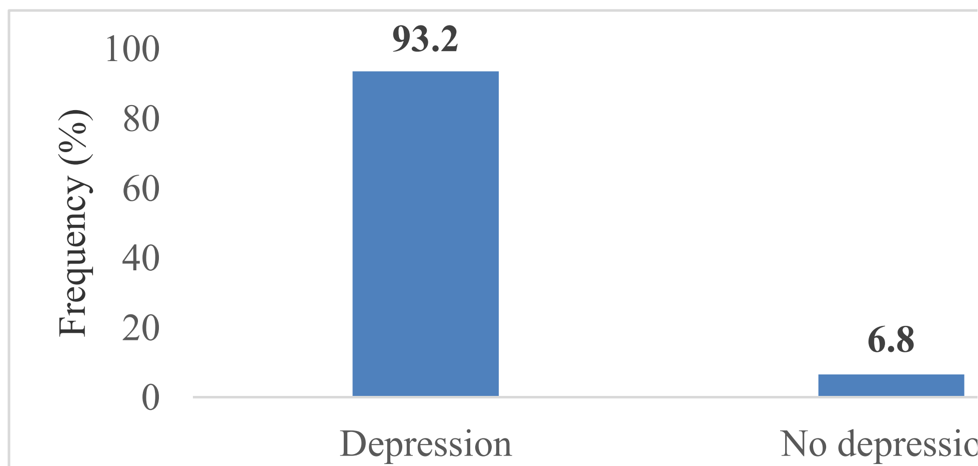

Figure 5: Prevalence of depression in Buea central prison

Levels of depression in the study population

Among the 276 (93.2%) inmates diagnosed for depression, different levels of depression such as mild, moderate and severe depression were observed. The frequency of mild, moderate, and severe depression in the study population were 62 (20.9%), 174 (58.7%) and 40 (13.5%) respectively (Figure 6).

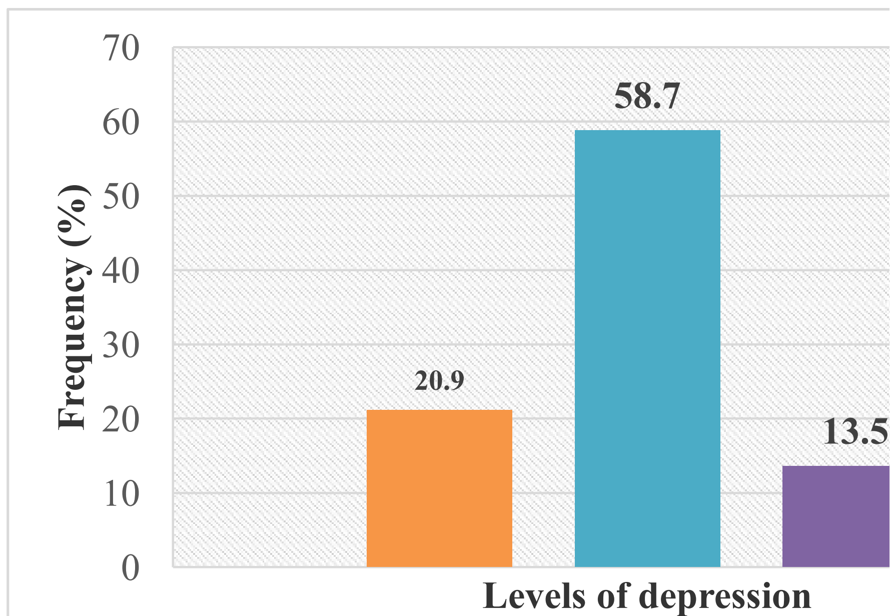

Figure 6: Levels of depression

Association of risk factors with depression among participants

Four factors were found to be associated with depression among inmates based on binary logistic regression (bivariate) analysis. The strongest risk factors for depression in descending order were missing love ones, being detained, lack of psychosocial support and low economic status with *P*-values 0.0002, 0.001, 0.006, and 0.029 respectively (Table 2). The other factors such as history of depression, current health condition, poor healthcare, overcrowding and drug abuse were not associated with depression in the study population (*P* = 0.277, 0.3022, 0.577, 0.122, and 0.202 respectively).

Table 2: Association of risk factors with depression among participants

Risk factors (Independent variable)	Depression		OR (95% CI)	P-value	χ2
	Yes	No			
History of depression Yes No	55 221	2 18	2.240 (0.504 – 9.946)	0.277	1.182
Being detained Yes No	211 65	9 11	3.968 (1.575 – 9.996)	0.001	9.665
Current health condition Yes No	164 112	9 11	1.627 (0.64 – 4.133	0.3022	1.065
Poor healthcare Yes No	142 134	9 11	1.295 (0.52 – 3.22)	0.577	0.3104
Overcrowding Yes No	197 79	11 9	2.04 (0.814 – 5.115)	0.122	2.394
Lack of psychosocial support Yes No	180 96	7 13	3.482 (1.344 – 9.021)	0.006	7.319
Drug abuse Yes No	61 215	2 18	2.553 (0.576 – 11.31)	0.202	1.63
Low economic status (reference) Yes No	232 44	13 7	2.839 (1.072 – 7.519)	0.029	4.75
Missing love ones (reference) Yes No	258 18	14 6	6.143 (2.108 – 17.9)	0.0002	13.8

Effects (predictors) of depression among inmates

Depression among prison inmates resulted in several effects that were identified during the study. The frequency of the identified effects of depression such as low self-esteem, frequent tiredness, hyper anger, always feeling anxious, feeling deep sadness, constant feeling of frustration, and feeling like taking your life were 182 (66.5%), 187 (68.0%), 166 (60.4%), 169 (61.5%), 231 (84.0%), 175 (63.6%) and 110 (40.0%) respectively (Table 3). Three factors were found to be associated with depression among inmates based on binary logistic regression analysis. The most to least significant effect as a result of depression were hyper anger, frequent tiredness and low self-esteem with P-values 0.002, 0.0115 and 0.019 respectively.

The other factors such as always feeling anxious, deep sadness, constant feeling of frustration and suicide ideation were not associated with depression in the study population (*P* = 0.0586, 0.6119, 0.101, 0.3830.122, and 0.383 respectively).

Table 3: Effects of depression

Effects of depression (Dependent variable)	Depression Yes	Depression No	OR (95% CI)	χ2	P-value
Low self esteem					
Yes	182	8	2.904 (1.147 – 7.352)	5.46	0.019
No	94	12			
Frequent tiredness					
Yes	187	8	3.152 (1.244 – 7.986)	6.39	0.0115
No	89	12			
Hyper anger					
Yes	166	5	4.569 (1.614 – 12.94)	9.569	0.002
No	109	15			
Always feel anxious					
Yes	169	8	2.392 (0.9462 – 6.044)	3.576	0.0586
No	106	12			
Feel deep sadness					
Yes	231	16	1.343 (0.428 – 4.213)	0.257	0.6119
No	43	4			
Constant feeling of frustration					
Yes	175	9	2.118 (0.849 – 5.28	2.686	0.101
No	101	11			
Feel like taking your life					
Yes	110	6	1.546 (0.577 – 4.147)	0.76	0.383
No	166	14			

Depression is a common mental disorder, characterized by persistent sadness and a loss of interest in activities that an individual normally enjoys, accompanied by an inability to carry out daily activities, which should be after at least two weeks (WHO, 2019). It can lead to a variety of emotional and physical problems and can decrease a person's ability to function at work and at home (American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, 2013). Depression is one of the most common mental health problems among prison population. Although depression is common among inmates, there is uncertainty over its etiology and risk factors, which complicates the management (Rao *et al.*, 2018). Very few studies on mental health have been carried out with respect to Cameroonian prisons with none addressing depression amongst inmates. This study aimed at investigating the prevalence, associated risk factors and effects of depression amongst inmates in Cameroonian prisons; Case of Buea Central Prison.

The study looked at the prevalence of depression (taking into consideration socio demographic factors), causes and effects of depression among inmates in Buea central prison. The study consisted of 296 inmates with 274 males and 22 females. The age of participants ranged between 12-70years with a mean age of 28.4±9.329 years.

Prevalence of depression

The overall prevalence of depression in the study was 93.2%(Figure 5).This result indicates abnormally high cases of depression in Buea prison. This findings are higher than previous report in Ethiopa (43.8%) by (Beyen *et al.,* 2017), Nigeria (42.2%) by (Nwaopara and Stanley, 2015),Brazil (40%) by (Andreoli, Dos Santos, Quintana, 2014), USA (43%) by (Rowell, Draine, and Wu, 2011), and Africa continent (10-85%) by (Naidoo and Mkize, 2012).This discrepancy is due to the following reasons; Cameroonian prisons still have very poor living conditions (Namondo, 2013) as compared to others, depression in Cameroonian prisons have really never been looked into for intervention, the Anglophone crisis situation in Cameroon which has led to the massive arrest of even innocent citizens, prisoners have not been exposed to psychotherapy or introduced to antidepressants. Compared to the general population, 93.2% prevalence of depression in prison is much greater than 3.9% prevalence according to WHO, 2017 in Cameroon. This is because prison environment neutralizes the formation and development of basic human values, contributes to stigmatization, alters the inmate's conduct and leads to temporary or even irreversible psychic sequelae which can lead to depression and anxiety (Nwaopara and Princewill, 2015).

The prevalence of depression was highest among females (95.5%), followed by minors (95.0%) and lastly males (92.5 %) even though there was no association with ward placement (*P*=0.816) Table 1. These findings are in

concordance to previous reports conducted in Amhara Ethopia which reported higher prevalence of depression in female (12%) than male (10%). This could be due to the fact that by physiology, women are more vulnerable to diseases. However, these prevalences are much lower than results obtained in the study. This is because studies on depression have not been carried out in the past and inmates have not been exposed to remedies to make their conditions better.

Recommendation

- A system should be created for routine checking and monitoring of depression among prisoners to minimize development of depressive illnesses, suicidal ideation, suicidal attempt and other effects.
- All prisoners should be screened on entry to prison for a range of mental health and related problems.
- The psychosocial domain in prison should be reinforced to provide support among inmates.
- The needs of prisoners should be included and respected in national health policies and plan.
- All prisoners should be provided with appropriate mental health treatment and care.
- The first step in understanding the mental health situation in a prison population is to ask prisoners their views on their needs and how these might be met.
- All staff working in prisons should have an appropriate level of mental health awareness training, which should cover the specific needs of those with personality disorders.
- Maintaining links between a prisoner and his/her family can be crucial for the mental well-being of the prisoner, for a successful return to society on release, as well as benefiting the family.

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