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Clinical Factors as Predictors of Depression in a Nigerian Prison Population

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Abstract

Background: Despite growing inmate populations in the Nigeria, inmates are excluded from most national health surveys and little is known about whether the prevalence of depression among the incarcerated is affected by clinical factors.

Aim: To investigate the clinical predictors of Depression in a Nigerian prison.

Methods: Through stratified random sampling, 400 prisoners were interviewed using the Depression component of WHO SCAN in a 2-stage design after screening with the BDI. SPSS Version 17, was used for analysis and test of significance was set at $p<0.05$.

Findings: 169 presented with depression using BDI. SCAN revealed a prevalence of 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. Clinical factors that were statistically significant included retroviral status and past psychiatric history. Multiple Logistic regression analysis, however, revealed that the strongest predictors of depression among the subjects, past psychiatry history (OR: 0.19, CI=0.08-0.48, p=0.01)

Discussion: Several clinical factors were found to be significant. Untreated depression in the prisoners is an increasing public health problem, so interventions or alteration in these factors will lead to a reversal of this trend, improve mental health care in prisons and help reduce disease burden of depression.

Keywords: Prison; Clinical; Correlates; Depression

Introduction

The fact is that in and out of prison, depressive disorder is one of the most undiagnosed, undertreated and untreated conditions in existence [1]. But despite growing inmate populations, inmates are usually excluded from national health surveys and little is known about whether the prevalence of depression is affected by clinical factors among the incarcerated [2].

The researchers, who are openly skeptical about whether the pains of imprisonment generally translate into psychological harm, concede that, for some people, prison can produce negative, long-lasting change. Most people, agree that the more harsh or psychologically-tasking the nature of the confinement, the deeper the damage that will occur [3].

Depression represents a change from the person's baseline associated with impairment in social, occupational, and educational functioning. DSM-1V and DSM-5 agrees that Major depression include diagnoses of unipolar affective disorder with at least 5 of 9 depressive symptoms, for at least 2 weeks [4].

In a study that analyzed mental illness care among inmates, both before and during incarceration, a quarter of inmates had a history of chronic mental illnesses and two-thirds of them were off treatment at the time of their arrest [5]. In that study, more than 40 percent of the total prison and jail population reported a chronic medical condition, an illness rate far higher than other Americans of similar age [5]. More than 20 percent of these sick inmates were in state prisons and 13.9 percent in federal prisons had not seen a doctor or nurse since incarceration [5]. This therefore means that a substantial percentage of inmates have serious medical needs co-existing with mental illnesses, yet do not get even minimal care. Inmates have high rates of chronic medical conditions, especially viral infections [6]. In addition, substance abuse and mental illness are common among inmates [6]. Hypertension is reported to be one of the most frequent medical conditions in the jail population [7].

High rates of both HIV and depression are seen in prison populations [8]. This is so because depression has been linked to disease progression in HIV, risky behaviors, and medication non-adherence. A high proportion of HIV infected inmates (44.5%) screened positive for depression and depressed inmates were significantly more likely to have low coping self-efficacy scores (180 vs. 214), and to report having had resource needs (OR = 2.91) prior to incarceration [8].

A related study revealed that those prisoners with chronic physical problems and a past psychiatric history are at particular risk of depression [9]. It is noteworthy that out of 133 suicides reported in Canadian prisons, 59% (44%) had been hospitalized outside prison and 39 (29%) has received psychiatric treatment as outpatient [10,11]. Other risk factors identified, include positive family history of depression and other mental illnesses, difficult early childhood, loss of parents early in life, child neglect, physical and sexual abuse, physical illnesses, and psychoactive substance usage including sedatives and Tobacco usage [7,12,13].

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Some findings from some earlier studies suggest that subclinical depression is a significant risk factor for depression [8]. Also having a close relative who has had an episode of depression increases the risk of having it again [9]. According to some estimates, approximately one-half of those who have developed depression will experience it [9].

This study was undertaken because despite the high prevalence of depression among incarcerated people, there is a paucity of local data among inmates of prisons in Nigeria. Therefore, this study in the south-south region of Nigeria was carefully undertaken, to provide data on clinical factors as correlates of depression, in the population of the prisoners particularly among the inmates of the prison in Port Harcourt, Nigeria. The study also provided data that may assist in the formulation of the necessary preventive and treatment strategies in the target population [14-16]. Available data reveals that this is the first time this kind of study on the prevalence of depression and correlates will be conducted at the Maximum security prison, in Port Harcourt, Nigeria since inception in 1928 [17].

With this justification of the rationale for the study, it initially set out to test 2 hypotheses:

- Medical conditions are common among the incarcerated
- Clinical factors are predictors of depression among the incarcerated.

Materials and Method

Methodology

Study setting: The study was carried out at the Maximum Security Prison, located in Port Harcourt, established by the British Colonialists in 1928 with a holding capacity of 804 inmates.

Study design: Cross-sectional descriptive study.

Study population: Inmates of the maximum security prison, in Port Harcourt, Nigeria.

Inclusion and exclusion criteria: The inclusion criteria were those who gave their consent, serving different terms of prison sentence and on awaiting trial list. The exclusion criteria were the inmates who declined to give consent to participate in the study, inmates who were too ill to participate and those who were floridly psychotic.

Sample size

According to the fine population correction (fpc) principle, postulated by Araoye [18],

$$n = \frac{Z^2pq}{d^2} = \frac{(1.96)^2(0.50)\ (0.050)}{(0.05)^2} = 384.$$

Using an assumed non-response rate of 15%, a corrected sample size using the formula:

$$\frac{Sample\ Size}{100-15}\ X\ 100 = \frac{339}{0.85} = 398.8.$$ Approximately, 400

Sampling technique

A list of all the study population was obtained, which became the sampling frame. A Simple random sampling was used to select the required sample size, based on proportional allocation to each stratum. The population was divided into two homogenous groups based on gender. A systematic random sampling was conducted using the sampling frame. Every seventh inmate on the register in both the male and female sections of the prisons was selected. It was a two stage design. The Socio-demographic questionnaire and BDI were administered to all participants. Only respondents with a BDI score of 11 and above were administered the SCAN 2.1. There was also random selection and analysis of the negatives with the SCAN 2.1 instrument which was done in 1 in 10 of them.

Data collection tools

Socio-demographic questionnaire, self-administered, was designed for data collection and consisted of three sections (A-C), with questions pertaining to socio-demographic data, clinical and penal characteristics. The Beck Depression Inventory was used to assess the severity of depression. The BDI is a 21- item self- rated instrument which measures the presence and degree of depression in adolescents and adults [19]. The internal consistency estimate of reliability Cronbach's alpha based on the present study was a = 0.74 and had a mean score of 15.7. The choice of BDI is a matter of convenience, because it has a solid research base with excellent psychometric properties [19]. Schedule for Clinical Assessment in Neuropsychiatry (SCAN 2.1), is a semi-structured, researcher administered instrument, used to derive ICD-10 diagnosis. SCAN has been validated in a number of studies on depression [6]**.** It is used to diagnose a broader range of disorders than PSE 9. The use of this instrument requires training which this author obtained.

Data analysis

Data collated was analyzed using SPSS version 17. A descriptive and inferential statistical analysis was employed. Chi-square test was used to test for association between the predictor variables (clinical factors) and the outcome variable (Depression). P-value was set at $P \leq 0.05$ which was considered significant. Multiple logistic regressions were computed to determine the size of the predictor variables on the dependent variable.

Ethical considerations

The permission for this study was obtained from the ethics committee of UPTH, and State Controller of Prisons. A written informed consent was obtained from each participant. Confidentiality was ensured. Participant's participation was voluntary and they could withdraw from the study at any time.

Results and Analysis

The 400 subjects involved in the study and interviewed, ranged in age from 14 to 90 years, with a mean age of 33.8 (SD ± 14.42). 30% were between the ages of 18 and 25 years (Table 1).

Clinical information on the subjects

According to the self-evaluation of the studied population, 197 (49.3%) had no diseases; 80 (20.0%) had skin infections as the commonest medical condition, 13 (3.2%) had hypertension, 59 (14.8%) had Retroviral disease, while 1(0.2%) had speech and hearing disability (Tables 2a and 2b).

Prevalence and pattern of depression among prison inmates

All the 169 subjects who scored greater than 10 using the BDI were interviewed in the second phase of the study, with the depression module of SCAN 2.1, used to generate an ICD-10 diagnosis. Based on this, 169 subjects (42.2%) of the study population fulfilled the criteria for current depressive disorder of whatever form.

Among the population with depression, 59 (14.8%) met criteria for mild depression with somatic symptoms, 57 (14.2%) for moderate depression with somatic symptoms, 25 (6.2%) severe depression

Demographics	n (%)
Sex	
Male	392 (98)
Female	8 (2)
Age	
<18.00	30 (7.5)
18.00-25.00	120 (30.0)
26.00-33.00	93 (23.2)
34.00-41.00	69 (17.2)
42.00-49.00	35 (8.8)
50.00-57.00	19 (4.8)
58.00-65.00	18 (4.6)
>65	16 (3.9)
Religion	
Christianity	352 (88.0)
Islam	45 (11.2)
African Traditional Religion	2 (0.5)
Others	1 (0.3)
Level of Education	40 (10.0)
No formal Education	196 (49.0)
Primary Education	28 (7.0)
Junior Secondary Education	111 (27.8)
Senior Secondary Education	10 (2.5)
Post-Secondary Education other than University	15 (3.7)

Table 1: Social demographic characteristics.

without psychotic symptoms and 18 (4.5%) for severe depression with psychotic symptoms. Ten (2.5%) had no SCAN depression. The BDI negatives were screened in the ratio of 1:10 and two (2) inmates were found to have depression. The overall true prevalence of depression after validation was 37%.

Validity of BDI by SCAN 2.1: One hundred and fifty nine (39.7%) of the patients met SCAN criteria for depression while 169 (42.2%) scored for depression on the BDI. The sensitivity and specificity of the BDI is calculated as follows (Table 3)**:**

Confidence level = 95%.

Sensitivity $= a/c1 = \frac{159}{161} \times 100\%$

= 98.75% or 0.98.

Specificity $= a/c2 = \frac{229}{239} \times 100$

= 95.81% or 0.958.

Apparent prevalence of depression $= \frac{161}{400} \times 100\%$

= 39.75% or 0.397

True prevalence $= \frac{\text{Apparent prevalence} + \text{specificity} - 1}{\text{Sensitivity} + \text{specificity} - 1}$

$= \frac{0.397 + 0.958 - 1}{1.0 + 0.958 - 1}$

$= \frac{0.355}{0.958}$

= 0.3705 = 37.05%.

For association between clinical condition and depression see Table 4

Logistic regression of predictor clinical factors and depression: Direct logistic regression was performed to assess the impact of a number of clinical factors on the likelihood that respondents would be depressed or not. The model contained two independent variables (past psychiatry history and HIV status). The full model containing all predictors was statistically significant, $\chi 2$ (3, N = 400) = 28.56, p =.001, indicating that the model was able to distinguish between respondents who had depression and those who did not. As shown in Table 5 only past psychiatry history was statistically significant (OR = 0.16, CI= 0.06-0.405).

Discussion

Depression is one of the most common psychiatric disorders and its prevalence among PLWHA has been noted to be twice as high as in the general population [20]. The rate of retroviral disease was 14.8% in this study. The rate was expectedly higher among the depressed as found in 8.2% as against 6.5% among those without depression. In a study among people living with HIV/AIDS, 21.3% were depressed [20], which was higher than findings in this study, because it was conducted exclusively among patients attending the retroviral clinic, and instruments were also different, hence the higher value. Criminality, is usually associated with high level of substance abuse may diminish self-restraint and make the abusers disinhibited and more prone to sexual indiscretions, which may increase the risk of HIV infections. The true prevalence rate of depression in this study was 37%. However, this prevalence rate correlated with the lifetime prevalence of 37% in case control studies [21]. But lower than the prevalence rate of 23% found in Benin, Nigeria [22]. The varying values obtained maybe because of different settings and instruments used in the studies. Most inmates affected by depression, were not on medication, which shows that depression is a significant source of morbidity among prison inmates [17].

Bivariate analysis shows that the clinical factors in association with depression included Retroviral status (X^2 =9.41, p=0.00) and past psychiatry history (X^2 =21.95, p=0.00). Multiple logistic regression however showed a statistically significant relationship between depression and past psychiatry history (OR=0.194, 95% CI: 0.08-0.46), p=0.00). This is less but agrees with the finding in a similar study in which the risk of depression at interview was greater in those with a past history of psychiatry illness (OR: 2.20, 95% CI 1.2-1.43). This is true because a history of psychiatric illness increases the inmates risk and vulnerability to future psychiatric illnesses. More so, those who have experienced depression once may have higher chances of developing it again [17,23]. In line with previous reports, approximately one-half of those who have developed depression will experience it again [23].

Common diseases identified among the inmates were skin infections, hypertension, and diabetes. This is in conformity with the finding in a similar study that the common diseases included high blood pressure, hypothyroidism and diabetes [24]. No one had a history of hypothyroidism in this study. The location of the prison and target population may have contributed to the variation noted because it has been reported that black people are protected from hypothyroidism, compared to Caucasians, after adjusting for age, income and smoking [2].

Hypertension was found in 3.5% which is comparable to the rate of hypertension which was 3.6% in a similar study [25]. However, the rate of hypertension in this study was lower than that in national estimates of prevalence of mental illnesses in prisons and jails in US which was 18.3% [26]. The higher value noted in the US study compared to the rate in this study was that it involved all prisons and jails and in the

Variable	n (%)
Medical and Surgical condition among inmates	
Chronic Medical Conditions (Diabetes Mellitus, Hypertension, Asthma, Peptic Ulcer, Tuberculosis)	105 (26.4)
Surgical conditions (Hernias, Hemorrhoids, Glaucoma, Cataract, Parotid Swelling)	15 (3.9)
Cyesis	2 (0.5)
Skin lesions/ Infections	80 (20.0)
Speech/ Hearing Impairment	1 (0.3)
No disease	197 (49.3)
Disabilities/Limitations	
Yes	14 (3.5)
No	386 (96.5)
Frequency of prescribed drugs among inmates	
No Medication	238 (59.3)
Oral Hypoglycemic agents	16 (4.0)
Anti-hypertensive	20 (5.0)
Anti-retroviral drugs	49 (12.3)
Antibiotics	22 (5.5)
Haematinics	2 (0.5)
Anti-Asthma	7 (1.8)
Anti-ulcer drugs	6 (1.5)
Anti-convulsants	1 (0.3)
Anti-fungal drugs	37 (9.3)
Anti-Tuberculosis drugs	2 (0.5)
Past Medical History among inmates	
No Past Medical History	268 (67.0)
Diabetes Mellitus	7 (1.8)
Hypertension	10 (2.5)
HIV/AIDS	21 (5.3)
Asthma	8 (2.0)
Seizure disorder	4 (1.0)
Peptic Ulcer Disease	12 (3.0)
Skin infections	66 (16.5)
Eye conditions (Glaucoma, Cataract)	4 (1.0)
History of sexual activity before incarceration	
Sexually active	309 (77.3)
Observed abstinence	33 (8.3)
Visited commercial sex workers	58 (14.4)

Table 2a: Clinical Profiles of the inmates.

Variable	n (%)
Retroviral status of inmates	
Positive	57 (14.8)
Negative	268 (67.0)
Unknown	75 (18.2)
Smoking habits and number of sticks taken by inmates	
Yes	
1-4 Sticks	104 (26.0)
5-9 Sticks	52 (13.0)
10-14 Sticks	8 (59)
Non smokers	236 (59.0)
Psychoactive substance abuse history of inmates	
Cannabis	107 (26.8)
Alcohol	98 (24.5)
Herbs	12 (3.0)
Nil	127 (31.8)
Nicotine	56 (14.0)
Past Psychiatric history among inmates	
Yes	31 (7.7)
No	369 (92.3)
Specific Psychiatric disorders among inmates	
No disorder	369 (92.3)
Depression	22 (5.5)
Bipolar Affective Disorder	7 (1.8)
Schizophrenia	1 (0.3)
Others	1 (0.3)

n=frequency, %=percentage

Table 2b: Other Clinical Profiles of the inmates.

	SCAN depression present	SCAN depression absent	Total
BDI score			
≥10	159 = a	10 = b	169 = r1
<10	2 = c	229 = d	231 =r2
Total	161 = c1	239 = c2	400 = t

Table 3: Validity of BDI by SCAN 2.1.

total U.S population as against the population of one prison used in this study. The rate was also higher for those that are depressed with a value of 1.8% compared to the rate of 1.4% in those not depressed [27].

The commonest disease noted was skin infections recorded in 20% of inmates. This is higher than the 10.5% recorded for skin infections in a similar study [19]. This is not surprising because the poor sanitary conditions of prison and overcrowding which could explain this finding in this study, which is similar to findings from other studies in most developing nations of the world [28-30]. Furthermore, as stated by Sarkin in 2003, most prisoners suffer deprivation and prisons throughout Africa, lanquish in disrepair, which are conditions that encourage the transmission of communicable diseases [21].

According to self-evaluation of the studied inmate population, 49.2% had no diseases. This agrees with the finding in a similar study, in which 50% had no diseases [14]. However, the fact that majority represented by 96.5% of the inmates, reported not having any disability, agrees with the finding in a similar study that majority of inmates affirm not having any limitations or disabilities [14]. However, 14 (3.5%) reported some form of disability which included, loss of limbs, deafness and dumbness, hemiplegia and blindness. This is comparable to the finding of about eight (8%) inmates with some type of disability, ranging from visual disabilities, mobility disability and dwarfism [14].

Two (0.5%) female inmates were discovered to be pregnant before incarceration. No reference was made to the number of people with pregnancy in similar studies reviewed [22,24,28,31], even among studies that looked at just female inmates [24,32].

Cannabis was the most commonly abused substance among 26.8% of the inmates. This agrees with the finding that Cannabis was the drug most regularly abused in a similar study [33]. This is close to the Cannabis use in 27.1% among local jail inmates [33]. There was a report that inmates smoking 1-5 sticks a day (28.1%) were at higher risk of depression in a similar study (0R:1.53, CI 1.20-1.87) [16]. The fact that most of them had been involved in substance abuse before incarceration strongly indicates that this substance may be a potential inducer of crime [21].

Clinical Implications and Future Prospects

The findings from this study suggest that past psychiatric history, is a significant risk factor for depression, and this should be considered

Variable	X^2	df	P value
Medical or Surgical Condition	16.46	15	0.35
Any Disabilities or Limitation	1.31	4	0.75
On Medication	12.84	10	0.23
Past medical History	12.61	8	0.12
Physical Status	0.74	1	0.39
Sexual Activity	1.24	2	0.53
HIV Status	9.41	2	0.009*
Smoking Habit	1.38	1	0.24
No of sticks smoked	2.61	3	0.45
Other Psychoactive	1.68	4	0.79
Past Psychiatric History	21.95	4	0.00*

Determination of association using chi-square between clinical factors and depression.
*Statistically significant
Table 4: Association between clinical condition and depression.

Variable	B	SE (B)	P-value	OR‡	95% CI for OR	
					Lower	Upper
HIV Status	0.42	0.36	0.24	1.53	0.75	3.11
Past Psychiatry History	-1.82	0.47	0	0.16	0.06	0.4

Table 5: Relationship between depression and clinical factors.

seriously both as a target for preventive intervention and for treatment. This finding agrees with the fact, that there is an urgent need for the improvement of medical and psychiatric services in prison settings and other public health institutions in developing nations like Nigeria, in order to minimize the sufferings of the inmates, due to various health neglects. The results of this research support the idea, that there is also the need to improve capacity training and competence, in the diagnosis and management of prisoners with mental illness like depression. Prisons service can provide a better corrective and rehabilitative role for which it is set out to do, only if these concerns are adequately addressed.

Recommendation

The burden of co-morbid physical illnesses co-existing with depression among the inmates, without receiving any treatment, demands that a proper evaluation and assessment of every prisoner upon entry into prison. Collaboration with the psychiatric unit of the university of Port Harcourt Teaching hospital will provide psychiatric intervention in the short and medium term. The condition of the prison studied is a reflection of the situation in most prisons of the developing world. There is the possibility therefore, that the local lessons can then indeed be translated into national as well as global action.

Conclusion

Data from this study shows that the burden of depression in this vulnerable and marginalized population poses a serious challenge to custodians of prisons, researchers and clinicians alike. This and the other findings above, point towards the need for coordinated care planning between the prison authority, psychiatric services, and the criminal justice system in order to promote public health of the inmates. The prison may be some inmates only opportunity to receive psychiatric care, so prison health should be considered as a priority in public health which demands provision of comprehensive medical and psychiatric services.

Limitation

The major limitation to the study being that data was obtained by self-report with a potential for recall bias The BDI suffers from the same problems as other self-report inventories, in that scores can be easily exaggerated or minimized by the participants. There were no medical records available to corroborate self-reports.

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Conflict of interest

Authors declare there are no conflicts of interests regarding this paper.

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