Clinical Factors as Predictors of Depression in a Nigerian Prison Population

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

Methods: Through stratified random sampling, 400 inmates 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.
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 correlates 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],

\[
n = \frac{Z_{p}^{2}pq(1.96)^{2}}{d^{2}}\left(0.50\right)^{2} = 384.384.
\]

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

\[
\frac{Sample\ Size}{100 - 15} = \frac{398.8}{0.85} = 461.4.
\]

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 homogeneous 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 ≤ 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, 129 (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
calculated as follows (Table 3):

The sensitivity and specificity of the BDI is the patients met SCAN criteria for depression while 169 (42.2%) scored one hundred and fifty nine (39.7%) of found to have depression. The overall true prevalence of depression negatives were screened in the ratio of 1:10 and two (2) inmates were psychotic symptoms. Ten (2.5%) had no SCAN depression. The BDI without psychotic symptoms and 18 (4.5%) for severe depression included Retroviral status (X² = 9.41, p = 0.00) and past psychiatry history (X² = 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 psychiatric 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].

Bivariate analysis shows that the clinical factors in association with depression included Retros trial status (X² = 9.41, p = 0.00) and past psychiatry history (X² = 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 psychiatric 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

Table 1: Social demographic characteristics.

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

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):

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, χ² (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= 0.06-0.465).

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].

For association between clinical condition and depression see Table 4
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, in which 50% had no diseases [14]. However, the fact that majority 49.2% had no diseases. This agrees with the finding in a similar 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, languish 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

### Table 2a: Clinical Profiles of the inmates.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical and Surgical condition among inmates</td>
<td></td>
</tr>
<tr>
<td>Chronic Medical Conditions (Diabetes Mellitus, Hypertension, Asthma, Peptic Ulcer, Tuberculosis)</td>
<td>105 (26.4)</td>
</tr>
<tr>
<td>Surgical conditions (Hernias, Hemorrhoids, Glaucoma, Cataract, Parotid Swelling)</td>
<td>15 (3.9)</td>
</tr>
<tr>
<td>Cystitis</td>
<td>2 (0.5)</td>
</tr>
<tr>
<td>Skin lesions/ Infections</td>
<td>80 (20.0)</td>
</tr>
<tr>
<td>Speech/ Hearing Impairment</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>No disease</td>
<td>197 (49.3)</td>
</tr>
<tr>
<td>Disabilities/Limitations</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14 (3.5)</td>
</tr>
<tr>
<td>No</td>
<td>386 (96.6)</td>
</tr>
<tr>
<td>Frequency of prescribed drugs among inmates</td>
<td></td>
</tr>
<tr>
<td>No Medication</td>
<td>238 (59.3)</td>
</tr>
<tr>
<td>Oral Hypoglycemic agents</td>
<td>16 (4.0)</td>
</tr>
<tr>
<td>Anti-hypertensive</td>
<td>20 (5.0)</td>
</tr>
<tr>
<td>Anti-retroviral drugs</td>
<td>49 (12.3)</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>22 (5.5)</td>
</tr>
<tr>
<td>Haematinics</td>
<td>2 (0.5)</td>
</tr>
<tr>
<td>Anti-Asthma</td>
<td>7 (1.8)</td>
</tr>
<tr>
<td>Anti-ulcer drugs</td>
<td>6 (1.5)</td>
</tr>
<tr>
<td>Anti-convulsants</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Anti-fungal drugs</td>
<td>37 (9.3)</td>
</tr>
<tr>
<td>Anti-Tuberculosis drugs</td>
<td>2 (0.5)</td>
</tr>
</tbody>
</table>

### Table 2b: Other Clinical Profiles of the inmates.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Medical History among inmates</td>
<td></td>
</tr>
<tr>
<td>No Past Medical History</td>
<td>268 (67.0)</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>7 (1.8)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>10 (2.5)</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>21 (5.3)</td>
</tr>
<tr>
<td>Asthma</td>
<td>8 (2.0)</td>
</tr>
<tr>
<td>Seizure disorder</td>
<td>4 (1.0)</td>
</tr>
<tr>
<td>Peptic Ulcer Disease</td>
<td>12 (3.0)</td>
</tr>
<tr>
<td>Skin infections</td>
<td>66 (16.5)</td>
</tr>
<tr>
<td>Eye conditions (Glaucoma, Cataract)</td>
<td>4 (1.0)</td>
</tr>
</tbody>
</table>

### Table 3: Validity of BDI by SCAN 2.1.

<table>
<thead>
<tr>
<th>BDI score</th>
<th>SCAN depression present</th>
<th>SCAN depression absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>161 = a</td>
<td>10 = b</td>
<td>171 = r1</td>
</tr>
<tr>
<td>10-14</td>
<td>229 = c</td>
<td>22 = d</td>
<td>251 = r2</td>
</tr>
<tr>
<td>Total</td>
<td>400 = t</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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 (OR: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...
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.

Acknowledgement

The Nigerian Prison Service Medical corps

Conflict of interest

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

Funding

None declared.

References


Table 4: Association between clinical condition and depression.

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR‡</th>
<th>95% CI for OR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical or Surgical Condition</td>
<td>1.646</td>
<td>15</td>
<td>0.35</td>
</tr>
<tr>
<td>Any Disabilities or Limitation</td>
<td>1.31</td>
<td>4</td>
<td>0.75</td>
</tr>
<tr>
<td>On Medication</td>
<td>12.84</td>
<td>10</td>
<td>0.23</td>
</tr>
<tr>
<td>Past medical History</td>
<td>12.61</td>
<td>8</td>
<td>0.12</td>
</tr>
<tr>
<td>Physical Status</td>
<td>0.74</td>
<td>1</td>
<td>0.39</td>
</tr>
<tr>
<td>Sexual Activity</td>
<td>1.24</td>
<td>2</td>
<td>0.53</td>
</tr>
<tr>
<td>HIV Status</td>
<td>9.41</td>
<td>2</td>
<td>0.009</td>
</tr>
<tr>
<td>Smoking Habit</td>
<td>1.38</td>
<td>1</td>
<td>0.24</td>
</tr>
<tr>
<td>No of sticks smoked</td>
<td>2.61</td>
<td>3</td>
<td>0.45</td>
</tr>
<tr>
<td>Other Psychoactive</td>
<td>1.68</td>
<td>4</td>
<td>0.79</td>
</tr>
<tr>
<td>Past Psychiatric History</td>
<td>21.95</td>
<td>4</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 5: Relationship between depression and clinical factors.

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR‡</th>
<th>95% CI for OR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV Status</td>
<td>0.42</td>
<td>0.36 0.24 1.53 0.75 3.11</td>
<td></td>
</tr>
<tr>
<td>Past Psychiatric History</td>
<td>-1.82</td>
<td>0.47 0</td>
<td>0.16 0.06 0.4</td>
</tr>
</tbody>
</table>

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 prisoners, 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 statistically significant.


