

**Original Article:****Prevalence and Socio-demographic Determinants of Depression among Inmates of a Prison in Malaysia****Authors:**

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Abstract: Depression is the most common form of mental disorder among prison inmates. The objective of this study is to determine the prevalence and socio-demographic determinants of depression among adult male inmates in a local prison in Malaysia. This cross-sectional study was conducted among 460 inmates who were systematically selected. Depression was screened using the Center for Epidemiologic Studies Depression (CES-D) scale. Chi-square tests and multiple logistic regression were applied to determine the association between depression and associated variables. Data was analyzed using SPSS software with a p value less than 0.05 was considered significant. The response rate was 90.7% while prevalence of depression was 40.7%. The presence of communicable disease (AOR=2.249, 95%CI=1.217-4.156) and non-communicable disease (AOR=1.890, 95%CI=1.132-3.156) identified as socio-demographic determinants of depression. The study suggest a high prevalence of depression among the inmates. Initiative must be given to address and improve the prison health care services.

Key Words: Prevalence, Socio-demographic, Determinants, Depression, Inmates

Introduction:

Prison is an institution where people who had run afoul of the law are detained. It is an institution which transform convicts into law abiding residents and reduce recidivism (1). However, it has been testified that imprisonment worsens mental health status (1). Besides physical health issue, many suffer from mental health problem (2). The World Health Organization (WHO) predicts that a minimum of one million (11%) from the nine million inmates throughout the world will have various mental health problems, and the most common is depression (3). Depression is common because it is associated

with imprisonment experiences among the inmates (4). At its worst, depression can lead to suicide.

In Malaysia, depression is also one of the most common mental health problems (5) and the prevalence is higher in prison population. One of the reasons might be the limited empirical data on socio-demographic determinants of depression among the inmates in Malaysia. Therefore, this present study aimed to study the prevalence and socio-demographic determinants of depression among adult male inmates of a local prison in Malaysia. The research hypothesis was that there was a significant association between depression and socio-demographic factors among adult male inmates of a local prison in Malaysia.

Methods:**Study Setting and Design**

This research was done in a medium security prison of a local prison in Malaysia which is an adult male correctional center. There is a health clinic within the prison that addresses prisoners' health issues together with dedicated healthcare professionals that provide mental health care services to the inmates. This research was of cross-sectional design and was carried out between June 2017 and June 2018.

Eligibility Criteria

Malaysian adults' prisoners aged 21 years old and above who have been convicted by the court regardless of the type of crime committed were included in the study. Meanwhile, inmates with severe communication problem or sentenced to life imprisonment and under treatment for mental illness were excluded.

Sample Size

The sample size was determined using two proportions hypothesis testing formula by Lwanga and Lameshow (1990) (6). Considering a power of 80% at a standard error of 1.96 with the confidence interval of 95% and the percentage of depression among prisoners without social support (0.515) and

with social support (0.374) (7), the calculated sample size was 388. Taking into consideration additional adjustment which are expected from eligible inmates (8) and non-response rate of 15% (9), the final calculated sample size was 507.

Sampling Technique

The inmates were randomly selected from different phases of imprisonment to ensure proportional representation and to reduce possible selection bias. A probability proportional to size (PPS) using stratified random sampling was used to choose the respondents. The inmates in the prison were divided into four phases of imprisonment (I-orientation, II-spirituality, III-skill training, and IV-pre-release) according to their duration of prison stay by the prison administrative. The number of respondents selected from each phase of imprisonment were decided based on the proportional calculation. Following that, each of the respondents was selected by simple random sampling.

Validity and Reliability

The face validity was checked to see whether respondents understand the questions being asked. Meanwhile the content validity was assured based on the reviews done by the expert panel. Reliability was assured by pre-testing with revision, where the pre-tests were done to inmates with similar characteristics but not in a sampling population. Cronbach's alpha for Likert scale questionnaire that was analyzed for internal consistency was given an alpha of 0.8, thus showing a good value (10).

Study Instrument

Data was collected by the researcher himself through face to-face interviews. The questionnaire has mainly two sections: the socio-demographic factor and the depression factor. Questions on age were open ended and age was categorized as less and more than 37 years old while questions on other matters were closed-ended. Socio-demographic profiling includes ethnicity (Malay, Chinese, Indian, and others), religion (Islam, Buddha, Christian, Hindu, or others), marital status (single, married, divorced, or separated), and education level (not formal education, primary, secondary, and tertiary level). Pertaining to employment, inmates need to specify whether they are employed or not prior to imprisonment. Respondents also need to mention their monthly income if they are working, where there are two options: less than RM1000 and more than RM1000. For communicable and non-communicable diseases, respondents need to specify whether or not they have any disease or not which were later classified into present or absence of diseases.

Center for Epidemiologic Studies Depression Scale (CES-D)

Depression was the dependent variable which was assessed by CES-D score. This study used a validated Malay-translated version of the CES-D which is an instrument to screen the depressive symptomatology of the inmates. There was no diagnosis of depression made, but only a screening. The Malay CES-D questionnaire was a translated version of the original English version of the CES-D designed by Radloff (1977) (11). This tool was chosen because it was the validated and pre-tested instrument in a local prison of Malaysia and has good validity and reliability (12). CES-D uses 20-item Likert scale to measure current depressive symptoms of the inmates. The mean score of total items were used as cut-off point to classify depression based on Malay CES-D (12).

Data Analysis

Data analysis was carried out using IBM SPSS version 22 software. Normality of data was checked and descriptive data were presented in terms of frequencies and percentages. Continuous variables were described in terms of means and 95% confidence intervals. Associations for categorical variables were established using the Chi-square and tabulated in frequencies and percentages. Variables with a *p* value less than 0.25 were included into the multivariate logistic

regression model to determine the final model. A *p*-value was considered significant if it is less than 0.05.

Results:

Response Rate

A total of 507 inmates were randomly selected to respond to the questionnaire and 460 inmates completed the questionnaire giving a response rate of 90.7%. The remaining 47(9.3%) did not respond to this study because some of them decided to withdraw from the study halfway and some were not present at the time of research. In order to overcome this, the researcher allowed a maximum of three trials to contain them in the study, before considering them as non-respondents.

Depression among Inmates

The prevalence of depression among adult male inmates from that particular prison in the research was 40.7% as highlighted in Table 1. A total of 273 inmates had a total score that is at or above the cut-off point of depression 18.0. The mean CES-D score was 18.05 ± 7.93 .

Depression	Mean \pm SD	Frequency (n)	Percentage (%)
Depression score	18.05 \pm 7.93		
Absence of depression (scores of <18)		273	59.3
Presence of depression (scores of \geq 18)		187	40.7

Socio-demographic Profile

Table 2 depicts the socio-demographic features of the respondents. The median age of the respondents was 37 years old (IQR: 12.0), which were dominated by those aged 30 to 39 years old (45.2%). Majority of the respondents were Malays (65%) and Islam (68%). Half of the inmates (50.2) were still single and a big proportion of the respondents (69.1%) attended until secondary school level. A large proportion of them (86.5%) were employed prior to incarceration compared to 13.5% who were unemployed. Among the earners, highest earning income was between RM1001 to RM2000 which was at 44.3%.

Bivariate Analysis

Table 3 shows the Chi-square test between depression and the associated socio-demographic factors among the inmates. There was significant association between depression and ethnicity and religion ($p < 0.001$). It also depicts that the majority of the respondents, who were mostly Malays (66.2%) and of the Islam religion (65.8%) were not depressed compared to those of other ethnicities and religions. There was a significant association between depression and the presence of both communicable disease ($p = 0.008$) and non-communicable disease ($p = 0.029$). The evidence from this study suggests that inmates without any communicable (61.5%) or non-communicable (61.6%) diseases were not depressed compared to inmates with communicable disease (58.0%) and non-communicable (52.0%) disease. Other factors which include age, marital status, education level, and employment status were not associated with depression.

Characteristics	Frequency (n)	Percentage (%)
Age (Years) Median 37.0, IQR 12.0		
21-29	73	15.9
30-39	208	45.2
40-49	126	27.4
50-59	42	9.1
60-67	11	2.4
Ethnicity		
Malay	299	65.0
Indian	109	23.7
Chinese	39	8.5
Other	13	2.8
Religion		
Islam	313	68.0
Buddha	32	7.0
Hindu	96	20.9
Christian	19	4.1
Marital status		
Single	231	50.2
Married	131	28.5
Divorced	79	17.2
Separated	19	4.1
Education level		
No formal education	32	7.0
Primary	83	18.0
Secondary	318	69.1
Tertiary	27	5.9
Employment status		
Employed	398	86.5
Unemployed	62	13.5
Monthly income (n=398)		
≤RM 1000	116	25.2
RM 1001-RM 2000	204	44.3
RM 2001-RM 3000	58	12.6
>RM 3000	20	4.3
Hypertension		
Yes	28	6.1
No	432	93.9
Diabetic		
Yes	41	8.9
No	419	91.1
Asthma		
Yes	13	2.8
No	447	97.2
HIV/AIDS		
Yes	15	3.3
No	445	96.7
Tuberculosis		
Yes	13	2.8
No	447	92.2
Hepatitis		
Yes	27	5.9
No	433	94.1

Variable	Depression		Test statistics		
	Absent [n (%)]	Present [n (%)]	Chi Square	df	p value
Age group (years)					
< 37	123(57.7)	90(42.3)	0.422	1	0.516
≥ 37	150(60.7)	97(39.3)			
Ethnicity					
Malay	198(66.2)	101(33.8)	16.726	1	<0.001*
Non Malay	75(46.6)	86(53.4)			
Religion					
Islam	206(65.8)	107(34.2)	16.978	1	<0.001*
Non Islam	67(45.6)	80(54.4)			
Marital status					
Single	145(62.8)	86(37.2)	2.369	3	0.499
Married	72(55.0)	59(45.0)			
Divorced	11(57.9)	8(42.1)			
Separated	45(57.0)	34(43.0)			
Education level					
No formal education	18(56.3)	14(43.8)	2.021	3	0.568
Primary	44(53.0)	39(47.0)			
Secondary	195(61.3)	123(38.7)			
Tertiary	16(59.3)	11(40.7)			
Employment status					
Employed	235(59.0)	163(41.0)	0.112	1	0.738
Unemployed	38(61.3)	24(38.7)			
Monthly income					
< RM 1000	116(55.7)	62(34.2)	4.077	1	0.043*
≥ RM 1000	157(55.7)	125(44.3)			
Presence of non-communicable disease (HPT, DM, Asthma)					
No	237(61.6)	148(38.4)	4.783	1	0.029*
Yes	36(48.0)	39(52.0)			
Presence of communicable disease (HIV/AIDS, TB, Hepatitis)					
No	252(61.5)	158(38.5)	6.998	1	0.008*
Yes	21(42.0)	29(58.0)			
*Significant at $p < 0.05$					

Logistic regression showed that non-Malay inmates were more likely to be depressed than Malay inmates (53.4% vs. 33.8%), which was statistically significant (OR = 2.25, 95% CI = 1.52–3.33, $p < 0.001$). Similarly, non-Muslim inmates were two times more likely to be depressed than those with the religion Islam (OR = 2.30, 95% CI = 1.54–3.43, $p < 0.001$). In this study, 34.2% inmates who earned an average monthly income of less than RM1000 were reported to be more depressed compared to 44.3% inmates who earned more than RM1000. This association was significant statistically (OR = 4.783, 95% CI = 1.01–2.20, $p = 0.04$). Other variables including age, marital status, education level, and employment status were found to be not significant (Table 4).

Table 4: Simple logistic regression examining depression among inmates and socio-demographic factors							
Factors	B	SE	Wald	df	COR	95% CI	p
Age group (years)							
=38	Reference						
< 38	0.173	0.193	0.806	1	1.189	0.815-1.734	0.369
Ethnicity							
Malay	Reference						
Non Malay	0.810	0.200	16.439	1	2.248	1.520-3.325	*<0.001
Religion							
Muslim	Reference						
Non-Muslim	0.832	0.204	16.645	1	2.299	1.541-3.429	*<0.001
Marital status							
Single	Reference						
Married	0.323	0.22	2.117	1	1.382	0.894-2.136	0.146
Divorced	0.204	0.484	0.177	1	1.226	0.475-3.167	0.674
Separated	0.242	0.265	0.835	1	1.274	0.758-2.141	0.361
Education level							
Tertiary	Reference						
No formal education	0.123	0.530	0.054	1	1.131	0.401-3.194	0.816
Primary	0.254	0.449	0.320	1	1.289	0.535-3.110	0.572
Secondary	0.086	0.408	0.045	1	0.917	0.412-2.042	0.833
Employment status							
Employed	Reference						
Unemployed	0.094	0.280	0.112	1	0.911	0.526-1.576	0.738
Monthly income							
<RM1000	Reference						
≥RM1000	0.399	0.198	4.060	1	1.490	1.011-2.195	*0.040
Presence of non-communicable disease							
No	Reference						
Yes	0.551	0.254	4.713	1	1.735	1.055-2.853	*0.030
Presence of communicable disease							
No	Reference						
Yes	0.790	0.304	6.748	1	2.203	1.214-3.996	*0.009

*Significant at $p < 0.05$

Socio-demographic determinants of depression among the respondents

Multiple logistic regression was used to determine the socio-demographic determinants of depression among the adult prison inmates. Five independent variables (presence of non-communicable disease, presence of communicable disease, ethnicity, religion, and income level) with a p value of less than 0.25 (Hosmer, Lemeshow, & Cook, 2000) (13) were included into the preliminary model selected from the bivariate analysis. The 'ENTER' method was selected as it produced the most number of significant depression predictors. There was no multicollinearity, and the Hosmer-Lemeshow goodness of fit chi-squared test showed that the

model is fit ($\chi^2=4.138$, $df = 5$, $p=0.530$). The Nagelkerke's R^2 was 0.091 which indicates that 9.1% of the variation in depression was explained by these variables, which were included in this logistic model.

Table 5 indicates the analysis of multiple logistic regression for socio-demographic determinants. Respondents with communicable disease were two times more likely to be depressed (aOR=2.249, 95%CI=1.217-4.156, $p=0.010$) compared to inmates without communicable diseases like Tuberculosis, HIV or Hepatitis. Similarly, inmates with non-communicable diseases like Diabetes and Hypertension were almost twice more likely to be depressed (aOR=1.890, 95%CI=1.132-3.156, $p=0.015$) compared to the inmates with non-communicable disease.

Table 5: Multiple logistic regression examining depression among inmates and socio-demographic factors							
Factors	B	SE	Wald	df	COR	95% CI	p
Ethnicity							
Malay	Reference						
Non Malay	0.416	0.562	0.547	1	1.515	0.504-4.559	0.460
Religion							
Muslim	Reference						
Non-Muslim	0.416	0.573	0.527	1	1.516	0.493-4.662	0.468
Monthly income							
≥RM1000	Reference						
<RM1000	0.401	0.205	3.817	1	1.493	0.999-2.232	0.051
Presence of non-communicable disease							
No	Reference						
Yes	0.637	0.262	5.918	1	1.890	1.132-3.156	*0.015
Presence of communicable disease							
No	Reference						
Yes	0.811	0.313	6.695	1	2.249	1.217-4.156	*0.010

*Significant at $p < 0.05$

Discussion:

Prevalence of Depression

The finding of the current research reveals that the prevalence of depression among adult male inmates in Seremban prison is 59.3%. The result is in line with the studies carried out among Ethiopian inmates (56.4%) (14). However, the prevalence was higher compared to that of the study conducted in Iran (42%) (15), Nigerian maximum security prison (42%) (9) and eastern Nepal prisons (35.5%) (16). On the other hand, the present findings also suggest low prevalence of depression compared to that of other studies conducted in Indian Rajahmundry central jail (81.8%) (17) and Nigeria medium security prison in Benin (72.6%) (18). This discrepancy can be described partially by the use of a different study tool for assessing depression, and partially by the prison characteristics itself which include security settings, prison laws, economic status, and cultural background of the inmates (19).

It is apparent from this study that the prevalence of depression is higher compared to the estimated prevalence of depression in Malaysia, which is between 8% and 12% (20). In Malaysia, the most recent Malaysian National Health and Morbidity Survey (NHMS) conducted among the general population in Malaysia reveals that 29.9% of adults in Malaysia are experiencing mental health problems including depression (21). The possible reason of high depression prevalence might

be due to the stressful environment of the prison, isolation from family, and lack of freedom of movement in prison compared to the population living outside prison.

Depression and Age

The youngest and oldest inmates in this study were 20 and 67 years respectively. Almost half of the inmates were aged between 30 to 39 years old (45.2%). The findings on age were inconsistent as different studies categorized age groups differently. However, a study in a Turkish prison reported the same finding, which is the majority of the inmates belongs to the age group of 30 to 39 years old (34.3%) (2). The fact that a higher number of inmates belong to the age group of 30 years may be explained by the higher crime rate among this age group as the majority of the inmates in Malaysia are young adults (22) and also because those of this age group are more likely to reoffend.

There was no significant association between depression and age group among the inmates ($p=0.369$). This is consistent with a study reported in Turkish (2) and Nigeria prison (19). This suggests that depression has no link with age group although many researchers tried to establish a genetic link with depression. Perhaps in a prison setting, other prison environmental related factors play a more prominent role than biological age variable in developing depression. The age group of less than 37 years old (42.4%) are seen to be more depressed compared to the age group of more than 37 years old (38.3%). This age group are more prone to depression as their future aspirations are more. Hopelessness, uncertain future, and helplessness at this productive age may lead to frustration, which cause depression. However, the findings of the current study do not support the previous research done among prisoners in Rio de Janeiro, Brazil as there was significant association between depression and age group ($p=0.03$) (23).

Depression and Ethnicity and Religion

This study has shown that a majority of the inmates in Seremban prison were Islam (68%) and Malays (65%), which was followed by Indians (23.7%), Chinese (8.5%), and others (2.8%). Malaysia is a multiracial country that predominantly consists of Malays, Chinese, Indians, and others as the minority group. This finding is in line with an earlier similar study on stress and depression among inmates in peninsular Malaysia in which the majority of prisoners were Malays (56.8%), Indians (20.3%), Chinese (18.9%), and others (4.0%) (24).

Depression was significantly associated with ethnicity ($p<0.001$) and religion ($p<0.001$). This results are also in line with the results reported in Western Australia maximum security prison (25). A possible explanation for this might be that a majority of the respondents in this study were Islam which is concurrent with the national demographic profiling. However, this finding is inconsistent with the other prison studies reported in Nigeria (26) and Ethiopia ($p>0.05$) (27).

Depression and Marital Status

This study found that almost half of the respondents (50.2%) were still single when they entered prison compared to those married (28.5%), divorced (17.2%), and separated (4.1%). The finding is consistent with the findings of past studies in Nigeria (18) and Ethiopia (7) which reported that 49.6% and 47.1% of the total respondents are still single, respectively. These inmates probably come from family backgrounds that were problematic that they were scared to establish new relationship or simply, because nobody there want to marry an ex-convict because of the stigma.

The results of this study showed that there was no association between depression and marital status among the inmates. Contrary to expectation, the disruption in family structure resulting from loss of contact with family members was not significantly associated with depression among those who were married. The fact that all the respondents in this study

were adult men may have accounted for this. These results agree with the findings of other studies, in which there was no association between depression and marital status among incarcerated women in Ribeirao Preto, Brazil (28). However, contradictory findings were reported among prisoners of Amhara regional state, Ethiopia (7) and prisoners in Rio de Janeiro, Brazil (23).

Depression and Education Level

There was no association of depression with educational status ($p=0.41$) which is consistent with the findings reported by Osasona & Koleoso (2015) in a Nigerian prison (18). However, inmates with higher education attainment were found to be less depressed compared to inmates with lower education level. This is consistent with the literature, which describes the protective effect of a higher education level against depression (29). These results differ from that of an earlier study among prison inmates in North Carolina which reported that education has an association with depression ($p<0.05$) (30).

Depression and Employment Status and Monthly Income

Results of this study have found that generally, 398 (86.5%) inmates were employed before incarceration. Most of them earned monthly between RM1001 to RM2000. The rate of employment before incarceration was better among the inmates in Malaysian prison compared to the inmates in Ethiopian prison (72.0%) (7) and Nigerian prison (67.9%) (19). However, the finding of this study is in contrast to the longitudinal cohort study (Surveying Prisoner Crime Reduction – SPCR) in United Kingdom, which reported that around two-thirds of prisoners were unemployed both before and after custody (31). The author stress the importance of employment as it is a very important tool in reducing re-offending.

The results of this study did not show any association between depression and employment status prior to imprisonment ($p=0.738$), which is in line with the findings reported among inmates at the federal prison in Abeokuta, southwest Nigeria (26). The possible explanation for this might be due to the difference in socio-demographic characteristics of study participants that include types of occupation, monthly income, quality of life, and satisfaction with daily life.

Depression and Communicable and Non-communicable Diseases

Our finding revealed that 356 (77.4%) inmates had no chronic disease. In comparison, prisoners in Hawassa central correctional institutions, Ethiopia (14), and Jimma town prison, South West Ethiopia (27) are healthier as 91% and 84% of them has no chronic medical illness. The remaining 104 (22.6%) inmates had either non-communicable disease or communicable disease. Most of the inmates had Diabetes (8.9%), Hypertension (6.1%), Hepatitis (5.9%), HIV/AIDS (3.3%), Tuberculosis (2.8%), and Asthma (2.8%). This finding is similar to the finding by NHMS, 2015, which serves as evidence that both Hypertension and Diabetes Mellitus are the top two non-communicable diseases among the adult population (21).

Determinants of Depression

In this study, both communicable and non-communicable diseases have been identified as the determinants of depression. Depression play a vital role in the etiology, development, and outcomes related to chronic diseases (32). In certain cases, depression appears as a consequence of specific biologic properties of chronic medical illness while in some cases it is influenced by behavioral characteristics. The restrictions on activity executed by the chronic diseases leads to gradual withdrawal from rewarding undertakings any may lead depressive symptoms (33). Presence of chronic disease was reported in few studies that put an inmates at higher risk of developing depression (14, 27). Probably this due to stresses

related to chronic diseases which is a condition that lasts for long time and thoughts the disease might not be cured (14).

Strength, Limitation and Recommendation

The strength of this study is that it had managed to get a high participation rate despite the fact that the study population are from a vulnerable group. There were some limitations in this research that need to be highlighted. The respondents were recruited from one homogenous male prison. Therefore, these results cannot be generalized or comparable with other prison studies. Even though that is the scenario, there was a diversity among the inmates itself who come from different backgrounds and who committed various crimes. There was a bias too since this study prevented us from making definitive inferences about the consequence of the risk factors associated with depression, as it is a cross-sectional study design. Future studies would need to cover heterogeneous population from both male and female inmates to ensure better representativeness.

Conclusion:

The current findings suggest a high prevalence of depression among the inmates especially those with the presence of both communicable and non-communicable diseases who are at a higher risk of being depressed. Immediate consideration should be given to address the mental health issues among the inmates especially those with diseases. Initiative must be taken to improve the health care services in the prison itself to ensure that inmates are healthy both physically and mentally. The prison environment can be a unique challenge for the prison healthcare professionals in providing best care although the provisions and modernizing of prison health can be beneficial in addressing depression.

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References:

1. Armour C. Mental health in prison: A trauma perspective on importation and deprivation. *Int J Criminol Soc Theory*. 2012; 5(2):886-894.
2. Unver Y, Yuce M, Bayram N, Bilgel N. Prevalence of depression, anxiety, stress, and anger in Turkish prisoners. *Journal of Forensic Sciences*. 2013; 58(5):1210-1218.
3. World Health Organization. Background paper for trend statement on prisons and mental health. Slovakia: WHO Publication; 2008.
4. Kamoyo JM, Barchok HK, Mburugu BM. Effects of imprisonment on depression among female inmates in selected prisons in Kenya. *Res Humanities Soc Sci*. 2015; 5(16).
5. Mukhtar F, Oei TP, Yaacob M. Effectiveness of group cognitive behaviour therapy augmentation in reducing negative cognitions in the treatment of depression in Malaysia. *ASEAN Journal of Psychiatry*. 2011; 12(1): 50-65.
6. Lemeshow S, Hosmer D, Klar J, Lwanga S. Adequacy of Sample Size in Health Studies. Hoboken, NJ: Wiley; 1990.
7. Beyen TK, Dadi AF, Dachew BA, Muluneh NY, Bisetegn, TA. More than eight in every nineteen inmates were living with depression at prisons of Northwest Amhara regional state, Ethiopia, a cross sectional study design. *BMC Psychiatry*. 2017; 17(1):3.
8. Aday L, Cornelius L. Designing and conducting health surveys: A comprehensive guide. San Francisco: Jossey-Bass; 2006.
9. Nwaopara U, Stanley P. Prevalence of depression in Port Harcourt prison. *J Psychiatry*. 2015; 18:340.
10. Tavakol M, Dennick R. Making sense of Cronbach's alpha. *International Journal of Medical Education*. 2011; 2:53.
11. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurements*. 1977; 1:385-401.
12. Mazlan NH, Ahmad A. A Validity Study of Malay-translated Version of Perceived Stress Scale. *Malaysian J Foren Sci*. 2012;3(1):52-7.
13. Hosmer D, Lemeshow S. Applied Logistic Regression (2nd Edition). New York: John Wiley & Sons, Wiley InterScience; 2000.
14. Bedaso A, Kediro G, Yeneabat T. Factors associated with depression among prisoners in southern Ethiopia: a cross-sectional study. *BMC Res Notes*. 2018; 11: 637.
15. Valizadeh R, Veisani Y, Delpisheh A, Kikhavani S, Sohrabnejad A. Major depression and psychiatric disorders in Iranian prisoners based on a clinical interview: a systematic review and meta-analysis. *Shiraz E-Medical Journal*. 2017; 18(6).
16. Shrestha G, Yadav DK, Sapkota N, Baral D, Yadav BK, Chakravarty A, Pokharel PK. Depression among inmates in a regional prison of eastern Nepal: a cross-sectional study. *BMC Psychiatry*. 2017; 17:348.
17. Datta PV, Vijaya M, Krishna IV, Bai BS, Sharon MT, Ramam S. Prevalence of depression and assessment of its severity among prisoners of central prison, rajahmundry, India. *Indo American Journal of Pharmaceutical Research*. 2015;5(9):2893-2898
18. Osasona SO, Koleoso ON. Prevalence and correlates of depression and anxiety disorder in a sample of inmates in a Nigerian prison. *The International Journal of Psychiatry in Medicine*. 2015; 50(2):203-218.
19. Uche N, Princewill S. Clinical factors as predictors of depression in a Nigerian prison population. *Journal of Psychiatry*. 2016.
20. Ng CG. A review of depression research in Malaysia. *The Medical Journal of Malaysia*. 2014; 69:42-45.
21. National Health and Morbidity Survey (NHMS). Institute for Public Health (IPH) 2015. Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problems. Kuala Lumpur: Institute for Public Health; 2015.
22. Asian and Pacific Conference of Correctional Administrators Challenges and initiatives in corrections. The Prisons Department, Ministry of Home Affairs Malaysia. 2013. Available at: <http://www.apcca.org/library.php?page=publications>. Accessed 29 April 2019.
23. Constantino P, Assis SGD, Pinto LW. The impact of prisons on the mental health of prisoners in the state of Rio de Janeiro, Brazil. *Ciênc Saúde Coletiva*. 2016; 21(7):2089-2100.
24. Ahmad A, Mazlan N. Stress and Depression: A Comparison Study between Men and Women Inmates in Peninsular Malaysia. *International Journal of Humanities and Social Science*. 2014; 4(2).
25. Fleming J, Gately N, Kraemer S. Creating HoPE: Mental health in western Australian maximum security prisons. *Psychiatry, Psychology and Law*. 2012; 19(1):60-74.
26. Majekodunmi OE, Obadeji A, Oluwole LO, Oyelami RO. Depression in prison population: Demographic and clinical predictors. *Journal of Forensic Science and Medicine*. 2017; 3(3):122.

27. Zakir A, Teshome K, Lamessa D, Workinesh T, Mubarek A. Prevalence and Associated Factors of Depression among Prisoners in Jimma Town Prison, South West Ethiopia. *Psychiatry Journal*. 2017; 2018:1-10.
28. Pinese CS, Furegato AR, Santos JL. Demographic and clinical predictors of depressive symptoms among incarcerated women. *Annals of General Psychiatry*. 2010; 9(1).
29. Bjelland I, Krokstad S, Mykletun A, Dahl AA, Tell GS, Tambs K. Does a higher educational level protect against anxiety and depression? The HUNT study. *Social Science and Medicine*. 2008; 66(6):1334-1345.
30. Scheyett A, Parker S, Golin C, White B, Davis CP, Wohl D. HIV-infected prison inmates: depression and implications for release back to communities. *AIDS and Behavior*. 2010; 14(2):300-307.
31. Brunton-Smith I, Hopkins K. The impact of experience in prison on the employment status of longer-sentenced prisoners after release. Technical Report. Ministry of Justice Analytical Series, 2014. Available at: <https://www.gov.uk/government/publications/the-impact-of-experience-in-prison-on-the-employment-status-of-longer-sentenced-prisoners-after-release>. Accessed 28 April 2019.
32. Chapman DP, Perry GS, Strine TW. The vital link between chronic disease and depressive disorders. *Prev Chronic Dis*. 2005; 2(1).
33. Simon GE. Treating depression in patients with chronic disease. *Western Journal of Medicine*. 2001; 175(5): 292.