ORIGINAL ARTICLE

Biopsychosocial Determinants of Depression among the Male Inmates in Malaysia

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ABSTRACT

Introduction: The increasing prevalence of depression has been a major public health concern. Being a marginalized population put the inmates at risk of depression. The main objective of this study was to identify the determinants of depression among the inmates according to the biopsychosocial model. **Methods:** A cross sectional study involving 460 male inmates was conducted at a medium security prison in Seremban. Only Malaysian adult prisoners who have been convicted and had spent a minimum of three months in the prison were eligible for the study. They were selected using the probability proportional to size using stratified random sampling. Data was collected using validated and pre-tested questionnaire by face-to-face interviews, with depression was measured using the Center for Epidemiologic Studies Depression (CES-D) Scale. The data were analyzed using IBM SPSS version 22 with a p-value less than 0.05 was considered statistically significant. **Results:** The results showed prevalence of depression were 40.70% (95% CI: 36.21-45.19) with its development being predicted by presence of communicable disease (AOR=2.145, 95% CI: 1.123-4.095), history of childhood abuse (AOR=1.762, 95% CI: 1.045-2.972), sentences of more than 5 years (AOR=3.801, 95% CI: 1.529-9.450), being non-Muslims (AOR=2.261, 95% CI: 1.461-3.497) and perceived stress (AOR=4.007, 95% CI= 2.610-6.151). **Conclusions:** This study revealed an alarmingly high prevalence of depression among the male inmates, with stress being the strongest risk factor. Reintegration of the prisoners into the community should be considered as part of the rehabilitation program to ensure continuation of psychiatric care and reduce relapsing.

Keywords: Biopsychosocial, Determinants, Depression, Inmates, Malaysia

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INTRODUCTION

Prison is an institution which is also known as correctional facility, commonly used in the criminal justice system. It serves as a rehab centre for inmates who commit crimes and at the same time protect the public from crimes and criminals (1) through educational courses in prison, teaching job skills, religious activity and counselling services. Epidemiological studies conducted across many counties have reported that the prevalence of mental illness in prison far exceeds the general population (2). It was estimated at least 11% of the global 9 million prisoners suffer from mental disorder (3), with depression being the most common and linked to the imprisonment experiences (4).

Depression has been reported to be prevalent among the incarcerated inmates (5). According to the Diagnostic and Statistics Manual of Mental Disorders V (DSM V), depression is diagnosed based on the presence of five or more of these symptoms for a period of two weeks which include, low mood, loss of interest, changes in sleep and activity, loss of energy, guilt feelings, suicidality and loss of concentration (6). Meanwhile World Health Organization defined depression as a mental disorder that presents with depressed mood, loss of interest, decreased energy, and feelings of guilt, disturbed sleep or appetite (7). A systematic review and meta-regression analysis conducted by Fazel and Seewald, (2012) on psychotic illness and major depression on 33,588 prisoners in 24 countries worldwide in year 2012 revealed higher prevalence of depression among female prisoners compared to male prisoners, 14.1% (95%CI 10.2–18.1) and 10.2% (95%CI 8.8–11.7) respectively (8). The low income countries were reported to experience twice higher risk of depression compared to middle income countries (8).

Depression is also one of the commonest mental health

problems in Malaysia in general (9). A comparison study of stress and depression between inmates in peninsular Malaysia reported that from the 426 inmates' respondents, 236 (55.4%) were having depression (10). Comparatively, 16.9% of the young prisoners at the Kajang integrity school and juvenile detention centre at the Kajang Prison reported to have depression, after alcohol and substance related disorders (11).

Many factors were linked to the inmates' experiences that lead to depression. Among them are feelings of inadequacy and fear of family abandonment, guilt for being absent from raising and educating their children, losing their right to the social importance of work upon release, identity loss and also social discrimination (12-15). According to the Bio-psychosocial model which was conceptualized by George Engel in 1977, this model is an integrated approach of biological, psychological and social aspect. It has been used widely in many researches to understand the development of illnesses or disorders. The 'bio' component examines the influence of biology factors on health, which includes brain changes, genetics, or functions of body organs. Meanwhile, the 'psycho' component refers to things like thoughts, emotions, or behaviours, and aspects like culture, economic status and social interactions are covered under 'social' component of the theory (16). Hence, based on the application of Bio-psychosocial model this study aimed to explore the determinants of depression among the inmates.

MATERIALS AND METHODS

This study was a cross sectional study involving 460 male inmates from the medium security prison in Seremban, Negeri Sembilan, Malaysia. The respondents were selected using the stratified proportionate to size sampling according to the 4 phases of prison (I-orientation, II-spirituality, III-skill training and IV-pre-release). Based on the calculated proportion for each phase, eligible respondents were recruited using simple random sampling. The eligibility criteria for the study includes adults (21 years old and above) and sentenced prisoners who have been convicted by the court regardless of type of crime committed or number of imprisonment either first time or more. Meanwhile exclusion criteria were, inmates who were sentenced to life imprisonment or on death row, under treatment for mental illness, had spent or transferred lesser than three months in the prison and also prisoners categorized as high risk. High risk inmates are those inmates considered as being a threat to the security, safety, and stability of the prison system by the prison authority as defined by Bryans and Atabay (2016) (17).

The sample size was determined using two proportions hypothesis testing formula by Lwanga and Lameshow (1990): $n=(2\sigma 2[Z1-\alpha/2+Z1-\beta]2)/([\mu 1-\mu 2]2)$ (18), using a power of 80% at a standard error of 1.96 with the confidence interval of 95%. The data was collected using a validated and pre-tested questionnaire by face-to-face interviews with individual respondent. The questionnaire consists of four sections namely biological factors (age, no. of children, presence of chronic disease), psychological factors (Rosenberg Self-esteem Scale (RSES), Cohen Perceived Stress Scale (PSS), pre-incarceration tobacco smoking and no. of cigarettes, pre-incarceration alcohol intake and frequency, pre-incarceration drug abuse and types), social factors (history of childhood abuse, history of childhood labour, presence of visitors, present offence, duration of sentences, duration of prison stay, previous incarceration, work tasks, religious practice, education) and Center for Epidemiologic Studies Depression Scale (CES-D) to measure depression as the main study outcome. After modifying some of the questions that were included with comments for the respondents' better understanding, the content validity was assured based on the reviews done by the expert panel. Reliability was assured by pre-testing with 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 (19).

The Malay version of CES-D was a translation of the original English CES-D version designed by Radloff (1977) (20) have twenty questions and uses four point Likert scale ranging from rarely or none of the time (0), some or a little of the time (1), occasionally or moderate amount of time (2) to most or all of the time (3).

IBM Statistical Package for Social Sciences (SPSS) version 22.0 (SPSS, Chicago, IL, USA) were employed for data entry and statistical analysis. Normality test were conducted for all continuous variables using both statistical and graphical methods. Descriptive statistics were used for continuous variable in the form of mean, and standard deviation. Categorical data were reported in frequencies and percentage. Multiple logistic regression using ENTER method was used to determine the predictive model for depression among the respondents. The confidence interval was considered at 95% and p value smaller than 0.05 were considered statistically significant.

RESULTS

Depression

The prevalence of depression is shown in table I. A total of 187 (40.70%, 95% CI: 36.21-45.19) inmates involved in this study were found to have depression.

Biological characteristics

Table II is showing the biological characteristics of the inmates, which were dominated by those aged 30 to 39 years old (45.2%), without chronic illness (77.4%), Hypertension (93.9%), Diabetes (91.1%), Asthma

Table I: Prevalence of depression among respondents (N= 460)

Depression	Mean ± SD	Frequency (n)	Percentage (%)
Depression score	18.05±7.93		
Absence of depression (scores of ≤18)		273	59.3
Presence of depression (scores of >18)		187	40.7

Table II: Biological background of the respondents (N=460)

Factors	Frequency (n)	Percentage (%)
Age group (years), Median 37.0 (IQR 12.0)		
20-29	73	15.9
30-39	208	45.2
40-49	126	27.4
50-59	42	9.1
≥ 60	11	2.4
Presence of chronic disease		
Yes	104	22.6
No	356	77.4
Hypertension		
Yes	28	6.1
No	432	93.9
Diabetes		
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
No. of children, Median 2.0 (IQR 1.0)		
0	250	54.3
1	51	11.1
≥ 2	159	34.6

(97.2%), HIV/AIDS (96.7%), tuberculosis (92.2%) and hepatitis (94.1%) and also had no children (54.3%).

Psychological characteristics

Meanwhile, the psychological characteristics of the respondents are shown in table III, with majority had history of pre-incarceration tobacco smoking (81.1%), no history of pre-incarceration alcohol intake (64.8%), had history of pre-incarceration drug abuse (81.3%), which was dominated by heroin intake (29.7%), high self-esteem (61.7%) and high perceived stress (55.2%).

Table III: Psychological background of the respondents (N=460)

Factor	Frequency (n)	Percentage (%)
Pre-incarceration tobacco smoking		
Yes	373	81.1
No	87	18.9
No. of cigarettes smoked (n=373)		
≤ 10	163	43.7
> 10	210	56.3
Pre-incarceration alcohol intake		
Yes	162	35.2
No	298	64.8
Frequency of alcohol intake (n=162)		
Seldom	87	53.7
Sometimes	50	30.9
Always	25	15.4
Pre-incarceration drug abuse		
Yes	374	81.3
No	86	18.7
Types of drugs abused (n=374)		
Heroin	111	29.7
Syabu	70	18.7
Syabu, heroin & morphine	61	16.3
ICE	52	13.9
ICE & heroin	28	7.5
Cannabis	23	6.1
Methamphetamine	16	4.3
Morphine	13	3.5
Self-esteem, Mean score 37.80 (±5.70)		
High self-esteem (≥38)	284	61.7
Low self-esteem (<38)	176	38.3
Perceived stress, Mean score 16.85 (±5.15)		
High (≥17)	254	55.2
Low (< 17)	206	44.8

Sociological characteristics

The sociological characteristics are described in table IV. Most of the respondents had no history of childhood abuse (82.8%), no history of childhood labour (80.7%), had visitors from time to time (56.7%), convicted due to drug related offence (62.2%), sentenced for 13 to 60 months (47.6%) been in the prison for less than 6 months (57.2%), had 1 to 4 previous incarceration (51.5%), not performing work tasks while in the prison (52%), always involved in religious practices (53.5%) and received secondary education (69.1%).

Determinants of depression

Table V is showing the predictive model for depression among the respondents. The occurrence of depression among the inmates are predicted by presence of communicable disease, previous history of childhood abuse, sentences of more than 5 years, being non-Muslims and presence of stress, with stress being the strongest risk factor.

Table IV: Sociological background of the respondents (N=460)

Factor	Frequency (n)	Percentage (%)
History of childhood abuse		
No	378	82.2
Yes	82	17.8
History of childhood labour		
No	371	80.7
Yes	89	19.3
Presence of visitors		
No	199	43.3
Yes	261	56.7
Present offence		
Drug related	286	62.2
Robbery	85	18.5
Commercial crime	37	8.0
Smuggling	21	4.6
Violent	18	3.9
Others	13	2.8
Duration of sentences (months), Median 14.0 (IQR 28.0)		
≤ 12	213	46.3
13-60	219	47.6
> 60	28	6.1
Duration of prison stay (months), Median 5.0 (IQR 5.0)		
<6	263	57.2
6-12	158	34.3
>12	39	8.5
Previous incarceration, Median 3.00 (IQR 3.0)		
0	53	11.5
1-4	237	51.5
>4	170	37.0
Work task performed		
No	221	52.0
Yes	239	48.0
Religious practice		
Always	246	53.5
Seldom	94	20.4
Sometimes	65	14.1
Frequently	55	12.0
Highest level of education		
No formal education	32	7.0
Primary	83	18.0
Secondary	318	69.1
Tertiary	27	5.9

Log (Probability of developing depression) = -1.741 + 1.388(perceived having stress) + 1.335(sentences more than 5 years) +0.816(non-Islam) + 0.763(presence of communicable disease) + 0.567(history of childhood abuse)

Table V: Predictive model for depression among the male inmate based on the biopsychosocial model (N=460)

Factors	B	SE	Wald	df	AOR	95% CI	p
Constant	-1.741	0.204	72.975	5	0.175		**<0.001***
Communicable disease							
No							
Yes	0.763	0.330	5.348	1	2.145	1.123-4.095	**0.021***
Childhood abuse							
No			Reference				
Yes	0.567	0.267	4.511	1	1.762	1.045-2.972	**0.034***
Duration of sentences							
≤5 years			Reference				
> 5 years	1.335	0.465	8.261	1	3.801	1.529-9.450	**0.004***
Religion							
Islam			Reference				
Non-Islam	0.816	0.223	13.427	1	2.261	1.461-3.497	**<0.001***
Perceived stress							
No			Reference				
Yes	1.388	0.219	40.276	1	4.007	2.610-6.151	**<0.001***

*Significant at p<0.05

DISCUSSION

Depression has been one of the most common mental problems regardless of age groups. According to World Health Organization (WHO), depression is the leading cause of disability as translated by the years lived with disability (YLDs) and expected to further increase in the coming years (21). Hence, initiative to create awareness on the negative impact of the illness is important, which include reducing stigma towards mental problems.

The imprisonment experience causes significant increase in the prevalence of psychiatric illness, higher than the reported prevalence among the general population for most mental disorder (22). This was more pronounced for severe mental disorder, which was five to ten times higher among prisoners (23). The overcrowding, lack of privacy, violence and social isolation in the prison setting added with inadequate mental health facilities may lead to mental disorders among them (24).

High prevalence of depression among inmates was also reported in a study among prisoners in southern Ethiopia with more than 50% reported to have depressive symptoms (25). Very high prevalence of depression among inmates had been reported in other studies with 81.18% among inmates in the Indian Rajahmundry central jail and 72.6% in Nigeria medium security prison in Benin City (25). Meanwhile, slightly lower prevalence was reported in a study among inmates in Jhumka Regional Prison, reported a depression prevalence of 35.3% slightly lower prevalence of depression of 35.3%, in which those inmates with previous incarceration and frequent appointments associated with health problems were more likely to experience depression (26). On the other hand, a similar study in South Nigeria reported 4.5% of the inmates had psychotic features associated with severe depression (27). Depressive symptoms among inmates frequently linked with suicide and

Table III: The mean difference of teamwork, professionalism and leadership skill score before and after Community Medicine Posting among medical students in UPM (n = 107)

Variable		Adjusted Mean (95% CI)	Mean difference	p-value
Teamwork	Pre-posting	43.98 (42.43, 45.53)	1.11	0.089
	Post-posting	45.88 (44.04, 47.72)		
Professionalism	Pre-posting	81.58 (79.70, 83.46)	1.23	<0.001
	Post-posting	87.62 (86.13, 89.11)		
Leadership	Pre-posting	76.05 (73.38, 78.72)	10.69	<0.001
	Post-posting	86.75(84.67, 88.82)		

Note: All analysis were adjusted for sex and age as potential confounders; 95% CI = 95% confidence interval.

mortality in prisons (28). The high prevalence of depression among the inmates reflect the importance of this issue and prompt action is needed, which require development of policy related to screening, provision of mental health services in prison.

According to Bedaso et al. (25), the public negative perceptions towards mentally ill individuals contribute to mental disorders in prisons, which can contribute to the psychological and social aspects of the determinants. The findings of this study revealed the important role of the social factors such as the religious beliefs or practices, history of childhood abuse and duration of present sentence predicting the development of depression among the inmates. Meanwhile, presence of communicable diseases and perceived stress are the only determinant under the biological factors and psychological factors respectively.

Inmates, especially with an incurable communicable disease like HIV/AIDS, can become depressed if they experience a significant level of stigma. This stigma is commonly related to fear of death as no specific treatment for example patient with underlying HIV/AIDS, lack of knowledge about the disease, dominant sexual beliefs that you can only become infected if you are promiscuous or homosexual and wrong misinterpretations about the disease (29).

Perceived stress is another significant predictor for depression in this study. The strong link between stress and depression among inmates has been reported in previous studies (10, 30, 31). According to Ahmad & Mazlan (10), stress is a significant variable contributes towards depression among male and female inmates in Malaysia, with higher tendency of stress and depression among female inmates. The restriction to achieve economic success as well as the limited bonding with the outside world may contribute towards their stress (32).

Meanwhile social aspects were shown to have significant link with the development of depression among the inmates. The result of this study showed that those who were non-Muslims were more likely to develop depression which probably explained by the higher number of Malay/ Muslims inmates in this study. However, it could also reflect the use of different religious-based coping mechanisms among them. Good spiritual value will be protected from depression as they know how to cope with it (33). Apart from that, previous history of childhood abuse was also found to be significantly predicting depression among the inmates which was similar to another study conducted among male prisoners at an urban jail in Pakistan (Shahid et al., 2014). Additionally, childhood abuse has been also reported to associate with early (OR = 13.73, 95% CI = 7.31–25.80, p<0.001), middle (OR = 5.36, 95% CI = 2.90–9.90, p<0.001) and late onset of depression (OR = 4.74, 95%CI = 2.51–8.95, p<0.001) (34). The other social factor that was found to significantly predict the development of depression among the inmates is duration of the sentence, with longer sentence put them at risk of depression. Imprisonment could be a depressing period for some inmates. The initial shock of sentences, the hopelessness of their situation, fear of impending death, and separation from families and friends could explain the reasons of depression symptoms among the inmates (35).

This study was only limited among the male inmates due to the approval obtained prior to conduction of the study. Hence, future research should also consider development of depression among female inmates in view of the higher risk to develop depression among female in general. A conduction of qualitative study should also be considered on the same issue in order to develop a better understanding on the experiences of the inmates in the prison that lead to the development of depression, so that preventive action at certain time of point can be implemented.

CONCLUSION

This study revealed an alarmingly high prevalence of depression among the male inmates, with stress being the strongest risk factor. Further exploration needed to understand the possible negative experiences in the prison that lead to stress and eventually depression among the inmates. If depression is not adequately identified and screened and also treated accordingly, it will have great challenges to reintegrate the prisoners in the community. Periodic screening may be useful especially after 3 months of imprisonment. The rehabilitation program and activities need to be re-evaluated to ensure preventive activities towards depression and other mental health problems being in place.

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