

**ASSOCIATED FACTORS OF DEPRESSION SEVERITY
AMONG SCHOOL-GOING ADOLESCENTS IN
MALAYSIA FROM NATIONAL SCHOOL BASED
HEALTH SURVEY 2012**

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SCHOOL BASED HEALTH SURVEY 2012**

by

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LIST OF ABBREVIATIONS

AC	Adjacent category
AIHW	Australian Institute of Health and Welfare
AIC	Akaike Information Criterion
AOR	Adjusted Odd Ratio
APA	American Psychiatric Association
BMI	Body Mass Index
CDC	Centre for Disease Control and Prevention
CI	Confidence Interval
CR	Continuation ratio
CS	Complex Sample
GSHS	Global School Based Health Survey
JEPeM	Jabatan Etika Penyelidikan Manusia
LR	Likelihood Ratio
MC	Multicollinearity
MLE	Maximum likelihood estimation
MOE	Ministry of Education Malaysia
MOH	Ministry of Health Malaysia
NCS-A	National Comorbidity Survey Adolescents Supplement
NHMS	National Health and Morbidity Survey
OR	Odds Ratio
PLME	Pseudo maximum likelihood estimation

PO	Proportional odds
PS	Power and Sample size software
ROC	Receiver Operating Characteristic
SD	Standard Deviation
SE	Standard Error
SPSS	Statistical Package for the Social Sciences
SRS	Simple Random Sampling
T1DM	Type I Diabetes Mellitus
T2DM	Type II Diabetes Mellitus
USM	Universiti Sains Malaysia
UNICEF	United Nations Children's Fund
WHO	World Health Organization

LIST OF SYMBOLS

α	Level of significance
$1-\beta$	Power
p	Proportion
p	Probability
Δ	Precision
Z	z-statistic distribution
n	Sample size
m	Ratio of control to cases group
δ	Estimated difference from population mean
σ	Standard deviation
P_0	Proportion of exposed factor in mild disease
P_1	Proportion of exposed factor in more severe disease
b	Regression coefficient
P	P-value
%	Percentage
=	Equal to
<	Less than
>	More than
\geq	More than or equal to
\leq	Less than or equal to
	Modulus

n	Covariate pattern
h	Leverage
dx2	Hosmer-Lemeshow Delta chi-squared influence statistic
dd	Hosmer-Lemeshow Delta-D influence statistic
db	Pregibon Delta-Beta influence statistic
K	Constant

**FAKTOR BERKAITAN DENGAN DEPRESI DIKALANGAN REMAJA YANG
BERSEKOLAH DI MALAYSIA DARIPADA TINJAUAN KEBANGSAAN
KESIHATAN SEKOLAH 2012**

ABSTRAK

Pengenalan: Depresi adalah penyumbang terbesar kepada beban penyakit global. Depresi dikenalpasti sebagai gangguan umum di kalangan kanak-kanak yang berumur kurang daripada 18 tahun.

Objektif: Objektif kajian ini ialah untuk mengenalpasti prevalens tahap depresi dan faktor yang berkaitan dengan tahap depresi di kalangan remaja yang bersekolah di Malaysia

Metodologi: Analisis data sekunder dari Tinjauan Kebangsaan Kesihatan Sekolah 2012 telah dibuat. Dari pangkalan data Kesihatan Mental, sejumlah 24,276 responden telah memberi respons kepada modul depresi dalam DASS-21. Sementara itu, jumlah responden yang menjawab semua modul dalam Kajian Global Kesihatan Sekolah (GSHS) adalah 25,410. Akhirnya selepas menggabungkan pangkalan data dan mengambil kira kriteria inklusi dan pengecualian kajian, sejumlah 21,764 remaja sekolah yang berumur 12 hingga 18 tahun layak dalam kajian ini. Tiada pensampelan tambahan atau lebih lanjut dilakukan terhadap data yang diperolehi dengan skim reka bentuk pensampelan asal GSHS yang melibatkan stratifikasi dan kluster. Ciri demografi sosial, faktor penggunaan bahan, kelakuan kesihatan, persekitan rumah dan sekolah dan komorbiditi telah diekstrak daripada pangkalan data. Sejumlah 21,764 remaja sekolah berusia 12 hingga 18 tahun layak dalam kajian ini. Tahap depresi telah dikategorikan sebagai normal, ringan,

sederhana dan teruk. Komplek Sampel ordinal logistik regresi telah digunakan untuk mengenalpasti *odds ratio* dan 95% selang keyakinan.

Keputusan: Seramai 21,764 remaja termasuk dalam kajian ini dengan purata umur 14.19 (1.47). Prevalens keseluruhan gejala depresi adalah 33.2% (95% CI: 32.0, 34.4). Prevalens depresi ringan, sederhana dan teruk adalah 16.6% (95% CI: 16.08, 17.27), 12.8% (95% CI: 12.04, 13.53) dan 3.8% (95% CI: 3.38, 4.22). Dalam analisis multivariable, depresi yang lebih teruk dilihat di kalangan remaja perempuan (OR = 1.32, 95% CI: 1.21, 1.43), etnik India (OR = 1.73, 95% CI: 1.42, 2.10), orang yang merokok (OR = 1.30, 95% CI: 1.15, 1.46), minum alkohol (OR = 1.30, 95% CI: 1.14, 1.48), mengambil dadah (OR = 1.81, 95% CI: 1.24, 2.65), terlibat dengan ponteng (1.31, 95% CI: 1.20, 1.43), mereka yang telah dibuli (OR = 1.84, 95% CI: 1.68, 2.01), mereka yang mempunyai idea untuk membunuh diri (OR = 3.02, 95% CI: 2.56, 3.55), kurang ikatan kekeluargaan (OR = 1.33, 95% CI: 1.22, 1.45), dan kurang hubungan yang rapat dengan ibubapa (OR = 1.29, 95% CI: 1.19, 1.40).

Kesimpulan: Satu per tiga remaja dilaporkan mempunyai symptom depresi. Prevalens depresi lebih tinggi di tahap ringan diikuti oleh sederhana dan teruk. Analisis Komplek Sampel ordinal logistik regresi menunjukkan bahawa perempuan, etnik India, faktor risiko penggunaan bahan, faktor risiko tingkah laku kesihatan and faktor risiko rumah dan sekolah dikaitkan dengan depresi yang lebih teruk.

Kata kunci: Remaja, Data Sekunder, Tahap Depresi, Regresi Ordinal

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GOING ADOLESCENTS IN MALAYSIA FROM NATIONAL SCHOOL BASED
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ABSTRACT

Introduction: Depression is the single largest contributor to the global burden of disease. Depression was found as a common disorders among children lower than 18 years old.

Objective: The objectives of this study are to estimate the prevalence of depression according to severity and to determine the factor associated with severity of depression among school-going adolescents in Malaysia.

Method: Secondary data analysis from Malaysian National School Based Health Survey 2012 was conducted. From Mental Health Survey database, a total of 24,276 respondent have responded to depression module in DASS-21. While, the total number of respondent that responded to all module in Global School based Health Survey (GSHS) was 25,410. Finally after merged the database and taking consideration of inclusion and exclusion criteria of the study, a total of 21,764 school-going adolescents aged 12 to 18 years old were eligible in this study. No additional or further sampling was done on the obtained data which was taken with GSHS original sampling design scheme which engaged stratification and clustering. Socio demographics characteristics, substance use, health behaviour, home and environment and comorbidities factor were extracted from the database. Looking for depression severity, it was categorised as normal, mild, moderate

and severe. Complex Sample ordinal logistic regression was used for analysis to quantify the odds ratio and 95 % confidence interval.

Results: A total of 21,764 adolescents were included in the study with the mean (SD) age of 14.19 (1.47). The overall prevalence of depression symptoms was 33.2% (95% CI: 32.0, 34.4). The prevalence of mild, moderate and severe depression were 16.6% (95% CI: 16.08, 17.27), 12.8% (95% CI: 12.04, 13.53) and 3.8% (95% CI: 3.38, 4.22) respectively. In multivariable analysis, the higher odds of having more severe depression was observed among females (OR=1.32, 95% CI: 1.21, 1.43), Indian ethnicity (OR=1.73, 95% CI: 1.42, 2.10), those who smoke (OR=1.30, 95% CI: 1.15, 1.46), drink alcohol (OR=1.30, 95% CI: 1.14, 1.48), take drug (OR=1.81, 95% CI: 1.24, 2.65), involved in truancy (OR=1.31, 95% CI: 1.20, 1.43), those who have been bullied (OR=1.84, 95% CI: 1.68, 2.01), those who had suicidal ideation (OR=3.02, 95% CI: 2.56, 3.55), lack of parental bonding (OR=1.33, 95% CI: 1.22, 1.45), and lack of parental connectedness (OR=1.29, 95% CI: 1.19, 1.40).

Conclusion: One third of adolescents were reported have symptoms of depression. The prevalence of depression by severity were higher in mild followed by moderate and severe depression. Complex Sample ordinal logistic regression analysis revealed that female, Indian ethnic, substance use risk factor, health behavior risk factor and home and school environment risk factor were likely to be associated in having more severe depression.

Keywords: Adolescent, Secondary Data, Depression Severity, Ordinal Regression

CHAPTER 1

INTRODUCTION

1.1. Background

Adolescent was defined as an individual aged 10-19 years by the United Nations Children's Fund (UNICEF) and it was estimated about 1.2 billion of adolescents that constituted to 18% of the global populations (UNICEF, 2011). Adolescence is a stage where there are many changes; physically and emotionally and it is a period of transition from a childhood to adulthood. The process of growing up was complicated and challenging for them. Adolescents need a good mental health to build normal emotional and mental development, to develop their potential, to have fulfilling relationship with peers and family and to deal with the challengers of the future life (UNICEF, 2011).

Depression was a common mental disorder and was a major contributor to the overall global burden of disease (Hallfors *et al.*, 2005; AIHW, 2007; Kieling *et al.*, 2011; WHO, 2017). American Psychiatric Association (APA) has characterized depression as deterioration from previous function with the presence of psychological complaints such as depressed mood, loss of interest or pleasure, feelings of worthlessness or guilt and recurrent thoughts of death or suicide, together with somatic symptoms which include significant in weight change, sleep disturbance, physical agitation or retardation, fatigue and inability to concentrate (APA, 2013). Depending on the number and severity of symptoms, a depressive episode can be categorized as mild, moderate, or severe. An individual with a mild depressive episode will have some difficulty in continuing with

ordinary work and social activities, but will probably not cease to function completely. During a severe depressive episode, it is very unlikely that the sufferer will be able to continue with social, work, or domestic activities, except to a very limited extent (WHO, 2017).

Depression was reported as a common disorders among children lower than 18 years old (McKenzie *et al.*, 2010; Kieling *et al.*, 2011; UNICEF, 2011). The WHO “Health for the world’s adolescent” report also revealed that depression is one of the important causes of health problem and disabilities for adolescents aged 10 to 19 years (WHO, 2014). According to Avenevoli *et al.* (2015) that used the National Comorbidity Survey Adolescents Supplement (NCS-A) data, about 11% of adolescents had a depressive disorder before reached 18 years old.

Depression in adolescents leads to serious impact on their socialization, family relations, and performance at school, and it can be fatal (Knopf *et al.*, 2008). These adolescents were at greater risk of frequent hospitalizations, recurrent depressive episodes, psychosocial impairment, alcohol abuse, drug abuse, violence and anti-social behavior as they grow up. Prospectively, adolescents will continue to show negative attributes, weakened interpersonal relationships, impairment in the overall function, teenage pregnancy and increased physical problems even after they were recover from depression (Bansal *et al.*, 2009; Uba *et al.*, 2010; Nagendra *et al.*, 2012). In addition, major depressive disorder has become a leading cause of youth suicidal behavior and suicide (Beatty and Chalk, 2006).

Most of global and regional studies have reported the prevalence of depression among adolescents ranged from 8% to above 20% (Bodur and Küçükendirici, 2009; Frigerio *et al.*, 2009; Merikangas *et al.*, 2010). Study in Saudi Arabia showed more than 60% adolescents have depression (Abdel-Fattah and Asal, 2006). The prevalence of depression were ranged from 30% to 60% were reported from several studies in India among adolescents (Chauhan *et al.*, 2014; Verma *et al.*, 2014; Murthy *et al.*, 2015). While, in Sri Lanka, the overall prevalence of depression among adolescents was 36% (Rodrigo *et al.*, 2010).

The reported prevalence of depression were varies depending on which symptoms and what degree of severity were measured. As for example, Rushton *et al.* (2002) has used Center for Epidemiologic Studies-Depression Scale (CES-D) scores to identify degree of depressive symptoms by mild, moderate and severe. It was found over 9% of adolescents have moderate or severe depressive symptoms at baseline (CES-D \geq 24). Females, older adolescents, and ethnic minority youths were recorded more likely to report depressive symptoms at baseline. Then, the results showed only 3% of adolescents with low initial CES-D scores (CES-D < 16) developed moderate or severe depressive symptoms at 1 year follow-up (Rushton *et al.*, 2002). Female gender, adolescents who have fair or poor general health, school suspension, weaker family relationships, and health care utilization were found associated with depression. Other factors, including race and socioeconomics, did not predict persistent depressive symptoms (Rushton *et al.*, 2002).

In Malaysia, a pilot study among 2048 school going adolescents in Selangor revealed that 10.3% of adolescents were suffering from depression (Adlina *et al.*, 2007). Then, the prevalence of depression was reported 24.2% among adolescents aged between 13 to 17 from selected school in states in Malaysia (Yaacob *et al.*, 2009). Another study among 2927 adolescents in South Malaysia showed the prevalence of depression symptoms was 42.5% using a validated Depression, Anxiety and Stress Scale (DASS-21) questionnaire. In term of severity, the results showed symptoms of mild depression were found in 33.2% of the respondents, while the prevalence of moderate, severe and extremely severe depression were 21.5%, 18.1% and 3.0% respectively (Latiff *et al.*, 2016).

Previous studies has proven that being female, taking substance abuse, suicidal behavior, involved in sexual activity, having school problems that can lead to school failure , sleeping problems , have poor physical health, loneliness, body image problems, including conflict with parents were reported as potential risk factors for depression (Khantzian, 1987; Adlina *et al.*, 2007; Maharaj *et al.*, 2008; Bansal *et al.*, 2009; Fontaine *et al.*, 2009; Hudson *et al.*, 2009; Moore *et al.*, 2009; Yaacob *et al.*, 2009; Goldfield *et al.*, 2010; Oshri *et al.*, 2011; Ramya and Kulkarni, 2011; Chauhan *et al.*, 2014; Gase *et al.*, 2014; Verma *et al.*, 2014; Murthy *et al.*, 2015)

There was a strong evidence that a brief standardized depression screening instrument was well-accepted in primary care practice. A multitude of instruments or measurement tools were usually used to determine the presence of depression like Beck Depression