

## **A Case Study of Depression Disorder Among Registered Patients of Hospital Sultanah Bahiyah, Kedah**

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### **ABSTRACT**

*Depression is a common chronic disorder that affects individual functioning and contributes to the increasing number of suicide rates. At present, the analysis of depression cases is carried out on a global scale and the trend data in the local scale has been found to be baffling. By solving this problem, it would allow the government and non-governmental bodies to understand the distribution of depression cases in the state of Kedah. This study aims to investigate the distribution of depression cases in Hospital Sultanah Bahiyah, Kedah. The age, gender and ethnicity of depression patients referred to this hospital were classified as secondary data as the basis of this analysis. The epidemiologic data of depression applied for this analysis were collected from 2014 until 2017. This study found that older patients (age 40 years old and above) were suffering from the depression disorder more than the youths (ages below 40 years old) ( $p= 0.0007$ ). Meanwhile, in terms of gender, the female patients were found to be diagnosed with the depression disorder higher than the male patients ( $p= 0.0134$ ). It was also found that there was no equal distribution among the ethnicity groups ( $p=0.005$ ). The findings of this research can be used as the baseline information for concerned parties to monitor and formulate strategies and policies. This can help to promote the good health and well-being for the Sustainable Development Goal 3 achievement.*

**Keywords:** Depression, Hospital Sultanah Bahiyah, age, gender, ethnic

### **INTRODUCTION**

Initially, depression was discovered as melancholia. The depression itself was mainly focused on the mental disorder rather than the physical one (Reynolds & Wilson, 2013). The Ancient Greeks and Romans inferred that depression might be caused by spirits or demons. Hippocrates, a Greek physician proposed that personality traits and mental disorders are correlated to balance and imbalanced body fluids which have four types that are yellow bile, black bile, phlegm, and blood (Tipton, 2014). Burton (1621) mentioned that social and psychological conditions are the factors of having depression (Knoff, 1975). There are beliefs that diet, exercise, travel and music are therapies for depression (O'Neil et al., 2013).

Depression is a common chronic disorder that affects individual functioning and it is related to the increasing of the suicide rates (McBeth et al., 2014). Depressive disorders frequently and often repeatedly occur at a young age as they cut down the individual's every day functioning. A person who suffers depression are exposed to miserable mood, loss of concern in everything they used to do, low self-esteem, loss of appetite and lack of focus in their everyday life (Marcus et al., 2012). Common depression symptoms in children and teenagers can be slightly different as they reach adulthood. As for children, the symptoms of depression can lead to sorrow, bad temper, hopelessness and fear while youngsters and teenagers might incorporate nervousness, irritation and anti-socialization (Jaffee et al., 2002).

There are a few types of depression such as recurrent depressive disorder and bipolar affective disorder. Major Depressive Disorder (MDD) is the most common type of depression (Cheung, Kozloff, & Sacks, 2013). Depression often goes unnoticed due to the lack of reliable laboratory tests and therefore a new methodology for diagnosing is needed (Smith, Renshaw, & Bilello, 2013). The National Institute of Mental Health (NIMH) states that certain kinds of depression run between relatives, indicating a biological susceptibility to depression could be heritable. The research proposes that a combination of genetic, biological, environmental and psychological aspects can be part of the cause of depression (Shally-Jensen, 2019). Depression can raise the chances of the emerging coronary artery disease, HIV, asthma and other medical diseases (Blume et al., 2011). There are other problems of depression which include its tendency to increase the illnesses, deaths and many other medical conditions (Goodwin, 2006).

The initial stage of treatment is by visiting a health care or mental health expert such as a psychiatrist or psychologist in getting the right treatment. Exam, interview and lab tests will be carried out to rule out other health situations that might have similar symptoms like depression (National Institute of Mental Health, 2016). Depression can be healed with medications, psychotherapy or a combination of both once the person has been diagnosed. There are a few types of psychological treatments such as behavioral activation, cognitive behavioral therapy (CBT) and interpersonal psychotherapy (IPT). All of these treatments may be effective for mild depression (World Health Organization, 2018). Some medicines which are consumed for a variety of health conditions are prone to trigger depression as a side effect. Specifically, they are consumed to heal high blood pressure, cancer, seizures, extreme pain and to achieve contraception which can raise the depression levels. However, there are several psychiatric medications that are used to treat sleep disturbance and to deal with alcoholism as well as anxiety, which can be a factor in the occurrence of depression (Kuria et al., 2012).

Some studies found that depression increases as age increases. Some researchers found that there is a low incidence of depressive disorder in older age groups compared to younger patients. Population-based studies have come out with a convincing evidence that declines the risk for depressive signs in youngsters as well as in elder adults which are related to their physical activity (Wassink-Vossen et al., 2018). Patten et al. (2016) mentioned that, in terms of age, the occurrence of depression declines steadily with increasing age. Their findings also have highlighted that depression is less dominant in men compared to young women. The incidence of depression responds differently with age, decreasing with age and no longer obvious in the individual over 75 years old (Patten et al., 2016). In Malaysia, the Ministry of Education has carried out mental health screenings on 253196 students aged 16. It was discovered that 1,163 students or 0.45% suffered from depression (Bernama, 2018). A study by Rashid and Tahir (2014) also revealed that among 2005 Malaysian participants of the age group 60 to 69 years old, showed the incidence of depression raised with age. Most analysts pointed out that depression is widespread among youngsters such as teenagers (Tan & Yadav, 2012). Some studies found that 18 to 29 year old Americans are probably to be three times highly depressed than adults above 60 years old (Yeoh et al., 2017).

The incidence rates of certain mental health issues are obvious in a different gender. For instance, females have a high risk of developing internalizing illnesses such as depression and anxiety, while males have a higher occurrence of some externalizing illnesses, as well as an antisocial individuality disorder and substance abuse. Concerning sex dissimilarities in depression, it is broadly proven that depression is more common among females with 21% than males with 13% which begins at late adolescence and last in adulthood (Kessler et al., 2003). Therefore, there are various aspects that may contribute to depression in terms of gender differences. The biological influences that involve are genetics, hormones and neurotransmitter systems. Furthermore, psychosocial variables are also included, for example, recurrent harassment and trauma in childhood, sex character factors, social adjustment; while emotional reactions such as increased vulnerability to the emotional pain of others, being more prone to meditation, difference in attributions and better reactivity to stress in terms of biological responses, self-concept and handling styles (Ryba & Hopko, 2012).

In Malaysia, 93% of women that received help from the National Council of Women's Organization (NCWO) have been reported to endure depression problems (Bernama, 2017). National Health and Morbidity Survey 2015 (NHMS 2015) pointed out that mental health issues are more frequent among Malaysian females with 30.8% than males with 27.6% (Yeoh et al., 2017). However, another finding recorded from the urban poor of Peninsular Malaysia where the men were 1.5 times more probably to be depressed than women (Tan & Yadav, 2015). Wong and Lua (2011) mentioned that there were no gender differences affecting depression. Hence, the method used and differences in sampling were probably the factors that contribute to these inconsistencies (Yeoh et al., 2017).

There are 29.4 million citizens compared to 3.2 million non-citizens estimated in 2019 by the Department of Statistics Malaysia. The Bumiputera groups contribute 69.3%, Chinese community contributes 22.8%, Indian community makes up 6.9% while others contribute 1% of the total Malaysian population. Kader Maideen et al. (2014) recorded that the highest incidence of depression with 17.6% were among those who self-identified as "other" in terms of ethnicity, followed by the Chinese with 13.8%, Malay with 10.8% and Indian with 6.1%. Another study found that the most depressed among the ethnicities was from the Indian ancestry (Yusoff et al., 2014), followed by the Chinese ethnic (Kaur et al., 2014). However, their study only observed 60 to 69 years age group. However, Yeoh et al. (2017) claimed that there are no ethnic differences among Malaysian university students who suffered depression problems.

At present, the analysis of depression cases is being carried out on a global scale and the trend data on the local scale has been found to be baffling. The objective of this study is to investigate the distribution of age, gender and ethnicity among patients registered with depression disorder at Hospital Sultanah Bahiyah, Kedah. The study hypothesizes that there is no significant difference in the distribution of age, gender and ethnicity among the registered patients. By understanding the distribution of depression cases, concerned parties could focus on prevention over treatment on depression and allow the state government and non-governmental bodies to cooperate in sharing knowledge of mental health through campaigns to create awareness.

## **RESEARCH METHODOLOGY**

The epidemiologic data applied for descriptive analysis were collected from Hospital Sultanah Bahiyah from 2014 until 2017. The age, gender, ethnicity of depression patients referred to the hospital were classified as the secondary data in this study. However, the data were limited to 100 due to its confidentiality. For the study purposes, only 94 data were selected for each year because they were

incomplete and unreliable data. The study did not involve the collection or using of confidential, sensitive personal information or identifiable data of an individual. It only focused on the total number of patients based on age, gender and ethnic groups. In gender study, the variables involved were males and females only. As for the age group, patients aged 40 years old and above 40 were chosen. Those who were 40 years old and below were considered as "youth" based on The Youth Societies and Youth Development Act 2007.

For statistical analysis, the mean of registered patients (M) and standard deviation (SD) were reported to measure the amount of variability. Normality test using the Shapiro-Wilks W test was firstly carried out in order to assess whether the data was normally distributed. Student's t-test (Parametric test) was used to determine if there is a significant difference between the means of two groups of gender and age studies, while the Kruskal-Wallis test (Nonparametric test) was used to determine the significant difference of reported cases for ethnicity studies. Dunn's post-hoc tests were carried out on each pair of the groups. As multiple tests were being carried out, some adjustments to the p-value were done. The Bonferroni adjustment multiplied each Dunn's p-value by the total number of tests which were being carried out. All statistical tests were 2-tailed and the alpha,  $\alpha$  was set earlier to 0.05 using the Statistical Package for Social Sciences, SPSS software (version 25.0; SPSS Inc, Chicago, IL).

## RESULTS

In general, the research found that there were more patients aged 40 years old and above (A40)(M=69.5,SD= 24.5) registered at Hospital Sultanah Bahiyah compared to patients aged below than 40 years old (B40) (M=24.5, SD= 9.95). Figure 1 shows the bar graph of the percentage of depression patients affected by the patient's age. The percentage of patients A40 was recorded in the range of 66% to 88.3%, while for patients B40, the range was determined at 11.7% to 34%. Both 2014 and 2015 recorded the same percentage of patients for both age groups. However, in 2016, patients A40 and patients B40 were observed to have the increasing and decreasing trends. The study suggested that patients A40 contribute to a high number of registered patients in Hospital Sultanah Bahiyah compared to patients B40.

An independent-samples t-test was conducted to compare the age of patients B40 and patients A40. There was a significant difference in the score for patients B40 (M= 26.050, SD= 10.563) and patients A40 (M= 73.950, SD= 10.563) conditions,  $t(6) = 6.4130$ ,  $p = 0.0007$ . These results suggest that age does have a pattern in depression patients. Specifically, the study suggests that attention should be paid more to the senior citizens compared to the youths.

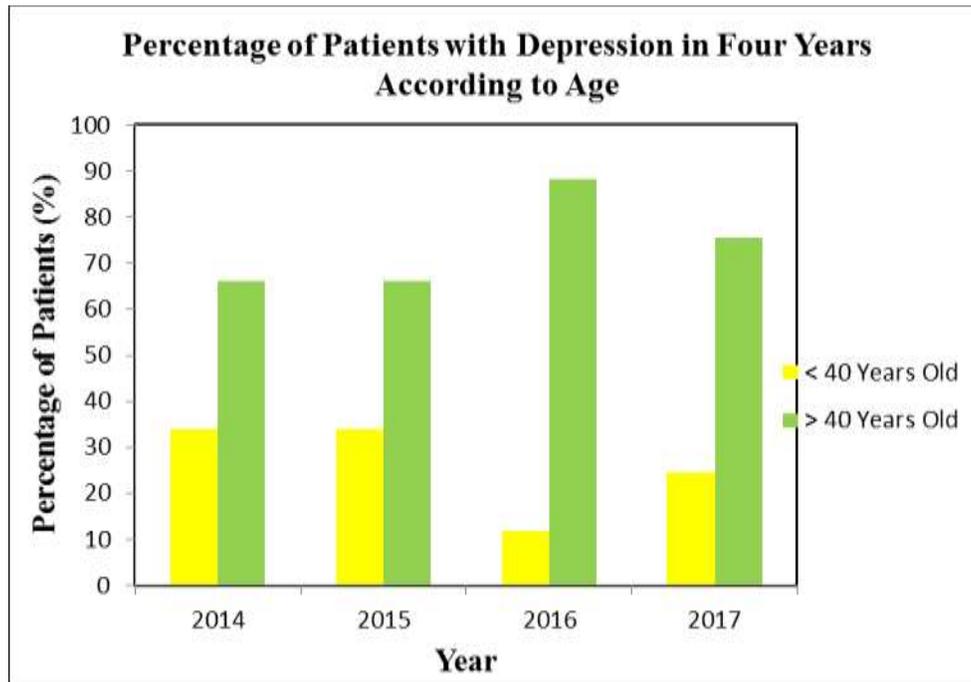


Figure 1: Distribution of depression patients based on the age from 2014-2017

This study found that there are more female patients ( $M= 50$ ,  $SD= 2.45$ ) registered at Hospital Sultanah Bahiyah in total compared to male patients ( $M= 44$ ,  $SD= 2.45$ ). Figure 2 shows the percentage of depression patients affected by their gender. In 2016, both genders recorded the same percentage which represents 50%. There is an alternating trend from 2014 to 2017 which shows the decreasing and increasing percentage of patients with depression disorder for both genders. However, the distribution is dominated by female patients. The lowest percentage of male patients registered was recorded in 2015 while the highest percentage was in 2016. On the other hand, the lowest percentage of female patients registered was in 2016 while the highest percentage was in 2015.

An independent-samples t-test was conducted to compare the male and female patients. There was a significant difference in the score for male ( $M= 46.8$ ,  $SD= 2.613$ ) and female ( $M= 53.2$ ,  $SD= 2.613$ ) conditions,  $t(6) = 3.4641$ ,  $p= 0.0134$ . These results suggest that there is the effect of gender on patients suffering depression at Hospital Sultanah Bahiyah.

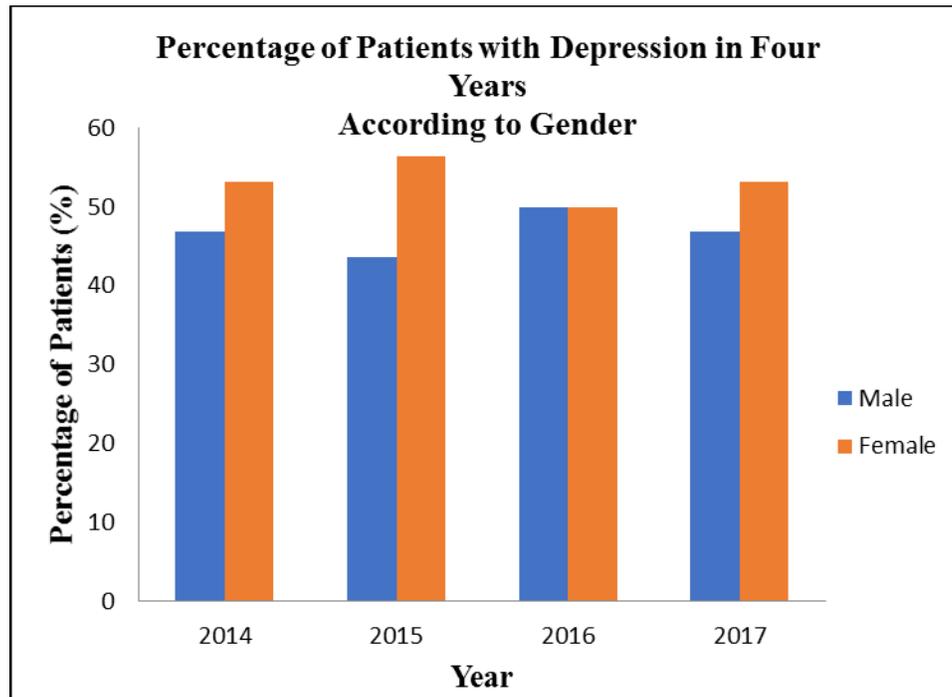


Figure 2: Distribution of depression patients based on gender from 2014-2017

For the ethnicity study, the study found that there were more Malay patients ( $M= 79$ ,  $SD= 3.86$ ) registered at Hospital Sultanah Bahiyah compared to other groups. Figure 3 shows the distribution of depression patients of Hospital Sultanah Bahiyah based on ethnicity. The Chinese rank second ( $M= 12$ ,  $SD= 2.38$ ), while Indian ( $M= 2$ ,  $SD= 0.96$ ) and other ethnicities ( $M=2$ ,  $SD=0.82$ ) rank third and fourth with the number of registered patients. The other ethnicity comprises of minority races, but it is worth mentioning that the Siamese community makes up the majority in this segment. For Malay, an increasing trend was observed from 2014 to 2016 while the percentage decreased from 2016 to 2017. The opposite trend was also observed for the Chinese where the decreasing trend was recorded from 2014 to 2016 before the increasing percentage was recorded from 2016 to 2017. While for the Indians and other groups, patients in this category recorded less than 3.2% every year. The study suggested that Malays contribute to high registered patients at Hospital Sultanah Bahiyah compared to other ethnicities.

A Kruskal Wallis H test showed that there was a statistically significant difference in patients score between the different ethnicities,  $X^2(3) = 12.879$ ,  $p= 0.005$ , with a mean rank patient score of 14.50 for Malay, 10.50 for Chinese, 4.25 for Indian and 4.75 for other ethnicities. Dunn's pairwise tests were carried out for the six pairs of groups. There was a very strong evidence ( $p=0.012$ , adjusted using the Bonferroni correction) of a difference between the Malay and Indian. The post hoc test also found that there was a very strong evidence ( $p= 0.025$ , adjusted using the Bonferroni correction) of a difference between the Malay and other ethnicities. There was no evidence of a difference between the other pairs.

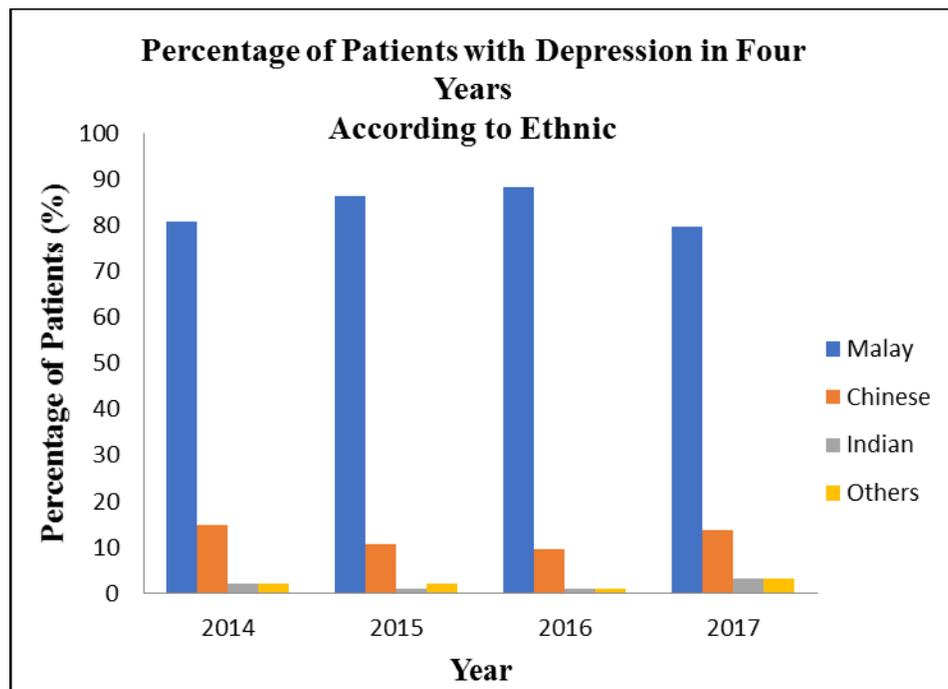


Figure 3: Distribution of depression patients based on ethnic from 2014-2017

## DISCUSSIONS

In terms of age, the number of patients aged above 40 years old in 2017 was declining from the previous year. This can be inferred that there is an improvement of better psychiatric services and some of them would have gained awareness on mental health issues. However, the most worrying situation is that the percentage of depression has increased among youths in 2017 compared to the previous year. Abi-Jaoude et al. (2020) stated that smart phones and social media have affected this group. They spent more time using technology compared to the real life. Physiologically, this will lower the individual's well-being.

According to the National Institute on Aging (2017), depression among senior citizens is common in the US. It does not relate much to the age of the person. Usually, older people enjoy their life even though they have various diseases. As they get older, they may feel sad, anxious and unhappy due to coming retirement years, coping with the loss of their beloved ones or dealing with chronic diseases (Wilson, 2014). From the data collection, medical problem is one of the factors that triggers depression among the older patients. A research carried out in China and the United States of America found that chronic diseases such as cancer, heart disease, diabetes and multiple sclerosis are associated with depression disorder (Li et al., 2019). This condition needs to be paid more attention to because it is hard to recognize depression in older adults. A study by Rashid and Tahir (2014) stated that most Malaysians aged above 60 years old show the prevalence of depression.

According to the study of gender, the number of females experience depression is higher compared to the males due to hormonal changes started from puberty until menopause, which causes fluctuation of hormones that may trigger depression to occur (Gersak et al., 2018). Changing hormonal alone does not

directly cause depression. Mayo Clinic Staff (2019) asserted there must be other factors that lead to depression such as emerging sexuality, identity issues, family conflicts and increasing pressure to achieve something in life. Depression is prone to occur in pregnant women due to dramatic hormonal changes which can affect their mood as well. This may be due to the lifestyle, work overload, conflict with a partner and lack of social support (Gersak et al., 2018). Depression is lower in males because they tend to express their mood differently where they are more likely to have changes in appetite, sleep disturbances, low self-esteem and suicidal thoughts when they are depressed (Jouini, 2018).

For ethnicity, the Malay shows a declining trend in 2017 compared to previous years but the Chinese, Indian and other ethnicity show the rise in the percentage of depression in the mentioned year. The reasons that contributed to the difference of depression levels among ethnicities could be culture and social variations among registered patients. The record of depression cases in Kedah from 2014 until 2017 shows the different outcomes as what found by Kader Maideen et al. (2014). They stated that out of all ethnicities in Malaysia, other ethnicity recorded the highest incidence of depression, followed by the Chinese, Malay and Indian. Another study found that Indian ancestry shows the most depression level among other ethnicities (Yusoff et al., 2014), followed by the Chinese which is still the second highest of depression cases (Kaur et al., 2014). The highest population of Malay in Kedah affects the number of depression cases compared to other ethnicities.

This study, however, is subject to several limitations. The finding is quite different in every study which might be due to different approaches and data gathered. This study exerts results strictly from 100 random registration data every year from 2014 to 2017 and it does not represent the value of the whole community of each ethnicity. It is recommended that more data should be collected so that precise and accurate statistical results can be achieved. Usually statistical tests require a bigger sample size to ensure the sample is the representative of a population. These limitations occur due to time and cost constrains during the sampling activities.

## **CONCLUSION AND RECOMMENDATIONS**

This study concludes that A40 age groups have suffered the depression disorder more than the youths B40. For gender, female patients are found to be diagnosed with depression disorder higher than male patients. It is also found that the percentage of depression among Malays shows higher rates of depression compared to other ethnicity. By understanding the distribution of depression cases, the concerned parties should focus on the prevention over treatment on depression and allow the state government and non-governmental bodies to cooperate in sharing the knowledge of mental health through the campaign to create awareness.

The study recommends that data from other hospitals in Kedah could be collected and analysed to compare the number of depression cases to improve the facilities, services and treatment policies. The medical team needs to disseminate the knowledge of the importance of taking care of mental health patients to the public. This could be done by having the awareness campaigns using mass media or social media. Ministry of Health (MOH) should discuss with the state government to provide a psychiatric center in the high-risk areas so that people are able to go for preliminary tests and get services, treatments, and counseling without going to the hospital.

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## REFERENCES

- Abi-Jaoude, E., Naylor, K. T., & Pignatiello, A. (2020). Smartphones, social media use and youth mental health. *Canadian Medical Association Journal*, 192(6), E136-E141. <https://doi.org/10.1503/cmaj.190434>
- Bernama (2017, April 8). 93pc of women seeking NCWO's help suffer from depression, says Puteri Umno chief. *The Malay Mail*, Retrieved from <https://www.malaymail.com/news/malaysia/2017/04/08/93pc-of-women-seeking-ncwos-help-suffer-from-depression-says-puteri-umno-ch/1351899>
- Bernama (2018, March 20). More than 18,000 Malaysians suffering from depression. *Free Malaysia Today*, Retrieved from <https://www.freemalaysiatoday.com/category/nation/2018/03/20/more-than-18000-malaysians-suffering-from-depression/>
- Blume, J., Douglas, S. D., & Evans, D. L. (2011). Immune suppression and immune activation in depression. *Brain, Behavior, and Immunity*, 25(2), 221-229. doi:10.1016/j.bbi.2010.10.008
- Cheung, A. H., Kozloff, N., & Sacks, D. (2013). Pediatric depression: An evidence-based update on treatment interventions. *Current Psychiatry Reports*, 15(8). doi:10.1007/s11920-013-0381-4
- Gersak, K., Gersak, Z. M., & Turcin, A. (2018). Reproductive aging: Perimenopause and Psychopathological symptoms. *Sex Hormones in Neurodegenerative Processes and Diseases*. <https://doi.org/10.5772/intechopen.74159>
- Goodwin G. M. (2006). Depression and associated physical diseases and symptoms. *Dialogues in clinical neuroscience*, 8(2), 259–265.
- Jaffee, S. R., Moffitt, T. E., Caspi, A., Fombonne, E., Poulton, R., & Martin, J. (2002). Differences in early childhood risk factors for juvenile-onset and adult-onset depression. *Archives of General Psychiatry*, 59(3), 215. doi:10.1001/archpsyc.59.3.215
- Jouini, L. (2018). Intercultural aspects of depression: Feelings and thoughts of low self-esteem, guilt, persecution and prejudice. <https://doi.org/10.26226/morressier.5a6ef3ebd462b80290b57ff8>
- Kader Maideen, S. F., Mohd. Sidik, S., Rampal, L., & Mukhtar, F. (2014). Prevalence, associated factors and predictors of depression among adults in the community of Selangor, Malaysia. *PLoS ONE*, 9(4), e95395. <https://doi.org/10.1371/journal.pone.0095395>
- Kaur, J., Cheong, S. M., Mahadir Naidu, B., Kaur, G., Manickam, M. A., Mat Noor, M., Ibrahim, N., & Rosman, A. (2014). Prevalence and correlates of depression among adolescents in Malaysia. *Asia Pacific Journal of Public Health*, 26(5\_suppl), 53S-62S. <https://doi.org/10.1177/1010539514544356>
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., Rush, A. J., Walters, E. E., & Wang, P. S. (2003). The epidemiology of major depressive disorder. *JAMA*, 289(23), 3095. <https://doi.org/10.1001/jama.289.23.3095>
- Knoff, W. F. (1975). Depression: A historical overview. *The American Journal of Psychoanalysis*, 35(1), 41-46. <https://doi.org/10.1007/bf01248425>
- Kuria, M. W., Ndeti, D. M., Obot, I. S., Khasakhala, L. I., Bagaka, B. M., Mbugua, M. N., & Kamau, J. (2012). The association between alcohol dependence and depression before and after treatment for alcohol dependence. *ISRN Psychiatry*, 2012, 1-6. <https://doi.org/10.5402/2012/482802>

- Li, H., Ge, S., Greene, B., & Dunbar-Jacob, J. (2019). Depression in the context of chronic diseases in the United States and China. *International Journal of Nursing Sciences*, 6(1), 117-122. <https://doi.org/10.1016/j.ijnss.2018.11.007>
- Marcus, M., Yasamy, M. T., Van Ommeren, M. V., Chisholm, D., & Saxena, S. (2012). Depression: A global public health concern. *PsycEXTRA Dataset*. <https://doi.org/10.1037/e517532013-004>
- Mayo Clinic Staff (2019, January 29). Depression in women: Understanding the gender gap. Retrieved from <https://www.mayoclinic.org/diseases-conditions/depression/in-depth/depression/art-20047725>
- McBeth, J., Lacey, R. J., & Wilkie, R. (2014). Predictors of new-onset widespread pain in older adults: Results from a population-based prospective cohort study in the UK. *Arthritis & Rheumatology*, 66(3), 757-767. <https://doi.org/10.1002/art.38284>
- More than 18,000 Malaysians suffering from depression. (2018, March 20). Retrieved from <https://www.freemalaysiatoday.com/category/nation/2018/03/20/more-than-18000-malaysians-suffering-from-depression/>
- National Institute of Mental Health. (2016). Depression Basics. Retrieved 25 October 2018, from National Institute of Mental Health: <https://www.nimh.nih.gov/health/publications/depression/depressionbasics-508->
- National Institute on Aging (2017). Depression and older adults. Retrieved from <https://www.nia.nih.gov/health/depression-and-older-adults>
- O'Neil, A., Berk, M., Itsiopoulos, C., Castle, D., Opie, R., Pizzinga, J., Brazionis, L., Hodge, A., Mihalopoulos, C., Chatterton, M. L., Dean, O. M., & Jacka, F. N. (2013). A randomised, controlled trial of a dietary intervention for adults with major depression (the "SMILES" trial): Study protocol. *BMC Psychiatry*, 13(1). <https://doi.org/10.1186/1471-244x-13-114>
- Patten, S. B., Williams, J. V., Lavorato, D. H., Wang, J. L., Bulloch, A. G., & Sajobi, T. (2016). The association between major depression prevalence and sex becomes weaker with age. *Social Psychiatry and Psychiatric Epidemiology*, 51(2), 203-210. <https://doi.org/10.1007/s00127-015-1166-3>
- Rashid, A., & Tahir, I. (2014). The prevalence and predictors of severe depression among the elderly in Malaysia. *Journal of Cross-Cultural Gerontology*, 30(1), 69-85. <https://doi.org/10.1007/s10823-014-9248-3>
- Reynolds, E. H., & Wilson, J. V. K. (2013). Depression and anxiety in Babylon. *Journal of the Royal Society of Medicine*, 106(12), 478-481. <https://doi.org/10.1177/0141076813486262>
- Ryba, M. M., & Hopko, D. R. (2012). Gender differences in depression: Assessing Mediation effects of overt behaviors and environmental reward through daily diary monitoring. *Depression Research and Treatment*, 2012, 1-9. <https://doi.org/10.1155/2012/865679>
- Shally-Jensen, M. (2019). Alternative healing in American history: An encyclopedia from acupuncture to yoga. ABC-CLIO.
- Smith, K. M., Renshaw, P. F., & Bilello, J. (2013). The diagnosis of depression: Current and emerging methods. *Comprehensive Psychiatry*, 54(1), 1-6. doi:10.1016/j.comppsy.2012.06.006
- Tan, K. L., & Yadav, H. (2012). Depression among the urban poor in peninsular Malaysia: A community based cross-sectional study. *Journal of Health Psychology*, 18(1), 121-127. <https://doi.org/10.1177/1359105311433908>
- Tipton, C. M. (2014). The history of "Exercise is medicine" in ancient civilizations. *Advances in Physiology Education*, 38(2), 109-117. doi:10.1152/advan.00136.2013
- Wassink-Vossen, S., Collard, R., Hiles, S., Oude Voshaar, R., & Naarding, P. (2018). The reciprocal relationship between physical activity and depression: Does age matter? *European Psychiatry*, 51, 9-15. <https://doi.org/10.1016/j.eurpsy.2017.12.029>

- Wilson, M. D. (2014). Depression. *Basics in Adolescent Medicine*, 381-390. [https://doi.org/10.1142/9789814329545\\_0036](https://doi.org/10.1142/9789814329545_0036)
- Wong S. Y., & Lua P. L. (2011). Anxiety and depressive symptoms among communities in the east coast of peninsular Malaysia: a rural exploration. *Malays. J. Psychiatry* 20 59–71
- World Health Organization. (2018). Depression. Retrieved 31 January 2019, from World Health Organization: <https://www.who.int/news-room/fact-sheets/detail/depression>
- Yeoh, S. H., Tam, C. L., Wong, C. P., & Bonn, G. (2017). Examining depressive symptoms and their predictors in Malaysia: Stress, locus of control, and occupation. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01411>
- Yusoff, F., Saari, R., Naidu, B. M., Ahmad, N. A., Omar, A., & Aris, T. (2014). Methodology of the national school-based health survey in Malaysia, 2012. *Asia Pacific Journal of Public Health*, 26(5\_suppl), 9S-17S. <https://doi.org/10.1177/1010539514542424>